Environmental Impact Assessment and Social Impact Assessment (ESIA) for New Refinery Plant

Minhla Township, Magway Region, Myanmar

3rd Revised Final Report

(13 July 2022)

Submitted to

MYANMA PETROCHEMICAL ENTERPRISE

By

Myanmar Survey Research

10 July 2020

To,

The Director General

Environmental Conservation Department

Ministry of Natural Resources and Environmental Conservation

Date: - - / - - / - - - -

Subject: Submission of ESIA report

Dear Sir,

We hereby submit the Environmental and Social Impact Assessment (EIA) report in pursuance of ECD's approval for the implementation of New Refinery Project Man Thapuyakan, Minhla Township, Magway Region. We, Myanmar Petrochemical Enterprise (MPE), address: Building No. 44, Ministry of Energy, Naypyidaw, hereby confirm, to the best of our knowledge and belief that

(1) this ESIA report is accurate and complete,

(2) this ESIA report had been prepared in compliance with applicable laws, rules, regulations and procedures,

(3) this ESIA study was conducted appropriate steps concerning with impact avoidance, mitigation measures and Environmental Management Plan (EMP) following the Environmental Impact Assessment procedure of Notification No.616/2015.

We also hereby declare that Myanmar Petrochemical Enterprise (MPE), the project proponent, will follow and abide by the Environmental Conservation laws, EIA procedures and guidelines and any existing laws, rules, regulations, procedures, notifications, directives, orders and guidelines related to the project which are entaced by the Government of the Union of Myanmar.

Sincerely and respectfully yours,

Signature……..

Managing Director

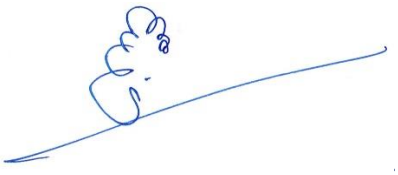
MYANMAR PETROCHEMICAL ENTERPRISE (MPE)

SUBMISSION OF DOCUMENTATION

We, **Myanmar Survey Research (MSR) Co., Ltd**. submit this Environmental and Social Impact Assessment Study Report, for **Implementing New Refinery Project at Man Thapuyakan, Minhla Township, Magway Region.**

To our knowledge all information contained in this report is accurate and truthful representation of all findings as relating to the project.

Signed at Yangon on 14th Day of November 2018



Signature: ----------

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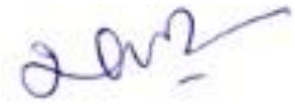

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Name U Tin Than, M.Sc. (Ygn), M.Sc. (AIT)

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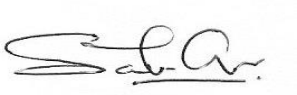

Signature: ----------

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

Designation Socio-economic Environment Specialist

Signature: ----------

Name U Kyaw Hlaing, MA (International Management, IUJ Japan)

Designation Team Leader

TERMS AND ACRONYMS

TERMS

U	"U" is an honorific placed before the name of a male adult. It is an equivalent of "Mr." It does not say whether the person addressed is single or married.
Daw	"Daw" is an honorific placed before the name of a female adult. It does not say whether the person addressed is single or married.
Ma	"Ma" is used to address a female child or a young lady. Women of same age— young or old—also address each other using this honorific. Especially older persons use this address for younger persons.
Ko	"Ko" is used to address a young man. Men of same age—young or old—also address each other using this honorific. Older persons also use this address for younger persons.
pyi	Myanmar volume measuring unit. There are 16 pyi's in a basket. There are 8 tin-fuls in a pyi. (tin = condensed milk tin)
viss	Myanmar weight measuring unit: One viss is equal to 3.6 pounds or 1.65 kilograms.

Basic Education System in Myanmar		
Primary School	= Elementary School	1st Grade (Kindergarten)
		2nd Grade
		3rd Grade
		4th Grade
		5th Grade
Middle School	= Lower Secondary School	6th Grade
		7th Grade
		8th Grade
		9th Grade
High School	= Upper Secondary School	10th Grade
		11th Grade (Matriculation)

After completing 11 years of Basic Education, a student can join an institution of higher learning.

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

ACRONYMS

AAS	Analytical analysis	**DGF**	Dissolved Gas Floatation
ACF	Activated Carbon Filter	**DO**	Dissolved oxygen
AG	Acid gas	**DSO**	Disulphide Oil
AIHA	American Industrial Hygiene Association	**EDC**	Energy Development Committee
ALARP	As Low As Reasonably Practicable	**EFO**	Export Fuel Oil
AOC	Accidentally Oil Contaminated	**EIA**	Environmental impact assessment
AQMS	Air Quality Monitoring Station	**EPC**	Engineering, Procurement and Construction
ARU	Amine Regeneration Unit	**ERPG**	Emergency Response Planning Guideline
BEPS	Basic Education Primary School	**ETP**	Effluent treatment plant
BFW	Boiler Feed Water	**FCC**	Fluid Catalytic Cracker
BOD	Biochemical oxygen demand	**FEED**	Front End Engineering Design
BPD	Barrels per day	**FFU**	Flocculation Flotation Unit
BPSD	Barrels-per-stream-day	**FGD**	Flue Gases Desulphurization
CAAQMS	Continuous Ambient Air Quality Monitoring Station	**FPIC**	Free and prior informed consent
CALM	Catenaries Anchor Leg Mooring	**GHG**	Greenhouse gas
CCR	Catalytic Reformer	**GO**	Gas Oil
CDU	Crude Distillation Unit	**GOHDS**	Gas Oil Hydrodesulphuriser
CLO	Clarified Oil	**GTG**	Gas Turbine Generators
COC	Continuous oil contaminated	**HAZID**	Hazard identification
COEP	Commitment of Environment Protection	**HAZOP**	Hazard and operability
CPI	Corrugated Plate Interceptor	**HC**	Hydrocarbon
CPI	Carbon Preference Index	**HCDS**	Hydrogen Compression and Distribution system
CPSE	Center for Petroleum Safety and Environment	**HHI**	Household interviews
CPW	Clean process water	**HMU**	Hydrogen Manufacturing Unit
CSD	Cutter suction dredger	**HRSG**	Heat Recovery Steam Generator
COC	Continuous oil contaminated	**HSE**	Health, safety and environment
COEP	Commitment of Environment Protection	**IAF**	Induced Air Floatation
CPI	Corrugated Plate Interceptor	**IASA**	International Association for Impact Assessment
CSW	Clean storm water	**IFC**	International Finance Corporation
De-NOx	Deoxidation of Nitrogen-oxides	**InAlk**	Indirect Alkylation Unit
De-Sox	Deoxidation of Sulphur-oxides	**KHDS**	Kerosene Hydrodesulphuriser
DFS	Detail Feasibility Study	**KII**	Key informant interviews

LCO	Light cycle oil
LLOD	Last Line Of Defense
LPG	Liquefied Petroleum Gas
LRU	LPG Recovery Unit
LTU	LPG Treatment Unit
MAOP	Maximum allowable operating pressure
MDG	Millennium Development Goal
MoU	Memorandum of understanding
MPE	Myanma Petrochemical Enterprise, (Ministry of Energy)
MRL	Maximum Residue Limits (for pesticides)
MSR	Myanmar Survey Research
NAC	Naphtha and Aromatics Complex
NDT	Non-destructive testing
NEMC	National Energy Management Committee
NHT	Naphtha Hydrotreating Unit
NRP	New Refinery and Petrochemical
NSDS	National Sustainable Development Strategy
OGPD	Oil & Gas Planning Department (Ministry of Energy)
PAT	Primary Assistant Teacher
PLEM	Pipeline End Manifold
PM	Particulate Matter
PPRD	Petroleum Products Regulatory Department
PPU	Polypropylene unit
PRU	Propylene Recovery Unit
PS	Project standards
PSA	Pressure Swing Adsorption
QRA	Quantitative risk assessment
RFCC	Residue Fluid Catalytic Cracker
RFO	Refinery Fuel Oil
RHDS	Residue Hydrodesulphuriser
SFSU	Sulphur forming and storage unit
SHE	Safety, Health and Environment
SIA	Social impact assessment
SRU	Sulphur Recovery Unit
STG	Steam Turbine Generators
SWS	Sour Water Stripper unit
TCJ	Temporary construction jetty
TGT	Tail Gas Treating Unit
TSS	Total suspended solid
UFO	Ultra Fuel Oil
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VLCC	Very Large Crude Carrier
VOC	Volatile organic compound

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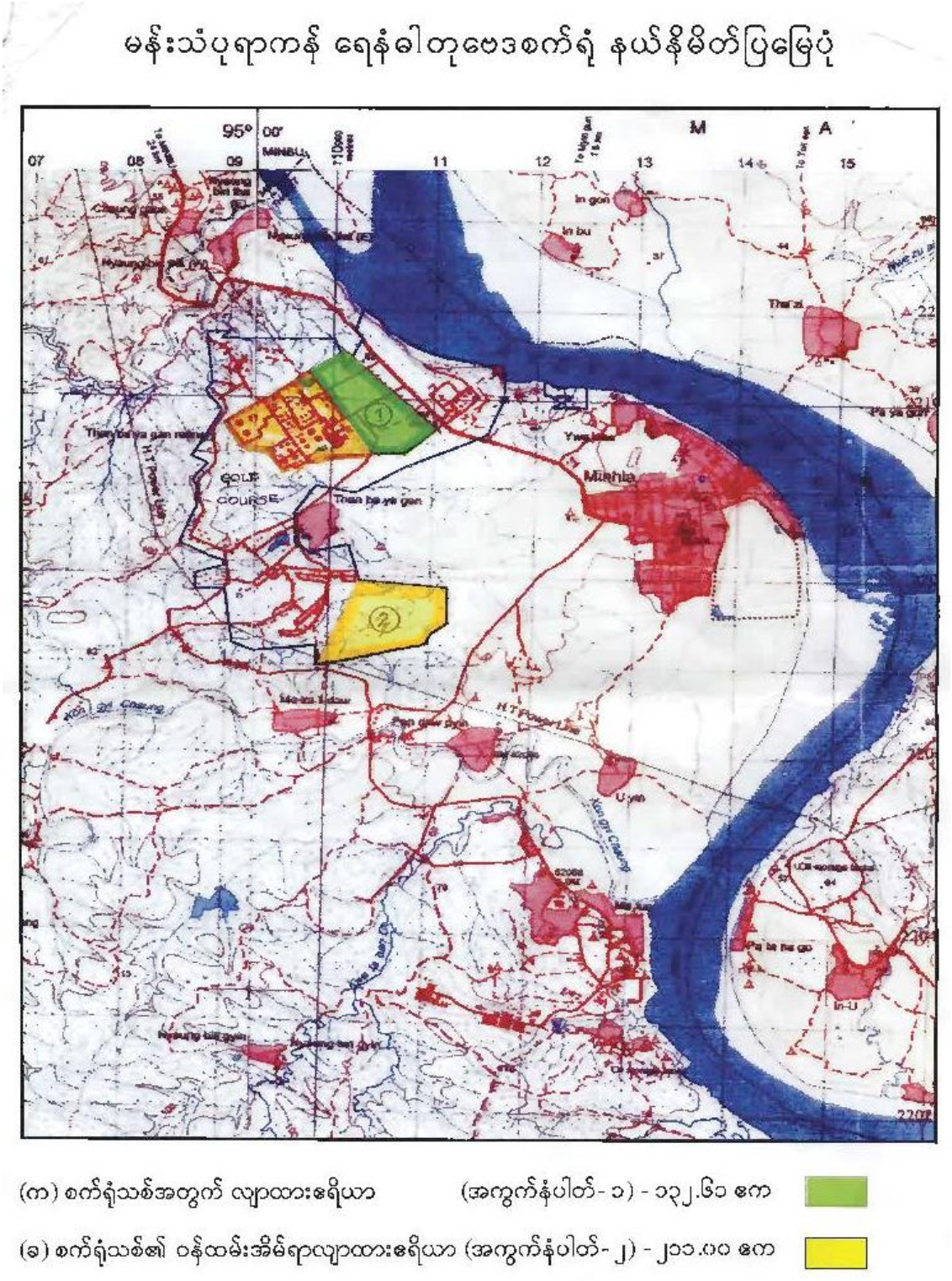
အစီရင်ခံစာအကျဉ်းချုပ်

မင်းလှရေနံချက်စက်ရုံသစ်အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာ အကျဉ်းချုပ်

၁။ နိဒါန်း



Project boundary area

ဤအစီရင်ခံစာ၏ရည်ရွယ်ချက်မှာ လျှပ်စစ်နှင့် စွမ်းအင်ဝန်ကြီးဌာန၏ မြန်မာ့ရေနံဓါတုဗေဒလုပ်ငန်းမှ မကွေးတိုင်းဒေသကြီး၊ အထက်မင်းလှမြို့နယ်၊ ရေနံဓါတုဗေဒစက်ရုံစု (သံပရာကန်) အနီးတွင် ရေနံချက်စက်ရုံသစ် တည်ဆောက်မည့် စီမံကိန်းအတွက် ဆောင်ရွက်ခဲ့သည့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းပြီးစီးခဲ့မှု၊ တွေ့ရှိချက်များနှင့်ထိခိုက်မှု သို့မဟုတ် သက်ရောက်မှုများကို ပြည့်စုံစွာတင်ပြရန် ဖြစ်ပါသည်။ ရေနံချက်စက်ရုံ တည်ဆောက်မည်ဆိုပါက ဤစက်ရုံ၏ ပတ်ဝန်းကျင်နှင့် လူတို့၏ကျန်းမာရေးအပေါ် ထိခိုက်နိုင်မှုမြင့်မားခြင်းကြောင့် ကမ္ဘာ့ဘဏ်၏ ပတ်ဝန်းကျင်ထိခိုက်မှုလမ်းညွှန်ချက်(၈၅/၃၃/ အီးအီးစီ) အရ အဆင့် (က) စက်ရုံမျိုးဟု သတ်မှတ်ချက်ကြောင့်လည်းကောင်း၊ မြန်မာ့ပတ်ဝန်းကျင် ထိန်းသိမ်းမှုဥပဒေ လုပ်ထုံးလုပ်နည်းအရလည်းကောင်း၊ ဤစီမံကိန်းမျိုး အတွက်ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (**EIA**) ကိုလုပ်ဆောင်ရမည်ဖြစ်ရာ မြန်မာ့ရေနံဓါတုဗေဒ လုပ်ငန်းသည် **Myanmar Survey Research** ကုမ္ပဏီ (**MSR**) အား ဤလုပ်ငန်းကိုဆောင်ရွက်ရန် စာချုပ်ချုပ်ဆို၍ တာဝန်ပေးအပ်ပါသည်။

ရေနံချက်စက်ရုံ၏ လုပ်ငန်းအဆင့်ဆင့်လည်ပတ်ရန်အတွက် ရေနံစိမ်းကုန်ကြမ်းပမာဏ အမြောက်အများနှင့် စွမ်းအင်ပမာဏများစွာ သုံးစွဲရပေသည်။ ရေပမာဏများပြားစွာလည်း အသုံးပြုရပါမည်။ စက်ရုံလည်ပတ်လာပါက ပတ်ဝန်းကျင်လေထုနှင့်ရေထုအတွင်းသို့ စွန့်ပစ်ပစ္စည်းနှင့် ညစ်ညမ်းပစ္စည်းအမျိုးမျိုးတို့ကို ထုတ်လွှတ်နိုင်သည်ဖြစ်ရာ စက်ရုံထုတ်ရေနံဓါတုပစ္စည်းအမျိုးမျိုး သုံးစွဲခြင်း၊ ထုတ်လုပ်ခြင်း အတွက် အနီးပတ်ဝန်းကျင်မှ မှီတင်းနေထိုင်ကြသူများ အလုပ်ရနိုင်ကြသကဲ့သို့ တိုင်းပြည်ဝင်ငွေမြင့်မားလာခြင်းကို အထောက်အကူပြုမည်မှာ သေချာသော်လည်း ပတ်ဝန်းကျင်ညစ်ညမ်း ထိခိုက်မှုမျိုးစုံဖြစ်ပေါ်လာနိုင်ပေသည်။ ဤအစီရင်ခံစာတွင် ပတ်ဝန်းကျင်ထိခိုက်မှုများအတွက် လျှော့နိုင်သည့်နည်းလမ်းများကို ပေးထားသကဲ့သို့ အကျိုးရှိနိုင်သောအချက်များ တိုးမြှင့်ရေးတို့အားလည်း ဖော်ပြထားပါသည်။ ဤရည်မှန်းချက် အောင်မြင်ရေးအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်ကိုလည်း ဤအစီရင်ခံစာတွင် ရေးဆွဲပြထားပါသည်။ စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်၊ စီမံကိန်းကတိကဝတ်အားလုံးနှင့် စည်းကမ်းချက်များကို အပြည့်အဝအကောင်အထည်ဖော်ရပါမည်။

၂။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ၏ ရည်ရွယ်ချက် (Purpose of the EIA Report)

စီမံကိန်းသစ်လုပ်ငန်းအကောင်အထည်ဖော်ခြင်းပြုလုပ်မဆောင်ရွက်မီ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာကို သဘာဝသံယံဇာတနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၏ အတည်ပြုချက်ရယူလျက် မြန်မာရင်းနှီးမြှုပ်နှံမှုကော်မရှင် (**MIC**) သို့ တင်သွင်းရမည်ဖြစ်ရာ အစီရင်ခံစာကို ဆန်းစစ်အကဲဖြတ်မည့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာန (**ECD**) ၏ စံကိုမှီသောအစီရင်ခံစာဖြစ်ရန် လိုအပ်သည်။

၃။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလေ့လာမှု၏ရည်မှန်းချက်များ (Objective of the ESIA Study)

(က) စီမံကိန်းလုပ်ငန်း အကောင်အထည်ဖော်ဆောင်ရွက်ရမည့် နေရာတဝိုက်မှ လူ့လောက၊ သက်ရှိလောကတို့၏ တည်ရှိနေသော ပကတိအခြေအနေနှင့် လူမှုစီးပွားဘဝအခြေအနေတို့အခြေခံ အချက်အလက်နှင့် ကိန်းဂဏန်းတို့၏တန်ဖိုးများကို မှတ်တမ်းယူနိုင်ရန်၊

(ခ) ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာထိခိုက်မှုသို့မဟုတ် သက်ရောက်မှုတို့ကို ရှင်းလင်းသေချာစွာ ထုတ်ဖော်တင်ပြထားလျက် ဖွံ့ဖြိုးရေးစီမံကိန်းဆိုင်ရာ ဆုံးဖြတ်ချက်အဆင့်ဆင့်တွင် ထည့်သွင်းစဉ်းစားမှု သေချာစေရန်၊

(ဂ) အဆိုပြုစီမံကိန်းကို ဆောင်ရွက်ခြင်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ရုပ်လောက၊ သက်ရှိလောကနှင့် လူမှုစီးပွားဆိုင်ရာ ဆိုးကျိုးနှင့်ကောင်းကျိုး သက်ရောက်မှုများကို ဆန်းစစ်ရန်၊

(ဃ) ဆိုးကျိုးသက်ရောက်မှုများအားလျော့နည်းစေရန် သင့်လျော်သည့်လုပ်ငန်းများ၊ ကောင်းကျိုးသက်ရောက်မှုများအား ပိုမိုဖြစ်ထွန်းတည်တံ့နိုင်စေမည့်နည်းလမ်းတို့ကို ထောက်ခံတင်ပြရန်တို့ ဖြစ်သည်။

၄။ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း (The Scope of Work)

မြန်မာဆာဗေးသုတေသနအဖွဲ့၏ **EIA Study Team** အနေဖြင့် နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း လုပ်ငန်းမှထွက်ပေါ်လာသည့် အောက်ပါအချက်အလက်များကို ပေါင်းစပ်လျက် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်ကိုဆောင်ကျဉ်းပါသည်။

(က) အဆိုပြုစီမံကိန်းတည်နေရာအတိုင်းအတာ

(ခ) ဤစီမံကိန်းမျိုးဆောက်လုပ်ခွင့်နှင့်သက်ဆိုင်သော မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင်

(ဂ) အဆိုပြု စီမံကိန်း၏ရည်ရွယ်ချက်များ

(ဃ) အသုံးပြုမည့်နည်းပညာများကို ဆန်းစစ်ခြင်း၊

(င) ထိခိုက်မှုရှိနိုင်သော ပတ်ဝန်းကျင်အနေအထားကိုတင်ပြခြင်း

(စ) ရုပ်ပိုင်းနှင့် သက်ရှိပိုင်း၊ စီးပွားရေးနှင့် လူမှုရေးအပိုင်း အပြင် ယဉ်ကျေးမှုဆိုင်ရာတို့နှင့် ဆက်စပ်သည့် တိုက်ရိုက်၊ တဆင့်ခံ စုစည်းပေါင်းစုံသည့် သက်ရောက်မှုများ ရေတိုရေရှည်သက်ရောက်မှုများကို တွက်ဆ မျှော်ကြည့်ခြင်း၊

(ဆ) ပတ်ဝန်းကျင်နှင့်ဆီလျော်သင့်မြတ်သည့် ညစ်ညမ်းရေဆိုးထိန်းချုပ်သန့်စင်ခြင်း စနစ်ကို တင်ပြပေးခြင်း

(ဇ) ရွေးချယ်ထားသော အသုံးပြုမည့် နည်းပညာနှင့် လုပ်နည်းကိုင်နည်းများကို ရှင်းလင်း တင်ပြခြင်း၊

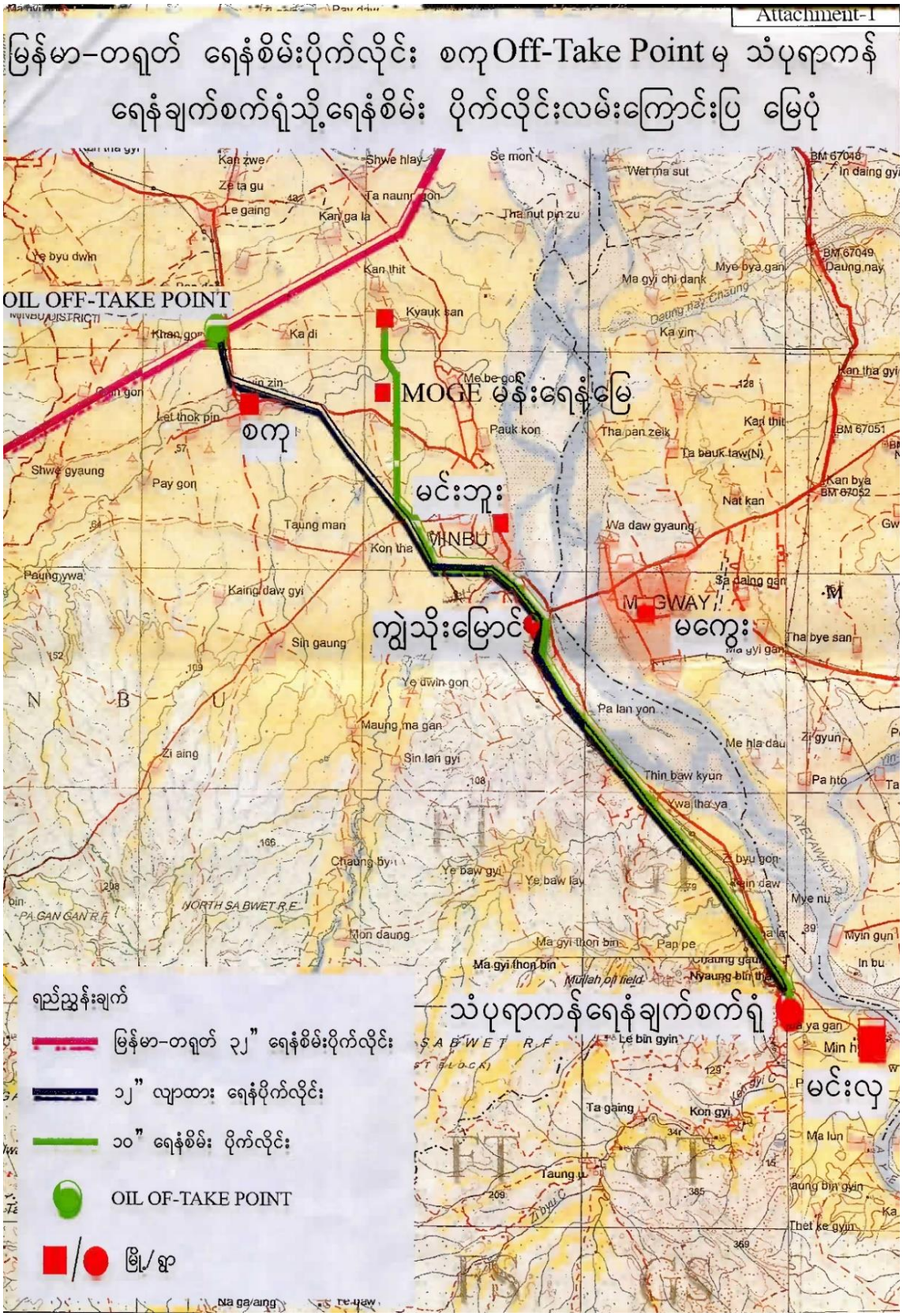
(ဈ) အဆိုပြုစီမံကိန်း၏နေရာ၊ အဆောက်အဦးဒီဇိုင်း၊ နည်းပညာများနှင့်ပတ်သက်သော အခြားနည်း ရွေးချယ်ခြင်းများကို ခွဲခြားဆန်းစစ်ခြင်း၊

(ည) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုမှု စီမံကိန်းကိုတင်ပြခြင်း၊

(ဋ) ဖြစ်ပေါ်လာနိုင်ခြေရှိသော မတော်တဆဖြစ်မှုများနှင့် ဘေးဆိုးအန္တရာယ်တို့ကို တားဆီနိုင်သည့် လုပ်ငန်း စီမံချက်တစ်ခုရေးဆွဲပေးခြင်း၊

(ဌ) လုပ်ငန်းခွင်အန္တရာယ်ကျရောက်မှုနှင့် အနီးပတ်ဝန်းကျင်ရှိ လူနေအိမ်ခြေများ အရေးပေါ် အခြေအနေနှင့် ရင်ဆိုင်ရပါက သက်သာစေမည့်နည်းလမ်း များတင်ပြပေးခြင်းတို့ဖြစ်သည်။

၅။ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့်စီမံကိန်းတည်နေရာ (Project Description and Project Location)



Proposed pipeline from off-take point to Refinery project area

ရေနံချက်စက်ရုံသစ်ကို မကွေးတိုင်းဒေသကြီး၊ မင်းလှမြို့နယ် သံပရာကန်ရွာတွင်တည်ရှိသော လက်ရှိ ရေနံဓါတုဗေဒစက်ရုံစုရှေ့ကပ်လျက် ၁၃၂.၆၁ဧက ရှိရာနေရာတွင် တည်ဆောက်ရန် သတ်မှတ် ထားပါသည်။ ရေနံသိုလှောင်ကန်နှင့် စက်ရုံဆက်စပ် အဆောက်အအုံများအတွက် တောင်ဖက်တွင်ရှိသည့် စက်ရုံပိုင်မြေ ၂၁၁ ဧက ကိုအသုံးပြုရန်ဖြစ်သည်။ သို့ဖြစ်၍ စက်ရုံသစ် မြေနေရာအကျယ်အဝန်းသည် စုစုပေါင်း ၃၄၃.၆၁ဧက ရှိ၏။ ထို့ပြင် ၂၅မိုင်ခန့် ရှည်လျားသည် ရေနံပိုက်လိုင်းတစ်ခုလည်း အပါအဝင်ဖြစ်သည်။ ၄င်းသည် စကုမြို့အနီးရှိ **Off-take point** မှ အစပျိုး၍ စက်ရုံသစ်နေရာအထိ အရှေ့တောင်အာရှ ရေနံပိုက်လိုင်းဖြင့် သယ်ယူလာသော နိုင်ငံခြား ရေနံစိမ်းကို စက်ရုံသစ်သို့သယ်ယူရန်ဖြစ်ပါသည်။

ရေနံချက်စက်ရုံသစ်ကို ၃နှစ်အတွင်းတည်ဆောက်မည်ဖြစ်ပြီး၊ တစ်နှစ်လျှင်ရေနံစိမ်းတန်ချိန် ၃.၂သန်း (တစ်ရက်လျှင်၇၈,၄၈၄.၈၄စည်) ချက်လုပ်မည်ဖြစ်သည်။ နိုင်ငံခြားရေနံစိမ်းတို့မှာ ကူဝိတ် ရေနံစိမ်း၅၀%၊ ဆော်ဒီ ရေနံစိမ်းပေါ် ၂၅% နှင့် ဆော်ဒီအလတ်တန်းစားရေနံစိမ်းကို ဥရောပစံနှုန်း အဆင့် ၄ ရှိသော ရေနံထွက်ပစ္စည်းများ အဖြစ် ပြောင်းလဲချက်လုပ်ပါမည်။

ရေနံချက်စက်ရုံသစ်ကို နိုင်ငံတကာစံချိန်မှီ အဆင့်အမျိုးအစားအဖြစ် တည်ဆောက်ပြီး အဓိက ချက်လုပ်မှု အဆင့် ၉ ဆင့်ပါစနစ်ဖြင့် လည်ပတ်မည်ဖြစ်ပါသည်။ ဤစက်ရုံတွင် ရေဆိုးထိန်းစနစ်နှင့် မီးတောက်စနစ် တစ်ခု လည်းပါဝင်ပါသည်။

၆။ စီမံကိန်းအကောင်အထည်ဖော်မှုကြိုးပမ်းရသည့်အကြောင်းအရင်း (Rationale of Project)

မြန်မာ့ရေနံဓါတုအနေဖြင့် ယခုလက်ရှိအခြေအနေတွင် ပြည်တွင်း၌ရေနံချက်စက်ရုံ ၃ ရုံကို လည်ပတ်နေ စေလျက်ရှိ၏။ ၎င်းတို့မှာ တစ်နေ့လျှင် ရေနံစည်ပေါ် ၆,၀၀၀ထိချက်လုပ်နိုင်သော ချောက် ရေနံချက်စက်ရုံ၊ တစ်နေ့လျှင် ရေနံစည်ပေါ် ၂၅,၀၀၀ထိချက်လုပ်နိုင်သော သံပရာကန် ရေနံချက်စက်ရုံနှင့် တစ်နေ့လျှင် ပေါ် ၂၀,၀၀၀ထိချက်လုပ်နိုင်သော သန်လျှင်ရေနံချက်စက်ရုံ တို့ဖြစ်ကြသည်။ ထို့ကြောင့် တစ်နိုင်ငံလုံးအတွက် လည်ပတ်မှုပမာဏမှာ ၄၁% မျှသာ ဖြစ်ပါသည်။

ရေနံလိုအပ်ချက်ကို ပြည်တွင်း ထုတ်လုပ်မှုက မဖြည့်ဆည်း နိုင်သဖြင့် နိုင်ငံခြားမှ အမြောက်အမြား တင်သွင်းနေရသည်။ ၂၀၁၄ခုနှစ် တစ်နှစ်အတွင်း၌ပင် ဒီဇယ်ဆီ ၁၂၄၈၄.၅၃၅ စည်၊ အော့တိန်း ဆီစည်ပေါင်း ၇၁၈၇၉၇၊ ဂျက်လေယာဉ်ဆီ (**A**1 အမျိုးအစား) စည်ပေါင်း ၇၈၀၂၁၅ တင်သွင်းပြီး အမေရိကန် ဒေါ်လာ ၂.၄၆ဘီလျံ သုံးစွဲခဲ့ရသည်။

ယခုတည်ဆောက်ရန် ရည်ရွယ်သည့် ရေနံချက်စက်ရုံသစ်၏ ထုတ်လုပ်မှုမှာ ဤလိုအပ်ချက်ကို ဖြည့်ဆည်းရန် ဖြစ်သည်။ ပြည်တွင်းထုတ်လုပ်မှုကို မြှင့်တင်၍ သွင်းကုန်ကိုလျော့ကာ သန်းပေါင်းများစွာသော နိုင်ငံခြား ငွေသုံးစွဲမှုကို ခွေတာရန်ဖြစ်သည်။

ယခုတည်ဆောက်မည့် ရေနံချက်စက်ရုံသစ်သည် ရေနံစိမ်းတန်ချိန် ၃.၅သန်းကို ချက်လုပ်၍ ပြည်တွင်း လိုအပ်ချက်ကို ဖြည့်ဆည်းနိုင်မည်ဟု မျှော်လင့်သည်။ ဤသို့ဖြင့် အရှေ့တောင်အာရှ ရေနံပိုက်လိုင်းမှ ရယူမည့် ရေနံစိမ်းဖြင့် စွမ်းအင်လုံလောက်သည့် အနေအထားကိုတည်ဆောက်ရန်ဖြစ်သည်။

၇။ မူဝါဒ၊ ဥပဒေနှင့်အဖွဲ့အစည်းဆိုင်ရာမူဘောင် (Policy, Legal and Institutional)

မြန်မာနိုင်ငံတွင်``ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ´´ ကို သက္ကရာဇ်၂၀၁၂ခုနှစ်တွင် ထုတ်ပြန် ကြေငြာခဲ့၏။ ဤဥပဒေဖြင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ ဆောင်ရွက်ချက်များကို လွှမ်းခြုံသက်ရောက် မှုရှိသည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေများကို အမိန့်ကြော်ငြာစာ အမှတ် ၅၀/၂၀၁၄ဖြင့် ၂၀၁၄ခုနှစ် ဇွန်လ၊ ၅ရက် နေ့ နေ့စွဲဖြင့်ထုတ်ပြန်ခဲ့သည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံး လုပ်နည်းကို အမိန့်ကြောငြာစာ အမှတ်(၆၁၆/၂၀၁၅)ဖြင့် ၂၀၁၅ ခုနှစ်၊ ဒီဇင်ဘာလ၊ ၂၉ ရက်နေ့တွင် ထုတ်ပြန်ခဲ့သည်။ စီမံကိန်းပြုလုပ်လိုသူသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေပုဒ်မ ၅၆အရ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာကို အရည်အချင်းပြည့်မှီကြောင်း အသိအမှတ်ပြုထားသော လုပ်ငန်းလိုင်စင် ရှိသည့် တတိယပုဂ္ဂိုလ် (သို့မဟုတ်) အဖွဲ့အစည်းအား ဆောင်ရွက်စေခြင်းဖြင့် အစီရင်ခံစာကို သက်ဆိုင်ရာဝန်ကြီး ဌာနသို့ တင်ပြရမည် ဖြစ်သည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုကင်း၍ လူမှုဘဝအဆင်ပြေစေမည့် ဖွံ့ဖြိုးမှုလုပ်ငန်းများနှင့် သက်ဆိုင်သည့် တရား ဥပဒေမူဘောင်၊ အမျိုးသားစီမံကိန်းလမ်းညွှန်မှုဆောင်ရွက်မည့် စီမံကိန်းနှင့်ဆက်စပ်သော ကဏ္ဍ အသီးသီးမှ ဥပဒေများအား ဆန်းစစ်ထားချက်များနှင့်အတူ **UNEP, IFC** နှင့် **ADB** စံထားနှုန်းများနှင့် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များအားမှီငြမ်းနိုင်ရန် ဆန်းစစ်လေ့လာလျက် ဤအစီရင်ခံစာတွင်တင်ပြထားပါသည်။

၈။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်စဉ်ဆောင်ရွက်ခဲ့သည့် လုပ်ငန်းများ အကျဉ်းချုပ်

MSR ၏ **EIA Study Team** အနေဖြင့် ပထမဆုံးအလုပ်မှာ စီမံကိန်းနေရာပတ်ဝန်းကျင်သို့ သွားရောက်၍ ရုပ်ပိုင်း၊ ဇီဝပိုင်းနှင့် လူမှုရေးအခြေအနေများကို စူးစမ်းလေ့လာပြီး အခြေခံအချက်အလက်များကို ကောက်ယူမှတ်တမ်းတင်သည်။ ထို့နောက် စီမံကိန်းနှင့် ပတ်သက်သည့် မူဝါဒ၊ ဥပဒေမူဘောင်ဆိုင်ရာ လေ့လာမှုနှင့်အတူ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ဆိုးကျိုး ကောင်းကျိုးသက်ရောက်မှုများကို ခွဲခြားသတ်မှတ်ပါသည်။

ထိခိုက်မှုများနှင့် သက်ရောက်မှုများကို အမျိုးအစားခွဲခြားပြီးနောက် ထိုထိခိုက်မှုများ၏ ဖြစ်နိုင်ခြေများကို ခန့်မှန်းသည်။ ထိခိုက်မှုများ၏ သိသာထင်ရှားမှုကို အကဲဖြတ်ခြင်းအား **Impact** နှင့်ပတ်သက်၍ နောက်ဆုံးအဆင့် အနေဖြင့်လေ့လာတင်ပြပါသည်။

လူထုပါဝင်ပူးပေါင်းကူညီမှုကို တစ်ဦးချင်းအိမ်တိုင်ရာရောက် တွေ့ဆုံမေးမြန်းခြင်း၊ လုပ်ငန်းတူ အုပ်စုဆွေးနွေးခြင်းနှင့် လူထုတွေ့ဆုံပွဲပြုလုပ်ခြင်းစသည့် နည်းလမ်းများသုံး၍ ပြုလုပ်ခဲ့ပါသည်။ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ရေးဆွဲခြင်းကိုကား ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းစေရန် ဆောင်ရွက်မည့်နည်းလမ်း အစီအစဉ်များဖော်ပြခြင်းနှင့်အတူ စောင့်ကြပ်ကြည့်ရှုမှုလုပ်ငန်းများ ထည့်သွင်းလျက် သုံးစွဲမည့် လူအရင်းအမြစ်များ အတွက်ပါ ကုန်ကျစရိတ်ခန့်မှန်း ဖော်ပြချက်တို့နှင့်အတူ တင်ပြထားပါသည်။

နောက်ဆုံးအဆင့်အနေဖြင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာအပြည့်အစုံကို စီမံကိန်းအဆိုပြုသူ အား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာနသို့ တင်ပြနိုင်ရန် ရေးသားဖော်ပြပေးထားပါသည်။

၉။ စီမံကိန်းဆိုင်ရာအခြားနည်းရွေးချယ်ခြင်း (Project Alternative)

(က) ထုတ်ကုန်အဆင့်ဆင့်အခြားနည်း

ရေနံချက်စက်ရုံ၏ ရေနံချက်လုပ်ငန်း အဆင့်ဆင့်တွင် ရေနံစိမ်းမှ ဟိုက်ဒရိုကာဗွန်ကွဲများ (**hydrocarbon fractions)** ဖြစ်လာအောင်ခွဲထုတ်သည့် သန့်စင်နည်းအမျိုးမျိုး ပါဝင်နေသည်။

အဆိုပြုစီမံကိန်း၏ လိုအပ်ချက်ပေါ်မူတည်၍ အဓိကရေနံသန့်စင်မှု ဖြစ်စဉ်ကွဲ အမျိုးအစားများကို အောက်ပါအတိုင်းတွေ့ရသည်။

(၁) ရုပ်ပိုင်းဆိုင်ရာခွဲခြားမှုအဆင့်ဆင့် (**Physical separation processes)**

(၂) ဓါတုပိုင်းဆိုင်ရာ ခွဲခြားမှုအဆင့်ဆင့် (**Chemical conversion processes)**

(၃) သန့်စင်မှု သို့မဟုတ် ဓါတ်ပြုမှုသုံးခွဲခြားခြင်း အဆင့်ဆင့် (**Purification or treating processes)**

(၄) အသုံးပြုပစ္စည်းမျိုးများနှင့် အထွေထွေလိုအပ်ချက် ကိရိယာများ (**Utilities and General facilities)** နှင့်

(၅) ပတ်ဝန်းကျင်ထိန်းချုပ်နည်းလမ်းများ (**Environmental Controls)**

ပတ်ဝန်းကျင်ထိခိုက်မှုနည်းစေရန် အထက်ပါနည်းလမ်းများဖြင့် ရေနံစိမ်းကိုစက်ရုံ၌ သန့်စင်ချက်လုပ်ကြပါသည်။ သို့ရာတွင် ရွေးချယ်မှုသည် **PEC** ခေါ် စက်မှုလက်မှု၊ ပစ္စည်းရယူမှုနှင့် ဆောက်လုပ်ရေးဆိုင်ရာ ကန်ထရိုက်တာ၏ ရွေးချယ်မှုနှင့် ရေနံစိမ်းအရည်အသွေးအပေါ်တွင်လည်း မူတည်ပါသည်။

(ခ) အကောင်းဆုံးနည်းပညာသုံးအခြားနည်း

မြန်မာ့ရေနံဓါတုဗေဒလုပ်ငန်းအနေဖြင့် ရေနံဓါတ်ငွေ့ဌာနခွဲ (**O&G)** မှလက်ခံသည့် နည်းလမ်းကို အသုံးပြုမည့် အနေအထားရှိသည်။ ပတ်ဝန်းကျင် ထိခိုက်မှုလျော့ပါးစေရန် **BAT** ဆန်းစစ်ခြင်းဖြင့်သာ ခေတ်အမှီဆုံး နည်းပညာကို ရွေးချယ်နိုင်ပေမည်။

(ဂ) ရေနံပိုက်လိုင်းနေရာရွေးသည့် အခြားနည်း

EIA အဖွဲ့အနေဖြင့် ရေနံပိုက်လိုင်းသွားရာလမ်း (**ROW)** ကိုဖြောင့်ဖြောင့်ဖြစ်နေသည့် **Off-take-point** မှ ကျောက်ဆန်းရွာကို ဖြတ်သည့်လမ်းကြောင်းကို ရွေးချယ်စေလိုသည်။ ခရီးတာ ၇.၅၇ ကီလိုမီတာ ရှည်ပြီး၊ ရွာ ၃ရွာ ကိုသာဖြတ်ရမည်ဖြစ်သဖြင့် မြေယာလျော်ကြေး သက်သာမည်ဖြစ်သည်။

(ဃ) ယခုစီမံကိန်းကိုဆောင်ရွက်ရန်ရွေးချယ်သည့်နည်း

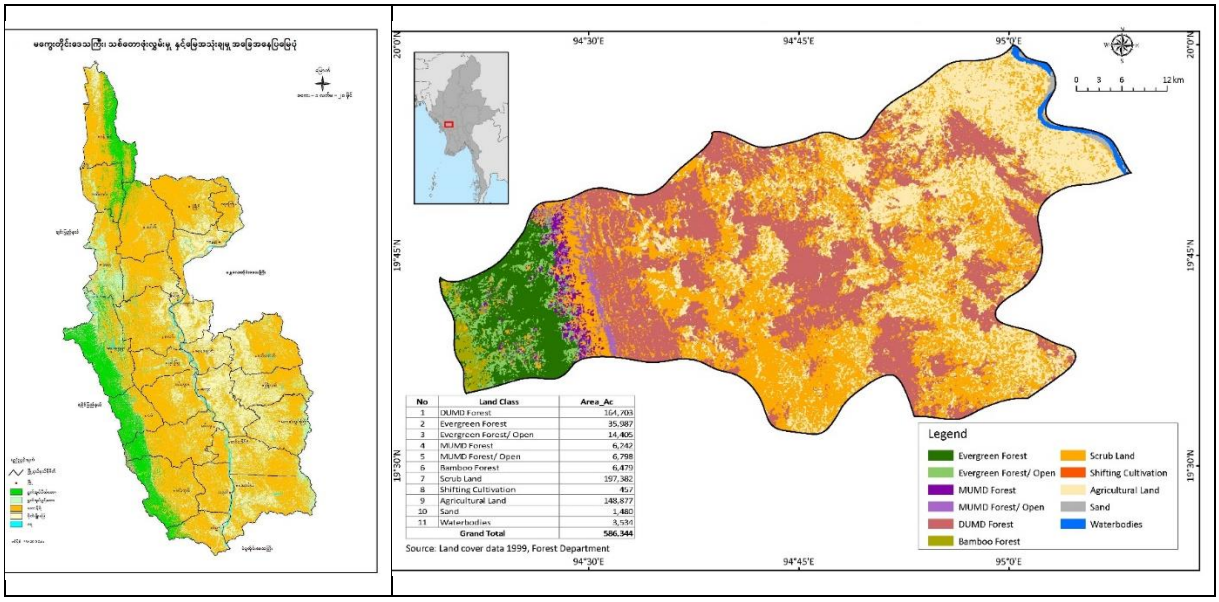
တရုတ် ရေနံစိမ်းပိုက်လိုင်း သည် ကျောက်ဖြူ မှ ကူမင်းမြို့အထိ သွယ်တန်းထားပြီး စာချုပ်အရ အရှေ့ အလယ်ပိုင်း ရေနံစိမ်းကို မြန်မာ့ရေနံဓါတုဗေဒလုပ်ငန်းသို့ ပေးမည်ဖြစ်ရာ နိုင်ငံအတွက်အရေးကြီးသည့် ပြည်တွင်း လိုအပ်ချက်ကို ဖြည့်ဆည်းရန် အကောင်းဆုံးနည်းလမ်း ဖြစ်သည်။

(င) ရေနံစိမ်းသယ်ယူမှုလမ်းရွေးချယ်ခြင်း

အရှေ့တောင်အာရှရေနံပိုက်လိုင်း (**SEAP**)မှ သံပရာကန်သို့ရေနံသယ်ယူခြင်းကို **Pipe-line transmission** နည်းဖြင့်ဆောင်ရွက်ရန် ထောက်ခံပါသည်။ တစ်နှစ်တာအတွင်း ရေနံစိမ်းတန်ချိန် ၃.၅သန်းကို မော်တော်ကားဖြင့် သယ်ယူရန်မဖြစ်နိုင်ပေ။

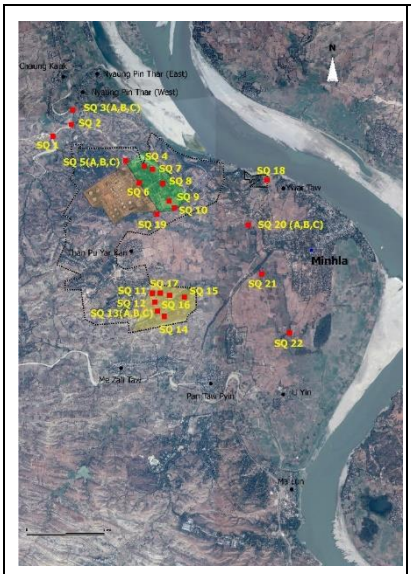
၁၀။ သက်ရောက်မှုရှိသော ပတ်ဝန်းကျင် (Affected Environment)

အဆိုပြု ရေနံချက်စက်ရုံသစ် စီမံကိန်းနေရာသည် မကွေးတိုင်းဒေသကြီး၊ မင်းလှမြို့ အနောက်ဘက်သို့ ၂.၅ ကီလိုအကွာတွင်ရှိသော ရေနံခါတုဗေဒစက်ရုံစု (သံပရာကန်)နှင့် အနီးကပ်လျက် ရှိနေသည့် ဆူးခြံတောဖုံးလွှမ်းနေသည့်နေရာဖြစ်၏။ ဤနေရာသည် အပူပိုင်းခြောက်သွေ့ဒေသဖြစ်၍ မိုးရေချိန် အလွန်နည်း၏။ အမြင့်ပေ ၄၅၀ခန့်ရှိသည့် လှိုင်းတွန့်ပုံအတော်အတန်ဖြစ်နေသည့် မြေပြင်ကျယ်ဒေသဖြစ်၏။ သဲချောင်းငယ်များမှာ နွေရာသီတွင် ရေမရှိဘဲ ခြောက်ကပ်နေ၏။ ဆန်နှင့် နှံစားပြောင်းစိုက်ရုံမက ကြံ၊ သစ်သီး၊ ပဲတီစိမ်း၊ ပဲစဉ်းငုံ၊ မြေပဲ၊ နှမ်း၊ ပြောင်း၊ ဝါ၊ ကြက်သွန် တို့ကိုပါ ပတ်ဝန်းကျင်မြေလွတ်နေရာများ၌ စိုက်ပျိုးကြ၏။ မြေများသည် မြေနီသဲဝန်း၊ မြေဝါသဲဝန်းမြေများဖြစ်ပြီး မြေနှင့်ကျောက်ခဲ များရောနှော နေသော မြေစေးနည်းသည့် မြေများဖြစ်ကာ သဲရာခိုင်နှုန်းလည်းမများလှဘဲ သစ်ဆွေးခါတ်နှင့် အစိုခါတ်နည်းသည့်မြေမျိုးဖြစ်၏။ ပိုတက်စီယမ်ခါတ်နည်း၏။ အပူပိုင်းဇုံ၏အနောက်ဘက်တွင် ရွက်ကြွေတောခြောက်ရှိ၏။

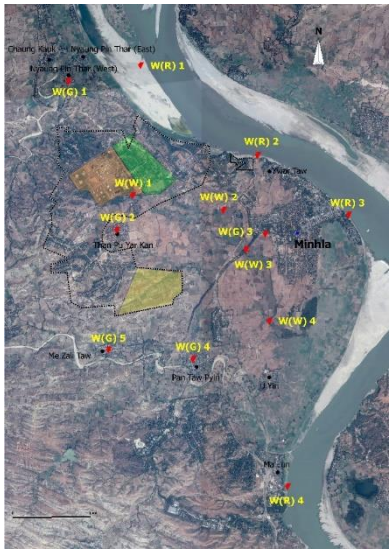


Forest cover and Landuse map of Magway Region and Minhla Township

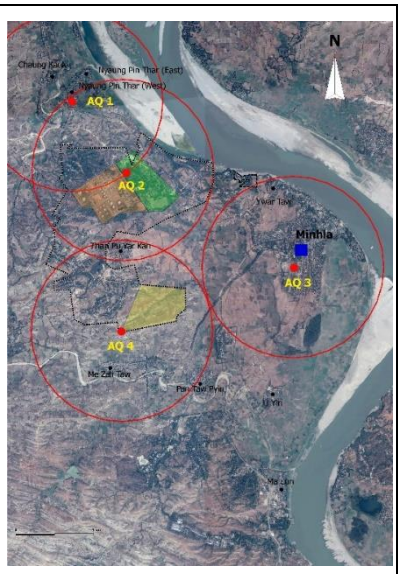
၁၁။ ပတ်ဝန်းကျင်အခြေခံအချက်အလက်ကောက်ယူမှုနှင့်လေ့လာရေးနည်းလမ်းများ (Baseline data collection and survey methods)



Location of soil samples



Location of water samples



Location of Air quality and noise pressure samples

အခြေခံအချက်အလက်ကောက်ယူမှုကို **Biophysical** နှင့် **Socio-economic Study Team** တို့သည် ၂၀၁၅ ခုနှစ်၊ဇန်နဝါရီနှင့်ဖေဖော်ဝါရီလအတွင်း ၂ကြိမ်အုပ်စုခွဲ၍ လုပ်ဆောင်ခဲ့ပါသည်။ ရေနှင့်မြေတို့၏ အခြေခံအချက်အလက်အတွက် ရေစံနမူနာ၊ မြေစံနမူနာတို့ကို သက်ရောက်မှုရှိနိုင်သည့် နေရာများ၌ မြေကြီးအတွက် **SQ** အမှတ်အသားနှင့် မြေအောက်ရေ၊ မြစ်ရေနှင့် ရေဆိုးတို့အတွက် **WG, WR, WW** ဟူ၍ အမှတ်အသား သတ်မှတ် ကောက်ယူသည်။

လေအရည်အသွေးတိုင်းတာမှုအတွက် အသံဖိအားပေါ်ပေါက်နိုင်သည့်နေရာမျိုးကို **AQ** ဟု သတ်မှတ်၍ တိုင်းတာသည်။ ဇီဝဗေဒကဏ္ဍအတွက်ကား စီမံကိန်းနေရာ၊ အနီးပတ်ဝန်းကျင်ကျေးရွာများ၊ လက်ရှိရေနံပိုက်လိုင်း (စကု မှ သံပရာကန်ထိ)၊ ရေဆိုးမြောင်းနှင့် ရေနုံချက်စက်ရုံ၏ ဧရာဝတီမြစ်ကမ်းမှ ဆိပ်ကမ်းတို့ ပတ်ဝန်းကျင်တဝိုက်တွင် လက်ရှိမှီတင်းနေထိုင်ကြသော သတ္တဝါများနှင့် ပေါက်ရောက်နေကြသည့် သစ်ပင်မျိုးစိတ်များ၊ နေထိုင်ရာ သဘာဝပတ်ဝန်းကျင်တို့နှင့် ဂေဟစနစ်များကို သတ္တဗေဒပညာရှင် ၃ ယောက် နှင့် ရုက္ခဗေဒပညာရှင် ၁ ယောက်တို့က လေ့လာ၍ မှတ်တမ်းယူခဲ့ကြသည်။

၁၂။ လေအရည်အသွေး (Air Quality)

လေအရည်အသွေးတိုင်းတာမှု အတွက် လေနမူနာယူမည့် နေရာများကို **Air dispersion model** ဖြင့် သတ်မှတ်သည်။ ဤပုံစံဖြင့် လေအရည်အသွေး အခြေခံအချက်အလက်ရယူမှုသည် ၃ကီလိုမီတာ မှ ၅ ကီလို မီတာ အချင်းဝက်အကျယ်အဝန်းကို လွှမ်းခြုံထားရာ လေတိုင်းစက်၏ စွမ်းရည်မှာ ၅ မိုင် ပတ်ဝန်းကျင်ထိ သက်ရောက်၏။

စမ်းသပ်တိုင်းတာချက်များအရ မလွန်ဇရပ်ကုန်း (**AQ** 4) တွင် စုစုပေါင်း လေထုထဲတွင် တွယ်၍ ပါဝင်နေ သော အမှုန်ပမာဏ **Total Suspended Particulate Matter (TSPM)** သည် သတ်မှတ်ထားသည့်

တန်ဘိုး (200**µgm/m**^{3}) ကိုကျော်၍ 229.43 **µgm/m**^{3} ထိရှိနေကြောင်း တွေ့ရှိရသည်။ အသက်ရှူလမ်းကြောင်းသို့ ခိုဝင် နိုင်သော သေးငယ်သည့် လေထဲမှ အမှုန်ပမာဏ **Respiratory Particulate Matter (PM$_{10}$)** သည် **WHO** စံထက် မြင့်နေ၏။ ဆာလဖာဒိုင်အောက်ဆိုဒ် (**SO$_2$**) နှင့် နိုက်ထရိုဂျင်အောက်ဆိုဒ် (**NO$_2$**) တို့မှာလည်း **WHO** လေထု ညစ်ညမ်းမှု ခွင့်ပြုချက်စံထက် လျော့နည်း လျက်ရှိကြောင်းတွေ့ရသည်။

၁၃။ အသံဖိအားတိုင်းတာမှု (Sound Pressure Survey)

အများဆုံးအသံဖိအားပမာဏ(**Lmax**)နှင့် ဆက်တိုက်ညီမျှချေအသံပမာဏ (**Leg**) တို့ကို စီမံကိန်းတဝိုက်မှ သင့်လျော်သည့်နေရာများ၌တိုင်းတာခဲ့သည်။ သတ်မှတ်တန်ဖိုးကိုကျော်လွန်မှုမရှိပေ။

၁၄။ ရေအရည်အသွေး (Water Quality)

ရေစံနမူနာများကို စီမံကိန်းနေရာနှင့်အနီးဆုံး **tube wells** များ၊ စက်ရုံဆိပ်ကမ်း၏ ဧရာဝတီမြစ်အပေါ် ပိုင်းနှင့် အောက်ဘက်ပိုင်း၊ ယခုလက်ရှိစက်ရုံမှထုတ်လွှတ်သည့် ရေဆိုးမြောင်းနေရာတို့မှ ကောက်ယူခဲ့သည်။ အနီးအနားရွာများမှ လူသုံးများသည့် **tube wells**များမှလည်း ရေနမူနာများ ယူခဲ့သည်။ အနောက်ညောင်ပင်သာရွာ (**WG-**1) မှရေနမူနာတွင် စုစုပေါင်းကိုလီဖောင်းနှင့် မစင်ရေကိုလီဖောင်း ဘက်တီးရီးယားပေါက်မှုန္နန်း သတ်မှတ်တန်ဖိုးထက်မြင့်မားနေသည်။

သံပရာကန် စက်ရေတွင်း (**WG-**2)၌ အစိုင်အခဲပျော်ဝင်မှု နှင့် အယ်လကာလီ ပါဝင်မှုမြင့်မားနေပြီး၊ မင်းလှမြို့ မြောက်ဘက်စက်ရေတွင်း (**WG-**3)မှ ရေတွင်လည်း အယ်ကာလီပါဝင်မှုမြင့်မားသည်။ ပန်းတော်ပြင် မြောက်ဘက် စက်ရေတွင်း (**WG-**4) မှ ရေတွင် စုစုပေါင်းကိုလီဖောင်းဘက်တီးရီးယားနှုန်းမြင့်မားပြီး၊ အယ်ကာလီပမာဏ မြင့်မား၏။ မယ်ဇီတော ရေတွင်း (**WG-**5) တခုတည်း၌သာ ရေအရည်အသွေးကောင်း၍ သတ်မှတ်တန်ဖိုး အတိုင်းအဆထက် နည်းလျက်ရှိသည်။

မြစ်ရေကောက်ခြင်းကို ၄ နေရာ၌လုပ်ခဲ့ပါသည်။ မလွန်မြစ်ကမ်းနံဘေး (**WR-**4) မှ ကောက်ယူသည့် ရေတွင် ရေနံဆီနှင့် အရည်ဆီပါဝင်မှု 15.35 **ppm** ရှိပြီး သတ်မှတ်တန်ဖိုး 10 **ppm** ထက် အလွန်မြင့်နေသည်။ တခြား မြစ်ရေစံနမူနာရေများ အရည်အသွေးကောင်းပါသည်။

၁၅။ မြစ်ပေါ်ရေ Surface Water (Waste Water, WW)

ရေဆိုးရေမှကောက်ယူခဲ့သည့် ရေနမူနာတို့တွင် ပါဝင်မှုပမာဏများသည် သတ်မှတ်တန်ဖိုးအောက်တွင်သာရှိ၍ အန္တရာယ်မရှိပေ။

၁၆။ မြေလွှာအနေအထား (Soil)

မြေကြီးနမူနာ ၂၂ခုကို လက်ရှိရေနံချက်စက်ရုံ၏ ၃ ကီလိုမီတာ အချင်းဝက်အကွာအဝေး ပတ်ဝန်းကျင်တဝိုက်မှကောက်ယူခဲ့၏။ မြေဆီလွှာစမ်းသပ်တိုင်းတာမှုကို ဆည်မြောင်းဝန်ကြီးဌာန၊ စိုက်ပျိုးရေးဦးစီးဌာန၊ မြေအသုံးချရေးဌာနခွဲတွင် ပြုလုပ်ခဲ့ပါသည်။

ဤမြေများမှာ အပေါ်လွှာ၌ ချဉ်ငံကိန်း **pH** မျှတပြီး အောက်လွှာများသည် အငံဓါတ်ပို၍များပါသည်။ မြေ၏ **pH**မှာ အလွန်ငံသောအဆင့်ရှိ၍ ကယ်လစီယမ်နှင့် မဂ္ဂနီစီယမ်ဓါတ်များစွာပါဝင်ပြီး၊ ပိုတက်စီယမ်ဓါတ်အသင့် အတင့်ပါ၍ သစ်ဆွေးနှင့် ကျန်သောဓါတ်များနည်းပါသည်။ သို့ရာတွင်မြေကြီး၏ မြေဆီလွှာ အဟာရ

ပိုင်းဆိုင်ရာ ပြဿနာမရှိပါ။ ဆားပေါက်မှု၊ ဆပ်ပြာပေါက်မှုနှင့် ဆိုဒီယမ်အဆိပ်သင့်မှု စသည်တို့မရှိပါ။ ရေပျော်ဆားပါဝင်မှု **EC** ခေါ် **Electrical Conductivity** မှာလည်း အပင်များခံနိုင်ရည်အဆင့် သာရှိသောကြောင့် ပြဿနာမရှိပါ။ **Residual Sodium Carbonate** ဆိုဒီယမ်ကိုရှာဖွေမှုတွင်လည်း ပြဿနာ မရှိပါ။ **Heavy Metal** စမ်းသပ်မှုဌ္ဌ လူနှင့်အပင်များကို အန္တရာယ်ပြုနိုင်သည့် ခဲဓါတ်(**Pb**)နှင့် အာဆင်းနစ်ဓါတ် (**As**) အလွန်နည်းပြီး၊ ပြဒါးဓါတ် (**Hg**)သာ အလွန်များနေပါသည်။ ဤသည်မှာလည်း ပဲအမျိုးမျိုးစိုက်ပျိုးရာတွင် ပေါင်းသတ်ဆေး၊ မှိုသတ်ဆေး၊ ရွက်ဖြန်းအားဆေးများ အလွန်အကျွံ သုံးစွဲခြင်းကြောင့် ဖြစ်နိုင်ပါသည်။

၁၇။ ရေနံပိုက်လိုင်းတည်ရှိရာနေရာအတွက် အခြေခံအချက်အလက် (Baseline Study of the Pipeline Area)

ရေနံပိုက်လိုင်းအဟောင်းနေရာတလျှောက်သို့ **MSR** ၏ လေ့လာရေးအဖွဲ့က ၂၀၁၅ခုနှစ်၊ နိုဝင်ဘာလ ၂၇ရက်မှ ၃၀ရက်အတွင်း သွားရောက်ကြည့်ရှုစစ်ဆေးခဲ့ကြသည်။ မြေပေါ်သို့ပေါ်ထွက်လျက်ရှိသည့် အပိုင်းများနှင့် ကျွဲတဲရွာအနီး မင်းဘူး-စကုကားလမ်းမဘေးနှင့် ကန်ရေရွာအနီး မင်းဘူး-အမ်း လမ်းဘေးတွင်ရှိသော ကျောက်တိုင် အမှတ်အသား (**stone makers**) နှစ်ခုတို့ကို မှတ်တမ်းတင်ခဲ့သည်။

၁၈။ ဇီဝပတ်ဝန်းကျင်၏ အခြေခံအချက်အလက်များ (Biological Baseline)

ဇီဝပတ်ဝန်းကျင် ကွင်းဆင်းလေ့လာခြင်းတွင် လက်ရှိအနေအထား၌ တွေ့မြင်သိရှိရသည့် သတ္တဝါနှင့် သစ်ပင်အမျိုးအစား၊ သတ္တဝါများနေထိုင်ရာ သဘာဝပတ်ဝန်းကျင်အမျိုးအစား ဂေဟစနစ်အခြေအနေနှင့် အရည်အသွေးတို့ကို လေ့လာ၍ အခြေခံအချက်အလက်များအဖြစ် မှတ်တမ်းတင်ရန်ဖြစ်သည်။

အခြေခံအချက်အလက် ကောက်ယူမှုနှင့်ပတ်သက်၍ စီမံကိန်းပတ်ဝန်းကျင်ကျေးရွာများ၌ မှီတင်းနေထိုင်ကြသည့် တောတောင်ရေမြေ သဘာဝအကြောင်းအကျိုးတဝင်ရှိသူများကို မေးမြန်းခြင်း၊ စီမံကိန်းပတ်ဝန်းကျင်နှင့် ရေနံပိုက်လိုင်းတလျှောက် လယ်ကွင်းနှင့်စိုက်ခင်းများ၊ ကျေးရွာပတ်ဝန်းကျင်မှ ပေါက်ရောက်လျက်ရှိသော သစ်ပင်များနှင့်တွေ့ရှိရသည့် ငှက်မျိုးစုံအပါအဝင် သတ္တဝါမျိုးများအား **Transect Survey Method** အသုံးပြု၍လေ့လာပါသည်။ ဤသို့ဖြင့် မျိုးပေါင်း ၄၁မျိုးရှိ သစ်ပင်မျိုးစိတ် ၁၅၇ မျိုး ကိုလည်းကောင်း၊ နို့တိုက်သတ္တဝါ ၄မျိုး၊ ငှက်မျိုးစိတ် ၂၄မျိုး၊ မြွေဖား ၅မျိုးနှင့် ငါးမျိုးစိတ် ၁၄မျိုးတို့ကို မှတ်တမ်းတင်ထားနိုင်သည်။

စီမံကိန်းပတ်ဝန်းကျင် အရပ်ဒေသ ၏ **Habitat** မှာ **Than-Dahat forest** နှင့် **Thorn Forest** ခေါ် ဆူးထူပင် များ ပေါက်ရောက်ရာသစ်တောမျိုးဖြစ်၏။ ဤတောခြောက်မျိုးတွင် ရှားပင် (**Accacia catechu**)၊ ထနောင်းပင် (**Accacia leucophloea**)၊ ဒဟတ်ပင် (**Tectona hamiltoniana**) တို့အပေါက်များသည်။ ဇီးနှင့်သနပ်ခါးပင် များလည်း ပေါက်ရောက်၏။

သစ်တောများယုတ်လျော့သွားခြင်းမှာ ကြာညောင်းခဲ့ပြီဖြစ်ပြီး ယခုအခါ ကွက်ကြားကွက်ကြား ခြုံထူတောများ အစုလိုက်၊ အစုငယ်လိုက်ရှိနေကြသည်။ ဤသို့တောဆုတ်သွားခြင်းမှ စကု၊ မင်းလှ၊ မင်းဘူးမြို့နယ်များတွင် လူဦးရေတိုးပွားလာခြင်း၊ လယ်ယာစိုက်ခင်းများချဲ့ထွင်တိုးချဲ့လာခြင်းနှင့် ရေနံတူးသည့် လုပ်ငန်းများ ရှိလာခြင်းတို့ကြောင့်ဖြစ်ပြီး တရုတ်-မြန်မာရေနံပိုက်လိုင်းသွားလမ်း တလျှောက်မှ သစ်ပင်များကို ခုတ်ထွင်ရှင်းလင်းပစ်ခြင်းတို့ကြောင့်ဖြစ်သည်။

ဆည်ရေသွင်းယူနိုင်သော ကျေးရွာများ၏ပတ်ဝန်းကျင်တွင် သစ်ပင်များများပေါက်ရောက်လျက်ရှိနေတုန်း ပင်ဖြစ်သည်။ ရေနံပိုက်လိုင်းဘေး ကွင်းပြင်များ၌ကား စပါး၊ ပြောင်း၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ကြက်သွန်၊ နှမ်းနှင့်ဝါ တို့စိုက်ထားကြသည်ကိုတွေ့ရ၏။ မိုးရာသီ၌ လယ်ကွင်းနှင့် စိုက်ခင်းဝန်းကျင်တို့တွင် ဖားနှင့် ဖားခုံညင်းတို့ပေါများ၍ နွေတွင်ကြွက်ပေါပါသည်။ စိုက်ခင်းများ၌ အင်းဆက်ပိုးများရောကိရှိလာကြသကဲ့သို့ ၄င်းတို့ကိုမှီဝဲသည့် ငှက်မျိုးစိတ် များလည်း ရောက်လာတတ်သည်။

Direct impact zone open forest types

Allium cepa L. *(Kyetthun- ni)*

Zea mays L. *(Pyaung-bu)*

Cicer orietinum L.*(Ka-la-pe)*

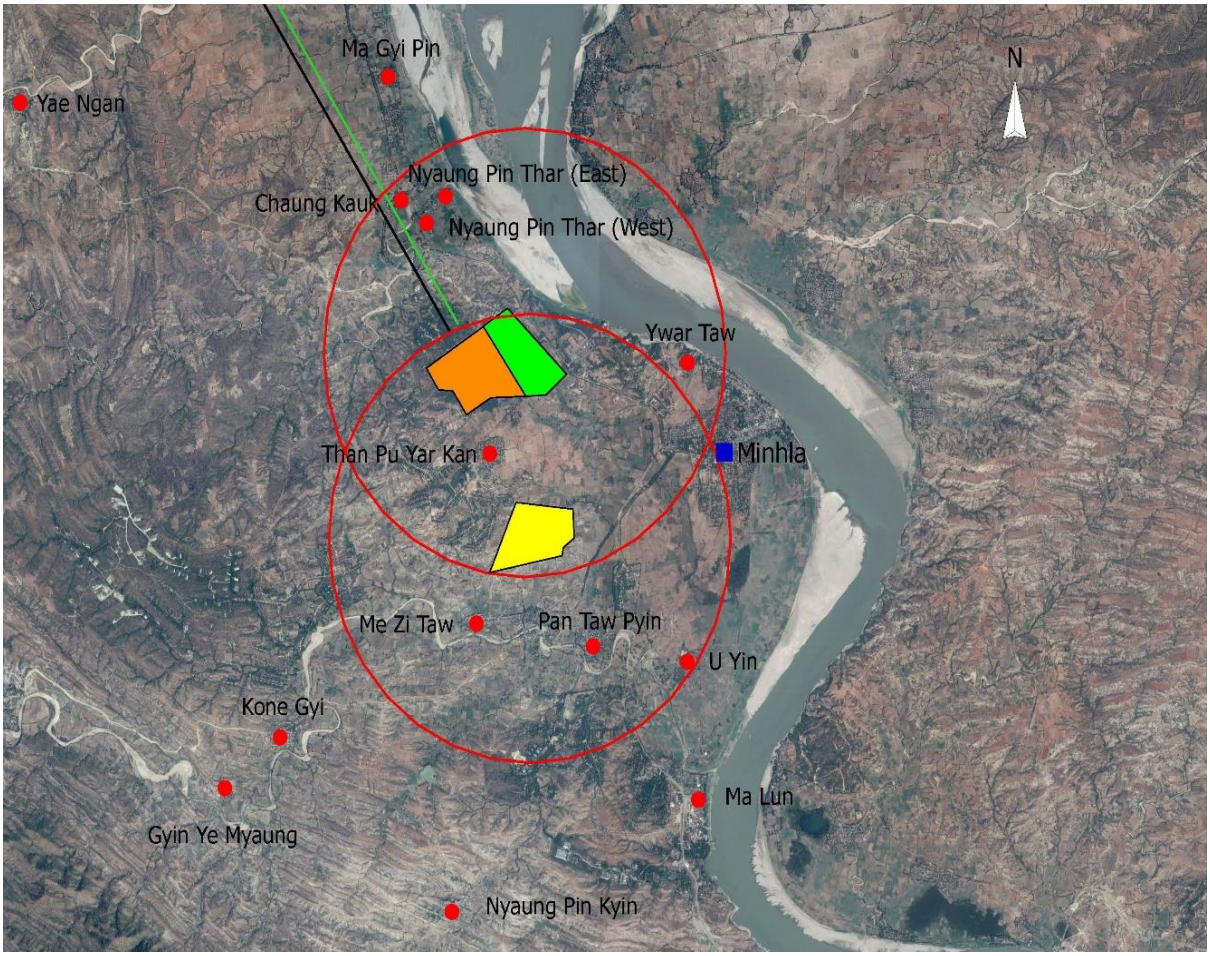
၁၉။ လူမှုစီးပွား အခြေခံအချက်အလက်များ (Socio-economic Baseline)

လူမှုစီးပွားအခြေခံအချက်အလက်ကောက်ယူမှုတွင် နည်းလမ်း ၃မျိုးကို အခြေခံထား၏။ ၎င်းတို့ မှာ

(၁) ကျေးရွာဆိုင်ရာအချက်အလက်များ (**Village profile)** ကောက်ယူခြင်း၊

(၂) မိသားစုဝင်များကို မေးမြန်းခြင်း (**Household interview)** နှင့်

(၃) အဓိကကျသောသတင်းပေးနိုင်သူတို့ကို နှိုက်နှိုက်ချွတ်ချွတ်မေးမြန်းခြင်း (**Key Informant In-depth Interview)** တို့ဖြစ်သည်။



Location map of surrounding villages of New refinery project

MSRလေ့လာရေးအဖွဲ့ဝင်များသည် စက်ရုံသစ်နှင့် ဝန်ထမ်းအိမ်ရာများနှင့် အနီးဆုံးဖြစ်သည့် ၃ ကီလို မီတာ အချင်းပတ်လည်ရှိ ကျေးရွာ ၇ ရွာသို့ သွားရောက်၍ လူမှုစီးပွားစစ်တမ်းကဲ့သို့သော အချက်အလက်များ ကောက်ယူခဲ့ပါသည်။ ရွာများ၌မေးမြန်းသည့် ပုဂ္ဂိုလ်များအတွင်း အမြဲနေရွာသားများ၊ စီမံကိန်း သက်ရောက် စံပုဂ္ဂိုလ်များနှင့် ကျေးရွာအုပ်ချုပ်ရေးအဖွဲ့များပါဝင် ပါသည်။

ကျေးရွာ ၇ ရွာအနက်သံပုရာကန်ရွာတွင် လူဦးရေအများဆုံး (၁,၃၂၃ ဦး) နေထိုင်ပြီး ဒုတိယ လူဦးရေ အများဆုံး ကျေးရွာမှာ ပန်းတော်ပြင်ဖြစ်ပါသည်။ လူဦးရေ ၁,၂၈၂ ဦးရှိပါသည်။

ကျေးရွာများ၏ ဝင်ငွေသည် လယ်ယာကိုင်းကျွန်းမှရရှိ၏။ သစ်တောများပြုန်းတီးလာခြင်းနှင့် ရာသီဥတု ဆိုးရွားမှု တို့ကြောင့် ကျေးရွာများမှာ စီးပွားရေးနိမ့်ကျလျက်ရှိသည်။ မယ်ဇီတော၊ ပန်းတော်ပြင် နှင့် ဥယျာဉ် စသည့် ရွာများတွင် ကျေးရွာဆေးပေးခန်းတို့နှင့် မူလတန်းကျောင်း တစ်ကျောင်းစီရှိ၏။

ချောင်းကောက်ရွာနှင့်ဥယျာဉ်ရွာတို့မှကျေးရွာနေသူများ ရေနံချက်စက်ရုံပိုင်မြေများ၌ စိုက်ပျိုးရေး လုပ်ကိုင်နေခြင်းမရှိပေ။

ကျေးရွာ ၅ ရွာမှ မိသားစုဦးရေ ၁၉၁ အိမ်ထောင်အတွင်း ၃၇ အိမ်ထောင်မှ မိသားစုဝင်များသည် မြေကေ ၃၂.၆ ကေ လက်လွတ်ရမည်ဖြစ်ပြီး ၂၁ အိမ်ထောင်စုမှာ မြေယာမဲ့ ဖြစ်သွားပေမည်။ အိမ်ထောင်စု ၂ စုသာ အပြင်လက်ယက်ရေနံတွင်းများ၌ အပိုဝင်ငွေရနိုင်ရန် အလုပ်လုပ်လျက် ရှိကြသည်။ လူမှုစီးပွားအခြေ

အနေ နိမ့်ကျနေသဖြင့် အိမ်ထောင်စုများမှာ ကြွေးမြီမကင်းဖြစ်နေကြသည်။ ကျေးရွာသူ၊ကျေးရွာ သားများ၏ ၅၀% က ဤရေနံချက်စက်ရုံသစ် စီမံကိန်းသည် ၄င်းတို့၏ဒေသဖွံ့ဖြိုး မှုအတွက် အထောက်အကူပြု အရင်း အမြစ်ဟု ယူဆကြသည်။

Data Collection for Village Profiles, Household Interiews and KII Interviews

၂၀။ ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာ သက်ရောက်မှုများ (Anticipated Environmental and Social Impacts)

ရေနံချက်စက်ရုံသည် ရေနံစိမ်းကို ချက်လုပ်ခြင်းအားဖြင့် ရေနံထွက်ပစ္စည်းအမျိုးပေါင်း ၂,၅၀၀ ခန့် ထုတ်လုပ်နိုင်စွမ်းရှိ၏။ အထူးသဖြင့် ရည်ပျော်ဓါတ်ငွေ့၊ ဓါတ်ဆီ၊ ကီရိုဆိန်း၊ လေယာဉ်ဆီ၊ ဒီဇယ်ဆီ၊ လောင်စာဆီ၊ ချောဆီနှင့်စက်ရုံသုံးသိုလှောင်ဆီများဖြစ်ကြ၏။

ရေနံချက်လုပ်မှုဖြစ်စဉ် (**Refinery Process**)ကို ရေနံစိမ်းရယူမှုဖြင့်အစပျိုးသည်။ စက်ရုံတွင် ရေနံစိမ်း သိမ်းဆည်းမှု နှင့် သန့်စင်မှုအဆင့်ဆင့်လည်ပတ်မှုနှင့်အတူ ထုတ်ကုန်များကို အပြင်ဖက်လိုအပ်သည့် နေရာများသို့ တင်ပို့နိုင်ရန် ပြင်ဆင်ခြင်း အဆင့်များကိုပါ စက်ရုံအတွင်းလုပ်ဆောင်သည်။

ရေနံချက်လုပ်ခြင်းမှာ ရေနံစိမ်းကို ရုပ်ပိုင်းအနေဖြင့်လည်းကောင်း၊ အပူရှိန်အနေဖြင့်လည်း ကောင်း၊ ဓါတုဓါတ်ပြုမှုဖြင့်လည်းကောင်း ခွဲခြားမှု အဆင့်ဆင့်ပြုလုပ်ပြီး သန့်စင်မှုအမျိုးမျိုးကဏ္ဍသို့ ပို့ဆောင်လျက်

ထုတ်ကုန်အမျိုးမျိုးအဆင့်သို့ ဖြစ်ထွန်းလာစေရန် ခွဲခြားခြင်းနှင့် ခါတ်ပြောင်းလဲခြင်း အဆင့်ဆင့်ကို ဖြစ်ပေါ်စေသည်။

ဤသို့ဖြင့် မူလအဆင့် ညစ်ညမ်းပစ္စည်းထုတ်လွှတ်ခြင်းမှာ ထွက်ပေါက်များမှ ယိုစိမ့် ထွက်တတ်သည့် **volatile organic compound** များပျံ့လွင့်ထွက်ခြင်းဖြစ်၏။ ဤဖြစ်ရပ်မှာ နောက်ဆုံးဆင့်ထုတ်ကုန်များဖြစ်သည် အထိရှိနေ၏။

စက်ရုံလည်ပတ်သည့်အခါ ဆာလဖာဒိုင်အောက်ဆိုဒ်၊ ဟိုက်ဒရိုဂျင်ဆာလဖိုဒ်၊ အမှုန်များ၊ အဆိပ်သင့်စေသည့် ခါတ်ငွေ့များကိုပတ်ဝန်းကျင်သို့ ထုတ်လွှင့်စေသည်။ လောင်ကျွမ်းမှုပြုလုပ်သည့် ကိရိယာများမှလည်း ညစ်ညမ်း ပစ္စည်းအမျိုးမျိုးနှင့် အဆိပ်ခါတ်ကို ထုတ်လွှင့်သည်။

ယေဘုယျထုတ်လွှတ်သည် ညစ်ညမ်းပစ္စည်းများမှာ

(က) အဆုတ်တွင်းသို့ရောက်နိုင်သည့် အမှုန်သေးများ (**Particulate matter)**

(ခ) ဆာလဖာဒိုင်အောက်ဆိုဒ်များ အထူးသဖြင့် SO_2

(ဂ) ကာဗွန်မိုနော့ဆိုဒ်

(ဃ) ဟိုက်ဒရိုကာဗွန်အမျိုးမျိုး

(င) နိုက်ထရိုဂျင်အောက်ဆိုဒ် **NOx**

(စ) အော်လဒီဟိုဒ် (-**CHO** ပါ ဒြပ်ပေါင်းအုပ်စု)နှင့်

(ဆ) အမိုးနီးယား တို့ဖြစ်သည်။

ရေနံချက်စက်ရုံမှထုတ်လွှတ်သည့်ခါတ်ငွေ့များနှင့် အမှုန်သေးများသည် ပတ်ဝန်းကျင်ရှိ လေထု၊ မြေထုနှင့် ရေထုသို့သက်ရောက်မှု ထိခိုက်မှုအမျိုးမျိုးကိုဖြစ်ထွန်းစေ၏။

ဤအစီရင်ခံစာတွင် ဆောက်လုပ်ရေးမတိုင်မီ၊ ဆောက်လုပ်ရေးကာလ၊ စက်ရုံလည်ပတ်မှုကာလနှင့် စက်ရုံဖျက်သိမ်းသည့်ကာလ စသည်ဖြင့် ကဏ္ဍအဆင့်ဆင့်၌ ဖြစ်ပေါ်တတ်သည့်ထိခိုက်မှု၊ သက်ရောက်မှုများကို ရှင်းလင်းတင်ပြထားပါသည်။

ယေဘုယျအားဖြင့် စီမံကိန်းတိုးတက်ဖြစ်ထွန်းလာမှုတလျှောက် ဖြစ်ပေါ်နေနိုင်သည့် ထိခိုက်မှု၊ သက်ရောက်မှု အမျိုးအစားများမှာ အောက်ပါအတိုင်းဖြစ်သည်။

(က) အကျိုးပြုသက်ရောက်မှုများ (Positive Impacts)

- အလုပ်အကိုင် အခွင့်အလမ်းများပေါ်ထွန်းလာနိုင်မှု၊
- စီးပွားရေးလုပ်ငန်းဆိုင်ရာ အခွင့်အလမ်းများနှင့်အတူ လုပ်ငန်းမျိုးစုံဖြစ်ထွန်းလာမှု
- နိုင်ငံတော်နှင့်ပြည်နယ်အစိုးရအတွက် အခွန်ငွေတိုးမြှင့်ရရှိလာခြင်း၊
- ခရီးသွားလာမှုလွယ်ကူလာခြင်းနှင့် လမ်းများပိုမိုကောင်းမွန်လာခြင်း၊
- အနီးအနားပတ်ဝန်းကျင်တွင် လုံခြုံရေး အဆင့်အတန်းမြင့်မားလာခြင်း၊
- ရေနံစိမ်းလိုအပ်ချက်အတွက်ပြည့်မှီရန် ထောက်ပံ့ကူညီမှုရရှိခြင်း၊

(ခ) အကျိုးယုတ်စေသောသက်ရောက်မှုများ (Negative Impacts)

- ဆောက်လုပ်ရေးကာလအတွင်းဖြစ်ပေါ်တတ်သောမြေပြိုခြင်းနှင့်မြေလွှာအရည်အသွေးယုတ်လျော့ခြင်း၊
- စွန့်ပစ်ပစ္စည်းများထုတ်လွှတ်ခြင်း
- ဆူညံသံနှင့်တုန်ခါနှုန်းမြင့်မားခြင်း
- ဖုန်မှုန့်များလွင့်ခြင်းနှင့်ကားအိပ်ဇောပိုက်မှ အငွေ့များထွက်ခြင်း
- လေထုညစ်ညမ်းမှု
- မှန်လုံအိမ်ခါတ်ငွေ့များလေထုတွင်းရောက်ရှိလာရှိခြင်း
- အန္တရာယ်များဖြစ်ပေါ်မှု
- ရေနံဆီ၊ ဒီဇယ်ဆီဖိတ်မှု
- ရေသုံးစွဲမှုပမာဏများပြားလာခြင်း
- ယာဉ်သွားလာမှုများများပြားလာခြင်း
- လုပ်ငန်းခွင်ထိခိုက်ဒဏ်ရာရမှုများပြားလာနိုင်ခြင်း
- သစ်ပင်၊ ချုံနွယ်နှင့်သတ္တဝါငယ်များနေထိုင်ရာသဘာဝဆူးခြုံတောနှင့် တောချောက်များ ယုတ်လျော့ပျောက်ကွယ်လာခြင်း
- သဘာဝမြင်ကွင်းအလှယုတ်လျော့သွားခြင်း
- မီးလောင်ကျွမ်းနိုင်မှုအန္တရာယ်ရှိခြင်း
- မြေအောက်ရေလွှာပြင်၌ညစ်ညမ်းပစ္စည်းများပါဝင်နေခြင်း
- ဧရာဝတီမြစ်ပိုင်းတွင်ရေနေသက်ရှိတို့ မူလရှင်သန်မှု အနေအထားကိုပြောင်းလဲထိခိုက်စေခြင်း
- စီမံကိန်းပတ်ဝန်းကျင် ကျေးရွာများရှိမူလနေထိုင်သူများ၏ လုပ်ကိုင်နေကျ အသက်မွေးမှုကို ထိခိုက်ခြင်း
- ဆောက်လုပ်ရေးပစ္စည်းများ လိုအပ်ချက်မြင့်မားလာခြင်း
- ဆောက်လုပ်ရေးကာလတွင် အလုပ်သမားများ ထိခိုက်ဒဏ်ရာရရှိမှုနှင့် ဘေးအန္တရာယ်ရှိမှုများပြားခြင်း
- ယာဉ်တိုက်မှုများနှင့် ယာဉ်လမ်းပိတ်ဆို့မှုများပိုမိုဖြစ်ပေါ်နိုင်ခြင်း
- လက်ရှိလုပ်ကိုင်နေသောလယ်ယာကိုင်းမြေများယုတ်လျော့လာခြင်းစသည့် ထိခိုက်ပြောင်းလဲမှုများ စီမံကိန်းတိုးတက်မှု အဆင့်ဆင့်တွင် ဖြစ်ပေါ်နိုင်သည်။

၂၁။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆိုးကျိုးလျော့ချရေးလုပ်ငန်းများ (Mitigation Measure)

အဆိုပြုစီမံကိန်းကို အကောင်အထည်ဖော်ခြင်းအားဖြင့် ဖြစ်ပေါ်လာသောဆိုးကျိုးသက်ရောက်မှုများကို သက်သာစေခြင်း၊ ယုတ်လျော့စေခြင်းနှင့်ပပျောက်စေခြင်းဆိုသည့် ကြိုးပမ်းချက်များကို စီမံကိန်းအဆိုပြုသူက ဆောင်ရွက်မည်ဖြစ်ရာ အောက်ဖော်ပြပါတို့မှာ အချို့သောလုပ်ငန်း လုပ်ကိုင်နည်းများ ဖြစ်ကြ၏။

(က) လေထုညစ်ညမ်းမှုယုတ်လျော့စေရန်

(၁) မှန်ကန်သော ခါတ်ငွေ့မီးတောက်စနစ်ရှိရေးနှင့်ခါတ်ငွေ့အရောင်တောက်ပမှုလျော့ချရမည့် အပြင် မီးတောက်ထားရာနေရာသည် ကျေးရွာလူထုနေထိုင်ကြရာမှ ဘေးကင်းသည့်အကွာအဝေးတွင် ရှိစေရမည်။

(၂) ရေနံသန့်စင်မှုအဆင့်ဆင့်မှ ယိုထွက်လွင့်ထွက်လာသည့် ညစ်ညမ်းပစ္စည်းများ၏ အနေအထားကို အမြဲတမ်းစောင့်ကြပ်ကြည့်ရှုစစ်ဆေးမှုရှိရမည်။

(၃) အဆိပ်နှင့်ကင်ဆာဖြစ်စေသည့် အရာဝတ္ထုနှင့် ခါတ်ငွေ့များထုတ်လွှတ်မှုနည်းသည့် သန့်စင်နည်း ကို အသုံးပြုရမည်။

(၄) စီမံကိန်းနယ်မြေအတွင်း ယာဉ်ကြီးယာဉ်ငယ်များကို မလိုအပ်ပဲမောင်းနှင်ရွေ့လျားမှု မပြုစေရ။ အနှံ့အသက်ဆိုးဝါးသည့် မီးခိုးလုံးများ ထုတ်လွှင့်နေမှုနည်းစေရန် မီးတောက်ထုတ်လွှတ်မှုကို ထိန်းချုပ်သည့်စနစ်ရှိရမည်။

(ခ) ဖုန်မှုန့်ထမှုယုတ်လျော့စေရန် အောက်ပါနည်းလမ်းများကို အသုံးချရမည်။

(၁) လိုအပ်လျှင်ဆောက်လုပ်ရေးလုပ်ငန်းများ ဆောင်ရွက်နေသည့်နေရာအားလုံးကိုရေဖြန်းပေးခြင်း၊

(၂) သဲများ၊ ကျောက်များ၊ ခိုင်မြဲစွာတုတ်နှောင်ထားမှုမရှိသော ထရပ်ကားကြီးများကိုတာလပတ်ကာ ဖုံးအုပ်ပေးထားခြင်း၊

(၃) ကတ္တရာနှင့်အင်္ကတေခင်းထားမှုမရှိသောလမ်းများ၊ ကားရပ်နားသည့်နေရာများကို ရေဖြန်းပေးခြင်းနှင့် မြေများကျစ်လာအောင်ပြုပြင်ပေးခြင်း၊

(၄) အင်္ကတေခင်းထားသောလမ်းများနှင့် မြေခိုင်မာအောင်ပြုပြင်ထားသည့် သယ်ယူပို့ဆောင်ရေးလမ်းများနှင့် ယာဉ်ရပ်နားနေရာများတွင်နေ့စဉ်သန့်စင်ရှင်းလင်းရေးလုပ်ပေးခြင်းနှင့်

(၅) ဖုန်ထလွယ်သည့်နေရာများနှင့် မြေကွက်လပ်များတွင် သစ်ပင်၊ မြက်ပင်များစိုက်ပေးခြင်း၊

(ဂ) ရေပမာဏအမြောက်အမြားသုံးစွဲမှုလျော့ချရေး

(၁) ရေသုံးစွဲမှုကိုဖြုန်းတီးခြင်းဖြစ်မသွားစေရန် ထိန်းချုပ်ရမည်။

(၂) ပန်းခြံ၊ မြက်ခင်းနှင့် လမ်းဖုန်ထမှုတားဆီးရေးနှင့် ဆေးကြောခြင်းအတွက် သုံးမည့်ရေများကို ပြန်လည်သုံးစွဲသည့် **Recycling of water** ပြုလုပ်သင့်သည်။

(၃) မိုးရာသီတွင် ခေါင်မိုးကျရေကို သိမ်းဆည်းထားရမည်။

(၄) ရေသိုလှောင်ကန်များကို စစ်ဆေးခြင်းနှင့် စောင့်ကြပ်ကြည့်ရှုခြင်းပြုလုပ်ရမည်။

(ဃ) ဆူညံသံနှင့် တုန်ခါမှုနှုန်းတို့ကိုယုတ်လျော့စေရေး

(၁) ဆူညံသံကြီးသည့်စက်များကိုမောင်းနှင်ရသူတို့အား အသုံးပြုရန်မလိုအပ်သည့် အချိန်များတွင် စက်ကြီးများကိုမနှိုးရန်၊

(၂) ဆောက်လုပ်ရေးလုပ်ငန်းခွင်၌ အသံထိန်းကိရိယာပါသည့် စက်များကိုသာသုံးစွဲစေရန်၊

(၃) စက်များတွင်တပ်ဆင်ထားသည့် အသံထိန်းကိရိယာတို့ကို ပုံမှန်ဆန်းစစ်ပြင်ဆင်ရန်၊

(၄) ဆောက်လုပ်ရေးနှင့် ထုတ်လုပ်ရေးလုပ်ငန်းများ ဆောင်ရွက်ခြင်းကို ညဖက်၌မလုပ်စေဘဲ နေ့ဖက်၌သာ လုပ်ဆောင်စေရန်၊

(၅) စက်ကြီးများမောင်းနှင်ရသည့်သူများနှင့် ၎င်းတို့အနီးတွင် အလုပ်လုပ်ကိုင်ရသည့် အလုပ်သမားများ အားလုံးကို အသံကာကိရိယာကို နားတွင် ဖုံးကာထားစေရန်၊

(၆) ပိုင်တွင်းတူးသည့်လုပ်ငန်းတွင်အသံကာများ တတ်ဆင်ရန်၊

(၇) စီမံကိန်းနေရာတဝိုက်တွင် သစ်ပင်စိုက်၍ **buffer** အဖြစ်ထားရှိရန်တို့ဖြစ်သည်။

(c) စွန့်ပစ်ပစ္စည်းများလျော့နည်းစေရေး

(၁) မြေဖြတ်ထုတ်ခြင်းနှင့် မြေတွင်းတူးဖော်ခြင်းလုပ်ငန်းအတွက် မလိုအပ်ပဲ အပိုမလုပ်မိရန် ဆောက်လုပ်ရေးလုပ်ငန်း မြေပုံကိုသေချာစွာစီမံရေးဆွဲထားရမည်။

(၂) လိုအပ်သောပစ္စည်းများ အပိုအလျှံဝယ်မထားမိစေရန် ခန့်မှန်းတွက်ချက်မှု မှန်ကန်စေရမည်။

(၃) အမှိုက်ပုံများကိုသိသာသော အရောင်အမှတ်အသားဖြင့်စွန့်ပစ်ပစ္စည်းများခွဲခြား၍ ထည့်နိုင်ရန် စီမံပေးထားရမည်။

(၄) အမှိုက်သရိုက်နှင့်စွန့်ပစ်ပစ္စည်းများစွန့်ထားရန် မြေကျင်းတွင်းထဲသို့ ပုံမှန်သွားရောက်သွန်ပစ်ရမည်။ **Recycle, Reuse** နှင့် **Refurbish** ပြုလုပ်သုံးစွဲခြင်းသည် စွန့်ပစ်ပစ္စည်းများအား အပြင်သို့ စွန့်ထုတ်ပစ်လွှတ်ခြင်းထက် ပိုကောင်းသည့်လျော့နည်းစေခြင်းဖြစ်သည်။

(၅) အလုပ်သမားများအား အမှိုက်သရိုက်နှင့်စွန့်ပစ်ပစ္စည်းများ၊ အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများထိန်းသိမ်းရေးပညာပေးသင်တန်းပေးထားရမည်။

(d) သစ်တောများနှင့်သတ္တဝါများနေထိုင်ရာ သဘာဝဝန်းကျင်ရှင်သန်ပြန်လည်ဖြစ်ထွန်းစေရေး

(၁) အပူပိုင်းဒေသဝန်းကျင်ဖြစ်သည့် စီမံကိန်းဒေသရှိကျယ်ဝန်းသော လွင်တီးခေါင် တောရိုင်းမြေများတွင် သစ်စေ့ (**seeds**) များ လေယာဉ်ပေါ်မှကြဲချသည့် အစီအစဉ်ပြုလုပ်သင့်သည်။

(၂) သစ်ပင်များသဘာဝအလျောက်ပြန်လည်ဖြစ်ထွန်းလာမှုကောင်းမွန်စေရန်လူတို့က ခြံတောများ ဖျက်ထုတ်ခြင်း တွင်ကျယ်စွာမပြုလုပ်ရပေ။

(၃) ရေနံချက်စက်ရုံပတ်ဝန်းကျင်တဝိုက်ရှိ မြေရိုင်း မြေလပ်များတွင် သန်း၊ ဒဟတ်၊ ရှား၊ သနပ်ခါး၊ လျှော်ဖြူစသည်တို့ စိုက်ပျိုးသင့်သည်။

(၄) ကျေးလက်ဒေသနေ ပြည်သူများအထူးသဖြင့်အမျိုးသမီးများပါ ပါဝင်သောကျေးရွာအခြေပြု သစ်တော (**Community Forestry**) ထူထောင်ရေးပြုလုပ်ရမည်။

(၅) သစ်ပင်များပြန်လည် စိုက်ပျိုးမှုစီမံကိန်းများတွင်ကျေးရွာသူ၊ ကျေးရွာသားများနှင့်အတူ ကျောင်းသား လူငယ်များပူးပေါင်းပါဝင် လုပ်ဆောင်လျက် သစ်ပင်ငယ်များအရွယ်မရောက်မီ ထင်းမီးသွေးအတွက် အလွန်အမင်းခုတ်ဖြတ်ခြင်း တားဆီးရေးဆောင်ရွက်ကြရမည်။

(ဆ) စိုက်ပျိုးလယ်ယာ မြေယုတ်လျော့မှုကိုဖြည့်ဆည်းခြင်း

လယ်သမား၊ ယာသမားများအတွက် ဆုံးရှုံးသွားသော လယ်ယာမြေများကိုအစားထိုးရန် အတွက် လယ်ယာမြေသစ်ဖော်ထုတ်ရေး စီမံကိန်းနှင့်အတူ သင့်လျော်သောမြေယာလျော်ကြေးများကို အမှန်တကယ် ပေးကမ်းနိုင်ရမည်။

(ဇ) ပြန်လည်နေရာချထားမှု (Resettlement)

အိမ်ရာမြေစွန့်ခွာပေးရသည့် တောင်သူလယ်သမားများအတွက် ပြန်လည်နေရာချထားရေး စီမံကိန်း နှင့်အတူ ၄င်းတို့၏လူမှုဘဝမြင့်မားရေးကိုသေချာစေသည့် အစီအမံများဆောင်ကြဉ်းပေးရမည်။

(ဈ) ပတ်ဝန်းကျင်လူထုကျန်းမာရေးထိခိုက်မှု

ပတ်ဝန်းကျင်လူထုကျန်းမာရေးကိုမထိခိုက်စေရန် ရေနံသန့်စင်မှုဖြစ်စဉ် အဆင့်ဆင့်မှထုတ်လွှတ် သည့် ညစ်ညမ်းပစ္စည်းအမျိုးမျိုးအနက် အဓိကဖြစ်သော ကာဗွန်ဒိုင်အောက်ဆိုဒ်ကို ၉၀% ထိလျော့ချနိုင် ရမည်။

(ည) ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း (Cumulative Impact Assessment)

ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်းအတွက် အဆိုပြုစီမံကိန်းပတ်ဝန်းကျင်တည်နေရာနှင့် အနီးတဝိုက် ပတ်ဝန်းကျင်တို့တွင် ဖြစ်ပေါ်လာနိုင်သည့် ကောင်းကျိုး၊ ဆိုးကျိုးသက်ရောက်မှုတို့ကို **VCE** ခေါ် **Valued Environmental and Social Components** များဖြစ်သည့် လေထုဝန်းကျင်၊ ရေမျက်နှာပြင် (ရေချိုငါး သယံဇာတ)၊ ညစ်ညမ်းပစ္စည်းရောက်နိုင်သည့် မြေလွှာနှင့် သစ်တောများပေါက်ရောက်နိုင် သည့် ဂေဟစနစ်နှင့် တောရိုင်းတိရစ္ဆာန်တို့ မှီတင်းနေထိုင်ရာ သဘာဝပတ်ဝန်းကျင်တို့ကို သတ်မှတ်၍ သက်ရောက်မှုများအား အမျိုး အစားခွဲခြားလျက် တန်ဖိုးဖြတ်သည့် ချဉ်းကပ်နည်းဖြင့် တင်ပြထားပါသည်။ ထိခိုက်မှု ယုတ်လျော့နိုင်သော နည်းလမ်းများကိုလည်း ဖော်ပြထားပါသည်။

၂၂။ ပြည်သူလူထုနှင့်တိုင်ပင်ညှိနှိုင်းခြင်း (Public Consultation)

ပြည်သူလူထုနှင့်တိုင်ပင်ညှိနှိုင်းခြင်းပထမအကြိမ်ကို ၂၂-၂-၂၀၁၅ နေ့က နံနက် ၁၁နာရီခန့် ညောင်ပင် သာရွာ အ.မ.က ကျောင်းခြံဝင်းအတွင်းတွင် ပြုလုပ်ခဲ့ပါသည်။ တက်ရောက်သူများ ၇၀ ခန့်တွင် ကျေးရွာ အုပ်ချုပ်ရေးမှူး ညောင်ပင်သာအုပ်စုမှ ရပ်မိရပ်ဖ၊ အဖွဲ့အစည်းများမှ ဝန်ထမ်းများ၊ ဆရာ ဆရာမများ၊ စိတ်ပါဝင်စားသည့် ကျေးရွာသူ ကျေးရွာသားများနှင့် ကျောင်းသား ကျောင်းသူများပါဝင်ကြသည်။ **MSR** ၏ **EIA** လေ့လာရေး အဖွဲ့ဝင်များမှ အဆိုပြုစီမံကိန်းဖြစ်သည့် ရေနံချက်စက်ရုံသစ်ကို သံပရာကန် ယခင်စက်ရုံ ဟောင်းရှေ့မြေကွက်လပ် တွင်တည်ဆောက်ရန် အစိုးရ **လျှပ်စစ်နှင့်**စွမ်းအင်ဝန်ကြီးဌာန **MPE** မှ စီမံကိန်း ဆွဲထားကြောင်းနှင့် တက်ရောက်လာသူများက စက်ရုံသစ်ကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် အကျိုးဆက်နှင့် သက်ရောက်မှုများအကြောင်း မေးမြန်းချက်များကို ဖြေကြားခဲ့ကြပါသည်။ ထို့နောက်ကျောင်းဝင်းအတွင်း တပ်ဆင်ထားသည့်လေအရည်အသွေး တိုင်းတာသည့် စက်အကြောင်းနှင့် အဘယ်ကြောင့် လက်ရှိလေထဲတွင်

ရှိနေသည့် အရည်အသွေးကိုတိုင်းတာကြောင်း ရှင်းပြခဲ့ကြပါသည်။ တက်ရောက်လာသူများ၏ အကြံဉာဏ်ပေးမှုများကို တောင်းခံ၍ မှတ်တမ်းတင်ယူခဲ့ပါသည်။

ပြည်သူလူထုနှင့် တိုင်ပင်ဆွေးနွေးခြင်း ဒုတိယအကြိမ်ကိုကား ၂၂-၂-၂၀၁၅ ရက်နေ့ နေ့ခင်း ၂း၀၀ နာရီခန့်တွင် မင်းလှမြို့ အ.ထ.ကကျောင်း အစည်းအဝေးခန်းမ၌ကျင်းပခဲ့ပါသည်။ မြို့နယ်အုပ်ချုပ်ရေးမှူး၊ တပ်မတော်စက်မှုလက်မှုစက်ရုံများ၏ တပ်မှူးများ၊ မြို့နယ်ရပ်မိရပ်ဖများ၊ ဆရာဆရာမများနှင့် စိတ်ပါဝင်စားသူများအပါအဝင် စုစုပေါင်းတက်ရောက်သူ ၆၀ ခန့်ရှိပါသည်။ တက်ရောက်သူများအနေဖြင့် လေထုညစ်မှုပြဿနာ၊ မြေယာများအသိမ်းခံရမှုပြဿနာ၊ ကျန်းမာရေးထိခိုက်နိုင်မှုပြဿနာများကို ဆွေးနွေးတင်ပြကြပါသည်။

ဆွေးနွေးအကြံပြုသူများအနေဖြင့် စက်ရုံသစ်ပေါ်ပေါက်လာမည့်အပေါ် လိုလိုလားလား ကြုံဆိုမှုပြုကြပြီး၊ စက်ရုံတည်နေရာအနီးမှဘွဲ့ရလူငယ်များ အလုပ်အကိုင်ရရှိနိုင်မည့် အခွင့်အလမ်းကို မျှော်ကိုးကြပါသည်။

စီမံကိန်းတည်နေရာအနီး ပတ်ဝန်းကျင် ကျေးရွာ ၇ရွာမှ စိုက်ပျိုးတောင်သူ မိသားစုများ၏ လူမှုစီးပွားအခြေအနေစီးပွားရေးစစ်တမ်း သတင်းအချက်အလက်များကို အိမ်တိုင်ရာရောက် သွားရောက်တွေ့ဆုံမေးမြန်း၍လည်း စုဆောင်းမှတ်တမ်းယူခဲ့ပါသည်။ ထိုသို့တွေ့ဆုံစဉ်လူထု၏ အမြင်နှင့်ယူဆချက်များကို အစီရင်ခံစာတွင် ပြည့်စုံစွာ ဖော်ပြထားပါသည်။

၂၃။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုမှုစီမံချက် (Environmental Management Plan and Monitoring Plan)

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည် စီမံကိန်းသက်တမ်း (**Project Lifecycle)** တစ်လျှောက် ဖြစ်ပေါ်လာသည့်ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားအပေါ်သက်ရောက်မှု ပြင်းထန်ခြင်းအား ထိ်နှိုးချုပ်ရန် မူဘောင်နှင့် လုပ်ဆောင်ရမည့်အစီအမံများ တင်ပြထားခြင်းဖြစ်သည်။ စီမံကိန်းဆောင်ရွက်ရမည့် အသေးစိတ်ဒီဇိုင်းကိုဆွဲသားပြီးပါက **EMP** ကို အသစ်တဖန်ဖြည့်စွက်ရေးဆွဲရန် လိုအပ်ပါသည်။ ဤစီမံခန့်ခွဲမှု အစီအစဉ်၌ ရေသယံဇာတနှင့် စက်ရုံမှထုတ်လွှတ်သည့် ညစ်ညမ်းပစ္စည်းပြဿနာများမှသည် အလုပ်သမားနှင့် မှီတင်းနေထိုင်ကြသော လူပုဂ္ဂိုလ်တို့၏ ကျန်းမာရေးပြဿနာများထိ ဖြေရှင်းရန်နည်းလမ်းများကို **Risk Assessment** အားအခြေခံလျက် ရေးသားတင်ပြထားခြင်း ဖြစ်သည်။

စီမံခန့်ခွဲရန် အသေးစိတ်လိုအပ်ချက်များ၊ တာဝန်နှင့် ဝတ္တရားများ၊ ဘက်ပေါင်းစုံစီမံချက်များနှင့် စီမံကိန်း အကောင်အထည်ဖော်မှုနှင့် ဖျက်သိမ်းသည်အထိ ဆောင်ရွက်ရမည့် လုပ်ငန်းများကို လမ်းညွှန်တင်ပြထား ပေသည်။

စီမံကိန်း အောင်မြင်စွာအကောင်အထည်ဖော် ဆောင်ရွက်ရန် ထိရောက်သော စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ် ရှိရန်လိုအပ်၏။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် **(EMP)** ၌ စီမံကိန်းရည်မှန်းချက်များ၊ တရားဥပဒေဆိုင်ရာလိုအပ်ချက်၊ စီမံခန့်ခွဲသည့်လုပ်ငန်းများ၊ စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ် လုပ်ငန်းအကောင်အထည်ဖော်မှု အချိန်ဇယားနှင့် တာဝန်ဝတ္တရားများကိုပါ ဖော်ပြထားပါသည်။ စောင့်ကြပ်ကြည့်ရှုမှုနည်းလမ်း၊ အကြိမ်နှင့်ကာလ၊ စောင့်ကြပ်ကြည့်ရှုမှုလုပ်ငန်းများလည်း ပါဝင်သည်။ စောင့်ကြပ်ကြည့်ရှုရေး ဆောင်ရွက်ချက်များကို မည်သို့မှတ်တမ်းများ ပြုလုပ်ထားရမည်ကိုလည်း ထည့်သွင်းဖော်ပြထားပါသည်။

မြန်မာ့ရေနံဓါတုဗေဒလုပ်ငန်း **(MPE)** အနေဖြင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်တို့ကို ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့ချရေးအစီအစဉ်နှင့် လုပ်ငန်းများအား လိုက်နာဆောင်ရွက်ရန် ကတိကဝတ်ပြုလျက်၊ စည်းမျဉ်းစည်းကမ်းများကိုလည်းလိုက်နာ၍ စီမံကိန်းအကောင်အထည် ဖော်ဆောင်ရာ လုပ်ငန်းတလျှောက်လုံး အန္တရာယ်ကင်းဝေး လုံခြုံမှုရှိစေရန် ကြိုးပမ်းမှုပြုထားသည်။ စောင့်ကြပ်ကြည့်ရှုရေး လုပ်ငန်းကို ကုမ္ပဏီ၏ **Project Management Unit** မှဆောင်ရွက်မည် ဖြစ်ကြောင်းနှင့် ကုန်ကျစရိတ်အသုံးအစွဲများ ပြည့်စုံစွာလျာထားသတ်မှတ်ထားကြောင်း ခိုင်ခံ့စွာရပ်တည်မှုရှိသည်ကို တွေ့ရှိရ သည်။ **MPE**၏ ဆောက်လုပ်ရေး ကန်ထရိုက်တာများအနေဖြင့် **EMP** ပါအချက်အလက်များကို မှန်ကန်စွာ လိုက်နာမှုရှိစေရန် ကြီးကြပ်ဆောင်ရွက်မည်ဟု ကတိကဝတ်ပြုထားကြောင်းတွေ့ရှိရပေသည်။

၂၄။ နိဂုံးနှင့်အကြံပြုချက်များ (Conclusion and recommendations)

ဤအဆိုပြုရေနံချက်စက်ရုံသစ် စီမံကိန်းမျိုးကား တိုင်းပြည်အတွက်လိုအပ်သည့်စီမံကိန်းမျိုးဖြစ်၏။ ဤစီမံကိန်းမှ အကျိုးသက်ရောက်မှုများမှာအလုပ်အကိုင်ဖန်တီးနိုင်မှု၊ လုပ်ငန်းကဏ္ဍပေါင်းစုံ ဖွံ့ဖြိုးလာမှုနှင့်အတူ တိုင်းပြည်စီးပွားရေး တိုးတက်လာမှု၊ ဒေသအတွင်း အကောင်းဆုံး မြေယာအသုံးချနိုင်မှု၊ စွန့်ပစ်ပစ္စည်း ဘက်ပေါင်းစုံစီမံနိုင်မှုနှင့် ပြည်တွင်းဝင်ငွေခွန် မြင့်မားလာမှုတို့ ဖြစ်ကြသည်။ သို့ရာတွင် ရေနံချက်စက်ရုံ၏ ပတ်ဝန်းကျင်အပေါ် ညစ်ညမ်းမှု ဖြစ်ထွန်တတ်မှုကြောင့် ဆိုးကျိုးသက်ရောက်မှုများကို

အတတ်နိုင်ဆုံးလျှော့ ချရပေမည်။ **ESIA** လေ့လာမှု အဖွဲ့အနေဖြင့် ဤစက်ရုံစီမံကိန်း မဖြစ်မြောက်နိုင်အောင် တားဆီးနိုင်သည့် သက်ရောက်မှုမျိုးကို မတွေ့ရှိရပေ။

ဤစီမံကိန်းကိုပတ်ဝန်းကျင်ရှာများ၌ မှီတင်းနေထိုင်ကြသော ကျေးရွာသူ ကျေးရွာသားများနှင့် မင်းလှမြို့နယ် လူထုမှ ကြိုဆိုကြပေသည်။ ပညာတတ်လူငယ်များအလုပ်အကိုင်ရရှိလာနိုင်ရေးကို လူထုက မျှော်ကိုးကြောင်း တွေ့ရှိရပါသည်။

သို့နှင့် ကျွန်ုပ်တို့ပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာရေးအဖွဲ့အနေဖြင့် တင်ပြထားသည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်များ၏ လမ်းညွှန်ချက်များကိုလိုက်နာလျှက် ဤအဆိုပြု စီမံကိန်းကို ဆက်လက်အကောင်အထည်ဖော် ဆောင်ရွက်ရန် ထောက်ခံတင်ပြပါသည်။

ရေနံချက်စက်ရုံတည်ဆောက်မည့်နေရာတဝိုက်၌ လူနေရပ်ကွက်များ ရှွေ့ပြောင်းနေရာချထား ရမည့် ပြဿနာမရှိသော်လည်း အသစ်ဆောက်လုပ်ရမည့် ရေနံပိုက်လိုင်းတလျှောက်မှ လူနေအိမ်ခြေများနှင့် စိုက်ပျိုးခင်းများအတွက် ပြောင်းရွှေ့နေရာချထားရေးနှင့် မြေယာနှင့်သီးနှံ လျော်ကြေးပေးဆောင်မှုကို အတော်ပင်ကြိုးစားလုပ်ဆောင်မည့် အနေအထားရှိပေသည်။ ဆောက်လုပ်ရေးကာလအချိန်တို့တွင် လယ်ယာကိုင်းကျွန်းလုပ်ဆောင်မှု ရပ်ဆိုင်းနေရမည်ဖြစ်သော်လည်း စီမံကိန်းဆောက်လုပ်ရေးတွင် ဝင်ရောက်လုပ်ကိုင်နိုင်ခြေရှိပေသည်။

စီမံကိန်းအဆိုပြုသူဘက်မှ လုပ်ဆောင်ရမည့်ကျေးရွာလူထုအကျိုးပြုအစီအစဉ် **CSR (Corporate Social Responsibility)** အစီအစဉ်ကို ဆောက်လုပ်ရေးကဏ္ဍပိုင်းနှင့် လုပ်ငန်းလည်ပတ်မှု ကဏ္ဍပိုင်းကာလများတွင် တပြိုင်တည်းဆောင်ရွက်ပေးရန်လည်း တိုက်တွန်းအကြံပြုအပ်ပါသည်။

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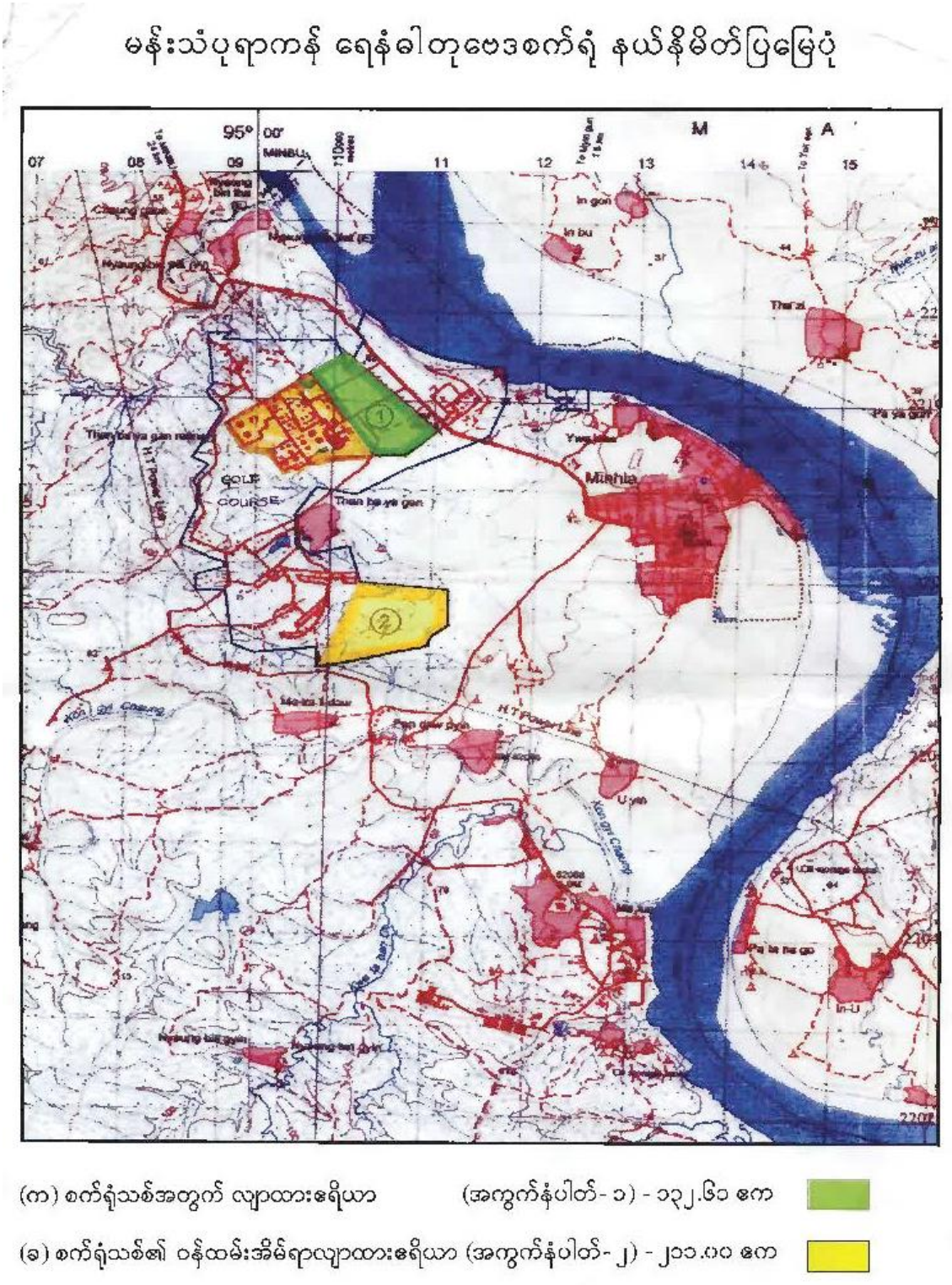
Executive Summary (English)

Introduction



Project boundary area (See larger map in appendix 25)

The objective of this report is to present the work-done, findings and impact assessment made along the study process of ESIA for the new refinery project proposed by MPE to be built in Mnhla, Magwe Region. World Bank has classified Refinery Project as Category A and the EIA Directive (85/337/EEC) has listed it under projects subject to mandatory EIA since they are known or considered to have potentially significant adverse impacts on the environment and

Myanmar newly enacted law of “Environmental Conservation Law” demands the developer to conduct an EIA for the project which can have significant impacts on the environment and the people, MPE commissioned MSR to conduct EIA study for this project.

Petroleum refineries process large amounts of raw materials and consume substantial amounts of energy. They also use large quantities of water. Emissions to air and water are generated as well as various solid and liquid waste are extracted. Therefore, proposed project will pose variety of environmental and socioeconomic impacts and it also provide economic and social benefit to the local community and to the national economy. This report provides effective strategies to help mitigate the negative impacts and maximize positive impacts with an environmental management plan and enable the project proponent to make major decisions and commitments for betterment.

Purpose of the EIA Report

Before implementing this project, a procedural requirement entails submitting an EIA/SIA report to the Myanmar Investment Commission (MIC), with an approval from the Ministry of Natural Resources and Environmental Conservation (MONREC), since the Department of Environmental Conservation (ECD) serves as an authorized environmental expertise to assess the report.

The objectives of this ESIA study are:

1. to obtain baseline information and examine the existing environmental situation on and around the project site and socio-economic situation of the community—people on or near the project site;
2. to ensure the environmental and social considerations are explicitly addressed and incorporated into the development decision process;
3. to assess potential impacts—positive and negative— of the project that will affect the people living in the buildings of the project and the area in and around the project site; and
4. to recommend mitigation measures to minimize the negative impacts and to enhance the positive impacts.

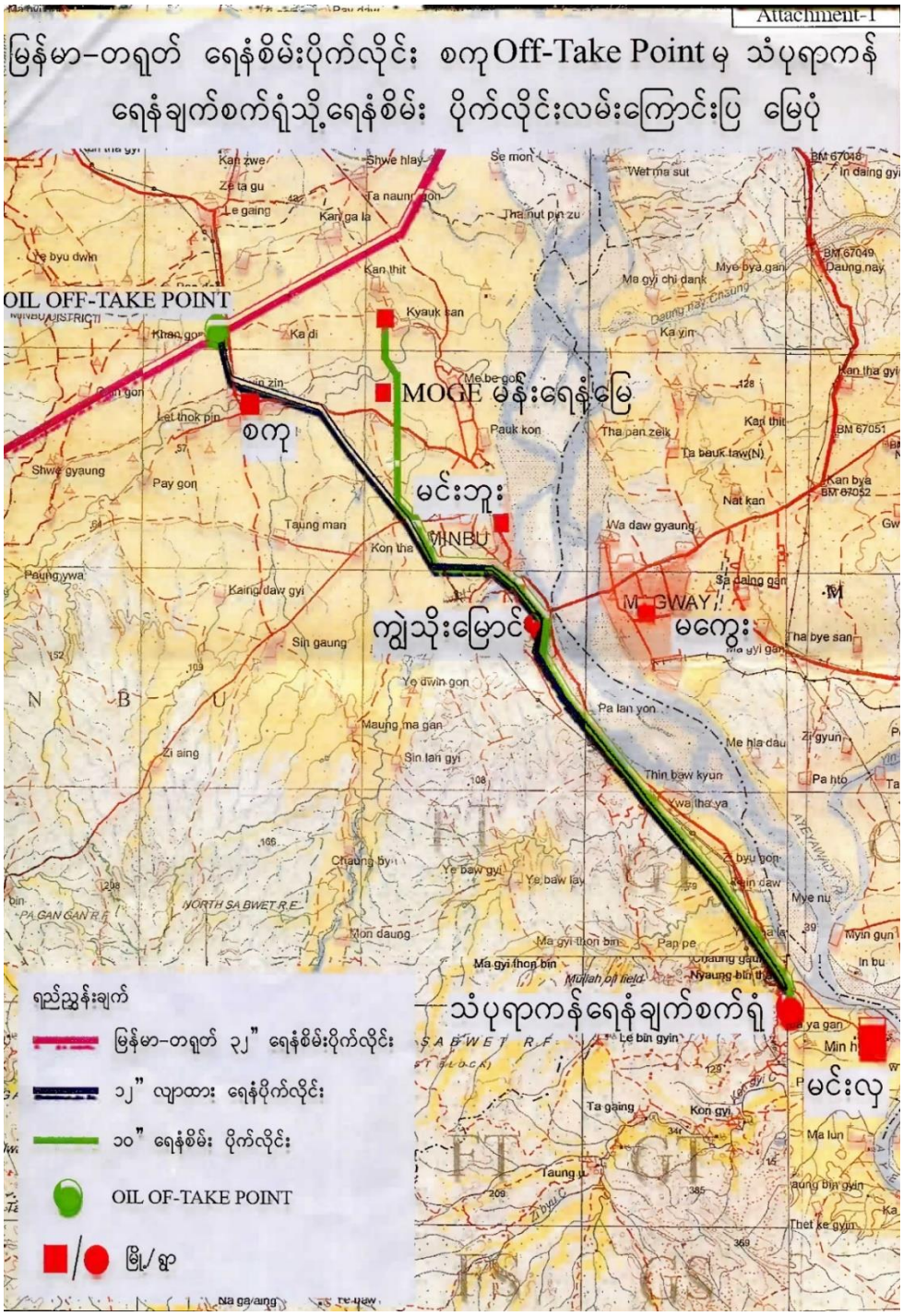
The scope of work

The EIA Study Team of Myanmar Survey Research conducted the study by incorporating the following outputs along with the undertaking of activities of the EIA process.

- The location of the proposed development project
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- The objectives of the proposed project.
- The technology, procedures and processes to be used, in the implementation of the project.
- A description of the potentially affected environment.
- The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- To recommend a specific environmentally sound and affordable wastewater management system.
- Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.
- Analysis of alternatives including project site, design and technologies.

- An environmental management and monitoring plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including timeframe and responsibility to implement the measures.
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.

Project Description and Location



Proposed pipeline from off-take point to Refinery project area (See larger map in appendix 26)

Project Background

The new refinery project is planned to be constructed at the 132.61-acre wide tree-covered land of current existing petrochemical complex (Thanbayakan) area located in Minhla Township, Magway Region. A 211-acre farm land situate proximal in the south of current refinery will be used for storage tanks and other associated structures for new refinery. Therefore, total land area for new proposed plant is 343.61 acres. A 25-mile long pipe line from off-take point, located near Saku, to the proposed project site is also included in the project, for it will carry the foreign crude oil from the Southeast Asia Crude Oil Pipeline.

The new oil refinery will be built within 3 years of time and will have the capacity of refining 3.5 million tons of crude oil per year (78,484.84 barrels per day). The foreign crude oil (Kuwait Crude Oil 50%, Saudi Light Crude Oil 25%, and Saudi Mediate Crude Oil 25%) will be taken from the Southeast Asia Pipeline-SEAP and the products will be produced to meet the Euro IV standard.

The new refinery will be built with international standard to include nine main process units and waste water treatment plant, and a flare system.

1 Crude Oil Distillation Unit,
2 Vacuum Distillation Unit,
3 Delayed Coker Unit
4 Hydrocracker Unit
5 Diesel Hydrotreater Unit
6 Kerosene Hydrotreater Unit
7 Naphtha Catalytic Reformer Unit,
8 Hydrogen Production Unit,
9 Sulphur Recovery Unit,
10 Power Station

Rationale of Project

The Myanmar Petrochemical Enterprise (MPE) runs the country's three oil refineries—in Chauk (6,000 barrels per day or BPD), Thanbayakan (25,000 BPDs) and Thanlyin (20,000 BPD)—with a total installed capacity of 50,000 BPD. However, the refineries are old and average utilization rates are as low as 41%.

As local production is not sufficient to meet the increasing demand of local fual market, a large amount of fuels has been imported to Myanmar. In 2014 alone, 12,484.535 barrels of diesel, 7,118,797 barrels of octane, and 780,215 barrels of Jet A1, with a total value of 2,463 million United States dollars, were imported.

The proposed new oil refinery is to fill the gap. It will increase local production significantly and substitute the import of fuels, and save billions of US dollars yearly.

The current capacity of local products is far below than the local demand. Production of the new refinery's outputs from 3.5 million tons of crude oil will meet the current demand and can avoid the dependency of import.

The plan of new oil refinery to process the crude oil from the Southeast Asia Pipeline is desirable for Myanmar. It is of national importance and necessary to achieve the status of energy independence.

Legal and Institutional Framework

The Environmental Conservation Law, or the Pyidaungsu Hluttaw Law No.9/2012, and its executive regulations set the overall framework for environmental protection in Myanmar. The

Environmental Conservation Rules have been issued by the Ministry with Notification No. 50/2014. According to the section 56 of Environ C Rules, an Environmental Impact Assessment (EIA) study shall be carried out by a qualified third party accepted by the Ministry. The project proponent will submit the EIA report together with the application for a project licenses. The Ministry of Natural Resources and Environmental Conservation of Myanmar is the competent national authority in environmental management as per the Environmental Conservation Law, or Rule. The EIA procedure has been formally issued as Ministry's notification No.616/9/2015 since 29th December 2015. This notification spells the requirement of EIA for such kind of project.

A section of legislative framework for the project is also stated by focusing on the enacted laws, regulations and guidance to develop the project environmental and social friendly responsible business in Myanmar.

A review of the National Planning Policy Framework, relevant Government Guidance (including the National Planning Practice Guidance), and most of the relevant laws of various sectors run by the Government in relation with establishing an oil refinery plant is described in this section of the report.

A full assessment of the planning policy context for the proposed development is also mentioned while international standards UNEP, IFC and ADB Guidelines and Emission Guidelines issued by MONREC are referred.

A summary of activities undertaken during the EIA study

First, MSR's EIA team conducted the biophysical and socio-economic examination of the project sites and it surrounding area as baseline data collection and analysis. Then the impact identification was made along with procuring the pertinent institutional information for impact study of the project. Collected samples of soil and water were tested in reliable laboratories and analyzed.

Potential impacts of proposed project are anticipated, predicted and evaluated to determine

the significance. Mitigation measures were identified and analyzed after impact significance was assessed. Public consultation has been done in the form of undertaking FGD (Focus Group Discussion) involving of various social groups. Meeting and discussion with local people living in nearby villages about the project was also conducted to get public opinion and idea upon relevancy of selected alternative.

A summary of an EMP (Environmental Management Plan) with a budget for the implementation of the mitigation measures, the human resources affected by the project proponent undertaking the implementation of the EMP, and the internal and external monitoring requirements.

Then the team provides the recommendations in the ESIA final report.

Project Alternative

Production Processes Alternatives

Crude oil refining involves separation of crude into various hydrocarbon fractions of specific distillation ranges.

Depending on the proposed project requirements, the major categories of refinery processes are considered as possible alternatives:

- Physical separation processes,
- Chemical conversion processes,

- Purification or treating processes,
- Utilities and General facilities, and
- Environmental Controls.

The above major categories of production processes have been globally accepted for an environment friendly operation of petroleum refinery.

Nevertheless, the proposed refinery plant will adapt depending on what potential EPC (Engineering, Procurement and Construction) contractor selects different alternative production processes. Processing methods in refining usually depends on the quality of the crude oil and the product distribution requirement.

Best Alternative Technology

MPE shall adopt a technology that conforms to the Oil and Gas Sector (O&G) accepted standards. BAT assessment can ensure that most efficient and state-of-the-art technologies to reduce the environmental impact.

Alternatives of the Location of New Pipeline

Three different routes were assessed in this ESIA study. The ROW which goes straight from off-take point to Kyauk San is recommended, because the pipeline will cross only 3 villages with the length of 24,838 feet (7.57km) and compensation money will be least among the three options.

Need of the Project Option is recommended

The evaluation of alternatives to the proposed project in the context of the ESIA process has been carried out on the basis of the current status of the South East Asia Pipeline (SEAP) operated by China National Petroleum Corporation (CNPC) and the MOU signed between Myanmar‘s Ministry of Energy and CNPC for mutual cooperation on the proposed new oil refinery project. The SEAP pipeline runs from Kyaukphyu Port to Kunming in Yunnan Province of China. The new refinery project is of national importance. It will increase local production of fuel and reduce the amount of fuel imports significantly. It is expected to contribute to the ultimate goal of energy independence.

Transportation of crude oil

The crude oil for the proposed oil refinery will have to be obtained from the existing SEAP pipeline and there are two options of transporting the crude oil.

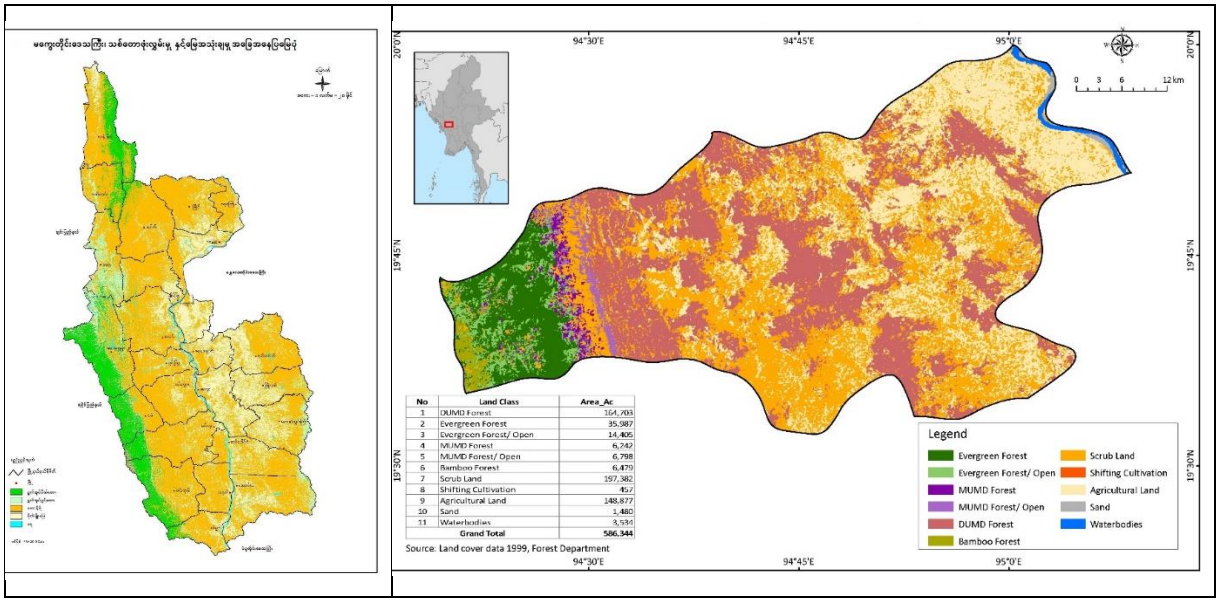
Road transport or vehicular transport from off-take point to the Refinery in Minhla Township, thousands of trips by oil tankers to transport 3.5 million tons of crude oil per year, will not be cost effective. Pipeline transmission should be favoured.

Affected Environment

The proposed refinery project area is located near Minhla, a north-western town of Thayet District of Magwe Region which lies geographically at the center of Myanmar, alongside and at the western bank of the Ayeyawady River’s mid-stream section. The new refinery is to be built near the old one which is currently running oil refinery located near the Thanbayakan village 2.5 Km west of Minhla. In fact this area is a western part of Myanmar’s major ecoregion, Dry Zone known due to its relatively low rainfall. The landscape of the area has a flat to gently undulating topography with an average elevation of about 150 m (UNDP/FAO, 1983). The topography of the area is generally undulating. Most of the local streams are dry for much of the year. In addition to rice and millet, crops grown in the surrounding environment include

sugarcane, fruit, legume, peanut or groundnut, maize, onion and sesame.

The land surface is characterized by clay, sandy loam and sandy soils that include gravel and soils have low fertility and less organic matters. Potassium levels are also low for agriculture. The lack of moisture in the ground constitutes a major constraint to crop growth during periods of inadequate rainfall. The western border of the dry zone is to some extent covered by dry deciduous forest, a dominant type among the different vegetation types of Myanmar.

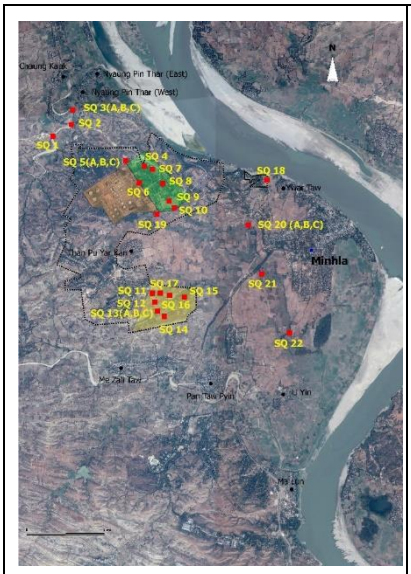


No	Land Class	Area_Ac
1	DUMD Forest	164,703
2	Evergreen Forest	35,987
3	Evergreen Forest/ Open	14,405
4	MUMD Forest	6,742
5	MUMD Forest/ Open	6,798
6	Bamboo Forest	6,470
7	Scrub Land	197,382
8	Shifting Cultivation	457
9	Agricultural Land	148,877
10	Sand	1,480
11	Waterbodies	3,590
	Grand Total	586,344

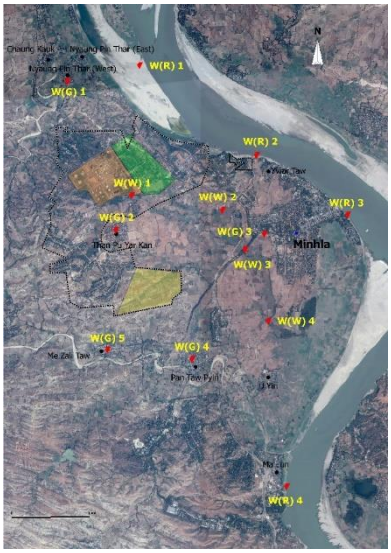
Forest cover and Landuse map of Magway Region and Minhla Township

Baseline data collection and survey methods

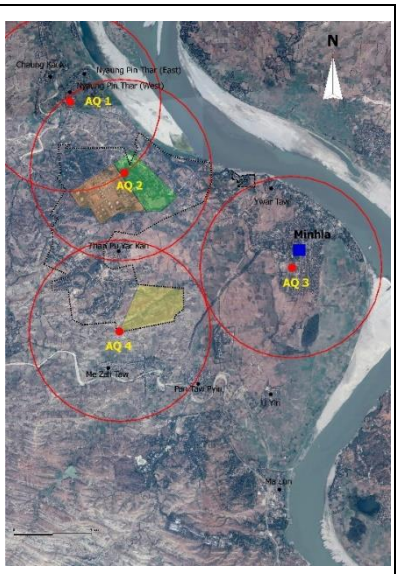
Baseline data for physical component, samples were collected at possible impacted locations of soil (**SQ**), groundwater (**WG**), river water (**WR**), waste water **(WW**), and ambient air **(AQ**) and places where s**ound pressure occurs**. For biological component, direct observation of presence of existing fauna and flora at the proposed project site, surrounding of villages, current pipeline from Sagu to Thanphyakan, along waste water channel and jetty area.



Location of soil samples



Location of water samples



Location of Air quality and noise pressure samples

Air Quality

Air quality sampling sites were chosen with the dispersion model. This model covered 3-5 kilometers radius of the sampling sites; so that air quality measurement could cover some villages and residences of some townships. Efficiency of Ambient air quality and Noise pressure testing machines can roam 5 miles radius circle.

Ambient air quality test (Table 20) shows that Total Suspended Particulate Matter (TSPM) from Malon Zayut Kone site (AQ-4) shows higher (229.43) than guideline value (200µgm/m^3).

Respiratory Particulate Matter (PM_{10}) of all sample sites are higher than WHO standard.

SO_2 concentration of all sample sites are too much lower than WHO guideline value.

NO_2 in 24-hour mean at all sites are lower than WHO guideline value.

Sound Pressure Survey

Maximum Sound Pressure Level (Lmax) and the Equivalent Continuous Sound Level (L_{eq}) were measured at available site of the Project area.

All values (Table 21) are not increased that the position of observation should be taken into account.

Water Quality

Ground water samples from nearest tube wells, Irrawaddy river water from upstream and downstream and waste water samples from existing disposed water drainage were collected. Water samples were analyzed at the Occupational and Environment Health Department Laboratory.

Water samples from tube wells which are used by village people at surrounding area of different locations at nearby villages were collected.

The bacterial growth of total Coliform and Fecal Coliform at WG-1 (Nyaungpinthar West) are higher than reference value.

The total dissolved solid content and alkalinity are quite higher in Thanpyarkan tube well, WG-2. Water from tube well WG-3 of northern Minhla indicates higher alkalinity. There are higher bacterial growth of total coliform and alkalinity in WG-4, Nothern Pandawpyin tube-well. Only samples from WG-5 of Mezedaw show lower value than reference limit.

River water samples were collected in 4 points

Water sample of Malun foreshore at WR-4 point indicates higher content of oil and grease is 15.35 ppm, higher than reference value of 10 ppm, while other samples are good in quality.

Surface Water (Waste Water) (WW)

The results of the analysis of collected Waste water samples (Table 16) are normally lower than reference value.

Soil

MSR study team collected soil samples from 22 points selected at proposed site and surrounding by setting 3Km radius from the existing refinery plant (Map 14). Soil properties were tested and classified in Laboratory of Land-use Division, Agricultural Department.

These soils have neutral pH value in upper surface and high value in lower surface. The soils are extremely alkaline and high in calcium and magnesium content but sufficient amount of potassium and low in humus and other nutrient content. However, there is no nutrients problem and soil soluble salts problem in these soils.

There is no problem in Electrical conductivity and residual sodium carbonate. In the result of heavy metal analysis, the contents of lead (Pb) and arsenic (As) are relatively low, but mercury

(Hg) content is higher than maximum permitted level. It might be due to excessive use of herbicide, fungicide and growth-oriented tonic which are exported from other countries for leguminous crops.

Baseline Study of the Pipeline Area

MSR's study team visited the existing pipeline area where indications of pipeline running on land and shallow groove from November 27th to 30th, 2015. Exposed segments of the exposed pipeline in several places in the survey area were recorded and found stone markers for the pipeline in two places: one place beside Minbu-Saku motor road near Kywe Te village and the second place beside the Minbu-Ann motor road near Kan Ye Village.

Biological Baseline

The main objective of the field study is to know the presence and absence of different types of animal and trees both in the project site and its adjacent areas that surround it. The biological environment setting here is described in terms of habitat types, selected floral and faunal species, endangered or threatened species, and some special features of existing ecosystem's status and quality with a perspective of how to maintain some values of ecological quality in rural and natural setting.

Information of plants, wildlife and animal presence is largely relied on interviewing the local inhabitants/villagers and secondary data, while tracks and signs were observed with direct eye sight as we walk in the field by using Transect Survey Method.

Thus, 157 species from 41 Families of trees and plants, 4 species of mammals, 24 species of birds, 5 species of herpetiles and 14 species of fishes were recorded.

Forests currently existing near the project area are Than-Dahat forest and Thorn forest. Dominant species grown in such forest are: Than (*Terminelia oliveri*), Dahat (*Tectona hamiltonii*), Sha (*Acacia catechu*), Tanaung (*Acacia leucophloea*), Zi (*Zizyphus jujube*), and Thanakha (*Limonia acidissima*).

Disappearance of forest cover has long been existing, except scattering of patches of Dry Forest in some areas, in Sagu, Minbu and Minhla townships as a result of the expansion of agricultural land due to population pressure and oil extraction activities in Minbu District. Construction of China-Myanmar Oil Pipeline also took all of previously existing trees standing along the RoW of that pipeline.

There are more trees in village area where irrigation water is available. However, land area along the proposed pipeline is being used for growing paddy, maize, pulses, groundnut, sesame, cotton, etc. Paddy fields are habitat of snake and rats. In the rainy season, two type of frogs, *Rana tigrina* and *Rana limnocharis* are very common in the wet paddy fields. As variety of insects can enjoy the rice field environment, insect eating birds are coming to the paddy field year round.

Direct impact zone open forest types

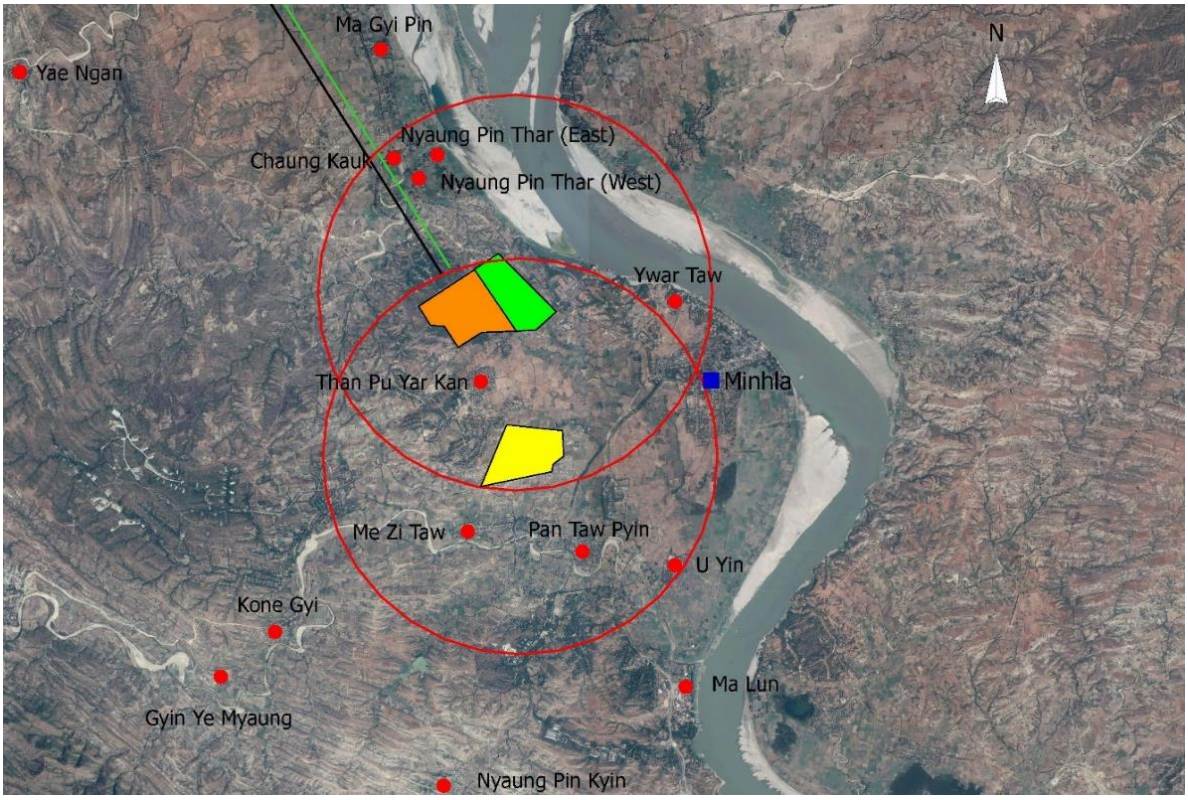
Allium cepa L. *(Kyetthun- ni)*

Zea mays L. *(Pyaung-bu)*

Cicer orietinum L.*(Ka-la-pe)*

Social-economic Baseline

Social survey method includes 3 parts: i. Village Profiles, ii. Household interviews, and iii. KIIs - Key Informant In-depth Interviews.



Location map of surrounding villages of New refinery project

Study team visited seven villages which are located 3 Km radius of the refinery and discussed with villagers, stakeholders, and village administrative committees.

Among seven villages, Thanpuyarkan village is the most populous with total population of 1,323. Pantawpyin is second populous village with total number of 1,282 residents.

Main source of income comes from farming in all these villages. Because of deforestation and bad weather, socio-economic condition of the villages is poor. Mazalitaw, Pandawpyin, and Uyin village have rural health center and all villages have primary school.

Out of seven villages, villagers from Chaung Kauk and Uyin have no farm land in the refinery compound.

According to the survey data, 191 household members of 37 households from five villages will

be deprived of total farm acre of 323.6 and 21 households will become landless. Only two households work at the small private oil field for side income. Due to bad socio-economic condition, households were in debts.

Nearly 50% of the villagers accept new refinery project for the development of their region.

Data Collection for Village Profiles, Household Interiews and KII Interviews

Anticipated Environmental and Social Impacts

Refinery Process

The petroleum refining industry converts crude oil into more than 2500 refined products, including liquefied petroleum gas, gasoline, kerosene, aviation fuel, diesel fuel, fuel oils, lubricating oils, and feed stocks for the petrochemical industry.

Petroleum refinery activities start with receipt of crude for storage at the refinery, include all petroleum handling and refining operations, and they terminate with storage preparatory to shipping the refined products from the refinery.

Petroleum refining is the physical, thermal and chemical separation of crude oil into its major distillation fractions which are then further processed through a series of separation and conversion steps into finished petroleum products.

The primary pollutant emitted is volatile organic compounds arising from leakage, venting, and evaporation of the raw materials and finished products.

Significant amounts of sulfur oxides, hydrogen sulfide, particulate matter, and a number of toxic species can also be generated from operations. In addition, a wide variety of fuel combustion devices emits all of the variety of pollutants and a number of toxic species.

The common pollutants are;

- Particulate matter
- Sulfur Oxides SO_x (as SO_2)
- Carbon Monoxide
- Total Hydrocarbons
- Nitrogen Oxides NO_x (as NO_2)
- Aldehydes (an organic compound containing the group -CHO, formed by the oxidation of alcohols)
- Ammonia

Oil refinery emits gases and particulate matters which may impact to natural soil, water body and surrounding atmosphere.

The impacts of the proposed project are categorized in relations with different implementation phases: Pre-construction phase, Construction phase, Operation phase and Abandonment phases.

In general, the following positive and negative impacts are anticipated to be associated with the proposed project development.

Positive Impacts

- Creation of employment opportunities,
- Increased business opportunities and secondary economic activity
- Improved access and roads in the region,
- Improved local and national economy,
- Improvement of areas general security
- Availability of crude oil for the proposed oil refinery

Negative Impacts

- Soil erosion and degeneration during construction period,
- Solid Waste generation,
- Noise and vibration caused by heavy trucks, and construction machinery,
- Dust generation and exhaust emissions,
- Air pollution,
- Emission of greenhouse gases,
- Foul smell (Odour)
- Oil spilling,
- Increased energy consumption,,
- Increased water demand,
- Increased traffic flow
- Noise and vibration,
- Risk of accident and injuries,
- Visual quality disorganization,
- Loss of forest cover, habitat, and natural vegetation,
- Risk of fire,
- Groundwater contamination,
- Changes in aquatic biota at Ayeyawady River,
- Impact to local livelihood,
- Demand for building materials,
- Workers accidents and hazards during construction.
- Traffic congestion and accidents,
- Loss of agricultural fields

Mitigation Measures

In order to alleviate/suppress/minimize the identified negative impacts associated with the project, the proponents shall undertake several measures, among these are:

To reduce air pollution

- Proper gas flaring system, minimizing flame lit, locating flare at safe distance from local community
- Permanent monitoring to minimize emissions of pollutants from refining processes

- Apply the refinery processes that reduce the emission of toxic and carcinogenic substances
- Prohibit unnecessary driving and moving at site
- Operating flare to control odor and visible smoke emission
- Strictly prohibited open fire burning of materials or wastes

Dust suppression techniques during project implementation by adopting the following measures:

- Watering all active construction areas when necessary.
- Cover all trucks hauling soil, sand and other loose
- Pave, apply water when necessary, or apply soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads and parking areas at construction sites.
- Re-vegetating of exposed and dust prone surfaces

Water Usage

- Water usage to be controlled to avoid unnecessary wastage
- Recycling of water from curing to spraying roads and pouring plants
- Make use of roof catchment (rainy season)
- Checking and monitoring to storage tanks

Suppression techniques to minimize the impact of noise and vibration are:

- Ordering sensitive construction vehicle drivers and operators to switch off engines not being used
- Using sound absorb, sound proof engines at construction site
- Noisy out door engines and generators are enclosed in sound proof wall or buildings
- Regular checking and maintenance to silencers of engines and machines to avoid noise
- Construction and production activities to work at day time and avoid night time.
- Workers in the vicinity or involved in high level noise to wear safety and protective gear and ear muffs
- Install sound barriers for pile driving activity.
- Trees around the site shall provide as some buffer against noise.

Solid Waste Generation

- Ensure construction drawing to avoid unnecessary cutting and filling of earth work and excavation work
- Ensure calculation and estimation of material requirement to avoid excessive purchase
- Provide, dust bins and skips at appropriate places painting different color for hazardous substances and biodegradable substances
- Periodically disposal of solid waste at permitted land fill area or dumping sites
- Recycling and refurbishment to solid waste will reduce the amount and volume of construction debris
- Educate workers to dispose properly

Forest Recovery including wildlife habitat

- Massive-scale afforestation programs are needed, with emphasis on aerial seeding in different types of topography and wastelands.
- Human interference should be avoided to maintain natural regeneration of vegetation.
- All the marginal and common lands available in the nearby area should be brought into a plantation program giving priority to local species such as Than, Dahat, Sha, Thanakar, Shawphyu, etc.
- Community Forestry should be introduced in redevelopment efforts so as to provide protection of common property, local employment, and local people's participation (including women), so that villagers who started the plantation will hace the right to utilize forest resources, i.e. fodder, fuel and timber.
- Villagers and school children should be encouraged to take part in plantation and activities for advocating to reduce cutting small trees for firewood.

Loss of agricultural lands

- Allocation of new agricultural lands should be planned to compensate the loss land for farmers.

Resettlement

- Resettlement plan would be drawn with public participation and improvement of local people living standard should be ensured.

Health of Surrounding Communities

- Sulphur dioxide abatement to 90% would be required.

Cumulative Impact Assessment

In the environment of proposed new refinery project, Valued Environmental and Social Components (VECs) such as Air shed, Surface Water (Fisheries resource), Land and soil pollution by discharging waste and pollutants in the air, and Ecosystem (Forest resource) and Resident wildlife are dealt for the cumulative impact assessment. Mitigation measures are also provided.

Public Consultation

First public consultation was conducted at the compound of State Primary School, Nyaungpinthar village in the morning of 22 February, 2015. About 70 persons including respected elders of the village, village administration officer, teachers, students and some village residents. MSR's EIA study team explained about the proposed project and provided answers to what attendants asked about the possible consequences of new project. Public could also see Air Quality measuring device and installation of it in the school campus.

Second public consultation was held at the assembly hall of the State High School, Min Hla town in the afternoon of February 22, 2015.

This meeting was attended by Township administrative officer, Commander of Engineering Corps of the region, Chairman of township Development Association, Chairman of Township Traders and Businessmen Association, heads of various government departments, local residents and teachers.

Public meetings provide face-to-face contact in which dialogue can take place between consultants and wide range of affected parties and between interest groups themselves.

Simultaneous presence of many groups and individuals with widely differing views can render a discussion of particularly complex or even emotional issues related to potential impacts of the project.

Air pollution and health issue, job opportunity of local residents, oil pollution at the jetty area of Ayawadee River and compensation for farmers' lands were addressed seriously in the meeting

while majority supported the proposed new refinery plant. They have the high expectation of job opportunity for young educated persons from local communities.

Interviewing local residents for socio-economic data collection were undertaken from 7 villages located near the project sites. This activity renders public opinion as well.




Environmental Management Plan (EMP) and Monitoring Plan

Environmental Management Plan (EMP) provides a framework for dealing with risks to the environment and socio-economy during the project lifecycle and the over-arching requirements for environmental management. It is needed to update the EMP once the detailed design is complete. Risk Assessment is used as the basis of the EMP which components range from water resources and emission control to workers' health and safety.

EMP documents specify detailed requirements, along with designated roles and responsibilities, to produce an integrated management plan that provides ongoing utility and guidance to the project proponent throughout the project's life cycle.

Effective monitoring of EMP implementation is a critical measure of success.

The EMP includes Objectives, Legal Requirements, Management Actions, Monitoring Plans, Implementation Schedule and Responsibilities. It also include monitoring methodology, frequency and duration of monitoring activities. The plan specifies how monitoring records will be maintained.

MPE is committed to implementing the environmental and social management and monitoring plan which will ensure that the construction and the operation of the proposed New Refinery Plant complies with environmental standards, the requirements of the environmental legislations and guidance notes as applicable in Myanmar and the effectiveness of the

environmental management and mitigation measures will be monitored throughout the construction and operation of the proposed project. Monitoring will be carried out by MPT's Project Management Unit.

MPE and its appointed contractors will supervise all activities relating to the Environmental and Social management Plan (ESMP) and carry out supervision for the implementation of the mitigation measures and monitoring the results

The summary of the EMP includes budget for implementation of the mitigation measures and monitoring requirement.

Conclusion and recommendations

It is quite evident that the proposed refinery plant is a kind of needed development project. The positive impacts including creation of employments, improving growth of the economy by boosting all sectors`, optimal use of land, incorporation of integrated waste management and increase in revenue among others. However, negative impacts occur, as it is an oil refinery project, hence the need to mitigate them in order to reduce their adverse effects to the environment. ESIA study team have found no major impacts, as long as advanced technology is applied, that can diminish the emergence of the successful project.

The project is welcomed by majority of local communities as a positive entity as they envisage that the project will provide job opportunity to the local people particularly educated younger generation from the starting of the preconstruction phase to operation phase.

This is our recommendation that the project be allowed to proceed with the understanding that the proponent will adhere to the mitigation measures recommended herein and will further still implement the proposed Environmental Management Plan (EMP) and Monitoring Plan.

Though there exists no resettlement issue at the refinery plant site, new pipeline area will have difficulty in solving the settlement issue and compensation of farm lands. There are local people who are currently using the land for seasonal crops and their livelihood will be affected to a certain extent, and the households living in the area along the new oil pipeline, from off-take point to project area. They will temporarily be removed from their farm land, it requires giving compensation. The route of the new pipeline will temporarily affect the farmland during the construction period, but the impact on farmers is negligible. Hence, appropriate mitigation measures, such as creating job opportunities in the construction of the project, should be taken.

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CHAPTER 1:
CONTEXT OF THE PROJECT

1. CONTEXT OF THE PROJECT

1.1 Overview of the Project

1.1.1 Introduction

The ESIA for the new oil refinery that Myanma Petrochemical Enterprise has planned to construct in Minhla township of Magway Division was conducted by Myanmar Survey Research (MSR). The objective of the study is to carry out a comprehensive environmental impact assessment (EIA) and social impact assessment (SIA) for it. The study examines the environmental and social context of the proposed site and identifies potential biophysical, socio-economic, cultural and ecological impacts based on the activities associated with preconstruction, construction, operation, and decommissioning of the oil oil refinery and the storage of oil products and associated infrastructure.

Emphasis is also given to determine the ecological functioning of the area at the site visit to allow the analysis to extend to ecological determinants, rather than a simple inventory approach.

Subsequent to environmental and social impact assessment, some mitigation measures are outlined. The mitigation component is further refined with the presentation of a suggested approach to environmental management.

A team of responsible persons and EIA/SIA experts from MSR has made a site visit for doing field observation and preliminary ESIA investigation to have examined the existing environment of the proposed project area.

Nowadays, petroleum refineries are watched out by public for their emission and pollution has serious impact upon human health and environment.

Generally, the primary purpose of the ESIA process is to encourage the consideration of the environment in planning and decision making and to ultimately arrive at actions which are more environmentally sound.

The proposed refinery project area is located in the dry zone where natural land cover is dry forest which is basically made up of short and thorny trees and shrubs with low rainfall.

The ESIA conducted ESIA by MSR is developed by undertaking activities such as baseline data collection of physical, biological, socio economic survey, public consultation tasks, impact identification, impact assessment, impact prediction, impact mitigation; selecting proposed action from alternatives. EMP as well as Monitoring Plan is also provided to deal with negative impacts.

In terms of findings throughout the study process, it could be said that air pollution, water pollution, soil pollution, loss of habitats and forest cover, fishery issues, health issues can be encountered in one form or another as a consequence of building an oil refinery, while positive impacts, such as economic development, higher job opportunities, reduction of pollution by clean technology and efficient process can stand on the encouraging side.

The project construction is intended to meeting the local growing demand for oil products, and facilitates the local economic development.

The proposed refinery to build is designed to produce high-quality oil products to meet the growing demand of Myanmar; thereby Myanmar's oil self-sufficiency rate can be raised greatly to facilitate the local economic development.

The proposed refinery, after being built and put into operation, will continue to implement the strategy of staff localization for promoting the local employment.

The project construction shall facilitate the development of Myanmar's oil refining industry, and train its oil refining technical talents.

Currently, there are three refineries in Myanmar, with a total design capacity of about 51,000 BPSD. They are becoming out-dated, with aging units and equipment, coupled with low level

of technology and management, the actual processing capacity is only one third of the design, and features a low level of processing capability, unable to make in-depth processing and the production of clean fuels.

The project refinery is proposed to taken an advanced, well proven and reliable refining technology, with processing capacity greater than the sum of the existing refining capacities of Myanmar; therefore, it can greatly improve the technical level of the oil refining industry in Myanmar.

1.1.2 Project Background and Rationality

The Ministry of Energy and CNPC of People's Republic of China signed a MoU and Cooperation Agreement and had a discussion on facilitation of acquiring crude oil for internal use. As a result, Myanmar will get total 3.5 million tons by the cooperation of China Oil and Ministry of Energy. So MPE had cooperated with CNPC South-East Asia Pipeline Co Ltd to conduct feasibility study for the construction of new oil refinery near the currently existing Petrochemical Complex (Thanbayakan) by using the crude oil acquired from Myanmar-China Oil pipeline. CNPC has conducted the feasibility study for this new oil refinery.

The new refinery project is of national importance. It will increase local production of fuel and reduce the amount of fuel imports significally. It is expected to achieve the status of energy independence eventually.

1.1.3 Project Proponent

Managing Director, Myanmar Petrochemical Enterprise (MPE)

Building No. 44, Ministry of Energy, Naypyidaw.

Tel: 067-3411116, Fax: 067-3411126,

Email: mpeict@gmail.com, Website: https://www.moee.gov.mm/

1.2 Current Local Production of Fuel Oil

The Myanmar Petrochemical Enterprise (MPE) runs the country's three oil refineries—in Chauk (6,000 barrels per day or BPD), Thanbayagan (25,000 BPDs) and Thanlyin (20,000 BPD)—with a total installed capacity of 50,000 BPD. However, the refineries are old and average utilization rates are as low as 41%.

Other downstream facilities include five urea fertilization factories using natural gas with a total capacity of over 2,000 metric tons per day and three liquefied petroleum gas (LPG) plants with a total of 42 – 50 million cubic feet per day (mmcfd).

1.3 Imports of Fuel Oil

Yearly import of fuel oils – by quantity (barrels)

Sr	Product	2013	2014	2015 (Jan-May)
		Barrels		
1	Diesel oil	9,392,563	12,484,535	6,409,093
2	Octane	3,680,765	7,118,797	2,975,391
3	Jet A1	292,669	780,215	401,513
	Total (Barrel) ▶	**13,365,997**	**20,383,546**	**9,785,996**

Yearly import of fuel oils – by value (USD in millions)

Sr	Product	2013 (Jan-Dec)	2014 (Jan-Dec)	2015 (Jan-May)
		USD in millions		
1	Diesel oil	1,189	1,532	515
2	Octane	448	835	214
3	Jet A1	38	96	26
	Total Value ▶	**1,675**	**2,463**	**755**

The new refinery will have the capacity of refining 3.5 million tons of crude oil per year (78,484.84 barrels per day). The foreign crude oil will be taken from the Southeast Asia Crude Oil Pipeline and the products will be produced to meet the Euro IV standard.

Given the fact that current capacity of local product fuel oil is far below the local demand and Myanmar's fuel market heavily depends on import of fuel, the plan of new oil refinery to process crude oil from the Myanmar-PRC oil pipeline is desirable for Myanmar. The new project is important for Myanmar to achieve the status of energy independence.

However, a petrochemical oil refinery is delineated under World Bank's Categoy A project type which would normally require an EIA study and Myanmar new law of "Environmental Conservation Law" demands developers to conduct an EIA for the business and industries which can have significant impacts to the environment and do harm to the people. Historically, petroleum refineries are notorious to be seriously polluted industry in many parts of the industrial countries. The issue of Impacts of oil refinery is becoming controversial throughout the world nowadays.

Therefore, MPE has responsibly asked MSR to conduct an EIA for the new oil refinery by providing a fair competition to win the tinder bid of the Ministry.

1.4 A Statement of Requirement of the ESIA Study

According to the existing law, procedures and notifications of the Ministry of Natural Resources and Environmental Conservation for managing environmental and social economic impacts of businesses, services, investment activities and any kind of investment projects which are categorized as the project that could impose significant impacts on the physical environment, ecosystems, humans and other living beings, it is compulsory to conduct the systematic environmental impact assessment in order to decide whether such a project should be permitted or not in specific areas.

Likewise, an EIA recognizes that there is a strong link between environmental sustainability and social economic development in doing investment businesses in the country. The immediate objectives of an EIA are:

- to improve the environmental design of the project,
- to ensure that resources are used appropriately,
- to identify appropriate measures for mitigating potential impacts of the proposed project.

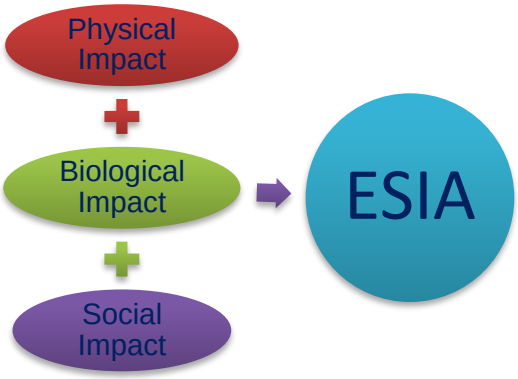
In addition to these objectives, an EIA also encompasses specific long-term objectives. These objectives include (a) avoidance of irreversible charges and serious damage to the environment, (b) safeguard valued resources, natural and cultural heritage and ecosystem which are invaluable for the future generation.

Having understood both EIA procedures, requirements set by the Environmental Conservation Department and its rules and regulations, the proponent of New Refinery project shall submit

scoping report and a final EIA report after conducting stakeholder engagement and public hearing meetings.

1.5 Components of ESIA

In EIA/ESIA refers to the systematic assessment of a proposed project, business, service or activity to determine if it will significantly impact the physical environment and ecosystems, humans and other living beings (including negative health or socioeconomic impacts. The assessment has to measure physical, biological and social impacts in order to gauge the overall impact of a project.



1.6 The Environmental and Social Impact Assessment Expert Team

It is legal requirement for the project proponent, Myanmar Petrochemical Enterprise (MPE), to submit an Environmental and Socio-economic Impact Assessment (ESIA) with regard to the project to the government authorities concerned. Hence, it has contracted Myanmar Survey Research – an independent and private research firm and certified by Department of Environmental Conservation of the Ministry of Natural Resources and Environmental Conservation in Myanmar – to conduct this assessment to ensure that the project will not only be environmentally sound but also acceptable to local communities and in full compliance with guidelines and regulations of ECD and the Myanmar Environmental Conservation Law.

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

1.6.1 Assessment Team Members

Figure 1: Team Discussing Mitigation Measures

The MSR's EIA assessment team has been formed for conducting the ESIA study and assessment for this Myanmar Petrochemical Enterprise (MPE) with the following environmental and social experts:

Name and designation	Position in team	Responsibility
U Kyaw Hlaing President	Leader	Overseeing the EIA/ESIA assessment process and the project
Dr. San Tun Aung Senior Executive Adviser	Dy Leader	Advising on socio-economic impact assessment and editing the report
U Tin Than Head, EIA Department	Member	Biological Impact Assessment, Preparation of written documentation and report writing
Engr. U Myint Swe Consultant Engineer	Member	Specialist gathering data of physical environment and devising the Environmental Management and Monitoring Plan
U Than Tun Consultant	Member	Consultation & Management Plan
Dr. Lay Kyi Consultant Sociologist	Member	Social Impact Assessment Studies Public Consultation
U Phone Myint Tun (Consultant, Physical Environment)	Member	Air Quality & Noise Level Assessment Hydrology, Geology & Soil Studies
U Aung Lin Librarian-cum-Databank Manager	Member	Co-writer of ESIA report and gathering data (Social impacts)
U Ko Ko Soe Lwin Thaw (a) Ko Soe GIS & IT Specialist	Member	Cartography, photography and designing
Daw Ei Ei Htwe (EIA Specialist)	Member	Environmental policy specialist
U Oo Kyaw Maung (Policy Specialist)	Member	Policy specialist Specialize on laws, by-laws and regulations of Myanmar related to EIA/ESIA
Dr Marlar Soe, M.B.B.S, MPH	Member	Health and safety specialist Give advice on community health in the surrounding areas of the project
Daw Tin Tin Htwe Staff	Member	Supporting Staff Assist in typing and desktop publishing
U William Han Lwin Senior Analyst, MSR	Member	Report Writer
Government agencies that provide lab results		
Relevant Agencies		**Lab tests performed**
Land Use Division of Department of Agriculture		Soil interpretation and soil analysis; soil water extraction interpretation and soil water extraction analysis
Plant Protection Division of Department of Agriculture		Heavy metal analysis of soil sample

1.6.2 General Information of the Proponent for ESIA

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

1.7 Report Structure

The EIA/SIA report will be prepared through identification of possible impacts due to the project, inclusion of mitigation measures against anticipated negative impacts, preparation of environmental management (EMP) and monitoring plan and with findings from stakeholder meetings.

Structure of the EIA / SIA report will be as follows.

Executive Summary (Myanmar and English)
Chapter 1 Introduction
Chapter 2 Policy, Legislative and Administrative Frameworks
Chapter 3 Description of the Project and Alternative
Chapter 4 Description of the Surrounding Environment
Chapter 5 Impact and Risk Assessment and Mitigation Measures
Chapter 6 Cumulative Impact Assessment
Chapter 7 Environmental Management/Monitoring and Budget Plan
Chapter 8 Public Consultation and Disclosure
Chapter 9 Conclusion and Recommendations
References
Appendix

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CHAPTER 2:
LEGISLATIVE FRAMEWORK AND GUIDELINE

2. LEGISLATIVE FRAMEWORK AND GUIDELINE

2.1 Introduction

This section analyses all existing laws, rules, regulations and policy guidelines which are relevant for this project. It is legal requirement for the project developer and investors to commit the following policy, legal and regulatory frameworks and need to follow Myanmar's environmental legislation in undertaking business investments in order to promote more responsible investment and safeguard the environment and human wellbeing in Myanmar. The developer of Min Hla Refinery Project commits to the following provisions in respective legal and policy guidelines.

2.2 Policy, Plan, Strategy and Framework

2.2.1 National Administrative Structure

Since currently ruling government has taken the executive power, there are 30 ministries. Regarding environmental, natural resources and social issues related to investment businesses, the focal agency is the Environmental Conservation Department of the Ministry of Natural Resources and Environmental Conservation (MONREC), which the Ministry of Environmental Conservation and Forestry (MOECAF) were merged in April 2016.

Regarding Environmental, Health and Safety matters, other key ministries that have jurisdiction over such project include (1) Ministry of Energy, Myanmar Oil and Gas Enterprise (MOGE), Ministry of Agriculture, Livestock and Irrigation, Ministry of Labour, Ministry of Immigration and Population, Myanmar Investment Commission.

2.2.2 The Constitution of Republic of Union of Myanmar

The existing constitution of Myanmar came into effect in 2008. According to the constitution, the Union government has put special consideration and obligation to the critical role of natural environment for sustainable development and economic growth. Meanwhile, the constitution also states the commitment of the Union and its government in:

- Preservation and safeguarding of cultural heritage;
- Environmental conservation;
- Striving for development of human resources; and
- Protection and preservation of public property.

The project developer commits to comply the three Articles (Article 37 (a)(b), Article 45 & 390 in the 2008 Constitution of the Republic of Union of Myanmar. These articles provide a basis for legalizing and institutionalizing for ESIA in Myanmar. Stipulations of these articles are as follow:

- The Union is the ultimate owner of all lands and all natural resources above and below the ground, above and beneath the water and in the atmosphere in the Union; the Union shall enact necessary law to supervise extraction and utilization of State-owned natural resources by economic forces;
- The Union shall protect ad conserve natural environment.
- Every Citizen has the duty to assist the Union in carrying out the following matters:
    - (a) preservation and safeguarding of cultural heritage;
    - (b) environmental conservation;
    - (c) striving for development of human resources;
    - (d) protection and preservation of public property

2.2.3 Framework for Economic and Social Reforms

Since Myanmar has peacefully started its democratic transition in 2011, the Myanmar Government had vigorously pursued social economic reforms for the social economic development throughout the country. In 2012, the President U Thein Sein's administration announced, "a second stage of reforms" and the Framework for Economic and Social Reforms

(FESR) was developed. The FESR was an essential policy tool for the Myanmar government to realize both the short-term and long-term of social economic development and to materialize the National Comprehensive Development Plan. One of the main objectives of this FESR is to help achieve “sustained economic growth and poverty reduction, which in turn will facilitate further progress in the national reconciliation”.

The project developer commits to the requirements and policy statements in this FESR at each stage of development of this project.

2.2.4 Myanmar Economic Policy

The vision of the economic policy of the Union of Myanmar is people-centered and aims to ensure inclusive and continuous development. It aims to establish an economic framework that supports national reconciliation, based on the just balancing of sustainable natural resource mobilization and allocation across the States and Regions. The importance of national reconciliation and job creation is basic considerations for the policy which guarantees nationwide equitable development. Likewise, the very first point of the twelve objectives of this policy specifically states that to use a policy that will support national reconciliation and help make the country to become a united federal democratic union. Similarly, the second objective of this policy particularly prioritizes to create good economic conditions in which Regions and States will develop equally. More importantly, it is assured to keep a balance between environmental conservation and the economic development of the country with the consent of the people.

The project developer commits to comply with all points of this policy statement and requirements in executing every stage of this project.

2.2.5 Sustainable Development Goals

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are: No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life below Water, Life on Land, Peace, Justice and Strong Institutions and Partnerships for the Goals. These 17 SDGs are integrated, that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

The project developer commits to comply with the Sustainable Development Goals (SDGs), and requirements in executing every stage of this project.

2.2.6 Myanmar Sustainable Development Plan (2018 – 2030)

The Myanmar Sustainable Development Plan (MSDP) provides a long-term vision: a vision of a peaceful, prosperous and democratic country. The MSDP is designed to achieve its aims through coordinated effort involving public entities, the non-profit sector, as well as the private sector. This MSDP is structured around 3 Pillars, 5 Goals, 28 Strategies and 251 Action Plans. Pillar 1. Peace and Stability has Goal 1. Peace, National Reconciliation, Security & Good Governance and Goal 2. Economic Stability & Strengthened Macroeconomic Management. Pillar 2. Prosperity & Partnership has Goal 3. Job Creation & Private Sector Led Growth. Pillar 3. People and Planet has Goal 4. Human Resources & Social Development for a 21st Century Society and Goal 5. Natural Resources & the Environment for Posterity of the Nation. For each of the 5 Goals, clear strategies have been developed. For each strategy, action plans have been identified. Action Plans are intended to be multidimensional, with successful implementation requiring the involvement of a broad range of stakeholders, including multiple ministries and departments. Taken together, these pillars, goals, strategies and action plans combine to form the MSDP Implementation Matrix. By prioritizing peace and stability, prosperity and partnership, people and planet, the MSDP seeks to develop fundamental infrastructure, soft and hard, individual and institutional, that will radically and positively shift

Myanmar's development trajectory, while addressing the needs of all our people, fostering broad-based, equitable and sustainable development.

The project developer commits to meet the goals of Myanmar Sustainable Development Plan especially Goal 5. Natural Resources & the Environment for Posterity of the Nation in executing every stage of this project.

2.2.7 Myanmar National Environment Policy (1994)

With purposes to establish sound environmental policies, utilization of water, land, forests, mineral, marine and other mineral resources in order to conserve the environment and prevent environmental degradation, the National Commission for Environmental Affairs (NCEA) draft the National Environmental Policy in 1994. To meet with emerging challenges a new multifaceted national environmental policy, based on this National Environmental Policy, has finalized the final stage of drafting national environment policy by the Ministry of Natural Resources and Environmental Conservation (MONREC). This new national environmental policy is intended to "complement the national economic policy.[1]" The policy objectives also include "achieving harmony and balance between its people, their cultural heritage, the environment and its national resource [2]". Principally, this policy states that it is the obligation of the government to take *"environmental considerations into account when developing anything that may enhance the quality of the life of all its citizens"* and environmental projection should always be "primary objectives in seeking development"[3].

The project developer commits to comply with each policy statements and requirements at every stage of the project development.

2.2.8 National Land Use Policy

The National Land Use policy was drafted under the guideline of the former government's administration in 2014. This National Land Use Policy is the guide for the emergence of a new land law, including "harmonization of existing laws relating to land and their implementation" in Myanmar.

Some of the core objectives of this policy include:

- To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources for the interest of all people in the country
- To recognize and protect customary land tenure rights and procedure of the ethnic nationalities
- To develop transparent, fair, affordable and independent dispute resolution mechanisms in accordance with rule of law

In addition to these objectives, one of the basic principles of the National Land Use Policy is (a*) "to legally recognize and protect legitimate land tenure rights of people, as recognized by the local community, with particular attention to vulnerable groups such as smallholder farmers, the poor, ethnic nationalities and women[4]".*

The project developer commits to comply with requirements and policy statement in executing every stage of this project.

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[1] "A new and comprehensive national environmental policy for Myanmar", UNDP (2016), http://www.mm.undp.org/content/myanmar/en/home/presscenter/pressreleases/2016/12/a-new-and-comprehensive-national-environmental-policy-for-myanma.html

[2] Myanmar Laws & Regulations" Forest Legality Initiative, http://www.forestlegality.org/risk-tool/country/myanmar

[3] Myanmar Laws & Regulations" Forest Legality Initiative, http://www.forestlegality.org/risk-tool/country/myanmar

[4] Chapter (3) (a), Basic principles, the National Land Use Policy

2.2.9 Myanmar Forest Policy

The policy document formalizes the commitment and intent of the government in "ensuring sustainable development of the forest resource both for environmental and economic purposes"[5]. This policy was drawn in 1995 to facilitate in implementation of the Forest Law promulgated in 1992. The policy mainly focuses on sustainable production, satisfying basic needs, institutional strengthening and improvements in efficiency. In addition, the policy focus pertains (a) forest and biodiversity protection and participatory forestry. This policy also reinforces the commitment of Myanmar government to "ensure sustainable development of forest resources while conserving wildlife, plants and ecosystem"[6].

Specifically, the Myanmar Forest Policy has identified six imperatives which are essential to achieve broader national goals and objectives. These imperatives are as follow.

1. Protection of soil, water, wildlife, biodiversity and environment
2. Sustainability of forest resources to ensure perpetual supply of both tangible and intangible forest benefits for all generations
3. Basic needs of the people for fuel, shelter, food and recreation
4. Efficiency to harness, in a socio-environmentally friendly manner, the full economic potential of the forest resources
5. Participation of the people in the conservation and utilization of the forests
6. Public awareness about the vital role of the forest in the well-being and socio-economic development of the nation

The project developer commits to comply with requirements stipulated in this policy in carrying out the development of the project.

2.2.10 National Biodiversity Strategy and Action Plan (NBSAP)

The United Nations Convention on Biological Diversity (CBD) is a framework for national action for the conservation of biodiversity, the sustainable use of its components, and the equitable sharing of benefits arising from the utilization of genetic resources[i]. To fulfill this commitment to the Conservation, the government meeting No.17/2006 of the Republic of the Union of Myanmar, held on 25th May 2006, approved to formulate National Biodiversity Strategy and Action Plan (NBSAP), for which the funding is provided by the United Nations Environment Program (UNEP) and Global Environment Facility (GEF)[ii].On the third of May 2012, the Government of the Republic of the Union of Myanmar adopted the Myanmar National Biodiversity Strategy and Action Plan by the Government Meeting No. 16/2012.

The fundamental objectives of the NBSAP are to provide "a strategic planning framework for the effective and efficient conservation and management of biodiversity and natural resources with greater transparency, accountability and equity"[7]. In addition to this objective, the National Biodiversity Strategy and Action Plan is designed based on the five grounded guided principles. Two of these five principles recognize that it is the indispensable right of indigenous and ethnic people in conserving biodiversity and for their coexistence with ecosystem. Also, the highest consideration is put to secure the access to common resources by economically disadvantaged groups[8].

[5] Myanmar Forest Policy (2015)

[6] "Myanmar Law & Regulations", Forest Legality Initiative, http://www.forestlegality.org/risk-tool/country/myanmar

[7] National Biodiversity Strategy and Acton Plan (2011)

[8] National Biodiversity Strategy and Action Plan (2011)

The project developer commits to comply with the requirements and statements stipulated in this action plan at each stage of project.

2.2.11 Myanmar Industrial Policy

On February 27, 2016, Industrial Policy was laid down by the Ministry of Industry, the Government of the Republic of the Union of Myanmar. In order for accomplishing the vision of the State "to establish the peaceful and modern developed new democratic nation", the industrial policy implicitly states to accomplish the specific missions in 2020, which includes "to restore eternal peace and all-round improvement through country".

Likewise, Myanmar industrial policy has stipulated the essential factors to be assessed from different point of views to successfully establish the industries in the industrial zones and special economic zones across the country. These includes

a. National Development Strategy that the investors needed to be "acquainted widely the National Comprehensive Development Plan (NCDP), regional development plans, the Investment Law, Industrial Zone Law and the Special Economic Zone Law are as a guide "[9]

b. Location and situation for which the following criteria are essential to be fulfilled for the long-term development
    a. A place for regional development
    b. A place of good water resource
    c. A place of good electricity supply
    d. A place of good information and communication
    e. A place where there is enough labor
    f. A place where environmental conservation can be arranged
    g. A place where land, water and air transportation are good

The project developer commits to comply with all requirements and stipulations of this policy at each stage of project development.

2.2.12 National Energy Policy and National Energy Security Strategy

The national energy policy aims to systematically explore the available resources of the country to supply the demand of the country and to export as value added products for surplus resources, thus ultimately targeting to sustainably improve the living standard of the people in the country. The main objective of the Myanmar Energy Sector policy is to ensure energy security for the sustainable economic development the country; to provide affordable and reliable energy supply to all categories of consumers, especially to those living in the remote areas that are currently without electricity.

In formulating effective energy policy and programs to achieve sustainable energy supply at an affordable price, the policy provides particular emphasis on measures to minimize impacts on environment resulting from exploration of energy resources. The energy sector policy also incorporates a framework to expand the renewable energy infrastructure that is based on fuel that is free and self-renewing. In doing so, the government of Myanmar is fully aware that without adequate environmental and social safeguards, climate change mitigation and adaption policies, and energy efficiency regulations, Myanmar's energy sector will continue to be vulnerable to environmental challenges.

The project developer commits to comply with requirements and policy statements in carrying out the development of this project.

2.2.13 National Health Policy (1994)

Policy guidelines for health services and development have been provided in the Constitution of the Republic of the Union of Myanmar (2008). The article 28 of the constitution states that

[9] Chapter 5, "Establishment of Industries in Industrial Zones and Special Economic Zones" Myanmar Industrial Policy (2016), Ministry of Industry, the Government of the Republic of the Union of Myanmar

the Union shall (a) earnestly strive to improve education and health of the people, (b) enact the necessary law to enable national people to participate in matters of their education and health. Further, the article 367 also designates that the Union shall “every citizen shall in accord with the health policy laid down by the Union, have the right to health care”.

The National Health policy was developed with the initiation and guidance of the national health committee in 1993. The fundamental goal of this policy is based on the Motto “Health for all”. Some of essential goals of the national health policy include

a. To raise the level of health of the country and promote the physical and mental well-being of the people with the objective of achieving “Health for all” goal, using primary health care approach

b. To strictly abide by the rules and regulations mentioned in the drug laws and by-laws which are promulgated in the country.

c. To promulgate new rules and regulations in accord with the prevailing health and health related conditions as and when necessary

d. To intensify and expand environmental health activities including prevention and control of air and water pollution

e. To foresee any emerging health problem that poses a threat to the health and well-being of the people of Myanmar, so that preventive and curative measures can be initiated.

The project developer commits to comply with policy requirements in implementing each stage of this project.

2.2.14 National Contingency Plan for Marine Pollution

Myanmar became signatory to the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990 in December 2016 and hence Myanmar developed its National Contingency Plan for Marine Pollution. The plan embraces all stakeholder arrangements to promote a rapid and cooperative response to oil spills occurring within the area defined in the plan. The plan also includes a mechanism for seeking international assistance and support. According to the contingency plan, the vessel Master, person in charge of a facility or any other entity that either spills a petroleum product or crude oil into the waters of Myanmar or observes a spill from another source (known or unknown) shall immediately send an initial report to the national authority via VHF, phone, fax, or email. Recognizing the importance that any notification of a spill shall be sent to an “active” recipient, points of contact have been identified; one is the appropriate port authority in case of a spill within the port limits, and the other is the maritime police within rivers and near shore. In addition to these, the Department of Marine Administration is designated as a national contact point and Maritime Search and Rescue Coordination Center is also included in the contact list as they have a 24-hour seven day a week duty officer.

The project developer commits to comply with plan requirements in implementing each stage of this project.

2.3 Law, Rules and Procedures

The project developer commits to comply with the following sections of laws, rules of rules and articles of procedures and these are listed in the table below. The details of sections, rules and articles of laws, rules and procedures which the project developer commits to comply with are also mentioned below the table.

Sections of laws, rules of rules and articles of procedures complied by project developer

No.	Law, Rules and Procedures	Sections, Rules and Articles
1.	Environmental Conservation Law (2012)	Sections (7) (o), (14), (15), (24), and (29)
2.	Environmental Conservation Rules (2014)	Rule (69) (a) and (b)

3.	Environmental Impact Assessment Procedure (2015)	Articles (102) (a) and (b), (103), (104), (105), (106), (107), (108), (109) (a), (b), (c), (d), (e) and (f), (110), (113) (a) and (b), (115) and (117)
4.	National Environmental Quality (Emission) Guideline (2015)	Guidelines on air emissions, wastewater, storm water runoff, effluent and sanitary discharges (general application), site runoff and wastewater discharges (construction phase), and noise levels Guidelines on emissions, effluent and waste levels for onshore oil and gas Guidelines on effluent levels, and air emission levels for petroleum refining
5.	Myanmar Investment Law (2016)	Sections (50) (a), (b), (c), (d), (e) and (f), (51) (a), (b), (c), (d), (e) and (f), (65) (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p) and (q), and (73)
6.	Myanmar Investment Rules (2017)	Rules 202, 203, 206 and 212 (a), (b), (c), (d), (e) and (f)
7.	Indigenous Peoples' Rights Protecting Law (2015)	Section (5)
8.	Oil Field (Workers and Welfare) Act (1951)	Chapter (3) Health, Chapter (4) Safety, Chapter (5) Welfare, sections 28 and 29 of Chapter (6) and Chapter (7) Working Hours for Adults
9.	Farm land Law (2012)	Section 30
10.	Vehicle Safety and Motor Vehicle Management Law (2020)	Sections (9) (a), 12 (c), (14) (r), 18 (a) and 81(g)
11.	Motor Vehicle Rules (1989)	Rules 7, 8, 12, 13, 14, 15, 16, 17, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 55, 56, 58, 59, 60, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 132, 133, 135, 137, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 165, 166, 167, 168, 169, 170, 171, 172, 173, 175
12.	Myanmar Insurance Law (1993)	Sections (15) and (16)
13.	Labour Organization Law (2011)	Sections (18), (19), (20), (21) and (22)
14.	Labour Dispute Resolution Law (2012)	Sections (38), (38) (a), (39), (40), (43) and (51)
15.	Employment and Skill Development Law (2013)	Sections (5), (14) and (30)
16.	Minimum Wage Law (2013)	Sections (12) and (13)

17.	Payment of Wages Law (2016)	Sections (3), (4), (5), (14) and Chapter (3) covering the sections (7), (8), (9), (10), (11), (12) and (13)
18.	Leave and Holidays Act (1951)	Overview
19.	Workmen's Compensation Act (1923)	Overview
20.	Social Security Law (2012)	Sections (11) (a), 15 (a), (b), (18) (b), (48) (b), and (75)
21.	Occupational Safety and Health Law (2019)	Sections (12), (14), (16), (17), (18), (26), (27), (34) and (36)
22.	Protection and Preservation of Cultural Heritage Regions Law (2019)	Section 21 (b)
23.	Protection and Preservation of Antique Objects Law (2015)	Sections 12, 15, and 20
24.	Protection and Preservation of Ancient Monuments Law (2015)	Sections 12, 15, and 20 (f)
25.	Union of Myanmar Public Health Law (1972)	Sections 3 and 5
26.	Prevention and Control of Communicable Diseases Law (1995)	Sections (3) (a) (9), (4), (11)
27.	Control of Smoking and Consumption of Tobacco Product Law (2006)	Section (9)
28.	Conservation of Water Resources and Rivers Law (2006)	sections (8) (a), (11), (19), (21) (b), (22), (24) (b), and (30)
29.	Conservation of water resources and rivers rules (2013)	Rules (47), (48) and (49)
30.	Petroleum and Petroleum Products Law (2017)	Sections (9) (a), (e), (10) (a), (b), (d) and (11), (13), (31) (a), (b), (c), (d), (e), and (33)
31.	Petroleum Rules (1937)	Chapters III and IV
32.	Myanmar Engineering Council Law (2013)	Sections 34 and 37
33.	Myanmar Fire Brigade Law (2015)	Section 25
34.	Export and Import Law (2012)	Section 7
35.	Aquaculture Law (1989)	Section 29 (b)
36.	Prevention of Hazard from Chemical and Related Substances Law (2013)	Sections 15 (a), (b), 16 (b), (c), (d), (e) , (f) , (g), (h), (i) and (j), 17, 22, 27 (a), (b), (c) and (d)
37.	Explosive Substances Act (1908)	Sections (3), (4) and (5)
38.	Industrial Explosive Materials Law (2018)	Sections 6 (c), 7 (c), 11 (b), 13, 14 (b), 15, 16, 18, 19, 20 and 21
39.	Electricity Law (2014)	The project developer makes commitments for the use of electricity based on the sections 20, 21 (a), 24, 27, 29, 33, 40 and 68
40.	Boiler Law (2015)	Sections 12, 14, 18, 19, 20, 21, 24, 29 (b), 31 and 40
41.	Inland Vessel Law (2015)	Sections (33), (34), (35) and (36)

2.3.1 Environmental Conservation Law (2012)

The project developer commits to comply with the sections (7) (o), (14), (15), (24), and (29).

Section 7. The duties and powers relating to the environmental conservation of the Ministry are as follows:

(o) managing to cause the polluter to compensate for environmental impact, cause to contribute fund by the organizations which obtain benefit from the natural environmental

service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works.

Section 14. A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.

Section 15. The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.

Section 24. The Ministry may, in issuing the prior permission, stipulate terms and conditions relating to environmental conservation. It may conduct inspection whether or not it is performed in conformity with such terms and conditions or inform the relevant Government departments, Government organizations to carry out inspections.

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

2.3.2 Environmental Conservation Rules (2014)

The project developer commits to comply with the rule (69) (a) and (b).

Rule 69. (a) Any person shall not emit, cause to emit, dispose, cause to dispose, pile and cause to pile, by any means, the pollutants to environment and the hazardous wastes or hazardous materials stipulated by notification under the Law and any of these rules at any place which may affect the public directly or indirectly.

(b) Any person shall not carry out the actions which can damage the ecosystem and the natural environment which is affected due to such system, except the permission of the relevant Ministry for the interests of the public.

2.3.3 Environmental Impact Assessment Procedure (2015)

The project developer commits to comply with the articles (102) (a) and (b), (103), (104), (105), (106), (107), (108), (109) (a), (b), (c), (d), (e) and (f), (110), (113) (a) and (b), (115) and (117).

Article 102. The Project Proponent shall bear full legal and financial responsibility for:

a) all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project; and
b) PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project and shall support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts.

Article 103. The Project Proponent shall fully implement the EMP, all Project commitments, and conditions, and is liable to ensure that all contractors and subcontractors of the Project comply fully with all applicable Laws, the Rules, this Procedure, the EMP, Project commitments and conditions when providing services to the Project.

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

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

Article 106. The Project Proponent shall, during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure), engage in continuous,

proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this Procedure, standards, the ECC, and the EMP.

Article 107. The Project Proponent shall notify and identify in writing to the Ministry any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible and in any event, in respect of any breach which would have a serious impact or where the urgent attention of the Ministry is or may be required, within not later than twenty-four (24) hours, and in all other cases within seven (7) days of the Project Proponent becoming aware of such incident.

Article 108. The Project Proponent shall submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry.

Article 109. The monitoring reports shall include:

a) documentation of compliance with all conditions;
b) progress made to date on implementation of the EMP against the submitted implementation schedule;
c) difficulties encountered in implementing the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;
d) number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;
e) accidents or incidents relating to the occupational and community health and safety, and the environment; and
f) monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.

Article 110. Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

Article 113. For purposes of monitoring and inspection, the Project Proponent:

a) shall grant to the Ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; and
b) from time to time as and when the Ministry may reasonably require, shall grant the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed.

Article 115. In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the Project shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.

Article 117. The Project Proponent shall further ensure that the Ministry's rights of access hereunder shall extend to access by the Ministry to the Project's contractors and subcontractors.

2.3.4 National Environmental Quality (Emission) Guideline (2015)

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

Air Emissions

Parameter	Averaging Period	Guideline Value (µg/m³)
Nitrogen dioxide	1-year 1-hour	40 200
Ozone	8-hour daily maximum	100
Particulate matter PM_{10} [a]	1-year 24-hour	20 50
Particulate matter $PM_{2.5}$ [b]	1-year 24-hour	10 25
Sulfur dioxide	24-hour 10-minute	20 500

[a] Particulate matter 10 micrometers or less in diameter

[b] Particulate matter 2.5 micrometers or less in diameter

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

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Arsenic	mg/l	0.1
Cadmium	mg/l	0.1
Chemical oxygen demand	mg/l	250
Chlorine (total residual)	mg/l	0.2
Chromium (hexavalent)	mg/l	0.1
Chromium (total)	mg/l	0.5
Copper	mg/l	0.5
Cyanide (free)	mg/l	0.1
Cyanide (total)	mg/l	1
Fluoride	mg/l	20
Heavy metals (total)	mg/l	10
Iron	mg/l	3.5
Lead	mg/l	0.1
Mercury	mg/l	0.01
Nickel	mg/l	0.5
Oil and grease	mg/l	10
pH	S.U.[a]	6-9
Phenols	mg/l	0.5
Selenium	mg/l	0.1
Silver	mg/l	0.5
Sulphide	mg/l	1
Temperature increase	°C	<3[b]
Total coliform bacteria	100 ml	400
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50
Zinc	mg/l	2

[a] Standard unit

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

Site Runoff and Wastewater Discharges (construction phase)

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

Noise Levels

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

[a] Equivalent continuous sound level in decibels

Odor

Point and diffuse source odors from industries should be minimized using available prevention and control techniques as described in the IFC EHS industry-specific guidelines. Point source activities are those that involve stack emissions of odor and which generally can be controlled using waste reduction, waste minimization and cleaner production principles or conventional emission control equipment. Diffuse source activities are generally dominated by area or volume source emissions of odor (e.g., intensive agricultural activities) and which can be more difficult to control. Projects should control odors to ensure that odors that are offensive or unacceptable to neighbors do not occur. Generally, odor levels should not exceed five to ten odorant units at the edge of populated areas in the vicinity of a project. Projects with multiple odorous point or diffuse releases or emitting complex odors should conduct an odor impact assessment to determine ground-level maximum concentrations taking into account site-specific factors including proximity to populated areas.

Onshore Oil and Gas

This guideline applies to seismic exploration, exploratory and production drilling, development and production activities, transport activities including pipelines, other facilities (i.e. pump stations, metering stations, pigging stations, compressor stations, storage facilities), ancillary and support operations, and decommissioning.

Emissions, Effluent and Waste Levels

Parameter	Guideline
Drilling fluids and cuttings	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline
Produced sand	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline
Produced water	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline For discharge to surface waters or to land: - 5-day Biochemical oxygen demand 25 mg/l - Chemical oxygen demand 125 mg/l - Chlorides 600 mg/l (average), 1,200 mg/l maximum - Heavy metals (total)[a] 5 mg/l - pH 6-9[b] - Phenols 0.5 mg/l - Sulfides 1 mg/l - Total hydrocarbon content 10 mg/l - Total suspended solids 35 mg/l
Hydrotest water	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline For discharge to surface waters or to land: - 5-day Biochemical oxygen demand 25 mg/l - Chemical oxygen demand 125 mg/l - Chlorides 600 mg/l (average), 1,200 mg/l maximum - Heavy metals (total) 5 mg/l - pH 6-9 - Phenols 0.5 mg/l - Sulfides 1 mg/l - Total hydrocarbon content 10 mg/l - Total suspended solids 35 mg/l
Completion and well work-over fluids	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline For discharge to surface waters or to land: - pH 6-9 - Total hydrocarbon content 10 mg/l
Storm water drainage	Storm water runoff should be treated through an oil/water separation system able to achieve oil and grease concentration of 10 mg/l
Cooling water	The effluent should result in a temperature increase of no more than 3°C at edge of the zone where initial mixing and dilution take place; where the zone is not defined, use 100 meters from point of discharge
Sewage	Holding and discharge to municipal or centralized wastewater treatment systems or onboard treatment to achieve: - 5-day Biochemical oxygen demand 30 mg/l - Chemical oxygen demand 125 mg/l

	- Oil and grease 10 mg/l - pH 6-9 - Total coliform bacteria 400/100 mg/l - Total nitrogen 10 mg/l - Total phosphorus 2 mg/l - Total suspended solids 50 mg/l
Air emissions	Achieve WHO ambient air quality guidelines, and apply the following guideline value to emissions: - Hydrogen sulfide 5 mg/NM^{3}[c]

[a] Heavy metals include: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Vanadium and Zinc

[b] Standard unit

[c] Milligrams per normal cubic meter at specified temperature and pressure

Petroleum Refining

This guideline applies to processing operations from crude oil to finished liquid products, including liquefied petroleum gas, motor gasoline, kerosene, diesel oil, heating oil, fuel oil, bitumen, asphalt, sulfur, and intermediate products (e.g. propane/propylene mixtures, virgin naphtha, middle distillate and vacuum distillate) for the petrochemical industry. Finished products are produced from the blending of intermediate products.

Effluent Levels

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/l	30
Benzene	mg/l	0.05
Benzo (a) pyrene	mg/l	0.05
Chemical oxygen demand	mg/l	150
Chromium (hexavalent)	mg/l	0.05
Chromium (total)	mg/l	0.5
Copper	mg/l	0.5
Cyanide (free)	mg/l	0.1
Cyanide (total)	mg/l	1
Iron	mg/l	3
Lead	mg/l	0.1
Mercury	mg/l	0.02
Nickel	mg/l	0.5
Oil and grease	mg/l	10
pH	S.U.[a]	6-9
Phenol	mg/l	0.2
Sulphides	mg/l	1
Temperature increase	°C	<3[b]
Total nitrogen	mg/l	10[c]
Total phosphorus	mg/l	2
Total suspended solids	mg/l	30
Vanadium	mg/l	1

[a] Standard unit

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

[c] The effluent concentration of total nitrogen may be up to 40 mg/l in processes that include hydrogenation

Air Emission Levels

Parameter	Unit	Guideline Value
Hydrogen sulfide	mg/N m^{3a}	10
Nickel	mg/N	1
Nitrogen oxides	mg/N m^3	450
Particulate matter PM_{10} [b]	mg/N m^3	50
Sulfur dioxide	mg/N m^3	150 (for sulfur recovery units) 500 (for other units)
Vanadium	mg/N m^3	5

[a] Milligrams per normal cubic meter at specified temperature and pressure

[b] Particulate matter 10 micrometers or less in diameter

Crude Oil and Petroleum Product Terminals

This guideline is applicable to land and shore-based petroleum storage terminals receiving and dispatching bulk shipments of crude oil, gasoline, middle distillates, aviation gas, lube, oil, residual

fuel oil, compressed natural gas, liquid petroleum gas, and specialty products from pipelines, tankers, railcars, and trucks for subsequent commercial distribution. Process effluent discharge quality guideline values should be established on a site-specific basis, taking into account effluent characteristics and receiving water use. Storm water runoff from terminals should be treated as required to achieve the following effluent levels. General air emissions guidelines shall apply and volatile organic compound emissions from all sources should be controlled such that ambient air quality levels do not exceed health-based standards.

Effluent Levels

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

[a] Standard unit

2.3.5 Myanmar Investment Law (2016)

The project developer commits to comply with the sections (50) (a), (b), (c), (d), (e) and (f), (51) (a), (b), (c), (d), (e) and (f), (65) (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p) and (q), and (73).

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

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

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

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

(e) The Government may grant more favorable terms and conditions for the lease of land and the use of land by Myanmar citizen investors.

(f) The Commission shall obtain the approval of the Pyidaungsu Hluttaw through the Government, when granting an extension to investors for the rights to lease land or building and the rights to use the land or building in this Law, in less-developed and remote region for the purpose of the development around the Union.

Section 51. The investor:

a) may appoint of any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the Union in accordance with the Laws;
b) shall appoint them to replace, after providing for capacity building programs in order to be able to appoint citizens to different level positions of management, technical and operational experts, and advisors;
c) shall appoint only citizens for works which does not require skill;
d) shall appoint skilled citizen and foreign workers, technicians, and staff by signing an employment contract between employer and employee in accordance with the labor laws and rules;
e) shall ensure to obtain the entitlements and rights in the labor laws and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the rights and duties of employers and employees and occupational terms and conditions in the employment contract;
f) shall settle disputes arising among employers, among workers, between employers and workers, and technicians or staff in the investment in accordance with the applicable laws.

Section 65. The Investor:

a) shall respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union;
b) shall establish and register a company or sole proprietorship or legal entities or branches of such entities under the Laws in order to invest;
c) shall abide by the terms and conditions, stipulations of special licenses, permits, and business operation certificates issued to them, including the rules, notifications, orders,

and directives and procedures issued by this Law and the applicable laws, terms and conditions of contract and tax obligations;

d) shall carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and government organizations, or to carry out registration;
e) shall immediately inform to the Commission if it is found that natural mineral resources or antique objects and treasure trove are not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts. If the Commission allows, the investor shall continue to carry out the investment in such land, and if not allowed, the investor shall transfer and carry out, by obtaining the permission, at the substituted place which is selected and submitted by him;
f) shall not make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission;
g) shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage;
h) shall list and keep proper records of books of account and annual financial statement, and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards;
i) shall close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce;
j) shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason;
k) shall pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work;
l) shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar;
m) shall respect and comply with the labor laws;
n) shall have the right to sue and to be sued in accordance with the laws;
o) shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement;
p) shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;
q) shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact

assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.

Section 73. The investor shall insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.

2.3.6 Myanmar Investment Rules (2017)

The project developer commits to comply with rules 202, 203, 206 and 212 (a), (b), (c), (d), (e) and (f).

Rule 202. The investor must comply with the conditions of the Permit and other applicable laws when making an investment.

Rule 203. The investor shall fully assist while negotiating with the Authority for settling the grievances of the local community that have been affected due to investment.

Rule 206. If the investor is desirous to appoint a foreigner as senior management, technician expert or consultant according to section 51 (a) of the Law, it shall submit such foreigner's passport, expertise evidence or degree and profile to the Commission Office for approval.

Rule 212. Every investor that holds the permit or tax incentives must have taken out the relevant insurance out of the following types of insurance at any insurance business that holds the license in the Union based on the nature of the business:

a) Property and business interruption insurance;
b) Engineering insurance;
c) Professional liability insurance;
d) Professional accident insurance;
e) Marine insurance; and
f) Workmen compensation insurance.

2.3.7 Indigenous Peoples' Rights Protecting Law (2015)

The project developer commits to comply with the section (5).

Section 5. If any development projects, mega projects, businesses and extraction of natural resources are planned to implement in the indigenous peoples' regions, the detail project description and information must be completely shared in advance with the respective indigenous people and cooperation and collaboration with them must also be done.

2.3.8 Oil Field (Workers and Welfare) Act (1951)

The project developer commits to comply with Chapter (3) Health, Chapter (4) Safety, Chapter (5) Welfare, sections 28 and 29 of Chapter (6) and Chapter (7) Working Hours for Adults.

Chapter (3) Health

Drinking Water

Section (6) (1). The employer shall make sure that adequate access to safe drinking water for all workers in all suitable and easily accessible areas in all notified oil fields.

(2) All supplied water areas must be clearly marked as "Drinking water". These areas must be not within twenty feet distance from laundry places, toilets or places for urination.

(3) The President may prescribe the guidelines for testing drinking water supply by public health authorities or the other requirements for supplying clean drinking water to the notified oil field or a portion of the notified oil field.

Toilets and urinals

Section (7) (1). In each notified oil field:

a) Toilets and urinals of prescribed specifications shall be provided in sufficient number in places accessible to workers at all times.
b) Toilets and urinals for female petroleum workers shall be provided separately from the toilets and urinals for male petroleum workers.
c) At the entrance of these toilets, a clearly visible sign or notice must be affixed, indicating whether they are for men or for women.
d) Toilets and urinals shall be equipped with adequate lighting and ventilation. No toilets or urinals should be connected to a workplace without an open or ventilated space.
e) Toilets and urinals shall be kept clean and in a healthy condition at all times
f) Sweepers must be employed. The main job of these sweepers is to keep the toilets, urinals and washing places.

(2). The inspector shall prescribe the number of toilets and urinals to be provided in a notified oil field in proportion to the numbers of male and female oil field workers ordinarily employed therein, and shall make such other provisions in respect of sanitation in notified oil fields, including the obligations of the petroleum workers in this regard, as he considers necessary in the interest of the health of the oil field workers employed therein.

Chapter (4) Safety

Fencing of machinery

Section (8) (1). In each notified oil field, if the following machinery is installed, it shall be securely enclosed with solid safe-guards while it is in use, and these safeguards must be regularly repaired and kept in place.

(a) Prime mover:
    1) Every moving part of a prime mover and every flywheel directly connected to a prime mover (irrespective of whether the prime mover or flywheel is in the engine house).
    2) The headrace and tailrace of every water-wheel and water turbine.
    3) Every part of an electric generator, motor or rotary converter (fencing is not required if the unit is in such position or of such construction as to be as safe to every person employed or working in the building or nearby as it would be if securely fenced).

(b) Transmission machinery:
    Every part of transmission machinery (no fencing is required if the unit is in such position or of such construction as to be as safe to every person employed or working in the building or nearby as it would be if securely fenced).

(c) Other machinery:
    1) Every dangerous part of any other machinery (no fencing is required if the unit is in such position or of such construction as to be as safe to every person employed or working in the building or nearby as it would be if securely fenced).
    2) Any part of stock-bar which protrudes beyond the head-stock of a lathe.

Provided that, in determining for the purposes of the foregoing clauses (b) and (c) of sub-section (1) whether any part of machinery is in such a position or of such construction as to be as safe to every person employed or working in the building or nearby as it would be if securely fenced, no account shall be taken of a person carrying out, while the part of the machinery is in motion, an examination of the machinery which must be carried out while the part of machinery is in motion, or any mounting or shipping of belts, lubrication or other adjustments shown by such examination to be necessary while the part of the machinery is in motion.

Furthermore:

1) In addition to the responsibilities of fencing the machinery, every set screw, bolt and key on any revolving shaft, spindle, wheel or pinion, and all spurs,

worms and other toothed or friction gearings in motion with which such person would otherwise be likely to come into contact, shall be securely fenced to prevent such contact;

2) Such person shall not handle a belt for lifting or lowering a moving pulley unless the belt-joint is either laced or flushed with the belt;
3) This person shall be a male oil field worker specially trained for the job and listed as a worker in the prescribed oil field worker registration book. In addition, the person must wear protective gear while performing this work.

(2). The President may by rules prescribe such further precautions as he considers necessary in respect of any particular machinery or part thereof. He may exempt, subject to such conditions as he considers necessary for securing the safety of the workers, any particular machinery or part thereof from the provisions of sub-section (1), paragraphs (b) and (c).

Devices for cutting off power

Section (9). In each notified oil field:

a) Suitable striking gear or other efficient mechanical appliance shall be provided and maintained and used to move driving belts from fast to loose pulleys and from loose to fast pulleys which form part of the transmission machinery, and such gear or appliances shall be so constructed, placed and maintained as to prevent the belt form slipping back on to the fast pulley;
b) Driving belts when not in use shall not be allowed to rest or ride upon shafting in motion.

Restrictions related to work near machinery

Section (10) (1). No woman or child shall be allowed to clean, lubricate or adjust any part of the machinery while the part is in motion, or to work between moving parts, or between fixed and moving parts of any machinery which is in motion.

(2) The President may, by notification, prohibit, in any notified oil field or class of notified oil fields, the cleaning, lubricating or adjusting by any person of specified parts of machinery when those parts are in motion.

Lifts, hoists, cranes and other lifting machinery

Section (11) (1). The following provisions shall apply to all lifts, hoists, cranes and other lifting machinery in a notified oil field:

a) Every part thereof, including the working gear, whether fixed or moveable, and anchoring and fixing appliances, shall be:
1) Well constructed with strong material;
2) Well maintained. In addition, a person authorized to inspect must conduct a thorough inspection at least once every 12 months. A registration book shall be kept which records the contents of the inspection.
b) No such machinery shall be loaded beyond the safe working load which shall be clearly marked thereon.
c) While any person is working on or near the wheel-tract of a travelling crane, in any place where he might to be struck by the crane, effective measures shall be taken to ensure that the crane does not approach within twenty feet of that place.

(2) The President may make rules in respect of any lifting or hoisting machinery or class or of lifting machinery in a notified oil field:

a) Prescribing further requirements in addition to those set out in this section; and
b) Exempting from compliance with all or any of the requirements of this section, where in his opinion such compliance is not required.

Revolving machinery

Section (12) (1). In every notified oil field in which the process of grinding or abrading is carried on there shall be permanently affixed to or placed near each grinder in use a notice indicating the maximum safe working peripheral speed of every grinding or abrading wheel, the speed of the shaft or spindles upon which the wheel is mounted, and the diameter of the pulley necessary to secure such safe working peripheral speed.

(2) The grinder shall not rotate faster than the speed specified in the notice attached according to paragraph (1).

(3) Effective measures shall be taken in a notified oil field to ensure that the safe working peripheral speed of every revolving vessel, cage, basket, flywheel, pulley, disc or similar appliance driven by power is not exceeded.

Pressure plant

Section (13) (1). If in any notified oil field any part of machinery is operated at a pressure above atmospheric pressure, effective measures shall be taken to ensure that safe working pressure of such part is not exceeded.

(2) The President may make rules providing for the examination and testing of any machinery referred to in sub-section (1) and prescribing such other safety measures in relation thereto as may in his opinion be necessary in any notified oil field or class of notified oil fields.

Pits, sumps, openings in floors, etc.

Section (14) (1). In every notified oil field, a fixed vessel, sump, tank, pit or opening in the ground or in a floor, which by reason of its depth, situation, construction or contents, is likely to be a source of danger, shall be either securely covered or strongly fenced.

However, the provisions of this sub-section shall not apply to the operation of an oil rig if it is only operated directly through a hole in the bottom of the derrick floor.

(2) When repairing or installing a casing joint or cable tool joint, the employer shall close the hole in the upper room to prevent workers from slipping into the basement.

Excessive weights

Section (15) (1). No woman, adolescent or child shall be employed in any notified oil field to lift, carry or move any load so heavy as to be likely to cause injury.

(2) The President may make rules prescribing the maximum weights that may normally be carried or moved by workers in a notified oil field.

Protection of eyes

Section (16). If in a notified oil field:

a) The work is of a kind that is dangerous to the eyes due to particles or fragments being thrown off in the course of the work, or
b) The work is dangerous to the eyes due to excessive light exposure.

The President may by rules require that effective screens or suitable googles shall be provided for the protection of persons employed on, or in the vicinity of, the process.

Precautions against dangerous fumes

Section (17) (1). In any notified oil field, no person shall enter or be permitted to enter any chamber, tank, vat, pit, pipe, flue or other confined space in which dangerous fumes are liable to be present to such an extent as to asphyxiate persons, unless it is provided with a man-hole of adequate size or other effective means of egress.

(2) No portable electric light of voltage exceeding 24 volts shall be permitted in any notified oil field for use inside any confined space referred to in sub-section (1), and where the dangerous fumes present are likely to be inflammable, no lamp or light other than that of flame-proof construction shall be permitted to be used in such confined space.

(3) Every effort shall be made to remove the fumes which may be present in the confined space referred to in sub-section (1) of the notified oil field and no one shall enter or be allowed to enter the confined space unless the following measures are taken:

a) A certificate has been given by an authorized examiner, based on a test carried out by himself, that the space is free from dangerous fumes and fit for persons to enter; or
b) The oil field worker entering is wearing a suitable breathing apparatus and a belt securely attached to a rope the free end of which is held by a person standing outside the confined space.

(4) Suitable breathing apparatus, reviving apparatus and belts and ropes shall be kept ready for instant use in the vicinity of any such confined space which any person has entered. A person authorized to inspect shall be responsible for proper inspection of all such apparatus at regular intervals so that they are fit for use. A sufficient number of persons drawn from the workforce shall be trained in the use of all such apparatus and in the method of restoring respiration.

(5) No person shall be permitted to enter any boiler furnace, boiler flue, still, chamber, tank, vat, pipe, or other confined space for the purpose of working or making any inspection therein until it has been sufficiently cooled by ventilation or otherwise so as to be safe for persons to enter.

(6) The President may make rules prescribing the minimum dimensions of the manholes referred to in sub-section (1), and by other rules exempt, subject to such conditions as he may think fit to impose, any notified oil field from compliance with any of the provisions of this section.

Explosive or inflammable dust, fume, etc.

Section (18) (1). If there is in a notified oil field dust, fume or vapour of such nature and to such an extent as to be likely to explode on ignition, all possible measures shall be taken to prevent any such explosion by:

a) Effective enclosure of the machinery or equipment used in the business;
b) Removal or prevention of accumulation of dust, fume or vapour;
c) Isolation or effective enclosure of all possible sources of ignition.

(2) Where in any notified oil field the machinery or equipment use in the business and referred to in sub-section (1) is not so constructed as to withstand the force of such explosion as aforesaid, all possible measures shall be taken to prevent the spread of the explosion and to minimize the damage caused thereby by providing chokes, baffles, vents or other effective appliances in the machinery or equipment.

(3) Where in any notified oil field any part of machinery or equipment contains any explosive or inflammable fume and vapour under pressure greater than atmospheric pressure, such part shall be not be opened except in accordance with the following provisions, namely:

a) Before the fastening of any joint of any pipe connected with such part is loosened, any flow of the gas or vapour into the part or into any such pipe shall be effectively stopped by a stop-valve or other means;
b) Before any such fastening of any joint of any pipe or the firmly fastened cover is removed, all measures shall be taken to reduce the pressure of the fume or vapour in the part of pipe equal to the atmospheric pressure;
c) Where any such fastening as aforesaid has been loosened or removed, effective measures shall be taken to prevent any explosive or inflammable fume or vapour from entering the pipe or any part of the machinery or equipment.

(4) No tank or vessel which contains, or has contained, any explosive or inflammable substance, shall be subjected in any notified oilfield to any welding, brazing, soldering or cutting operation that involves the application of heat, unless adequate measures have been taken to remove such substance and fumes arising therefrom, or to render such substance and fumes

non-explosive or non-inflammable, and unless a certificate has been given by a competent examiner after a test carried out by himself that the plant, tank, or vessel is free from explosive or inflammable vapour.

(5) No explosive or inflammable substance shall be allowed to enter the tank or vessel after an operation described in sub-section (4), until the metal has cooled sufficiently to prevent any risk of igniting the substance.

Arrangement to be made against cases of fire

Section (19) (1) Evacuation procedures in a notified oil field shall be as prescribed. If it appears to the inspector that this is not the case in any notified oil field, he may serve on employer an order specifying the arrangements which, in his opinion, should be carried out to bring the notified oil field into conformity with the provisions of this section and any rules made thereunder and requiring them to be carried out before a date specified in the order.

(2) In every notified oil field, the doors affording egress from any room shall not be locked or fastened so that they cannot be easily and immediately opened from the inside while any person is within the room, and all such doors, unless they are of the sliding type, shall be constructed to open outwards.

(3) In every notified oil field, every window, door or other exit affording a means of escape in case of fire, other than the means of exit in ordinary use, shall be distinctively marked in a language understood by the majority of oil field workers and in red letters or by some other effective and clearly understood sign.

(4) In every notified oil field, there shall be installed apparatus to give warning in case of fire, clearly audible to every person employed in the notified oil field.

(5) An easy access path to the exits in case of fire shall be kept clear for the use of all oil field workers in the various sections of the notified oil field.

(6) Effective measures shall be taken to ensure that in every notified oil field:

a) Where more than twenty oil field workers are ordinarily employed in any place of the lowest floor, or
b) Where explosive or highly inflammable materials are stored or used, all the oil field workers are familiar with the means of escape in case of fire and have been adequately trained in the procedure to be followed in such case.

(7) The President may make rules prescribing in respect of any notified oil field, the means of escape together with the kind and number of fire-fighting apparatus to be provided for use in case of fire.

Power to require specifications of defective parts or tests of stability

Section (20) If it appears to the inspector that any building or part of a building, or any part of the passageways or machinery in a notified oil field is in such a condition that it will be dangerous to human life or safety, he may serve on the employer an order requiring him before a specified date:

a) to furnish such plans, specifications and other particulars as may be necessary to determine whether such building, passageways or machinery can be used with safety, or
b) to carry out such tests in such manner as may be specified in the order and to inform the inspector of the results thereof.

Safety of buildings and machinery

Section (21) (1). If it appears to the inspector that any building or part of a building or any part of the passageway or machinery in a notified oil field is in such a condition that it will be dangerous to human life or safety, he may serve on the employer an order specifying the

measures which in his opinion should be adopted, and requiring them to be carried out before a specified date.

(2) If it appears to the inspector that the use of any building or part of a building or any part of the passageway or machinery in a notified oil field involves imminent danger to human life or safety, he may serve on the employer an order prohibiting its use until it has been properly repaired or altered.

Power of President to make rules to supplement this chapter

Section (22). The President may, in addition to the safety measures mentioned in this chapter, by rules prescribe further safety measures concerning the following:

a) Further fencing regarding the safety of particular machines;
b) The provision of devices that will prevent the uncovering of a dangerous part of a machine while it is in motion, or that will stop the machine in case of danger;
c) The provision of automatic safety-guards that will prevent the person operating the machine from coming into contact with the dangerous part where this cannot be secured by a fixed safety-guard;
d) The additional fencing of items which are dangerous to handle while the machine is being operated; and
e) Any other matter which may be deemed expedient in order to give effect to the provisions of this chapter.

Chapter (5) Welfare

Washing Facilities

Section (23). The President may, in respect of any notified oil field or class of notified oil fields, make rules prescribing what constitutes adequate access to washing facilities.

First aid appliances

Section (24) (1). In every notified oil field, the employer shall provide and maintain a first-aid box or a medical cabinet equipped with the prescribed contents in a suitable place as may be directed by the inspector so as to be readily accessible during all working hours, and if more than 150 are hired, another first-aid box or medical cabinet shall be provided for every additional 150 workers or part thereof.

(2) Nothing but the prescribed contents shall be kept in the first-aid boxes or medical cabinets referred to in sub-section (1). Furthermore, all such first-aid boxes and medical cabinets shall be kept under the supervision of a trained nurse. This person shall always be available during working hours.

(3) In every notified oil field, where more than 200 workers are employed, there shall be a first-aid room or clinic of the prescribed dimension, containing the prescribed equipment. The first-aid room or clinic shall be kept under the supervision of such doctor and nurses as may be prescribed.

However, if there are two or more employers within a radius of two miles who employ 200 or more workers in total, the inspector may order them to set up a joint first-aid room or clinic in accordance with this sub-section (3) as directed by him.

Rest sheds, rest rooms and lunch rooms

Section (25) (1). Every employer who employs more than 200 workers must provide adequate rest-sheds or rest rooms and an adequate lunch room for the use of the workers.

(2) The rest sheds, rest rooms and lunch room to be provided under sub-section (1) shall be adequately lighted and ventilated. In addition, they shall be kept clean.

(3) The President may:

a) prescribe the design of the rest sheds, rest rooms and lunch room to be provided under this section and the methods of accommodation, furniture and other equipment to be provided therein; and
b) by notification exempt any employer from the provisions of this section.

Joint Labour Advisory Board

Section (26). The President may set up a Joint Labour Advisory Board consisting of the following persons:

a) welfare of oil field workers;
b) safety measures;
c) fostering a harmonious relationship between employers and employees.

The term of office of the members shall be 1 year.

1) Minister of Petroleum (Chairman)
2) Government Labour Officer (member and secretary)
3) Employers' Representatives (not more than 6)
4) Representatives of the oil field workers' Union (not more than 6)

Chapter (6) Special circumstances

Submission of notice of the outbreak of diseases

Section (28) (1). Where any oil field worker in a notified oil field contracts any disease specified in schedule 3 of the Workmen's Compensation Act, the employer shall submit notice thereof to the certifying doctor for the district in which the notified oil field is situated, in such form and with such particulars and within such time as may be prescribed.

(2) If any doctor attends on a person who is or has been employed in a notified oil field, and who is, or is believed by the doctor to be, suffering from any disease specified in Schedule 3 of the Workmen's Compensation Act, the doctor shall submit a report to the office of the chief inspector starting:

a) the name and address in full of the patient;
b) the name of the disease from which he believes the patient is suffering; and
c) the name and address in full of the current or previous employer of the patient.

(3) The doctor shall be entitled to the prescribed fee in respect of the report submitted in pursuance of this section.

(4) If any doctor fails to comply with the provisions of sub-section (2), he shall be punishable with a fine which may be extended to 50 kyats.

Submission of notice of accidents

Section (29). Where in any notified oil field an accident occurs which causes death, or which causes any bodily injury by reason of which the person injured is prevented from working in the notified oil field for a period of 48 hours or more immediately following the accident, or which is of such nature as may be prescribed for this purpose, the employer shall submit notice thereof to such authorities, and in such from and within such time as may be prescribed.

Chapter (7) Working Hours for Adults

Weekly working hours

Section (30). No adult oil field worker shall be required or allowed to work in a notified oil field for more than 44 hours in a week.

Provided that an adult male oil field worker in a notified oil field engaged in work which for technical reasons must be continuous throughout the day may work 48 hours in a week.

Weekly holidays

Section (31) (1). No adult oil field worker shall work or allowed to work in a notified oil field on a Sunday unless the following conditions are met:

a) the worker has had or will have a full holiday on one of the 3 days immediately before or after that Sunday; and
b) the employer has, before that Sunday or the day substituted therefore under clause (a), whichever is earlier'
    i. delivered at the office of the inspector a notice of his intention to require the oil field worker to work on the Sunday and of the day to be substituted therefore, and
    ii. displayed in the factory a notice to that effect for not less than 24 hours before any of such two days whichever is earlier and until the expiry of such two days whichever is later.

Provided that no substitution shall be made, which will cause any petroleum worker to work for more than 10 consecutive days without a full holiday.

(2) Notices given under sub-section (1) may be cancelled by a notice delivered to the office of the inspector and a notice displayed close to the notice of working hours put up under section 30, no later than the day before the Sunday or the holiday to be cancelled, whichever is earlier.

(3) Where in accordance with the provision of sub-section (1), any oil field worker works on a Sunday and has had a holiday on one of the three days immediately before the same, that Sunday shall, for the purpose of calculating his weekly hours of work, be included in the preceding week.

Substituted holidays

Section (32) (1) Where as a result of the passing of an order or the making of a rule under the provisions of this Act exempting notified oil field or the workers therein from the provisions of section (31), a worker is deprived of any of the weekly holidays for which provision is made in sub-section (1) of that section, he shall be allowed, within the calendar month in which the holidays were due to him or within the two calendar months next after that month, substituted holidays equal to the number of holidays so lost.

(2) The President may prescribe the manner in which the holidays, for which provision is made in sub-section (1), shall be allowed.

Daily working hours

Section (33). Subject to the provision of section (30), no adult oil field worker shall be required to work in a notified oil field for more than 8 hours in any day.

Breaks

Section (34). The periods of work of adult oil field workers during each day shall be so fixed that no period exceeds 5 hours in a stretch. No petroleum worker may work for more than 5 hours before he has had a break of at least half an hour, and he shall not work for more than 8 hours without 2 breaks.

Maximum periods of work

Section (35). The periods of work of an adult worker in a factory inclusive of breaks under section 34 shall be so arranged that such periods shall not spread over more than 10 hours in any day, save with the permission of the President and subject to such conditions as he may impose, either generally or in the case of any particular notified oil field.

Night shifts

Section (36). Where an oil field worker in a notified oil field works on a shift which extends beyond midnight, the following day for him shall be deemed to be the period of 24 hours beginning with the end such shift, and his work hours after midnight shall be counted as those of the previous day.

Provided that the President may, by order, direct that in the case of any specified notified oil field, the following day shall be deemed to be the period of 24 hours beginning with the commencement of such shift, and that the work hours before midnight shall be counted as those of the following day.

Prohibition of overlapping shifts

Section (37) (1) In any notified oil field, work shall not be carried on by system of shifts so arranged that more than one relay of workers is engaged in work of the same kind at the same time.

(2) The President may, subject to such conditions as may be prescribed, make rules exempting any notified oil field or class of notified oil fields from the provisions of sub-section (1).

Notice of periods of work for adults

Section (38) (1). There shall be displayed and properly maintained a notice of periods of work for adults showing during which period adult oil field workers may be required to work for every day.

(2) The periods shown in the notice required under sub-section (1) shall fix in advance in accordance with the following provisions of this section and shall be such that petroleum workers working in those periods would not be working in contravention of any of the provisions of sections 30,31, 33, 34 and 35.

(3) Where all the oil field workers in a notified oil field are required to work during the same periods, the employer shall fix those periods generally for such workers.

(4). Where all the adult oil field workers in a notified oilfield are not required to work during the same periods, the employer shall fix those periods generally for such workers.

(5). For each group which is not required to work by system of shifts, the employer shall fix the periods during which the group may be required to work.

(6). Where any group is required to work by system of shifts and the relays are not to be subject to predetermined periodical changes of shifts, the employer shall fix the periods during which each relay of the groups may be required to work.

(7). Where any group is work by system of shifts and the relays are to be subject to predetermined periodical changes of shifts, the employer shall draw up scheme of shifts where under the periods during which any relay of the group may be required to work, any relay which will be working at any time of the day may be known in advance for any day.

(8). The President may prescribe forms of the notice required by sub-section (1) and the manner in which they shall be maintained.

(9). If the employer starts operation after the date of the commencement of this Act, 2 copies of the notice referred to in sub-section (1) shall be submitted to the inspector before the day on which operation begins.

(10). The employer shall submit to the inspector 2 copies of any proposed change in the system of work which will necessitate a change of the notice referred to in sub-section (1) before the change is made. Except with the prior sanction of the inspector, no such change shall be made until 1 week has elapsed since the last change.

Register of adult oil field workers

Section (39). (1) Each employer shall maintain a register of oil field adult workers showing –

(a) the name of each oil field worker;

(b) the kind of his work;
(c) the group, if any, in which he included;
(d) where his group works in shifts, the relay to which he is allotted; and such other particulars as may be prescribed;
(e) such other particulars as may be prescribed.

The register must be available for inspection at any time during business hours. Provided that, if the inspector is of opinion that any list of workers or register maintained by the employer gives in respect of any or all the oil field workers hired by the employer the necessary particulars in full as required under this section, he may order that such list of workers or register shall to that extent be treated as the register of adult oil field workers and shall continue to be maintained as such.

(2). The President may prescribe the form of the register of adult oil field workers, the manner in which it shall be maintained and the period for which it shall be preserved.

Periods of work to correspond to the notice displayed under section 38 and register maintained under section (39)
Section (40). No adult oil field worker shall be required or allowed to work otherwise than in accordance with the notice of periods of work for adults under section 38 and the entry made in advance against his name in the register of adult petroleum workers under section 39.

Power to make rules for exemption
Section (41). (1) The President may make rules defining the persons who hold positions of supervision or management or position of confidence in a notified oilfield, and the provisions of this chapter, other than the provisions of clause (b) of sub-section (1) of section 43 and of the proviso to that sub-section, shall not apply to any person so defined.
(2) The President may make rules in relation to adult oil field workers in factories providing for the exemption, to such extent and subject to such conditions as may be prescribed-

a) of oil field workers engaged in urgent repairs, from the provisions of sections 30, 31, 32, 33, 34 and 35;
b) of oil field workers engaged in work preparatory or complementary nature which must necessarily be carried on beyond the limits of working hours, from the provisions of sections 30, 33, 34 and 35;
c) of oil field workers engaged in work which is necessarily so intermittent that the intervals during which they have no work to do exceeds the breaks ordinarily required under section 34, from the provisions of sections 30, 33, 34 and 35;
d) of oil field workers engaged in any work which for technical reasons must be carried on continuously throughout the day, from the provision of sections 30, 31, 33, 34 and 35;
e) of oil field workers engaged in boiler sheds, engine rooms or in attending prime mover or transmission machinery, from the provisions of sections 30 and 31.

(3). Rules for any exemption made under sub-section (2) may also provide for any consequential exemption from the provisions of section 38 which the President may deem to be expedient, subject to such conditions as he may prescribe.

(4). In making rules under this section, the President shall prescribe the maximum limits for the weekly hours of work for all classes of petroleum workers, and any exemption given, other than an exemption under clause (a) of sub-section (2), shall be subject to such limits.

(5). Rules made under this section shall remain in force for not more than three years

(6). For the purpose of giving effect to the provisions of this chapter, the President may make rules providing for any other matter which he may deem expedient.

Power to make orders for exemption

Section (42). (1) Where the President is satisfied that, owing to the nature of the work carried on or to other circumstances, it is unreasonable to require that the periods of work of any adult petroleum should be fixed in advance, he may, by order, relax or modify the provisions of section 38 in respect of such workers therein, to such extent and in such manner as he may think fir, and subject to such conditions as he may deem expedient to obtain effective control over periods of work.

(2) The President, or subject to the control of the President, the chief inspector may, by order exempt on such conditions as he may deem expedient any or all of the adult oil field workers in any notified oilfield or group or class of notified oilfields, from any or all of the provisions of section 30, 31, 33, 34, 35 and 38 on the ground that the exemption is necessary to deal with exceptional pressure of work.

(3) Any exemption given under sub-section (2) in relation to weekly hours of work shall be subject to the maximum limits prescribed under sub-section (4) of section (41).

(4) An order issue under sub-section (2) shall remain in force for such period as may be specified but it shall not exceed 2 months from the date on which notice thereof is given to the employer.

Provided that if the President considers that public interest so requires, he may, from time to time, by notification published in the Gazette, extend the period of enforcement of any such order for such period as may be specified in the notification, not exceeding 6 months at any one time.

Additional restrictions on the employment of women

Section (43). (1) The Provisions of this chapter shall apply to female oil field workers employed in notified oilfields with the following restrictions;

a) No woman shall be exempted from the provisions of section 33;
b) no woman shall be required or allowed to work in a notified oilfield from 6:00 pm to 6:00 am; and
c) (1) the periods of work shall be the same for all women employed in the notified oilfields; and

   (2) the periods of work of female workers shall not be changed more than once in any calendar month, except if permitted by the inspector.

Wages for overtime

Section 44. (1) Where an oil field worker in notified oilfields works for more hours than those specified in section 30 and 33, he shall in respect of the overtime so worked be entitled to be paid at the rate of twice his ordinary rate of wages.

(2) If an oil field worker has to work on a recognized regular holiday, he shall be paid twice his ordinary wage for the hours worked.

(3) Where oil field workers are paid on a piece-rate basis, the President, in consultation with the Joint Labour Advisory Board, shall fix hourly wage rates that shall be as close as possible to the average rate of earnings of those workers, and for the purposed of this section, the rates so fixed shall be deemed to be the ordinary rates of wages of those workers.

(4) The President may prescribe the registers to be maintained in a notified oilfield for the purpose or securing compliance with the provisions of this section.

Explanation: The term “wages” shall, for the purpose of calculating wages for overtime payable under this section, mean the bear wages without any allowances.

2.3.9 Farm land Law (2012)

The project developer commits to comply with section 30.

Section 30. In respect of application to use the farm land by other means for the interests of the public:

a) The Central Administrative Body of the Farm Land may permit to use the farm land by other means with the recommendation of the Region or State, Nay Pyi Taw Administrative Body of the Farm Land;

b) The relevant Region or State Government Organization shall permit to use the farm land by other means except low land with the recommendation of the Region or State, Nay Pyi Taw Administrative Body of the Farm Land.

2.3.10 Vehicle Safety and Motor Vehicle Management Law (2020)

The project developer commits to comply with the sections (9) (a), 12 (c), (14) (r), 18 (a) and 81(g).

Section (9). The Ministry shall carry out the following matters with the consent of the Union Government.

(a). Designate and limit the places and aeras for the locally – used vehicles to access.

Section (12) (c) The Ministry shall prescribe safety and environmental conservation guidelines, standards and norms for the initial registration of vehicles.

Section (14) (r) The Department has a right and responsibility to limit the driving speed for the safety of vehicles on the public streets.

Section 18 (a) The vehicle owner shall maintain his/her vehicle according to the standards stipulated by the Department for the safe use of vehicle.

Section 81(g). No one shall in the public place carry or transport the dangerous goods with the vehicle non-compliance with the regulations.

2.3.11 Motor Vehicle Rules (1989)

The project developer commits to comply with the following rules 7, 8, 12, 13, 14, 15, 16, 17, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 55, 56, 58, 59, 60, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 132, 133, 135, 137, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 165, 166, 167, 168, 169, 170, 171, 172, 173, 175.

Rule 7. (a) The registration period of the motor vehicle shall be as prescribed by the Central Registration Board. The expiration date must be the last day of the expiring month.

(b) Before the expiration of the period prescribed under sub-rule (a), usually within the month of the expiration of the registration, the owner shall change the registration of his vehicle with the relevant registration body. However, for special cases, the Central Registration Board may prescribe a new registration change within 90 days before the registration period expires.

(c) In case of making a new registration change after the expiration of the period prescribed under sub-rule (a), the owner shall also pay the overdue fee assessed by the Central Registration Board in addition to the prescribed registration fee.

(d) If the period of failure to change the new registration is five consecutive years, the registration of such motor vehicle shall be automatically canceled.

(e) The new registration shall be exchanged at the registration body concerned with the address of the owner mentioned in the motor vehicle registration book.

(f) The owner must have paid third party liability insurance premium for his vehicle before changing the new vehicle registration.

(g) The registration body shall replace the new registration only after inspecting the vehicle and complying with the stipulations.

(h) The owner shall install it on his vehicle so that the registration certificate exchanged by the registration body can be clearly seen from the front.

(i) According to this Rule, the New Vehicle Registration Board shall report to the Central Registration Body the contents of the new motor vehicle as prescribed.

Rule 8. (a) Only the owner is responsible for repairing the vehicle at all times in accordance with Section 5 of the Law.

(b) The responsible person shall repair and maintain his vehicle as stipulated in Chapter 3 of these Rules.

Rule 12. To change the owner's home address, follow these steps:

a) If the owner wants to change the address, he must inform the current registration body and submit the registration book to write the new address. The new registration body must be notified upon arrival at the new address. The new registration body may refuse to re-register the vehicle that was transferred without notifying the old registration body.
b) The current registration body shall notify the new registration body and the Central Registration Body of the change of address under sub-rule (a).

Rule 13. The following steps must be taken regarding the change of ownership:

(a) If the owner of the registered vehicle needs to be changed then both the transferor and the transferee shall bring the national registration card and vehicle registration book and go to the registration body in person to change the owner.
(b) For the transfer of motor vehicle, if one of the two persons to be carried out under sub-rule (a) is unable to come to the registration body in person for any reason, the registration body may allow the submission of a legally registered contract or legally special power of attorney for the transfer and acceptance of motor vehicle. For any other significant change of ownership, it shall be as prescribed by the Central Registration Board.

Rule 14. (a) If the owner wants to make changes in the motor vehicle:

1. Must apply to the relevant registration body in advance. The application must state the changes and the duration.
2. Such application shall be made only with the written permission of the registration body.

(b) The registration body shall reply according to sub-rule (a) that the application of the owner is agreed or not agreed. If the application is not agreed, then the reasons for not agreeing shall be informed.

(c) shall come to the registration body with the registration book to be inspected immediately after the change in the vehicle is made as permitted.

(d) If the owner of the motor vehicle does not comply with sub-rule (a), the Central Registration Board may take action until the registration is revoked. The Central Registration Board shall prescribe in connection with this sub-rule.

Rule 15. (a) The Registration Board may temporarily suspend the registration of a motor vehicle in its area based on any of the followings:

1. There is a dangerous situation in public places;
2. Inconsistency with the requirements of Chapter 3 of these Rules;
3. Failure to comply with the other requirements of the motor vehicle owner contained in the rules other than the provisions of paragraphs (1) and (2) of this sub-rule;
4. The vehicle owner’s failure to present without any concrete reason on the occasion of taking action against the vehicle by the registration body.

(b) If the registration body suspends the registration under sub-rule (a), it shall immediately notify the Central Registration Body and the relevant Police Station in writing.

(c) The owner who has been punished under this Rule shall return the registration book and registration certificate to the relevant registration body.

(d) After repairing the requirements of the vehicle, which was under the suspension of registration according to sub-rule (a), the temporary suspension shall be revoked and the vehicle registration book and registration certificate shall be returned.

Rule 16. (a) The Central Registration Board shall cancel the registration of motor vehicles for any of the following reasons:

1. The registration body confirms the remark that it cannot be repaired for safe driving by having the engineer inspect the vehicle if it is dangerous to use the vehicle in a public place;
2. the owner to the relevant registration body to cancel the registration of his vehicle; Notification to the Central Registration Body in writing;
3. due to a vehicle accident; Due to fire; If the vehicle is damaged due to any other reason, the registration team shall inspect with the engineer and confirm the remark that the vehicle cannot be used forever.
4. Permanently taking the vehicle out of the Union of Myanmar with the permission of the Union Government;
5. the period of five consecutive years during the period when the motor vehicle registration has expired and the company fails to exchange for a new one;
6. The name of the vehicle due to the change in the vehicle without the permission of the registration body. Or seven forms; Or changes in load;
7. The motor vehicle registration period specified by the Ministry of Transport and Communications from time to time has expired.

(b) If the registration body submits the matters for deregistration mentioned in sub-rule (a) to the Central Registration Body, the Central Registration Body shall issue the order of vehicle deregistration. Matters which have been taken direct action by the Central Registration Body shall be notified to the relevant registration body. A copy of the order must be given to the owner;

(c) The registration body and registration certificate of the vehicle deregistered under sub-rule (a) by the registration body shall request from the owner;

(d) The aggregate list of deregistered vehicles shall be announced by the Central Registration Board at least once a year by a notification letter.

Rule 17. Registration book or to issue a copy of registration certificate as follows:

a) If registration book or the registration certificate is lost, the owner must report it to the People's Police Station. If the application for a copy of the book or a copy of the certificate is made in accordance with the stipulations of the Central Registration Body after obtaining the proof of such complaint, the relevant registration body shall issue a copy of the book or a copy of the certificate. After obtaining a copy of the book or a copy of the certificate, the lost book or certificate shall be returned to the relevant registration body.
b) If the registration book or registration certificate is damaged, the owner shall attach the damaged book or certificate when applying for a copy in accordance with the stipulations of the Central Registration Body. Upon receipt of the damaged book or certificate along with the application, the relevant registration body shall issue a copy.
c) The Central Registration Board shall prescribe to make it clear that it is a “copy” when issuing a copy of the registration book or a copy of the registration certificate.

Rule 21. According to Chapter 3 of the Law, every time any motor vehicle is registered or a new registration is changed. The insurance premium must be paid to the relevant Myanmar Insurance Corporation or registration body for third party liability insurance.

Rule 24. In accordance with the rules prescribed under this Chapter, no vehicle may be used or used in public places which is not in accordance with the directives issued by the Central Registration Board.

Rule 25. (a) Normally, every vehicle shall have two separate brake pedal brakes (three brakes while driving) and one hand brake (three brakes while parking or emergency braking). Vehicle brakes must be in a position that can be easily used by the driver.

(b) whether the pedal brake to be installed on the vehicle is loaded on the vehicle; If used on a flat road, whether unloaded or not, the vehicle stopping distance from the place of commencement shall be within the specified limits. The speed limit of the vehicle shall be as specified by the Central Registration Board.

(c) The handbrake to be installed in the motor vehicle is loaded on the vehicle; The vehicle must be stopped completely when used on slopes, whether loaded or unloaded.

(d) Brakes must be installed on the trailer to be hung on the vehicle. The application of the brakes must be in accordance with the manufacturer's instructions.

(e) Every motorcycle shall be equipped with two brakes for the rear wheel and one for the front wheel. According to the motorcycle manufacturer, if the front wheel brake is not included, it must be used only with the permission of the Central Registration Board.

(f) A vehicle equipped with a wind or vacuum type brake system shall have air tanks containing air or vacuum. There should be no air leakage in that system.

Rule 26. (a) between sunset and sunrise; every vehicle and motorcycle have headlights and headlights to provide light during the day when the light is dim due to the weather. In addition to the taillights, other specified lights must be fully installed.

(b) One or two headlights (either sideways or upside down) shall be installed at equal distances with the number of headlights on either side of the front left or right side of the vehicle. The shape of the bulbs; The size and color of the light must be the same. The height of the lamps on the ground must be the same. The headlights should be white. At least 100 meters (325 feet) of light must be visible on the road in front of the vehicle on clear nights. The headlights must be dimmed so that the person in front of you may not be distracted. The dimmer lights are on the front of the vehicle. Do not stare at the person standing at a distance of 61 meters (25 feet). When dimming the headlights of the dual headlights, the left or right extremities of the headlights, or the headlights of the upper and lower headlights, should be dimmed, and the rest of the headlights should be turned off, or the headlights of all bulbs should be lowered at the same time.

(c) A small side lamp shall be installed on each front and rear left edge of the vehicle. The headlights should be white or yellow. The color of the taillights should be red. The bulb should not exceed 7 watts. The side lights must be on to indicate that the vehicle is parked at night. There should be a light switch that can turn off the headlights when the side lights are on. Older models are allowed to be absent unless they have taillights.

(d) A red reflective plate shall be installed on each left and right end of the rear of the vehicle. The reflector should be the same height as the ground. On clear nights at night, the red reflector can be seen from 150 meters (500 feet) with the headlights of the vehicle behind. The red reflector can be mounted on the brake light.

(e) The vehicle registration number on the rear license plate of each motor vehicle shall be lit so that it can be seen from 15.25 m (50 ft) on clear nights. The light color should be white. The headlights of the vehicle; The next number plate must be lit every time you turn on the headlights.

(f) Adjacent to the red reflective plate on the back of the motor vehicle; there should be a red brake light on the left and right side of the top and bottom. (Note: Only one brake light is allowed on older models.) This light should only be on when the brake pedal is applied. The fire was lit during the day or at night. It can be seen from 91.55 meters (300 feet) at night.

(g) The front and rear left and right sides of the vehicle shall be equipped with traffic lights. The lights are white or yellow on the front. The back should be yellow or red. This light is an automatic shut-off light. Lighting speed should be at least 60 times to a maximum of 120 times

per minute. Older models allowed the installation of Traffic Lights on the left and right sides of the cockpit.

(h) Snow lights are usually used only in snow-covered areas. In this country, these lights can only be used during heavy rains and fog, but usually yellow lights should not be used instead of headlights.

(i) The rear light shall be mounted on the rear of the motor vehicle. The light color should be white or yellow. Only use the rear gear of the vehicle to turn on the rear lights. The bulb should not exceed 7 watts.

(k) In some large vehicles, small lights, which indicate the height and width of the vehicle body at night, are mounted on the roof of the vehicle, one on each front left and one on the left and one on the rear left and right. Usually, the headlights are yellow, and the taillights are red. Or the color approved by the Central Registration Board.

If the length of the vehicle body is longer than 7.31 meters (24 feet), the front and rear left body of the vehicle shall be fixed. At the front and rear of the right side of the body, small lights should be installed to determine the length of the vehicle at night. Normally the headlights are yellow, and the taillights are red. Or the color approved by the Central Registration Board.

(n) If the load on the vehicle is more than 1.22 m (4 ft) at the rear of the vehicle, a red light shall be installed at the tip of the device to detect the leak at night. The light shall be visible from a distance of about 150 m (500 ft).

(o) If the vehicle is parked on the road at night, the side lights must be on. Or if there is a separate stop light, it must be turned on. However, if the vehicle parked on the road can be seen from a distance of about 300 meters (1,000 feet), the stoplights do not need to be turned on.

(p) When using a spotlight installed in a vehicle, care must be taken that the beam of the light does not strike the windshield of a moving vehicle or the face of a road user.

(r) The motorcycle shall have the following lights installed:

1. Only one headlight should be installed on the front center of the motorcycle. The headlights are white and must be at least 12.2 meters (40 feet) at the front, with no more than 100 cc of cylinders on the motorcycle. Cylinders exceeding 100 cc and not exceeding 200 cc shall be at least 24.4 m (80 ft); Cylinders with more than 200 cc can be illuminated at least 49 meters (160 feet).
2. The rear center of the motorcycle shall be equipped with a red reflector and a red brake light, as well as a white rear license plate light. According to the manufacturer of the moped motorcycle, no brakes are allowed.
3. Yellow signal lights shall be installed on the front and rear of the motorcycle. The moped motorcycle manufacturer allows the absence of signal lights.
4. A small white or yellow side lamp shall be installed on the front end of the motorcycle side. A red reflector should also be installed at the rear end of the sidebar.

(s) The rear tail of the trailer shall be fitted with a red reflector on each side of the left and right sides. There should be a small light on the front and back of the right side of the body. Normally the headlights are yellow, and the taillights are red or the color approved by the Central Registration Board.

(t) The lights to be installed in the tractor vehicle are the same as the headlights, rear lights must have license plate light and other lights permitted by the Central Registration Board.

(u) If the lights installed on special vehicles registered under Chapter 2 of these Rules are different from the provisions of this Rule, the permission of the Central Registration Body shall be obtained.

(v) If other lights in the vehicle than the lights prescribed in this Rule are desirous to install, the permission of the Central Registration Board or the Registration Board shall be obtained.

(w) In general, the minimum lights to be installed in the vehicle are as follows:

1. Headlight
2. Small side lights
3. Red back reflective plate
4. Brake light
5. Signal light

Rule 27. The length of any vehicle or trailer or towing vehicle is measured from the front end of the vehicle to the rear end of the vehicle.

Rule 28. The width of the vehicle of any vehicle or trailer or trailer shall be measured at the widest point along the body of the vehicle. Measurements should not include the rearview mirror mounts and signal arms mounted outside the body.

Rule 29. When measuring the height of any vehicle or trailer or towing vehicle, measure from the ground level to the top of the vehicle's roof or cargo hold.

Rule 30. (a) the protruding body edge to the rear of the vehicle shall be within the original construction measurement of the vehicle manufacturer.

(b) Normally, the protruding body edge measurement from the rear tire edge of the vehicle to the body edge of the vehicle shall not exceed one-third of the measurement from the front wheel center to the rear wheel center.

(c) If the motorcycle has a protruding seat at the rear of the vehicle, it shall not protrude more than 31 cm (1 ft) from the edge of the rear tire of the vehicle. If the motorcycle is mounted on the side, the front end of the side wheel shall be more than 31 cm (1 foot) from the front tire tip of the motorcycle. The rear end should not protrude more than 61 cm (2 feet) from the rear tire edge of the motorcycle.

Rule 31. (a) The total unloaded weight and load of the motor vehicle or trailer or trailer shall be as prescribed by the vehicle manufacturer. Gross Vehicle Weight shall not exceed 18,000 kg (18 tons). If it weighs more than that, the Central Registration Board aims to make the road safer. It can be allowed with restrictions such as speed and time.

(b) The following weights shall be inscribed with oil paint on the right side of the vehicle with letters and numbers not less than 3 cm (1 inch) in size on the heavy vehicle or trailer:

1. Vehicle weight without load () ton; for
2. Load capacity of the vehicle () ton; for load
3. Total vehicle and load () ton; for weight

Rule 32. (a) The dimensions of the wheels mounted on the motor vehicle or trailer or trailer shall be the same as at the time of manufacture of the vehicle. The wheels shall not be twisted and cracked. In addition, it must be in a safe condition.

(b) Tires must be inflatable tires and in stable condition even on wet roads. Do not use dangerous tires.

Rule 33. Every vehicle must have a reliable steering system. The steering system makes it easy for the vehicle to turn in the right direction. Must be agile and accurate. There must be a program in place to control the moles used in communications throughout the system. Do not change the steering wheel position. The allowable amount of free play of the steering wheel shall be as specified by the Central Registration Board.

Rule 34 (a) The undercarriage is an integral part of the motor vehicle and shall have a marked mark. That number must be recorded in the vehicle registration record. If there is no score, it must be typed in the order prescribed by the Central Registration Board. Except for the Central Registration Board, no one can correct, delete and retype the marks.

(b) As the frame is mounted on the motorcycle, it applies in accordance with sub-rule (a) prescribed for the undercarriage.

(c) If the undercarriage or frame of the motor vehicle or motorcycle is to be changed, the application shall be submitted to the Central Registration Board in the prescribed application form. Substrates or frames may be changed only after receiving the written permission of the Central Registration Authority. If the substrate or frame to be replaced is not the original, it must be of the same size or performance as the original size and performance.

(d) The undercarriage or frame must be maintained in good condition to ensure road safety.

(e) The underlying body or frame which existed before the date of enactment of these Rules is permitted.

Rule 35 (a) Four plates as suspension between the axle and the undercarriage in each trailer and towing vehicle to prevent the impact of the road. It must be securely fastened with cushions or other fasteners. They must be able to withstand the weight of the vehicle and the total load.

(b) Shock absorber bars shall be installed between the axles and the undercarriage in order to reduce the vibration caused by the four. These shock absorbers should always be in good condition.

Rule 36 (a) Every motor vehicle motor must have a machine number printed by the engine manufacturer. That number must be recorded in the vehicle registration record. Type in the order specified by the Central Registration Board on the engine as required by the non-scoring or non-scoring or registration body. Except for the Central Registration Board, no one can correct, delete or retype the marks. Engine maintenance must be done.

(b) If the motor vehicle engine is to be changed, the application must be submitted to the Central Registration Board in the prescribed application form. The engine can be changed only after receiving the written permission of the Central Registration Authority. If the engine to be replaced does not match the original name and model, it shall be as specified by the Central Registration Board.

(c) If the fuel system of the vehicle is to be changed, it shall be as prescribed by the Central Registration Board.

Rule 37(a) The power conversion system of the motor vehicle shall be as installed by the motor vehicle manufacturer.

(b) All components of the transformer system shall be maintained in good condition.

(c) The permissible amount of clutch pedal allowable on a motorized vehicle shall be as prescribed by the Central Registration Board.

Rule 38 (a) The gear shift of the motor vehicle shall be in accordance with Rule 37 (a).

(b) Every motor vehicle shall have a reverse gear arrangement. Such a program does not have to be on a motorcycle.

Rule 39 (a) The parts contained in the head of the vehicle are the hood, mud cover, water tank cover, headlights and the driver's compartment. The head of the vehicle indicates the name and model of the vehicle. Any part of the head of the vehicle is to be changed, it must be as specified by the Central Registration Board. If the change is not in accordance with the regulations, the vehicle registration can be denied or revoked by the registration body.

(b) The head of vehicle permitted before the date of enactment of these Rules shall not apply to sub-rule (a).

Rule 40 (a) Regardless of the type of body structure constructed in the vehicle, that body shall be firmly attached to the undercarriage of the vehicle. Body and floor coverings and roofs must ensure the safety of the passenger and cargo in the vehicle. There shall be no protruding objects on the body.

(b) If the body of the vehicle is to be changed, the application must be submitted to the Central Registration Board in the prescribed application form. The owner shall be notified in writing whether or not the body of the vehicle is allowed to change. The owner shall act only in accordance with the reply letter of the Central Registration Board.

(c) Doors must be strong and closed securely in a body equipped with doors.

(d) The driver's seat must be comfortable for the driver and able to drive smoothly.

(e) If the vehicle is equipped with stairs, it must be firmly installed. Step board shall not pose a danger to climbers. Stairs shall not be less than 46 cm (18 inches) in width and step board shall not be less than 23 cm (9 inches). In unloaded vehicles, the bottom most step board shall not be less than 25 cm (10 inches) and higher than 40 cm (16 inches) from the ground.

Rule 41 (a) The paint color of the motor vehicle shall be as recorded in the vehicle registration record.

(b) If the color of the vehicle is to be changed, the application must be submitted to the Central Registration Board in the prescribed application form. The change may be made only after receiving the written permission of the Central Registration Body.

(c) If the color of private or cooperative hired vehicles to be determined uniformly as a group, it must be as specified by the Central Registration Board.

(d) The color of the vehicles registered under Chapter 2 of these Rules shall not be the same as the military green used in the vehicles owned by the military (Army / Navy / Air).

Rule 42. (a) The windshield of the vehicle shall be of the safety glass type and there shall be a clear view for the driver. Safety mirrors are the type of mirrors that keep the driver and occupants safe when the windshield is broken. The windshield should not be a mirror that disturbs the driver's eyesight.

(b) The side mirrors and rearview mirrors of the vehicle must be of the safety type.

(c) Rearview mirror or rearview mirrors shall be fitted in the vehicle so that the driver can see the oncoming vehicle and overtaking vehicles in the mirror without turning around his head. The rearview mirror must not be moved by vibration.

Rule 43. The windshield wiper must be fitted with a water jet. The device must be able to wipe off rain and moisture on the windshield to clear the driver's vision. The washer should be easy for the driver to use.

Rule 44. All vehicles must be equipped with a warning horn, which can be heard from a distance of at least 61 meters (200 feet). The horn must be one tone. The horn shall not be too loud, and the sound of whistling, siren and bell.

Rule 45 (a). Ambulance, fire engine, police car and other important vehicles can use the sound of whistling, siren and bell to get the priority in traffic.

(b) If the vehicle has an audible alarm system for moving backwards, the alarm shall be a single signal.

(c) Alarms such as music are not allowed on the vehicle at all.

Rule 46 (a) Noise caused by the engine and body of the motor vehicle shall not disturb the environment.

(b) Every internal combustion engine shall have an exhaust silencer. If the exhaust silencer does not properly maintain the engine noise, the registration body may refuse or suspend the vehicle registration.

Rule 47. The registration body may refuse or suspend the registration of vehicles that emit excessive amounts of air pollutants.

Rule 48. The registration body may refuse or suspend the registration of vehicles that cause leakages of oil and fuel which can get the surrounding environment polluted.

Rule 49. Every vehicle that can drive more than 19 kilometers (12 miles) per hour must be equipped with a speedometer. At any time, the device shall be able to alert the driver to the speed at which the vehicle is moving.

Rule 50 (a) If the vehicle is equipped with a radio/communication device, the vehicle owner must obtain a license for the radio / communication equipment. If the license is not obtained, the registration body may refuse or suspend the vehicle registration.

(b) Communication devices installed for duty on state-owned motor vehicles shall not apply to sub-rule (a).

Rule 51. The electrical wiring and contacts in the vehicle shall be covered with electrical shields. Electrical wiring must be neatly organized.

Rule 52. The position and distance between the headlights and the red reflector to be installed in the vehicle, length, width and height of motor vehicle or trailer or trailer shall be determined by the Central Registration Board.

Rule 55. Types of vehicles shall be as determined by the Central Registration Board depending on the purpose for which the vehicle is to be used.

Rule 56 (a). If anyone wants to drive any motor vehicle in a public place, he must have a valid driver's license. The driver's license must be valid to drive the relevant vehicle.

(b) No person shall obtain more than one driving license prescribed under this Chapter.

Rule 58. The types of driver's licenses must be as follows:

a) “A” driving license is a motorcycle driving license.

b) "B" driving license is a license that allows you to drive your own light vehicle and private bus.

c) “C” driving license is the license to drive other motor vehicles registered under Chapter 2 of these Rules.

f) “L” driving license is a license issued for learning to drive a motor vehicle.

Rule 59. (a) Applicant must obtain the following requirements:

1. Applicant must be over 18 years to apply for “L” driving license. There must be someone who can teach him to drive.
2. The person who wants to get “A” driving license or “B” driving license must have already obtained the “L” driving license.
3. The person who wants to get the “C” driving license must be at least 18 years old and able to drive the motor vehicle that he wants to get a driving license.

(b) Holders of driving licenses issued by any country other than the holder of an international driver's license must be able to obtain the necessary examination if he wishes to obtain a driver's license to drive in the Union of Myanmar. It must be issued a "B" driving license.

(c) The applicant for a driving license must be in compliance with the provisions regarding the health condition.

(d) Anyone wishing to obtain any driving license other than the "L" driving license prescribed by Rule 58 shall be subject to examination.

Rule 60. The following are the licensed vehicles for each type of driving license:

a) A holder of “A” driving license is allowed to drive only motorcycle.
b) A holder of “B” driving license has the right to drive the vehicles related to “A” driving license and “C” driving license respectively.
c) A holder of “C” driving license wishing to ride a motorcycle as well shall pass the required tests;

Rule 68. The Registration Body empowered under Rule 57 shall issue the license to the applicant who has fulfilled the requirements and has subscribed the fees prescribed.

Rule 69. A holder of a license under this chapter shall not transfer his license to another person for use.

Rule 70. A driver of a motor vehicle, a ticket conductor and a spareman shall keep his license with all the time. It shall be produced for inspection, when a member of the Myanmar Police Force in uniform on duty or any other organization or a person duly authorized as such requests him to produce the same.

Rule 71 (a) The Registration Body concerned shall renew a license of the holder of a license in continuation of his license under this chapter if it complies with the provisions of these Rules to hold in continuation of his license.

(b) A license holder under this chapter shall renew the license within 90 days before the expiration of the license. If the license is not renewed after the expiration of the license, there shall be no right to drive or work as a ticket conductor.

(c) If renewal of license is affected within two years after the expiration of the license, the license fee shall be paid in full for the period of failure to exchange the new license and the overdue fee prescribed by the Central Registration Board shall be paid. If the period for failure to renew the new license exceeds two years, action shall be taken under sub-rule (c) of Rule 75.

(d) The registration body renewing a new license shall, if such renewed license is the one issued by any other Registering body, inform the renewal to such Registration body and the Central Registration Body.

Rule 72 (a) If a license is lost, the holder of such license shall report it to the Myanmar Police Station. If an application is made for a duplicate of the license in accordance with the stipulations of the Central Registration Body after obtaining proof of such complaint, the relevant registration body shall issue a duplicate of the license. If the lost license is retrieved after obtaining the duplicate one, such license shall be returned to the relevant registration body.

(b) If the license is damaged, an application for a duplicate license shall be made by forwarding the damaged license together with the application in accordance with the stipulations of the Central Registration Body. The relevant registration body shall issue a duplicate only after obtaining the damaged license along with the application.

(c) The Central Registration Board shall prescribe to make it clear and consistent that it is a “duplicate” when issuing a duplicate of the license.

Rule 73 (a). If a license of a driver of a vehicle committing an offense under Section 27 (2) of the Law is confiscated by an authorized Myanmar Police Officer, a temporary ticket acknowledging that the license has been confiscated shall be issued. The holder of the temporary license shall have a right to drive the vehicle during the period specified in sub-rule (d) only until the license is returned to the holder or until a court order is passed.

(b) The Central Registration Board may direct the issue of a temporary permit instead of a license by the registration body as required.

(c) The Central Registration Board shall prescribe the form of temporary permit mentioned in sub-rules (a) and (b). No charges shall be levied for issuing the temporary permit.

(d) The validity period of such temporary permits shall be determined by the person empowered to do so as required. Such period whether it is continuous or extended shall not exceed 90 days. However, such period shall be within the limits of the original period of the tenure of the license seized.

(e) This rule shall not apply to the holder of “L” driving license.

Rule 74 (a) The Central Registration Board may, if it is convinced that a holder of the vehicle driving license or a holder of the ticket conductor/spareman license is not free from one of the following qualifications, may withdraw his license up to a period of four years:

1. A person who is not fit to drive a vehicle due to any illness or disability;
2. A habitual offender as per records maintained under Rule 77;
3. A person who is a heavy drinker or a drug addict;

4. A person who is using or using a motor vehicle involved in committing an offense under the jurisdiction of the Myanmar Police Force;
5. A person who recklessly or dangerously drives a motor vehicle;
6. A person infringing the provisions of Section 3 and Section 12 of the Law;
7. A person adjudged by a court to withdraw his vehicle driving license for an offense under the law;

(b) The registration body shall keep a license withdrawn under sub-rule (a) in his custody. No temporary permit shall be issued in lieu of that license.

(c) Upon the expiration of the revocation period for the revoked license, the registration body shall return the license to the licensee only after passing the prescribed driving test. The fees for the test determined by the Central Registration Board shall be paid.

Rule 75. (a) The Central Registration Board may cancel the license of a person indefinitely if he commits an office finishable with death or is totally unfit to drive due to mentally or bodily infirmity or unfit to continue to drive.

(b) The Registration Body shall if a false licenser is found on inspection, confiscate and destroy that license under section 27 (1) of the Law.

(c) On failure to renew the expired license up to two years will entail cancellation.

Rule 76. (a) The registration body or the Myanmar Police Force shall make the remark, in the license of a person who fails to observe the conditions under these Rules, about the non-observance of the particular provisions.

(b) The judgment of the court for the offense shall be noted in the license of an offender.

(c) A “Remark” column shall be embodied by the Central Registration Body in the license.

Rule 77. Recording of criminal offenses by the Central Registration Board if action is taken against the license holder under this Chapter by the Myanmar Police Force or if conviction is given by a Court of Law of if compounded under section 29, the relevant Registration board shall be informed by authorities authorized to act as above. The registration body shall then inform the Central Registration Body.

Rule 78 (a). A person wishing to hold an international driving license shall apply to the Central Registration Body.

(b) The Central Registration Body shall issue an international driving permit under the International Convention on Road Traffic. The format of an international driving permit shall be in accord with the descriptions given in the Convention.

Rule 79 (a). A holder of an international driving permit wishing to hold a driving license shall apply to the Central Registration Body.

(b) The Central Registration Body shall issue a “B” driving license to a holder of an international driving permit.

(c) A holder of an international driving permit issued by any State under the terms of the International Convention on Road Traffic shall be recognized as a holder of a vehicle driving license under these Rules in the Union of Myanmar until the expiry of such international driving permit.

Rule 80. Any vehicle driver or ticket conductor/spareman on obtaining or renewing a license shall effect a third party liability insurance according to Chapter 3 of the law.

Rule 81 (a) Charges payable under this Chapter shall be as prescribed by the Central Registration Board.

(b) Those who can be exempted from payment of charges under this Chapter shall be as prescribed by the Ministry of Transport and Communications.

Rule 82. Appeals

a) A holder a license wishing to make an appeal against any order or decision made by the Registering Authority under this chapter may appeal to the Central Registering Body within 30 days from the date of receipt of such notice.
b) An appeal under section 16 (2) of the Law against a decision made by the Central Registering Body, lies with the Ministry of Transport and Communications within 30 days from the date of receipt of the notice of the decision.
c) A decision made by the Ministry of Transport and Communications is final and conclusive.

Rule 132. In order to reduce the risk of motor vehicle accident on the road and to facilitate traffic, the rules of this chapter are to be followed by the vehicle owners.

Rule 133 (a) For the purpose of over seeing the observance and of taking action against persons failing to observe the provisions in the Chapter, the Ministry concerned has assigned duties to the Myanmar Police Force (Traffic Police). If required, may be assigned to any other organizations or individual person.

(b) A person assigned with duty under sub-rule (a) may supervise and control the vehicle traffic by hand signals, or by a whistle together with hand signals or by signalling instruments or by any other reasonable means.

(c) The road users shall follow the directions given by persons supervising and controlling the vehicular traffic.

Rule 135 (b) If the traffic lights are installed, the road users shall follow the instructions.

Rule 137. If the registration number installed on the vehicle is not clear and distinct or the registration plate mutilated, such vehicle shall not be driven or caused to be driven.

Rule 138. (a) No motor vehicle shall carry more than the number of carrying persons allowed or load more than the weight permitted at the time of registration. Only buses which are permitted to carry more than the prescribed number of passengers under Chapter 6, Rule 102, sub-rule (2) shall be exempted from the application of this provision.

(b) If a vehicle for carriage of goods is found to have been overloaded on inspection by a person responsible to supervise and control under Rule 133, the owner of the vehicle or the person responsible for the vehicle shall unload the overweighted goods from the vehicle and look after them on his own arrangement. If it is done with the arrangement of the person responsible to supervise and control, the costs incurred shall be borne by the owner of the vehicle or the person responsible for the vehicle.

Rule 139. No driver of a motor vehicle while driving shall carry passengers and load goods close to him to cause obstructions in the driving of the vehicle.

Rule 140. A driver of a motor vehicle shall drive in accordance with the road signs, road markings and signals. While vehicular traffic is being controlled under the provisions of Rule 113, the directions given by the controller is to be observed.

Rule 141. All vehicles normally shall keep to right hand side of the road. However on one way traffic roads it shall be driven on the side intended and the appropriate traffic lane.

Rule 142 (a). To avoid traffic blocks, vehicles shall not be driven at a snail's pace. If it is desired to drive slowly the slow moving traffic lane should be taken.

(b) On a road with a two – way traffic, if there shall be two traffic lanes or more, the traffic lane on the extreme left shall be taken.

Rule 143 (a). Where the roads are in good condition, the speed limit of a motor vehicle normally in the town area shall be 40 kilometer (30 miles) per hour or in the outside the town area on the high ways connecting a township with another it shall be 80 kilometer (60 miles) per hour.

(b) For vehicle with a trailer or for a vehicle carrying inflammable and combustible materials, the speed limit in the town area shall be 32 kilometer (20 miles) per hour or in the outside the town area on the high ways connecting a township with another it shall be 56 kilometer (35 miles) per hour.

(c) The organization at the State/Region level constituted by the Ministry of Transport and Communications by notification shall determine the speed according to the conditions of the road within the provisions under sub-rules (a) and (b) as required.

(d) Where there are three lanes each on either side of a two way traffic road in the town area it is permitted to drive up to 64 kilometer (40 miles) per hour on the extreme left traffic lane.

(e) A driver of a vehicle shall not drive his vehicle in excess of the speed prescribed.

Rule 145. The driver of a vehicle moving behind another vehicle shall keep at a reasonable distance away from that other vehicle to avoid a collision if the vehicle in front suddenly slows down or stops.

Rule 146. Overtaking

a) A driver of a vehicle wishing to overtake another vehicle in the front shall do so only after making sure of the followings:
    1. that no vehicle following him is preparing to overtake his vehicle;
    2. that the vehicle which he wishes to overtake is not preparing to overtake a vehicle it is following;
    3. that the lane to be used for overtaking is clear of any traffic.
b) Any vehicle overtaking another vehicle in front shall normally do so only from the left side of that vehicle after giving necessary signals keeping a reasonable distance away from the other vehicle.
c) If it is desired to overtake a heavy motor vehicle in front it shall be followed at a not very close distance from where the condition of the road ahead is clearly visible and shall overtake when the traffic is clear.
d) Re-entry into the original lane after the over-taking shall be done clearly without causing any hindrance to any vehicle following.
e) If any other vehicle overtakes his vehicle, a pass shall be given to that vehicle without increasing the speed of his vehicle until such vehicle has overtaken him.
f) Only under the following conditions shall a vehicle overtake another vehicle in front from the right hand side:
    1. when a vehicle in front signals to turn left;
    2. the road being blocked by traffic, yet being clear on the right side;
    3. when the lane taken by a vehicle is changed by entering clearly from the lane on the right side and by moving ahead of the vehicle running on the left lane in its front;
    4. when driving on a one-way road.

    Note: If traffic lanes are made on the roads and where vehicles driving on those lanes overtake vehicles from other lanes, it does not amount to overtaking under this Rule.

Rule 147. No overtaking of a vehicle in front shall be made at the following places and at such lanes:

a) places where pedestrians are allowed to cross;
b) road intersections and junctions;
c) road corners and road turns/bends;
d) ascending gradient and hill-top;
e) at the entrance of the bridge and on the bridge;
f) on narrow roads;
g) in tunnels;
h) along the road with two white lines in the middle of the road;
i) in the lane designated by a continuous line;
j) at the time when vision is not clear and not sure to overtake safely;
k) at the time when the vehicles on coming or moving ahead are liable to give way or slow down if overtaken.

Note: This rule shall not apply to overtaking the motorcycle.

Rule 148. (a) If it is desired to turn right at the intersections and junctions where there is no traffic signal lights or any person controlling the traffic, approach shall be made giving signals,

moving close to the left lane or the middle of the road and slowing down. After a temporary stop when the place is free from traffic and danger, turning into the desired road. When there are traffic signal lights or any person controlling the traffic at the intersection turning left shall be made as directed by the traffic signal lights or by the person controlling the traffic.

(b) If it is desired to turn left at the intersections and junctions where there is no traffic signal lights or any person controlling the traffic, approach shall be made being reaching the junction, by moving close to the right side of the road, slowing down and by giving signals. After a temporary stop when there is no traffic and no danger, turning into the road may be made. When there are traffic signal lights or a person controlling the traffic at the intersection turning right shall be made as directed by the traffic signal lights or by the person controlling the traffic.

(c) If it is desired to turn into a lane on the right side of the main road, turning shall be made when it is safe after giving signals and moving close to the right side of the road and slowing down. If it is desired to turn into a lane on the left side of the main road, turning shall be made when it is safe after giving signals and moving close to the middle of the road and slowing down. Turning shall be made when it is clear of oncoming traffic.

(d) If it is desired to turn one-way road from a road and if it is to turn right, the vehicle is to be driven close to the right and turn into one of the traffic lanes on the right when it is free from danger. If it is to turn left, the vehicle is to move closer to the center of the two-way road and turn into any lane on the left side of the one-way road.

(e) If it is desired to turn into a two-way road from a one-way road and if it is to turn right, the turning shall be made after moving closely to the right side of the one-way road. If it is to turn left, the turning shall be made after moving closely to the left side of the one-way road.

Rule 149. (a) At the intersection where there is no traffic signal light and no person controlling the traffic and of the two vehicles coming from either side of the road, priority shall be given to the one reaching the intersection first, and if the vehicles the intersection at the same time, the vehicle coming from the right shall be given priority. At the intersections where there are traffic signal lights or a person controlling traffic the directions made and given by such signal lights or person controlling the traffic shall be observed.

(b) At the intersection where a main road and a street meet, the vehicle from the street shall give priority to the vehicle driven on the main road.

(c) When an ambulance, fire engine, Myanmar Police Force vehicle and other important vehicles come sounding their sirens, such vehicles shall be given priority and allowed to pass or overtake.

(d) If there is a roundabout at the intersection, the vehicle which is ahead in the roundabout shall be given priority. At the roundabout, vehicles shall be driven by keeping to the right.

Rule 150 (a). At the following places, turning a (hair-pin bend) “U” turn is not allowed:

1) road in the middle of which one or two white/yellow continuous longitudinal line (s) have been drawn;
2) intersection, junction;
3) road corner, road curve;
4) top of high ground and within 100 meters (328 feet) from it;
5) at the entrance of a bridge and on the bridge;
6) one-way road;
7) a place where turning a (hair-pin bend) “U” turn is prohibited.

(b) Where it is desired to turn a (hair-pin bend) “U” turn, it shall be done only when there is no traffic in the front or at the back. If forward-and-backward movement is necessary in a narrow lane, there shall be no obstruction caused to the traffic of other vehicles.

Rule 151 (a). Where it is desired to reverse the vehicle, shall look both sides and rear, and only if there is no danger shall reverse slowly showing signal. There shall be no obstruction caused to the traffic of other vehicles.

(b) Exit reversal of the vehicle from a street onto the main road shall not be done.

(c) Reversal of the vehicle shall not be done on one-way road.

(d) Exit by reversal of the vehicle from any premises to the road shall not be done.

(e) Reversal of the vehicle for a long duration that may cause disturbance to other users of the road shall not be done.

Rule 152 (a). If a person responsible for supervising and controlling under Rule 133 directs the vehicle to top, the vehicle shall stop.

(b) At an intersection and a junction where there is no traffic lights and no person responsible to supervise the vehicle, shall stop for a while before crossing or turning a bend and the vehicle shall proceed only when there is no danger.

(c) Before driving out from a street onto the main road or from any premises onto the main road, the vehicle shall stop for a while at the intersection or at the entrance of the premises and then shall be driven out when there is no danger.

(d) If there are persons crossing at the zebra-crossing, place for crossing indicated by road signs or place for crossing in front of a school, the vehicle shall stop for a while at a distance of at least 5 meters (16 feet 6 inches) before reaching such places. Only when there are no persons crossing the road, the vehicle shall proceed.

(e) When an ambulance, fire engine, Myanmar Police Force vehicle and other important vehicles come sounding their sirens, such vehicles shall be given priority while one's vehicle shall stop at the edge of the road side. Only when those vehicles have passed, it shall proceed or if there is person responsible for supervising and controlling his direction shall be abided by.

(f) If a herdsman tending animals requests to stop the vehicle lest the animal may be frightened due to the vehicle, the vehicle shall stop. If animals are found on the road without a herdsman, driving shall be done with due care. If the vehicle should stop, it shall stop.

(g) Before crossing a level crossing with or without a gate under Rule 155, the vehicle shall stop for a while.

(h) When faced with a convoy of vehicles driving systematically on a road where there is difficulty for vehicles to cross easily, shall make way as may be necessary and stop one's vehicle till the convoy has passed.

(i) If one's vehicle is involved in an accident under Rule 175, the vehicle shall stop immediately.

(j) If there is difficulty to maneuver due to meeting of descending and ascending vehicles on a mountain road, the ascending vehicle shall be given priority and the descending vehicle shall stop as close as possible to the edge on the right side.

(k) If a circumstance arises which may cause danger to the public due to the vehicle, the vehicle shall stop.

(l) If one desires to stop the vehicle, it shall do so slowly after showing a signal.

Rule 153 (a) When a vehicle stops, halts and parks, it shall be moved to the right side of the road and the right wheels shall be within 31 centimeters (1 foot) from the edge of the road. On one-way main road, it shall be moved to the left side of the road and the left wheels shall be within 31 centimeters (1 foot) from the edge of the road.

(b) Under the provision of Rule 152, the vehicle shall stop at the places prescribed.

(c) The vehicle may halt not only at the places permitted, but also at other places that are not prohibited under this Rule.

(d) If it is desired to park a vehicle, it shall be done only at the places permitted. He shall park the vehicle parallel to the road side or aslant to the road side under the condition prescribed for parking place. It shall not obstruct the traffic of other vehicles.

(e) The vehicle shall not be stopped, halted or parked in opposite direction to the traffic lane.

(f) If the vehicle is to be stopped, halted or parked on the ascent and descent of a slope, it shall be done in a proper manner to prevent the rolling of the wheels.

(g) No vehicle shall stop at the following places:

1) within the area of an intersection or junction;
2) within the area of road corner and road curve (bend)
3) within the area of a roundabout;
4) on the railway line (tracks);
5) within the area of other traffic lanes with the exception of the traffic lane closet to the road side;
6) at the entrance of a school or hospital;
7) at the entrance of and within the area of a bridge and narrow street;
8) near a bus-stop;
9) on a hill;
10) alongside a vehicle already halted or parked;
11) at the side of a road marked with two longitudinal white lines;
12) on the left side of a one-way street.

(h) No vehicle shall halt or park at a place where there is signboard of road signs prohibiting the halting or parking of a vehicle.

(i) No vehicle shall halt or park at a place where there is a traffic signal post, direction signboard, near a place permitted for pedestrian crossing and kerb and post with red and white zebra markings. A vehicle shall not park also at a kerb and post with yellow-and-black zebra markings.

(j) A bus shall stop only at the relevant bus-stop. No other vehicles shall stop at the bus-stop.

(k) With the exception of a fire-engine, no other vehicle shall halt or park within 7 meters (23 feet) from a fire-engine station, fire-hydrant, fire-extinguishing water tank.

(l) No vehicle shall stop, halt or park so as to obstruct the road, narrow the scope of vision or cause danger to other users of the road.

(m) No vehicle shall stop, halt or park on the pavement or on a prescribed pedestrian lane.

(n) When the vehicle stops, halts or parks on the road at night, small side lights shall be switched on. If a stop-light has been installed, a parked vehicle shall switch on such light. If the vehicle lights are out of order while parked on a main road where there are no road lights, a red lantern shall be hung at the left edge of the rear of the vehicle so that the vehicle shall be visible from a distance of 300 meters (1000 feet).

Rule 154. If a vehicle stops, halts or parks at a public place in contravention of the provisions of Rule 153 and Rule 167, the person authorized to supervise and control shall cause the owner or the person responsible for the vehicle to remove it immediately. If the person responsible for the vehicle is not to remove it immediately the person authorized to supervise and control may remove it to a suitable place on his own arrangement. The expense of so removing shall be borne by the owner or person responsible for the vehicle.

Rule 155. (a) On approaching a railway track with a gate, if there is a sound of siren from the signal device of the on-coming train and signal lights are shown or of the gate-keeper shows a signal by waving the flag, the vehicle shall stop on the right side of the road at a distance of at least five meters (16 feet 6 inches) before reaching the railway track. The railway track shall be crossed only after the train has passed and the gate is reopened or when the gate-keeper gives permission to cross.

(b) On approaching a railway track without a gate or gate-keeper, the vehicle shall stop on the right side of the road at a distance of at least five meters (16 feet 6 inches) before reaching the railway track and shall watch both sides of the railway track and listen as to whether a train is approaching or not. If the train does not come or if the train has passed, the railway track shall be crossed.

(c) When crossing the railway track under sub-rules (a) and (b), it shall be done with low gear used for starting the vehicle. While crossing the railway track, the gear shall not be changed. The vehicle shall not stop at all on the railway track.

Rule 156 (a). When the vehicles are crossing each other in opposite direction, the lateral distance between the vehicles shall be at least 1.5 meters (3 feet) distance. On a narrow road, where there cannot be such a distance, crossing shall be done by reducing (slowing down) the speed before meeting each other.

(b) At a narrow bridge on the road on which only one vehicle can cross, the vehicle which reaches the bridge first shall cross first. If two vehicles from opposite directions reach the bridge simultaneously, the heavily-laden vehicle shall be given priority or the vehicle that first switches on the head light or the vehicle that first gives signal with its horn shall be allowed to cross first.

Rule 157. No vehicle shall be driven on a pavement or on a prescribed pedestrian lane.

Rule 158. Without the permission of the relevant fire brigade member, no vehicle shall drive over the fire-extinguishing hose laid down on the road without a protective cover.

Rule 159 (a). If it is desired to drive drawing a trailer, the said trailer shall be a registered trailer. It shall be attached firmly at the rear of the motor vehicle.

(b) Only one trailer shall be drawn by one vehicle. A vehicle with a trailer attached shall drive only at the prescribed speed.

Rule 160. The horn should not be used for any purpose other than to prevent danger. Do not use it to disturb the public.

Rule 161. (a) Between dusk and dawn or during day time when the light is dim due to weather, any vehicle shall be driven with the lights switched on to get illumination under Chapter 3

Rule 26 of these Rules.

(b) The beam of the head lights of the vehicle shall be lowered (dipped) to avoid a glare to the eyes of persons coming from the opposite direction. If a glare is caused due to the light of the oncoming vehicle, the speed of one's vehicle shall be reduced or the vehicle shall stop temporarily. If driving behind another vehicle, the beam of the head lights of one's vehicle shall be lowered (dipped).

Rule 162. If it is desirous to open the doors on the side of the traffic lane, they shall be opened when there is no danger. As soon as a passenger has entered or left the doors shall be closed immediately. If the doors on the side of the pavement or pedestrian lane are to be opened, they shall be opened carefully without disturbing the pedestrians. The doors shall not be left open.

Rule 163. When driving on a mountain road, the driver shall abide by the following:

a) If there is difficulty to maneuver due to meeting of ascending and descending vehicles, the descending vehicle shall move as close as possible to the right edge of the road and shall give priority to the ascending vehicle;
b) If there is space only on the right side of the lane of the ascending vehicle before reaching a place where the ascending and descending vehicle will meet, the ascending vehicle shall make away for the descending vehicle;
c) If it is not easy to maneuver at the place where the descending and ascending vehicles meet, the vehicle that has no difficulty in reversing shall do so;
d) The speed shall be reduced and the horn sounded at every road cover (bend);
e) The descending vehicle shall not drive with the gear in neutral or with the clutch pedal pressed down;
f) If the engine of a heavily-laden vehicle fails while ascending or descending or if the vehicle is stopped, the brakes shall be applied so as not to roll down and jammed blocks shall be wedged against the rear wheels.

Rule 165. The following shall be abided by in respect of the carriage of goods:

a) Every vehicle carrying goods shall carry the goods systematically and firmly in order not to endanger the road and the users of the road and not to cause annoyance to the driver and the other users of the road. In carrying the goods, the materials used such as the supporting pads, ropes, covers and packing materials shall be good and strong;
b) If goods are carried in a luggage rack on the roof of the vehicle, the height from the level road to the top of the goods in a heavy motor vehicle shall not exceed 3.66 meters (12 feet) and in a light motor vehicle shall not exceed 3.05 meters (10 feet);
c) The front and rear protrusion of the goods carried in a vehicle are determined as follows:
    i. shall not protrude more than one meter (3 feet 3 inches) from the head light of the vehicle;
    ii. shall not protrude more than one meter (3 feet 3 inches) from the rear of the vehicle, if without a warning (cautionary) article;
    iii. a warning (cautionary) article shall be affixed to the tip of the goods protruding more than 1 meter (3 feet 3 inches). Such warning (cautionary) article shall, during daytime be a circular disc of a diameter not less than 31 centimeters (12 inches), painted half white and half red and fitted vertically so as to be clearly visible or a red square flag, the length and breadth of which shall not be less than 31 centimeters (12 inches) shall be affixed. During night time, a red light visible from a distance of 150 meters (500 feet) shall be affixed. The protrusion of the goods from the rear of the vehicle shall not exceed 2 meters (6 feet 6 inches). The goods protruding shall not obscure from view the vehicle registration mark, the red reflector, the rear side lights and the brake lights;
    iv. if the goods carried on the roof of the vehicle protrude to the front and rear of the roof, such protrusion shall not exceed 1 meter (3 feet 3 inches) each way.
d) There shall be absolutely no goods hanging on both side of the exterior of the vehicle and there shall be absolutely no goods protruding from the interior of the vehicle or from the roof.
e) If under a business license passengers are also permitted to be carried on a hired goods vehicle, arrangements shall be made for the passengers to ride comfortably. When passengers are being carried, the carriage of dangerous goods or animals shall not be permitted.
f) Normally a goods vehicle shall be driven with its rear cover closed. However, if the goods carried are longer than the length of the body of the vehicle, the rear cover may be opened. The rear cover shall not obscure from view the registration mark of the vehicle, the red reflector, the rear side lights and the brake lights.
g) When a vehicle carrying dangerous goods is being driven, sufficient precautions shall be taken for such goods and special care shall be taken in so driving.
h) Loading and unloading of goods shall be done at the prescribed or permitted place. There shall be no obstruction of the road and no annoyance (disturbance) also to the other users of the road.
i) Goods prohibited by the Government of the State shall not be carried without lawful permission.

Rule 166. If vehicle is drawn (towed) by a rope or a drawn (towing) – road, the following shall be complied with:

(a) The distance between the rear and of the drawing (towing) vehicle and the front tip of the vehicle being drawn (towed) shall not exceed 3.66 meters (12 feet);
(b) In order to make visible the rope or the drawing (towing) road between the drawing (towing) vehicle and the vehicle being drawn or towed a circular disc of a diameter not less than 31 centimeters (12 inches) painted half white and half red or a red

square flag, length and breadth of which shall not be less than 31 centimeters (12 inches) shall be affixed in the center (middle) of the rope or the drawing-rod;

(c) If the vehicle is being drawn (towed) by a rope only a driver who has obtained a driving license shall control the said vehicle;

(d) The drawing (towing) vehicle shall be driven at a reduced speed;

(e) When a vehicle is being drawn (towed) only one vehicle shall be drawn.

Rule 167. If a vehicle breaks down on the road, the driver or the person responsible for the vehicle shall move the vehicle promptly to the side of the road where it is free from other vehicular traffic. After that, the vehicle shall be removed from the road-side as quickly as possible.

Rule 168 (a). While filling fuel, every vehicle shall switch off its engine.

(b) No one shall smoke, while filling fuel.

Rule 169. If there is a weight stipulated for crossing a bridge, every driver shall abide by such stipulation.

Rule 170. (a) Every driver of a vehicle shall take constant care not to injure any pedestrian in any place with his vehicle. In particular, he shall take due care in driving when there are children, elderly people, disabled persons and jay walkers on the road.

(b) When pedestrians are found crossing the road at the prescribed place for crossing, they shall take care in driving under Rule 152, sub-rule (d). At such place, if there is a vehicle in front, he shall not overtake such vehicle under Rule 147.

(c) As higher speed is allowed on roads outside the town and as there are no crossing places prescribed for pedestrians, care shall be taken in driving when pedestrians and animals make a sudden crossing.

Rule 171. If the vehicles are organized and driven by the convoy, the following must be followed:

a) The total number of vehicles per convoy shall not exceed ten. If there are more than ten vehicles, additional convoys will have to be formed and these additional convoy shall leave at different times.
b) The red flag in the first vehicle and the blue flag in the last vehicle in each convoy shall be put visible outside the left side of the cockpit. The flags must be square, not less than 51 cm (1 ft 8 inch) in length and width.
c) Each convoy shall have a supervisor. The supervisor must be responsible for the orderly movement of the convoy.
d) Every driver in the convoy must comply with the provisions of this Chapter.
e) Traveling in a convoy for social purposes shall not apply to this Rule.

Rule 172. No one shall drive a motor vehicle that is too dangerous or reckless to handle. Do not race against other vehicles.

Rule 173. The motorcycle rider must follow the following points:

a) Riding the handlebars of the motorcycle with both hands. Ride with one hand when signaling.
b) No additional occupants shall be allowed unless there is a passenger seat behind the motorcyclist. No more than one passenger for the passenger seat. In the back seat, the passenger must ride the vehicle and face forward, resting his or her feet on the pedestal on either side of the vehicle. Do not place anyone who cannot put feet on pedestal. Do not place anyone in front of the motorcyclist.
c) If the material is loaded on the back of the motorcycle, the material shall not be protruding more than 15 cm (6 inches) on each side of the rear seat and more than 31 cm (12 inches) from the rear tire edge of the vehicle. The height of the material shall not be higher than

the driver's shoulder. The weight of the load shall not be too heavy for the motorcyclist to handle his vehicle. Do not load hazardous materials.

d) Ride straight on the road. Do not compete with other motorcycles and motor vehicles. Do not disturb other drivers.
e) Every motorcyclist must wear a motorcycle helmet with a chin strap.
f) The clothes of the motorcyclist shall not be moving in air to make any dangerous situation.
g) Do not raise the engine noise of the motorcycle.

Rule 175. (a) In the event of a vehicle accident, the vehicle shall be stopped immediately. Those

involved in the accident and others nearby must immediately notify the nearest traffic police or

police station. In addition, if other traffic is blocked, the vehicles must be moved without losing any of the evidence that will assist in the investigation of the accident. If there are any injured persons in the accident, they need to be taken to a hospital as soon as possible for necessary assistance.

(b) If the driver who did the accident is not dead or seriously injured, shall give his name, address, driver's license number, vehicle registration number to the victim. The victim must return his or her name and address.

(c) If an official from the traffic police or the police station arrives at the scene of the accident, the persons involved in the accident and others using the road shall follow his instructions.

(d) In the event of a vehicle accident and in accordance with the requirements of sub-rule (a),

if the driver does not stop his vehicle immediately and does not provide the necessary assistance or if the person in charge of the vehicle does not immediately notify the nearest traffic police or the police station, those who fail to do so may be prosecuted under the Penal Code.

2.3.12 Myanmar Insurance Law (1993)

The project developer commits to comply with the sections (15) and (16).

Section (15). Owners of motor vehicles shall affect compulsory Third Party Liability Insurance with the Myanmar Insurance.

Section (16). An entrepreneur or an organization operating an enterprise which may cause loss to State-owned property, or which may cause damage to the life and property of the public or which may cause pollution to the environment shall affect compulsory General Liability Insurance with the Myanmar Insurance.

2.3.13 Labour Organization Law (2011)

The project developer commits to comply with the sections (18), (19), (20), (21) and (22).

Section (18). The labour organization has the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws.

Section (19). The labour organizations have the right to send representatives to the Conciliation Body in settling a dispute between the employer and the worker. Similarly, they have the right to send representatives to the Conciliation Tribunals formed with the representatives from the various levels of labour organizations.

Section (20). In discussing with the Government, the employer and the complaining workers in respect of worker’s rights or interests contained in the labour laws, the representatives of the labour organization also have the right to participate and discuss.

Section (21). The labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws.

Section (22). The labour organizations shall carry out peacefully in carrying out holding of meetings, going on strike and carrying out other collective activities in accord with their procedures, regulations, by-laws and any directives prescribed by the relevant Labour Federation.

2.3.14 Labour Dispute Resolution Law (2012)

The project developer commits to comply with the sections (38), (38) (a), (39), (40), (43) and (51).

Section (38). No employer shall fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause.

(a) No employer or employee shall fail to form a coordinating committee in accordance with the provisions of section 3. Failure to do so shall not result in further failure to form within 60 days from the date of conviction by the relevant court.

Section (39). No employer shall abruptly the terms and conditions of the employee, as established by the arbitral tribunal, before the dispute arises.

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

Section (43). No employer or employee shall fail to comply with or abide by any of the terms of the agreement entered into before the mediation in relation to the dispute.

Section (51). If an employer commits an act or omission to reduce the employee's benefits without due process during the settlement of the dispute, the arbitral tribunal or arbitral tribunal; Financial benefits decided by the tribunal must be paid in full. This money must be collected as if it were a land tax arrears by an official from the department assigned by the Ministry.

2.3.15 Employment and Skill Development Law (2013)

The project developer commits to comply with the sections (5), (14) and (30).

Section (5) (a) (i). The employer shall conclude an employment agreement within thirty days after appointing a worker to do any work. However, it does not concern with appointment of permanent staff at the Government department, Government organization;

(ii) If the pre-orientation period and probation period are prescribed before the appointment, such trainee shall not concern with stipulation in sub-section (1).

(b) The employment agreement shall include the followings:

i. category of employment;
ii. period of probation;
iii. wage, salary;
iv. place of employment;
v. term of agreement;
vi. working hour;
vii. holiday, day-off and leave;
viii. over-time;
ix. messing arrangement during working hour;
x. accommodation;
xi. medical treatment;
xii. arrangement for ferry and travelling;
xiii. terms and conditions to be abided by the workers;
xiv. term of period agreed by the worker to continue to work after attending the training if the worker has to attend the training sent by the employer;
xv. resignation from work and termination of work;
xvi. termination of agreement;
xvii. obligation from work and termination of work;
xviii. termination of employment agreement by mutual consent of employer and worker;

xix. other matters;
xx. prescribing, amending and adding the terms and condition of the agreement;
xxi. miscellaneous.

(c) Workplace terms and conditions included in the employment agreement shall be in conformity with any existing law and benefits of the worker shall not be less than benefits contained in any existing law;

(d) The Ministry shall issue notification to pay stipulated compensation to worker by the employer if the work is completed earlier than the period concluded in the employment agreement or if all or any part of the work is terminated due to unexpected cause or if a matter to terminate the work arises for any other cause;

(e) The employment agreement concluded under sub-section (a) shall apply to daily wage earners and piece-workers temporarily at the Government organization;

(f) The employer and the worker or workers may amend, by mutual agreement, conditions and benefits contained in the employment agreement as may be necessary in accord with the existing law;

(g) The copy of employment agreement concluded between the employer and worker shall be sent to the relevant labour exchange office by the employer within the stipulated time and obtain approval;

(h) The employment agreements concluded before coming into force of this Law shall be valid until the original term terminates.

Section (14). The employer shall carry out training programmes for increasing employment skill of the workers who are intended to appoint or who are working presently in his work in accord with the policy of the Skill Development Body according to the requirement of the work.

Section (30) (a). The employer of the industry and service shall pay money not less below 0.5% of salary, total wages paid to the level of worker supervisor and the workers below such level in such work monthly without fail as the contribution to the fund.

(b) The contribution paid under sub-section (a) shall not be deducted from the wage or salary of the workers.

2.3.16 Minimum Wage Law (2013)

The project developer commits to comply with the sections (12) and (13).

Section (12). The employer:

a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;
b) may pay more than the minimum wage stipulated under this Law;
c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;
d) shall pay the minimum wage to the workers working in the commerce, production business and service in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash in accord with the stipulations or jointly in some cash and in some produce prescribed in local price according to the desire of the worker;
e) may pay jointly in some cash and some produce prescribed in local price according to the local custom or desire of the majority of workers or collective agreement in paying the minimum wage to the workers and working in the agriculture and livestock breeding business. Such payment shall be for any personal use and benefit of the worker and his family and the value shall also be considerable and fair.

Section (13). The employer:

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

2.3.17 Payment of Wages Law (2016)

The project developer commits to comply with the sections (3), (4), (5), (14) and Chapter (3) covering the sections (7), (8), (9), (10), (11), (12) and (13).

Section 3. The employer:

a) shall pay wages to the workers employing in his business in local currency or foreign currencies stipulated by the Central Bank of Myanmar. Such payment may be paid in cash or cheque or deposit into the bank account of the worker with the agreement between the employer and the worker.
b) In paying such wages:
    i. if it is necessary to pay particular benefit, profits and opportunities for workers working in commerce, production and service businesses, it may be paid in cash or some in cash and some in things set up by local price on own volition of workers in accordance with the stipulations;
    ii. for workers employing in agriculture and livestock breeding business, it may be paid some wage in cash and something set up by local price according to custom, or on the volition of majority of worker or by collective agreement. In paying so, it shall be for personal use and the interest of his family, and shall be appropriate and equitable.
c) If any worker is conscripted under the Public Military Service Law, the (60) days of wages shall be paid as a special right.

Section 4. The employer:

a) shall pay wages at the end of the work or at the time agreed to pay to the worker for hourly, daily, weekly or other part time work, or temporary or piece work;
b) shall not exceed one month than the period agreed with the worker under sub-section (a) to pay wages;
c) shall pay the wages for the permanent work monthly. In making such payment:
    i. if workers are not more than 100, wages shall be paid at the end of the period for payment of wage;
    ii. if workers are more than 100, it shall be paid no later than five days after the end of the period for payment of wage;

d) shall pay the due wages within two working days from the date of termination, if a worker is terminated;
e) shall pay the wages at the end of the period for payment of wages, if a worker resigns on his own volition by sending prior written notice of resignation;
f) shall pay the due wages to a legal heir within two working days after the decease, if a worker is deceased;
g) shall pay all wages on a working day.

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

Section 14. The worker has the right to enjoy overtime wages stipulated by the law if he works over time.

Chapter 3

Deduction from Wages

Section 7. The employer:

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

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

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

Section 10. The employer:

a) shall obtain prior approval of the Department for what deduction can be made from wage and how much can be deducted before deducting anything stipulated as a fine under section 11;
b) shall post the approval contained in sub-section (a) in conspicuous places at relevant factory and work;
c) shall not exceed fine deducted for compensation than the value of damage or loss by action or omission of a worker;
d) in deducting from wages under Section 11;
   i. shall not deduct from wages without giving right to defence of the worker;
   ii. shall not deduct more than 5 percent of the monthly wages of the worker;
e) shall not absolutely deduct as the fine from a worker under 16 years of age;
f) may carry out the date of payment of passing fine in accordance with the agreement between the employer and the worker;

g) shall deduct from wages for compensation due to loss of property within a limited period by an agreement of the relevant Township Conciliation Body;
h) shall enter the deducting cash from wages into the register and systematically maintain it;
i) shall submit a report of the deduction from wages to the Department;
j) shall use fines of deduction from wages under sub-section (b) of Section 11 for the worker benefit in coordination with legally registered Labour Organization in the factory.

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

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

Section 12. The worker:

a) may request to the employer to be settled by himself or legally registered labour organization or the Workplace Coordination Committee in the factory if the following conditions occur:
   i. deduction from wages obtainable without credible reason;
   ii. failure to pay overdue payment of wages.
b) may submit to the inspector to solve the problem, if the employer fails to solve the problem asked under sub-section (a), within six months from the date of deduction or failure to pay.

Section 13. (a) The inspector may scrutinize such submission under sub-section (b) of the Section 12 and, if necessary, interrogate the relevant persons and make an appropriate order.

(b) The worker or employer may file an appeal to the chief inspector, if he does not satisfy the order made under sub-Section (a), within 30 days from the date of such order.

(c) The chief inspector may make an appropriate order after scrutinizing the appeal under sub-section (b) and hearing the employer and the worker.

(d) The order of the Chief Inspector is final.

2.3.18 The Leave and Holidays Act (1951)

This Act including eighteen sections, has been used as the basis framework for leaves and holidays for workers. This defines public holidays that every employee shall be granted with full payment. It also defines the rules of leaves for workers including medical leave, earned leave and maternity leave. Employer needs to avoid from prohibit according to this Act and any rule and order by this Act. If employer is absent it, he shall be punished with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five thousand kyats, or with both.

2.3.19 The Workmen's Compensation Act (1923)

This Act, including thirty-five sections that employer is required to make payments to employees who become injured or who die in any accidents arising during and in consequence of their employment. Such compensation also must be made for diseases which arise as a direct consequence of employment. But employee who claim compensation need approval for doing his duty unless the influence of drink and drug and the willful disobedience.

2.3.20 Social Security Law (2012)

The project developer commits to comply with the sections (11) (a), 15 (a), (b), (18) (b), (48) (b), and (75).

Section 11 (a). The following establishments shall be applied with the provisions for compulsory registration for social security system and benefits contained in this Law if they employ minimum number of workers and above determined by the Ministry of Labour in co-ordination with the Social Security Board:

i. industries which carry out business whether or not they utilize mechanical power or a certain kind of power, businesses of manufacturing, repairing and servicing, or engineering businesses, factories, warehouses and establishments;
ii. Government departments, Government organizations and regional administrative organizations which carry out business;
iii. development organizations;
iv. financial organizations;
v. companies, associations, organizations, and their subordinate departments and branch offices which carry out business;
vi. shops, commercial establishments, public entertaining establishments;
vii. Government departments and Government organizations which carry out business or transport businesses owned by regional administrative body, and transport businesses carried out with the permission of such department, body or in joint venture with such department or body;
viii. constructions carried out for a period of one year and above under employment agreement;
ix. businesses carried out with foreign investment or citizen investment or joint ventured businesses;
x. businesses relating to mining and gem contained in any existing law;
xi. businesses relating to petroleum and natural gas contained in any existing law;
xii. ports and out-ports contained in any existing law;
xiii. businesses and organizations carried out with freight handling workers;
xiv. Ministry of Labour and its subordinate departments and organizations;
xv. establishments determined by the Ministry of Labour, from time to time, that they shall be applied with the provisions of compulsory registration for Social Security System and benefits contained in this Law in co-ordination with the Social Security Board and with the approval of the Union Government.

Section 15 (a). The following funds are included in the Social Security Fund:

i. health and social care fund;
ii. family assistance fund;
iii. invalidity benefit, superannuation benefit, and survivors' benefit fund;
iv. unemployment benefit fund;
v. other social security fund for social security system of compulsory registration and contribution stipulated by the Ministry of Labour, in co-ordination with the Social Security Board, under clause (ii) of sub-section (e) of section 13;
vi. other social security fund stipulated that contribution may be paid after voluntary registration under clause (ii) of sub-section (e) of section 13;
vii. Social Security Housing Plan fund.

(b) The employers and workers of establishments shall pay contributions after effecting compulsory registration to the fund contained in clauses (i), (iii), (iv) and (v) of sub-section (a).

Section 18 (b). The employer shall deduct contributions to be paid by worker from his wages together with contribution to be paid by him and pay to the social security fund. The employer shall also incur the expense for such contribution.

Section 48 (b) The employers may affect insurance by registering voluntarily for the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system and by paying stipulated contribution to employment injury benefit insurance fund.

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

a) shall prepare and keep the following records and lists correctly and submit to the relevant township social security office in accord with the stipulations:
   i. records and lists of workers' daily attendance;
   ii. records on appointment of new workers, employing worker by changing of work, termination, dismissal and resignation;
   iii. records on promotion and paying remuneration;
   iv. records and lists of employer, manager, and administrator and records on change of them;
b) shall inform the relevant township social security office if the following matters arise:
   i. changes in number of workers and address of establishment;
   ii. change of employer, change of business, suspension of work, and close-down of work;
   iii. employment injury, decease and contracting diseases.
c) shall submit records of work and lists if requested by inspectorate or official assigned by the Social Security Head Office and various levels of Regional Social Security Office under this Law.

2.3.21 Occupational Safety and Health Law (2019)

The project developer commits to comply with sections (12), (14), (16), (17), (18), (26), (27), (34) and (36).

Section (12). The Employer shall, in accordance with the stipulations of the Ministry:

a) appoint the Person In-charge for Occupational Safety and Health to closely supervise safety and health of Workers in line with the type of Industry/Business; and
b) form the respective Occupational Safety and Health Committee in line with the type of Industry/Business comprising equal number of Employer and Worker representatives to become safe and healthy Workplace on condition that the number of Workers in his/her Industry/Business exceeds the number determined by the Ministry for that purpose. The Occupational Safety and Health of female Workers shall be considered according to the nature of Industry/Business when forming such Occupational Safety and Health Committee.

Section (14). Persons In-charge for Occupational Safety and Health shall comply with this Law and rules, orders, directives and procedures made under this Law to make the Workplace to be a safe Workplace that is good for health.

Section (16). Inspection Officers shall enter the Workplaces to which this Law applies and inspect Occupational Safety and Health conditions and direct Employers for their compliance and report the findings to the Chief Inspection Officer.

Section (17). Inspection Officers have the powers to perform the following for Occupation Safety and Health in accordance with their codes of conduct:

a) the power to enter, inspect and inquire at any Workplaces related to this Law at any time by showing the Inspection Officer's identity without warrant;

b) the power to look at, make copies of and seize as evidence as required documents and records in connection with Workplaces and Processes;
c) the power to take photos and record videos in connection with Workplaces and Processes that may be harmful to Occupational Safety and Health;
d) the power to assess and measure and take records of the extent of impairment and duration caused to the environment of the Workplace due to loudness, light, heat, coldness, particles, gas and Hazardous Materials, and obtain the assistance of the expert in the relevant field of study if required;
e) the power to inquire of any person in the Workplace during working hours with the assistance of the Recognised Doctor to check any conditions that put or are likely to put Workers in contact with Occupational Disease; and
f) the power to require responsible persons at clinics or hospitals to deliver, with the stipulated security grade, medical treatment records of the Worker who is under treatment or information relating to death due to Occupational Accident or Occupational Disease, or autopsy results asked by the Department in the stipulated form.

Section (18). Inspection Officers shall, with the approval of the Chief Inspection Officer, order the Employer to temporarily close a whole or part of the workplace, and notify the relevant Departments if required, if they believe that an occupational accident, occupational disease, hazardous event or major and serious occupational accident occurs or is likely to occur because:

a) it is not appropriate to continue doing the Industry/Business due to dangerous workplace condition, or unsafe operation carried by workers, or existence of hazardous materials and hazardous machines, or layout and function of workplace, part of the machine or equipment;
b) it is not appropriate to continue doing the industry/business due to breach or incompliance with any of the provisions of this law;
c) it deems that workers in the workplace are in danger due to acts, omissions, negligence or carelessness; or
d) it needs to evacuate workers from hazards because an occupational accident or accident is about to occur.

Section (26). The employer shall be responsible to:

a) Arrange as required to assess the risks of workplace, process and machines and materials used thereat;
b) Arrange as required to assess the likelihood of occurrence of hazards at the workplace and to the environment;
c) Arrange to have workers' medical checked-up by the recognized doctor in accordance with stipulations whether they suffer from any occupational disease;
d) Arrange to improve the workplace until it is safe and good for health based on the findings as per sub sections a, b, and c;
e) Provide workers with sufficient number of personal protective clothing, materials and facilities prescribed and approved by the Department on free of charge basis and cause workers to wear them while working;
f) Prescribe precautionary plans and plans for emergency;
g) Provide a clinic, appoint the registered doctors and nurses and provide medicines and supporting equipment for any industry/business where the number of workers is not less than the number determined by the Ministry;
h) Make necessary arrangements for managers, workers and members of the occupational safety and health committee including (Employer) himself/herself to attend occupational safety and health training courses stipulated by the Ministry in accordance with their departments or types of work;

i) Make necessary arrangements to enable immediate reporting to the person in-charge for occupational safety and health or manager in case where a worker suffers an occupational accident or his/her life or health is likely to be in danger;
j) Arrange to prevent any persons in the workplace from occupational safety and health risks occurred due to materials, machines or wastes used in the workplace or process;
k) Immediately stop the process, evacuate workers and conduct necessary rescue plans if any occupational accident is about to occur. If possible, workers will be relocated to another appropriate safe workplaces;
l) Display occupational safety and health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;
m) Arrange to be complied with precautions when entering restricted hazardous workplaces;
n) Arrange to disseminate occupational safety and health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to workers but also to related persons or raise their awareness or knowledge thereof;
o) Lay down the fire safety plan, perform fire drilling and train workers to use fire extinguishers systematically;
p) Allow the Chief Inspection Officer and Inspection Officers to enter workplaces, inquire, request documents and information or seize exhibits;
q) Cause workers to work only for the specified working hours if they have to work in hazardous industry/business and workplace; and
r) Incur the expenses for occupational safety and health matters.

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

a) During any period before a medical certificate is issued by the registered doctor for occupational injury or by the recognized doctor for contact with occupational disease;
b) Because the said worker has addressed a complaint for hazardous or health detrimental conditions;
c) Because the said worker has conducted the responsibilities of occupational safety and health committee; or
d) Because the said worker has refused to work in any condition where an occupational accident or occupational disease is about to occur.

Section (34). The employer is responsible to undertake the following in accordance with the stipulations:

a) Informing the Department in case of an occupational accident, hazardous event or major and serious occupational accident;
b) If a worker is in contact with a stipulated occupational disease or contaminated or likely to be contaminated due to materials or process used, sending a report to the Department together with a medical report prepared by the recognized doctor.

Section (36). (a) Inspection Officers must perform inspection as required if any Occupational Accident, Hazardous Event, Occupational Disease or Occupational Contamination breaks out.

(b) No one shall, without consent of the Chief Inspection Officer, remove, conceal, add or change a whole or part of the materials, machines, equipment, layout, documents or signs relating to the occurrence of an Occupational Accident, Hazardous Event, Occupational Disease or Occupational Contamination.

(c) The prohibition in sub-section (b) shall not apply to rescuing and doing related activities required for saving life, property and safety of people.

(d) The Chief Inspection Officer can approve the removal, dismantling, adding or changing of materials, machine and equipment and layout if the prohibition under sub-section (b) is likely to cause subsequent negative impacts.

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

The project developer commits to comply with the section 21 (b).

Section 21. The person wishing to carry out any of the following activities must comply with the provisions of the existing laws and to obtain the prior approval that there is no harm to the cultural heritage area, in the case of a World Heritage Site or a National Cultural Heritage Area, an application must be made to the Region or State Conservation Committee and in the case of any cultural heritage site other than the World Heritage Site or the National Cultural Heritage Area, an application must be made to the Regional Conservation Committee in accordance with the stipulations:

(b) In the buffer zone:

1. Construction or expansion of road construction, jetty, parking lot, railway, train station, gymnasium, sports stadium, building and bridge;
2. Construction of telecommunication towers, underground works, underground power lines, national power lines, electrical sub-stations, electrical poles and gas pipelines;
3. Flying helicopter, passenger balloons and drone;
4. Construction of entertainment facilities such as theaters, accommodation facilities, rest camps, equestrian race tracks and infrastructure.

2.3.23 Protection and Preservation of Antique Objects Law (2015)

The project developer commits to comply with the sections 12, 15, and 20.

Section 12. The person who finds any object which has no owner or custodian, he shall promptly inform the relevant Ward or Village-Tract Administrator if he knows or it seems reasonable to assume that the said object is an antique object.

Section 15. Whoever carries or transports an antique object to a foreign country without permission shall, on conviction, be punished with imprisonment for a term from a minimum of five years to a maximum of ten years or with a fine from a minimum of five million kyats to a maximum of ten million kyats or with both. In addition, the exhibit of the antique object involved in the offence shall be confiscated.

Section 20. Whoever attempts or conspires to commit any offence contained in this Law or abets in committing an offence shall, on conviction, be imposed the sentence provided in this Law for the relevant offence committed by him.

2.3.24 Protection and Preservation of Ancient Monuments Law (2015)

The project developer commits to comply with the sections 12, 15, and 20 (f).

Section 12. If a person who finds an ancient monument of over one hundred years old and above or under the ground or above or under the water which has no owner or custodian knows or it seems reasonable to assume that the said monument is an ancient monument, he shall promptly inform the relevant Ward or Village-Tract Administrative Office.

Section 15. A person desirous of any of the followings within the specified area of an ancient monument shall apply to get prior permission to the Department:

a) extending towns, wards and villages;
b) constructing or extending or repairing new buildings including hotels, factories and residential buildings or fencing or extending a fence;
c) digging to search petroleum, natural gas, gem or mineral, piping petroleum and natural gas, constructing factories, connecting national grid, constructing communication tower, constructing or extending infrastructures such as road, bridge, airfield, irrigation and embankment;
d) connecting underground electric cable, communication cable and other underground works;
e) digging or extending wells, lakes, cannels and ponds;

f) gold sieving, digging, burning bricks, digging well, lake, creek, ditch, gully, pit digging, refilling, levelling, mining, quarry, gravel digging and unearth sand, removing the mounds and hills which can damage the physical feature of the land;
g) placing and fencing ancient monuments in a private compound and area;
h) constructing a building which is not consistent with the terms and conditions stipulated according to the region by the Ministry near and at the surrounding of an ancient monument.

Section 20. No one shall carry out any of the following acts which is assumed to cause damage to an ancient monument within the specified area of an ancient monument or of a listed ancient monument without a written prior permission:

(f) discarding chemical substance and rubbish which can affect an ancient monument and the environment.

2.3.25 Union of Myanmar Public Health Law (1972)

The project developer commits to comply with the sections 3 and 5.

Section 3. Whatever is prescribed in other existing laws, the government shall do advising, inspection, supervision, repairing and prohibition of the following health matters in the interests of improving the health status and protecting the health problems of working people.

1) Environmental health activities:
    a. Collection and disposal of litter and wastes from the environment where public is living;
    b. International standardization and protection of public drinking water;
    c. Protecting the public and the environment against the harmful gases, fumes, odor, fine particles, noise and radiation;
    d. Cleansing urban development, housing construction and facilities and places used by the working population;
2) Matters related to food produced and sold by the working people:
    a. Registration, cancellation of registration and re-registration of food production and sales workshop, factory and businesses;
    b. Keeping the food sold to the working people healthy and clean;
    c. Prevention of counterfeiting of food sold to the working people, mixing with other inferior substances, and extraction of these additives from food;
    d. Keeping food production and sales workshop, factory and business clean and tidy;
    e. Keeping food stalls and buildings healthy and clean;
    f. Preventing people with infectious diseases from working in food production businesses and food shops;
    g. Confiscating and destruction of hazardous food;
    h. Sending the food to government laboratories for testing to examine the food – related matters;
    i. Following the food standards occasionally set by the government.
3) Matters related to home appliances and cosmetics to be used by the working people:
    a. Registration, cancellation of registration and re-registration of home appliances and cosmetics production workshops and factories;
    b. Prohibiting the production if the manufactured household goods and cosmetics may be dangerous or poisonous or containing the harmful radiation to the working people;
    c. Destroying the dangerous manufactured home appliances and cosmetics in a way of without endangering the working people;
    d. Confiscating and destruction of dangerous home appliances and cosmetics from shops;

e. Following the standards occasionally set by the government to implement home appliances and cosmetics.

4) Matters related to infectious diseases:
   a. Announcing the list of diseases to be reported by region from time to time in order to prevent and fight against the spread of infectious diseases;
   b. Conducting investigation, planning for vaccination of the entire working population, vaccination, pest control and other necessary activities for the prevention of infectious diseases;
   c. Declaring a state, region, district, township, ward, village or an area an emergency area for health issues and carrying out the necessary disease prevention measures by the government if there is a risk of infectious disease or an outbreak of infectious disease which will be a concern for the health of the working people.
5) Matters related to private clinics:
   a. Prescribing the necessary regulations regarding private clinics;
   b. Registration, cancellation of registration and re-registration of all private clinics.
6) Matters related to medicines required for use by the working people:
   a. Registration, cancellation of registration and re-registration of businesses which manufacture medicines for distribution and sales and retail and wholesale businesses for medicines;
   b. Asking to send medicine manufacturing formula and medicine samples to the organizations to be formed for this purpose to ensure that the medicines are safe and effective for the working people;
   c. Prohibition of advertising for saying more potency than the actual potency of the drugs or by lying;
   d. Distribution of imported drugs only after checking the potency;
   e. Assigning a government – designated laboratory to test the potency of the medicines.

Section 5. Organizations formed under this law or those assigned by these organizations or government departments and government subordinated agencies assigned by this law have the right to enter into and inspect and instruct the workshops, factories, businesses, shops, places and buildings at any time for the matters relating to environmental health, food, home appliances and cosmetics to be used by the working people, infectious diseases, private clinics, medicines used by the working people.

2.3.26 Prevention and Control of Communicable Diseases Law (1995)

The project developer commits to comply with the sections (3) (a) (9), (4), (11).

Section 3 (a). In order to prevent the outbreak of communicable diseases, the Department of Health shall implement the following activities systematically under the guidance of the Ministry of Health:

(ix) giving advice to and coordinating with relevant Government departments, organizations and non-governmental organizations for construction of healthy housing, obtaining safe drinking water and fresh water for use, proper waste disposal in order to prevent occurrence of communicable disease for workers who are carrying out activities of social and economic development.

Section 4. The public shall comply with the measures undertaken by the Ministry of Health and the Department of Health under section 3 in respect of prevention of the occurrence and spread of communicable disease and control thereof.

Section 11. In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures:

a) investigation of a patient or any other person required;
b) medical examination;

c) causing laboratory investigation of stool, urine, sputum and blood samples to be carried out;
d) other necessary investigation;
e) prohibition of the right of movement of the vehicle carrying animal or animal product suspected of having epidemic disease.

2.3.27 Control of Smoking and Consumption of Tobacco Product Law (2006)

The project developer commits to comply with the section (9).
Section 9. The person-in-charge shall:

a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6 in accordance with the stipulations;
b) arrange the specific place where smoking is allowed as mentioned in section 7 and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulations;
c) supervise and carry out measures so that no one shall smoke at the non-smoking area;
d) accept the inspection when the supervisory body comes to the place for which he is responsible.

2.3.28 Conservation of Water Resources and Rivers Law (2006)

The project developer commits to comply with the sections (8) (a), (11), (19), (21) (b), (22), (24) (b), and (30).

Section 8. No person shall:

a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks.

Section 11. No person shall:

a) dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.
b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.
c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek.

Section 19. No one shall dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk.

Section 21. No one shall:

b) drill well or pond or dig earth without the permission of the Directorate.

Section 22. No one shall, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area.

Section 24. No one shall:

b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks.

Section 30. Any government department and organization or any person desirous of constructing drainage, utilizing river water intake, constructing bridges spanning rivers, connecting underground pipe, connecting underground electric power cable, connecting underground telecom cable or digging in rivers and creeks, bank boundary and waterfront boundary, under the requirement of work, shall in order not to adversely affect the water

resources and rivers and creeks, carry out only after obtaining the approval of the Ministry of Transport and Communications.

2.3.29 Conservation of water resources and rivers rules (2013)

The project developer commits to comply with the following rules (47), (48) and (49).

Rule 47. Any government ministry, department and organization or any person desirous of constructing drainage, constructing hydro power plants, implementing water pumping projects for utilizing river water intake, utilizing river water for other businesses at or within bank boundary under the requirement of work, shall submit the location of the work, the amount of work and duration to the Directorate and request the recommendation.

Rule 48. After scrutiny of the recommendation request submitted according to Rule 47, and if there is no adverse impact on the conservation of water resources and rivers then the Directorate shall get the consent of the Ministry to issue recommendation by stipulating guidelines for constructing drainage, constructing hydro power plants, or implementing water pumping projects for utilizing river water intake, utilizing river water for other businesses.

Rule 49. If the recommendations are made according to Rule 48, the relevant government ministry, department and organization or any person shall

a) pay the service fee prescribed by the Ministry for measurement and developing drawing and field inspection to the Directorate;
b) pay the river water use fee and rivers maintenance fee prescribed by the Ministry to the Directorate for the utilization of river water for other businesses.

2.3.30 Petroleum and Petroleum Products Law (2017)

The project developer commits to comply with the sections (9) (a), (e), (10) (a), (b), (d) and (11), (13), (31) (a), (b), (c), (d), (e), and (33).

Section 9. The Ministry of Transport and Communications shall perform the following tasks with regard to petroleum and any types of petroleum products:

(a). Issuing licenses for motor vehicles, watercraft and barges for the carriage of petroleum and any types of petroleum products.

(e). specifying the procedures and terms for transportation, except for transportation by pipelines.

Section 10. The Ministry of Natural Resources and Environmental Conservation shall perform the following tasks with regard to petroleum and any types of petroleum products:

(a) Issuing storage licenses for warehouses and storage tanks;

(b) issuing a transportation permit for motor vehicles, watercraft and barges for the transportation of petroleum and any types of petroleum products;

(d) on-the-spot investigation and taking action in accordance with the laws in force in case of environmental damages caused during the operation of petroleum and petroleum products businesses.

Section 11. Every container which contains dangerous petroleum or any types of dangerous petroleum products shall display a warning through the placement of a mark, embossing, painting, printing or in other appropriate ways. If it is not possible to do so, a warning which is similar to a mark that warns of the dangerous nature of petroleum, spirit and petrol shall be displayed in easily visible words or signs.

Section 13. A danger warning sign shall be displayed in the shape of easily visible words or signs on a pipeline which is used for the transportation of petroleum or petroleum products.

Section 31. No license holder shall:

a) violate or fail to comply with any prohibition in the rules, regulations, notification, order, directive and procedures made according to this law;
b) use a container, transportation vehicle and pipeline which contains dangerous petroleum and any types of dangerous petroleum products without displaying easily visible danger warning signs;
c) import, transport, store and distribute petroleum and petroleum products in other ways than specified in this law, irrespective of whether the petroleum and petroleum products are dangerous or harmless;
d) operate without taking responsibility for damaging the environment during the operation of a petroleum and petroleum products business;
e) distribute petroleum and petroleum products which are not in compliance with the standards, quality and measurement.

Section 33. Nobody managing the business shall fail to immediately notify and give the necessary information of the accident if there is an explosion or fire caused by any types of petroleum and petroleum products business or there is a potential cause for a fire near the storage place of petroleum and petroleum products.

2.3.31 Petroleum Rules (1937)

The project developer commits to comply with Chapters III and IV.

CHAPTER III

Transport of Petroleum

PART I

GENERAL

24. Prevention of accidents. – All due precautions shall be taken at all times to prevent accident by fire or explosions.

25. Prevention of escape of petroleum. – All due precautions shall be taken at all times to prevent any escape of petroleum during transport especially into any drain, sewer, harbor, river or watercourse.

26. Empty receptacles. – All empty tanks or other receptacles which have contained dangerous petroleum or which have contained non-dangerous petroleum in bulk shall, except when they are opened for the purpose of cleaning them and rendering them free from petroleum vapor, be kept securely closed unless they have been thoroughly cleaned and freed from petroleum vapor.

27. Receptacles for dangerous petroleum. – (1) Dangerous petroleum, if not in bulk, shall be contained in gas-tight tinned, galvanized or otherwise externally rust-proofed sheet iron or steel receptacles which shall be fitted with well-made filling aperture and well-fitting screw plugs, or with screw caps or other caps with metal air-tight under-caps. The receptacles shall be kept in proper repair.

(2) No receptacles, other than tanks on tank-carts of a type approved in writing by the Chief Inspector, shall be of more than 65 galls capacity excluding the air-space prescribed by sub-rule (7).

(3) The receptacles, other than tanks on tank-carts, shall be of a type approved in writing by the Chief Inspector and shall have the following thickness of metal:

	Not less than
not exceeding 2 gallons … … … … …	27 B. G.
exceeding 2 but not exceeding 4 gallons … … …	22 B. G.

exceeding 4 but not exceeding 30 gallons … … … 18 B. G.

exceeding 30 but not exceeding 45 gallons … … … 17 B. G.

exceeding 45 gallons … … … ……. … … 16 B. G.

Provided that the Chief Inspector may, by written order, permit the use in any particular case of receptacles having thickness of metal less than that specified in this sub-rule.

(4) Where the approval of the Chief Inspector is sought to a type of receptacle not previously approved, three copies of a detailed drawing thereof to scale be forwarded to him.

(5) The receptacles shall be so constructed and secured as not to be liable, except under circumstances of gross negligence or extraordinary accident to become defective, leaky or insecure in transit.

(6) The receptacles shall bear a stamped, embossed, painted or printed warning exhibiting in conspicuous character the words “Petrol” or “Motor Spirit” or an equivalent warning of the dangerous nature of the petroleum.

(7) An air-space of not less than 5 per cent, of its capacity shall be left in each tank, drum or other receptacles containing dangerous petroleum.

(8) Nothing in sub-rules (1), (2), (3), (4) and (6) shall apply to receptacles in the possession of Armed Forces of Pakistan.

28. Receptacles for non-dangerous petroleum. – (1) Non-dangerous petroleum, if not in bulk, shall be packed in air-tight tins or drums, of steel or iron or in other receptacles not easily broken or in tanks permanently fixed to carts, wagons, boats or other means of carriage, and of types approved by the Chief Inspector.

(2) An air-space of not less than 5% of its capacity shall be left in each tank, drum or receptacle contained non-dangerous petroleum of a flash point below 150 degrees F.

Provided that, in the case of an un-berthed passenger ship to which Part IV of the Merchant Shipping Act, 1923 applied the petroleum shall be packed either in tins enclosed in outer wooden cases or in hermetically sealed iron or steel drums or, alternatively in the case of heavy petroleum, in sound well-coopered wooden casks of not more than 50 gallons capacity.

29. Restriction on delivery and dispatch of petroleum. – (1) No person shall delivery any petroleum to any one [in Pakistan] other than the holder of a storage license or his authorized agent or a Port Authority or railway administration.

(2) No person shall dispatch any petroleum to any one in Pakistan other than holder of a storage license.

(3) Notwithstanding anything contained in sub-rule (2), non-dangerous petroleum not exceeding 3,000 gallons in quantity packed in sealed air-tight tins or drums of steel or iron may be dispatched to a person not holding a storage license, provided that the person dispatching the petroleum has satisfied himself that prior arrangements have been made by the person to whom the petroleum is dispatched for the immediate disposal in the original packages of any quantity in excess of 500 gallons.

(4) This rule shall not apply to the delivery or dispatch of petroleum in quantities which are permitted by the Act or these rules to be stored without license, or to any petroleum in the possession of the Armed Forces of Pakistan.

PART II

TRANSPORT BY WATER

30. Conditions of carriage of petroleum in bulk by water. – (1) Petroleum in bulk shall not be carried by water except in ship or other vessel licensed annually for the carriage of petroleum in bulk by an officer appointed by the Central Government in this behalf, and the petroleum

shall be stored in such part of the ship or other vessel and in such manner as may be approved by general or special order by the officer so appointed after consultation with the Chief Inspector:

Provided that -

(a) nothing in this rule shall apply to ships importing petroleum.

(b) Petroleum in tank-wagons may, with the permission in writing of the Chief Inspector and subject to such conditions as he may specify, be transported across a river by a recognized wagon ferry.

(2) *The license referred to in sub-rule (1) shall be granted in such form and on payment of such fees as may be specified by the Central Government in this behalf and the license shall remain in force for a period of 12 months.

Notes and References. – Notification NO. M-826(2), dated the 22nd December 1938 prescribed the appended Form for the grant of licenses in respect of ship or other vessels for the carriage of petroleum in bulk by water and directs that fees on the following scale be payable for such licenses:

		Rs.
(a)	ship or other vessel not exceeding 100 tons gross tonnage	500
(b)	for every additional 50 tons gross tonnage or fraction thereof	100

License for the carriage of petroleum in bulk by water.

Name of Vessel ……

Official No. ……

Gross tonnage ……

Name of owners……

The above vessel is hereby licensed for the carriage of petroleum in bulk by water, under the rule 30 of the Petroleum Rules, 1937, subject to the provision of these rules and the Petroleum Act, 1934.

The petroleum shall be stored only in –

(i) the following parts ** of the vessels –

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*Inserted by Notification No. M-826(1), dated the 22nd December 1938

**The parts of the vessel and the manner of storage to be specified in detail by the licensing authority in consultation with the Chief Inspector of Explosives.

(2) the following manner, that is to say,

This license shall remain in force till the day*** (twelve months from the date of issue of the license) of 196

Issued at the day of 196

(Licensing authority appointed under Rule 30 of the Petroleum Rules, 1937).

Notes and References. – This rule means, in effect, that petroleum may not be carried in a ship or other vessel in any receptacle exceeding two hundred gallons in capacity unless the vessel has been specially licensed for the purpose less than a year before, Notification No. M-826 (2), dated the 31st March 1937 as amended in Pakistan appoints the officers specified in the annexed Schedule as the officers to license under this rule ships or other vessel for the carriage of petroleum in bulk by water.

THE SCHEDULE

1. The Principal Officer, Mercantile Marine Department, Karachi.

2. The Engineer and Ship Surveyor, Narayanganj.

31. Requirements as to construction of vessels. – Every ship or other vessel carrying petroleum in bulk, other than a recognized wagon ferry permitted to transport tank-wagons under proviso (b) to rule 30, must be of steel or iron well and substantially constructed with scantling of ample dimension in proportion to the size of the vessel.

32. Tank fittings on vessels. – In petroleum tank-ships or other vessels used for the transport of petroleum other than heavy petroleum the following provisions shall apply:

(a) all tanks shall be fitted with independent approved filling and suction pipes and valves or with stand-pipes with blank flanges, all pipes being carried down nearly to the bottom of the tanks, and no petroleum in bulk shall be taken on board or discharged except through such pipes and valves, unless otherwise permitted by the Chief Inspector in writing;

(b) all tanks shall be fitted with manholes having screw down covers with petroleum-tight joints and, in the case of tanks intended for use with dangerous petroleum, with ventilators or relief valves of approved pattern properly protected with wire gauge of a mesh of not less than 28 to the linear inch; and

(c) ventilators similarly protected shall be fitted to all spaces around tanks

Provided that the Chief Inspector may, by order in writing, exempt from the provisions of this rule any vessel which was employed in transporting petroleum in bulk before the 1st April 1937.

33. Self-propelled barges. – The following conditions shall be observed in self-propelled barges transporting petroleum other than heavy petroleum:

(a) the whole of the machinery shall be at the stern of the barge and shall be entirely separated from the cargo by a cofferdam consisting of two transverse petroleum-proof bulk-heads separated by a space of at least two feet six inches;

(b) the barge shall be provided with a heavy wood belting; and

(c) suitable ventilators shall be fitted to the cargo space;

Provided that condition (a) shall not be applicable to any barge which was employed in transporting petroleum before the 1st April 1937.

34. Petroleum in bulk on barges or flats. – (1) Petroleum in bulk shall not be transported in a barge or flat unless the barge of flat:

(a) is self-propelled and carries at least four fire extinguishers, or

(b) is in tow or, or otherwise attended by, a steamer or tug carrying at least four fire extinguishers.

(2) The fire extinguishers referred to in sub-rule (1) shall be of a pattern approved by the officer appointed under rule 30 and shall be fitted in position approved by him.

35. Inflammable cargo, or passengers. – (1) No ship or other vessel shall carry petroleum in bulk if it is carrying passengers, or any inflammable cargo other than petroleum or coal.

(2) This rule shall not apply to heavy petroleum used as fuel and carried in cellular double bottoms under engine and boiler compartments and under ordinary holds, and in peak

tank, deep tanks or bunkers of approved construction; such oil fuel storage tanks and installation connected therewith shall comply with the provisions of rules 228 to 243 of the Merchant Shipping (Construction and Survey of Passenger Steamers), Rule, 1935.

35A. – Petroleum carried as cargo in un-berthed passenger ships. – Dangerous petroleum shall not be transported as cargo by an un-berthed passenger ship as defined in the Merchant Shipping Act, 1923 (XXI of 1923):

Provided that the certifying officer referred to in section 157 of the Merchant Shipping Act, 1923 (XXI of 1923), may, in cases where he is satisfied that no other means of transporting the petroleum are available, permit dangerous petroleum in quantity not exceeding 250 gallons to be transported otherwise than in bulk by an un-berthed passenger ship other than a country craft subject to –

(a) the condition that no more persons shall be carried in the ship than can with safety be accommodated in the ship's life-boats in case of accident; and
(b) such other conditions as the certifying officer may, after consultation with the Chief Inspector, impose;

Provided further that clause (a) of the foregoing proviso shall not apply in the case of un-berthed passenger ships engaged on voyages between ports situated in Pakistan or between any port or place on the Dominion of Pakistan in the course of which they do not go more than 20 miles from land.

35B. Transport by country craft. – No country craft shall carry dangerous petroleum if it is carrying passengers.

36. Restrictions as to inflammable cargo. – (1) No steamer or tug employed in towing or otherwise attending a barge, flat or lighter carrying petroleum, other than heavy petroleum in bulk shall at the same time tow or otherwise attend any other vessel carrying an inflammable cargo other than petroleum or coal.

(2) No such steamer or tug shall carry any inflammable cargo other than petroleum or coal.

(3) All such steamers or tugs shall be fitted with efficient spark arresters.

37. Ventilation and cleaning of holds and tanks. – (1) Before any petroleum is discharged from a ship or vessel the holds of such vessel shall be thoroughly ventilated:

Provided that nothing in this sub-rule shall apply to any vessel carrying dangerous petroleum not exceeding 6 gallons or non-dangerous petroleum not exceeding 500 or heavy petroleum not in bulk.

(2) After all petroleum has been discharged from any such vessel the holds, tanks and bilges of the vessel shall be rendered free from inflammable vapour.

(3) Sub-rule (2) shall not apply to the tanks of a ship importing petroleum which leaves the port without delay after the discharge of cargo or remains only for the purpose of taking on board bunkers stores or ballast or for such other purposes as may be approved the Conservator of the Port, if the tanks of every such ship are securely fastened down immediately after the discharge of the cargo.

(4) Sub-rule (2) shall not apply to barges or lighters continuously engaged in the transport of petroleum in bulk, if –

(a) an interval of not more than 72 hours is likely to elapse between an operation of unloading or discharging and the next loading operations; and
(b) the tanks are securely fastened down immediately after unloading.

(5) Sub-rule (2) shall not apply to specially constructed steel tank motor-vessel approved by the Chief Inspector which are engaged in transport of petroleum in bulk on such rivers and on such parts thereof as may be approved by him in areas outside port limits, or by the Conservator of the Port within port limits, if the tanks of such vessels are securely fastened

down immediately after unloading and the vessels depart not later than 12 hours after completion of discharge for their next place of loading.

(6) All ships or other vessels which by sub-rules (3), (4) or (5) are exempted from the application of sub-rule (2) shall, until their holds and tanks have been rendered free from inflammable vapour comply with all the rules applicable to ship, or other vessels when carrying petroleum in bulk.

38. Master of vessel especially responsible. – (1) The master or other officer in charge of any ship with petroleum on board or of any vessel certified under rule 30 shall be responsible that –

(a) all due precautions are taken for the prevention of accident in the loading or discharge of petroleum.

(b) so long as there is petroleum or inflammable vapour in a tank, all openings from the tank to the atmosphere, except the gas escape line, are kept closed and locked or otherwise fastened in a manner certified as satisfactory by the officer appointed under rule 30; and when it is necessary to take dips or samples, the ullage plugs or sighting ports are closed immediately this has been done;

Provided that, subject to the provisions of clause (c), such master or officer in charge may cause the necessary openings to be opened or unlocked for the purpose of tanking on board or discharging non-dangerous petroleum, for cleaning the tanks, or for other sufficient reason.

(c) every person entering a tank wears a safety helmet of a description approved by the Chief Inspector, unless a Conservator of the Port or other officer appointed by the Central Government in this behalf has on payment of the fee prescribed in sub-rule (2) examined the tank with the air of a vapour-testing instrument and has certified it to be free from dangerous vapour;

(d) the vessels and any steamer or tug towing or otherwise attending on such vessel exhibits conspicuously:

(i) from sunrise to sunset a red flag not less than three feet square with a whiter circular center six inches in diameter, if dangerous petroleum is carried, and a red flag not less than three feet square if non-dangerous petroleum is carried; and

(ii) from sunset to sunrise such warning lights as may be required by the Conservator of the port;

(e) the vessel, when carrying petroleum in bulk, at all times lies afloat unless otherwise permitted by general or special order in writing of the Chief Inspector or the Conservator of the Port;

(f) the vessel, when carrying petroleum in bulk, is constantly under the control and personal supervision of a responsible person;

(g) iron or steel hammers or other instruments capable of causing a spark are not used for the purpose of opening or closing the hatches or tank covers; and

(h) footwear, which exposes any iron or steel, is not worn on the deck of any vessel while the loading or unloading of dangerous petroleum is proceeding.

(2) A fee of one hundred rupees shall be payable by the Master or other Officer in charge of the ship or vessel for each test carried out under clause (c) of Sub-rule (1).

39. Loading and unloading by night. – (1) Where adequate electric lighting is installed and rule 105 is complied with tank-ships and barges may discharge or load non-dangerous petroleum at any time and tank-ships and barges which have commenced the discharge into storage tanks on shore, or loading into their own tanks, of dangerous Petroleum in bulk before sunset may continue the said discharge or loading.

(2) Should anything occur during discharging or loading dangerous petroleum after sunset which necessitates a repair or disconnection of the plan pipes or connections, such discharging or loading shall be discontinued until after sunrise.

(3) Save as provided by sub-rule (1), petroleum shall not be discharged or loaded or landed between the hours of sunset and sunrise.

(4) This rule shall not apply to the refueling or aircraft by vessels certified under rule 30, subject to any conditions which the Chief Inspector may impose in this behalf.

40. Loading and discharge of bulk petroleum. – (1) The loading and discharge of petroleum in bulk shall be by armored hose and metal pipes.

(2) All pipes and other appliances used in the landing or loading of petroleum in bulk shall be free from leakage.

(3) When a ship has finished discharging petroleum other than heavy petroleum, the pipe line shall be immediately emptied of petroleum by pumping water through the line.

(4) The Chief Inspector may, by written order, grant exemption in any particular case from the provisions of sub-rules (1) and (3).

41. Precautions on suspension of loading or discharge. – When the loading or landing of petroleum has been commenced such loading or landing shall proceed with due diligence, and, if it is discontinued, the tanks and holds of the ships or other vessels concerned and all loading or discharge valves shall be closed immediately.

42. Naked lights, fire and smoking on board a vessel prohibited. – No fire, naked light, fuses, matches, or other appliance for producing ignition or explosion and no smoking shall be allowed on board any barge, flat or lighter carrying petroleum in bulk, or on board any such vessel used for the transport of dangerous petroleum otherwise than in bulk or for the transshipment of petroleum to or from any vessel within the limits of any port :

Provided that nothing in this rule shall prevent the use on a self-propelled barge of the machinery of propulsion.

43. Smoking, fire and lights prohibited during loading and unloading. – At all times during the loading or unloading of a ship or other vessel until such time as all petroleum shall have been loaded into or removed from the holds or tanks and the holds or tanks shall have been securely closed down and, in the case of landing, rendered free from inflammable vapour, there shall be no fire or artificial light or smoking on board such ship or other vessel or within 100 feet of the place where the petroleum is being loaded or landed;

Provided that this rule shall not apply to the use of lamps, cookers or other similar apparatus electric or otherwise, so designed, constructed and maintained as to be incapable of igniting inflammable vapour or, in the case of heavy petroleum, the cause of galley fires.

Provided further that this rule shall not apply to the discharging or loading of a ship, under conditions approved by the Conservator of the Port, by means of steam from her own boilers or power generated by electric motors or internal combustion engines placed in a position away from cargo holds an pump rooms or by means of electric motors so designed, constructed and maintained as to be incapable of igniting inflammable vapour and maintained in accordance with Lloyd's or any other approved classification society's requirements.

44. Matches. – No person engaged in landing or loading petroleum shall carry fuses, matches, or any other appliance for producing ignition or explosion.

45. Fire-extinguishing appliances to be ready for use. – Vessels discharging or loading petroleum shall have adequate fire-extinguishing appliances so disposed that they can be put into immediate use, and, if the petroleum is dangerous petroleum shall have their awnings furled.

46. Restriction on the conveyance of petroleum. – Dangerous and non-dangerous petroleum shall not be simultaneously conveyed to the shore or to another ship on the same vessel.

47. Restriction as to leaky tins. – Leaky tins or other receptacles containing petroleum shall not be discharged into a vessel containing sound tins or other sound receptacles.

48. Transport by sea of petroleum which has not been tested. – (1) Petroleum which has been imported into any port specified in sub-rule (1) of rule 7 and which not been tested at such port in accordance with the rules contained in Chapter IX, shall not be transported to any other port otherwise than to a port at which importation is permitted under sub-rule (1) of rule 7 and in accordance with the provisions of all the rules in Chapter II, except rule 5, when it arrives at such other port.

(2) Nothing in sub-rule (1) shall apply to petroleum of Burmese origin which is covered by a certificate in Form B granted by a testing officer appointed by the Government of Burma.

49. Transport by sea of petroleum which has been tested. – Petroleum which has been tested at one of the ports specified in sub-rule (1) of rule 7 and petroleum of Burmese origin which is covered by a certificate in Form B granted by a testing officer appointed by the Government of Burma, may be transported to any other port and the provisions of rule 8 to 14, 16 and 17 shall apply to such petroleum when it arrives at such other port.

50. Omitted.

PART-III

COASTWISE TRANSPORT OF DANGEROUS PETROLEUM OTHERWISE THAN IN BULK.

51. Applications. – (1) The rules in this part apply on to the transport coastwise and dangerous and dangerous petroleum otherwise than in bulk.

(2) Unless otherwise expressly provided in this Part nothing contained in Part II of this Chapter, except rule 39, shall apply to any petroleum transported in accordance with this Part.

51-A. Conditions of transport by un-berthed passenger ships. – Dangerous Petroleum may be transported otherwise than in bulk by an un-berthed passenger ship as defined in the Merchant Shipping Act, 1923 (XXI of 1923), not being a country craft, in accordance with the provisions of rule 35A and rule 53 to 61 inclusive.

52. Maximum quantity allowed to be carried. – Dangerous petroleum may be transported otherwise than in bulk by country craft or steam or motor vessels other than un-berthed passenger ships as defined in the Merchant Shipping Act, 1923, subject to the provision of rule 53 to 62 inclusive, if the quantity of petroleum does not exceed.

(a) in the case of country craft, the licensed carrying capacity of the vessel after taking into account the weight of the barrels or tins in which the petroleum is carried ; or
(b) in the case of steam or motor-vessels, 15 tons.

53. Loading of barrels and drums. – Barrels and drums shall be loaded with the bungs upwards.

54. Carriage below decks. – Dangerous petroleum shall not be carried below decks in decked vessels unless the hold is properly ventilated.

55. Provision of bulkhead. – In all vessels other than country craft a sold gas-tight bulkhead without openings, and in country craft a sold bulkhead without openings, shall be fitted between the hold and the after-deck where the crew are accommodated; and in vessels fitted with a poop the bulkhead shall be placed immediately in front of the poop. In decked vessels the bulkhead shall reach up to the deck ; in all other vessels it shall reach to within six inches of the gunwales.

56. Fire, lights and smoking. – (1) No fire, naked light of any description and no smoking, shall be allowed on any part of vessel transporting dangerous petroleum except abaft the sold bulkhead.

(2) The navigation light on any such vessel shall be carried abaft the bulkhead.

57. Carriage of other inflammable cargo. – No inflammable cargo other than dangerous petroleum or other petroleum products or the dunnage used for packing purposes shall be carried on a vessel transporting petroleum.

58. Fire buckets. – Buckets containing dry sand shall be placed at convenient points on a vessel transporting petroleum. Not less than two such buckets shall be placed on the after-deck.

59. Construction of steam or motor-vessels. – Steam or motor vessels not specially constructed for the carriage of petroleum shall not carry petroleum unless they are constructed only of iron or steel.

60. Transport in steam or motor-vessels. – On steam or motor-vessels, not specially constructed for the carriage of petroleum. :-

(a) any petroleum shall either be carried in separate compartments which shall be gas-tight and shall be efficiently sealed, or in a hold in which there are efficient ventilators in accordance with clause (b), or on deck in accordance with rule 61 ;

(b) half of the ventilators provided in accordance with clause (a) shall extend to the bottom of the space, and the other half only a short distance, below the deck; the short ventilators shall be labeled “Inlet or to Windward”; such ventilators shall have large cowl heads, the openings being covered with double fine brass wire gauze;

(c) dangerous petroleum shall be contained in receptacles complying with the provision of rule 27 ; and

(d) special precautions shall be taken against smoking and the use of lights or fire of any kind while the cargo is being loaded or unloaded, or while the hatches are off, or any deck opening are uncovered; before any lights are used in a compartment which contains petroleum, precaution shall be taken to ensure that the space is clear of vapour; all empty receptacles which have contained dangerous petroleum shall be kept securely closed.

61. Transport on deck. – Petroleum may be carried on deck in steam or motor vessels not specially built for the carriage of petroleum, subject to the following conditions:

(a) in cargo ships dangerous petroleum shall not occupy more than 50 per cent of the open deck areas and shall be so stowed as not to interfere with the navigation of the ship, or make is unseaworthy;

(b) in passenger ships a limited quantity of dangerous petroleum may be carried provided proper precautions are taken regarding stowage and keeping the packages away from passenger’s promenade or deck space;

(c) the petroleum shall be protected from the direct rays of the sun by the use of a canvas awning or otherwise; and

(d) conspicuous notices shall be posted up drawing attention to the danger arising from smoking or striking matches near the deck cargo.

62. Conditions of transport by country craft. – No dangerous petroleum shall be transported in country craft except subject to the following conditions:

(a) subject to the provision of rule 27, the petroleum shall be carried.

  (i) on 40/65 gallon steel barrels the screw bungs of such barrels being well-fitting and sealed; or

  (ii) in 4 gallon sealed steel drums, not more than three tiers of which may be carried on any single vessel; or

  (iii) in 2 gallon sealed steel tins, not more than six tiers of which may be carried on any single vessel;

(b) all barrels, drums or tins shall be placed within four feet of the after-deck where the crew are accommodated in the case of an un-decked vessel or on deck in the case of a decked vessel; and

(c) no passengers shall be carried on board the craft.

PART IV

TRANSPORT ON LAND VEHICLES

63. Prohibition of fires and smoking. – (1) No fire or other artificial light capable of igniting inflammable vapour shall be allowed on any vehicle containing petroleum in bulk.

(2) No person shall smoke while on or attending such a vehicle.

(3) No article or substance capable of causing fire or explosion shall be carried on such a vehicle.

Explanation. – For the purposes of this rule any tank or other receptacle which has contained petroleum, and which has not been thoroughly cleaned and freed from inflammable vapour shall be deemed to contained petroleum.

64. Filling and discharge of tanks. – (1) Tanks-wagons, lorries or carts transporting petroleum shall only be filled or discharged by means of metal pipes or armoured hose in which the armouring is electrically continuous throughout.

(2) Tanks, other than fuel tanks on vehicles, containing dangerous petroleum shall not be filled or discharged –

(i) within 100 feet of any fire, furnace or artificial light capable of igniting inflammable vapour; or

(ii) at any place where the lorry, wagon or cart is exposed to sparks

Provided further that the distance specified in clause (i) may be reduced to the figure 12 feet prescribed in the license in Form K where the petroleum is filled, stored and discharged into a tank in any premises licensed in that Form:

Provided further that the distance specified in clause (i) may be reduced to three meters [10 feet] for LPG cargo vehicle unloading into the LPG storage container and so positioning that the shut-off valves in both the truck and container are readily accessible.

Explanation. – A pipe supplying liquid to a tank is “under seal” to that tank if it is screwed to the tank or otherwise attached so that no liquid or vapour can escape into the air except through an approved vent.

65. Means of extinguishing fire to be carried. – An adequate supply of dry sand or other efficient means of extinguishing fire shall be carried in an easily accessible position on every vehicle transporting petroleum in bulk by road.

66. Prohibition as to public service vehicle. – Petroleum shall not be transported on any public vehicle which is carrying passengers.

67. Vehicle to be constantly attended. – Every vehicle on which petroleum is being transported by road, or which, while transporting petroleum by road is trailed by another vehicle, shall, so long as it contains petroleum, be attended by at least two persons:

Provided that such vehicles may be left unattended in places previously approved by the Chief Inspector.

68. Trailers attached to vehicles transporting petroleum by road. – (1) A trailer not exclusively used for transporting petroleum shall not be attached to any vehicle transporting petroleum.

(2) A trailer transporting petroleum shall not be attached to any vehicle other than a vehicle used for transporting petroleum, and not more than one trailer shall be so attached.

(3) A trailer shall have two axles.

(4) When a trailer is attached to a vehicle, the total quantity of petroleum transported on the trailer and the vehicle combined shall not exceed 2,000 gallons.

Provided that the Chief Inspector may, by order in writing and subject to such condition as he may deem fit to impose, raise the above limit to 3,000 gallons in the case of a tank wagon, and

(5) If a trailer transporting dangerous petroleum is attached to a vehicle transporting non-dangerous petroleum, the vehicle shall comply with all the provisions of these rules relating to vehicles transporting dangerous petroleum.

(6) A trailer other than a tank trailer shall not be attached to a tank-wagon. The capacity of a tank trailer shall not exceed 1,000 gallons, and no trailer shall be attached to a tank-wagon of greater capacity than 2,000 gallons.

(7) No trailer attached to a tank-wagon shall be employed within any thickly populated area without the permission in writing of the District Authority.

69. Tank capacity. – In these rules the tank forming part of a tank wagon or tank trailer shall be deemed to include any number of tanks on the same chassis and any limitation herein prescribed on the capacity of a tank shall be construed so as to permit of the tank containing the amount specified under varying degrees of temperature.

70. Employment of electric light. – If electric lighting is employed on any vehicle, including a trailer, used in the transport of petroleum other than heavy petroleum by road, the following conditions shall be complied with:

(i) the pressure shall not exceed sixteen volts;

(ii) the circuit shall be heavily insulated and shall be independent of the chassis, and the wiring shall be so fixed and protected as to reduce as far as possible the risk of damage;

(iii) the generator, battery, switches and fuses shall be carried in front of the fire-resisting screen and the battery shall be in an easily accessible position; and

(iv) means of cutting off the current close to the battery by a double pole switch or other suitable method shall be provided.

71. Fueling from vehicles. – (1) No motor vehicle shall fill or replenish its fuel tanks with petroleum other than heavy petroleum directly from vehicles carrying petroleum in bulk.

(2) Aircraft may receive fuel by means of specially constructed tank Lorries or wagons only if these are of a type approved by the Chief Inspector for this purpose.

(3) During the fueling of aircraft used for the conveyance of passengers no passenger shall be allowed to remain in the machine.

(4) No person shall be allowed to smoke within 100 feet of any aircraft while it is being, or is about to be fueled.

(5) All aircraft engines within the distance specified in sub-rule (4) shall be stopped so long as fueling is in progress.

(6) Nothing is sub-rules (2) and (5) shall apply to military aircraft fueling on military aerodromes.

72. Owner responsible for observance of rules. – The owner of a vehicle used for the transport of petroleum who employs any person in connection with such transport, shall be responsible that all necessary measures have been taken to ensure that such person is acquainted with and carries out the provisions of these rules.

73. Precautions to be observed during filling or emptying tank-wagons. – During the filling, discharging or emptying of any tank-wagon or trailer transporting petroleum in bulk other than heavy petroleum the following precautions shall be observed:

(i) if the vehicle is mechanically-driven the engine shall be stopped so long as the filling, discharging or emptying is in progress and shall not be restarted until all tanks and valves have been securely closed.

Proved that this condition may be dispensed within the case of vehicles approved under sub-rule (2) of rule 71, which are supplying aircraft;

(ii) adequate provision shall be made to prevent the accumulation of a dangerous static charge of electricity.

(iii) if the wagon is drawn by an animal or animals, they shall be removed from the wagon and the wheels securely scotched before the filling, discharging or emptying of any dangerous petroleum is begun; and

(iv) the vehicle shall be constantly attended by a competent person.

74. Composite vehicles. – Petroleum in cans or other receptacles shall not be transported by road on any tank-wagon used for the transport of petroleum unless the wagon is so constructed as to comply with the conditions applicable to transport on wagons other than tank-wagons as well as with the conditions applicable to transport on tank wagons.

75. Filling and dipping pipes to be kept closed. – Except during the operation of filling or emptying a tank-wagon the filling and dipping pipes shall be kept securely closed. Where the filling pipes are not provided with a liquid seal, the covers shall be kept locked or properly sealed except during the operation of filling a tank-wagon, and the keys shall not be carried on the wagon.

76. Filling and emptying by night. – Except where approved electric lighting as specified in rule 105 is exclusively used, the filling, discharging and emptying of tank-wagons shall be performed between the hours of sunrise and sunset.

77. Approval of vehicles for transport in bulk necessary. – (1) Petroleum in bulk shall not be transported by land except in a vehicle approved [licensed] in writing by the Chief Inspector or Inspector of Explosives authorized by the Chief Inspector of Explosives in this behalf after physical inspection of vehicle and scrutiny of plan which shall be furnished, in triplicate, together with an original treasury receipt for Rs. 500, showing that the amount of fee has been deposited in the local treasury/bank under the head of account of Department of Explosives.

(1A) Every approval accorded under sub-rule 1 may be revalidated by the authority empowered to accord such approval.

(1B) Every application for revalidation of approval [license] shall be accompanied by the approved plan and original treasury receipt showing the deposit of fee of Rs. 500 under the correct head of account and shall be made so as reach the authority on or before the 2nd December each year.

(1C) Application for revalidation of approval for tank lorry received after the 2nd December but not later than the 31st December shall be considered only on payment of double the fee ordinarily payable for such revalidation.

(2) All such vehicles other than those exclusively used for the transport of heavy petroleum shall have a stamped, embossed, painted or printed warning exhibiting in conspicuous characters the words “Petrol”, “Motor Spirit”, “Kerosene” or an equivalent warning of the nature of the contents.

(3) Every such vehicle and its fittings shall be maintained in good condition.

78. Vehicles for transport other than in bulk. – (1) Every vehicle on which petroleum not in bulk is transported shall be strongly constructed and with sides and back of adequate height and shall be maintained in good condition.

(2) In the case of animal-drawn vehicles the requirement is sub-rule (1) regarding the sides and back of the vehicle shall not apply if the load is securely fastened to the vehicle.

(3) All receptacles shall be so packed as not to project beyond the sides or back of the vehicle.

79. Engines of mechanically-driven vehicles. – (1) In every mechanically driven vehicle used for the transport by road of petroleum other than non-dangerous petroleum not in bulk or heavy petroleum:

(a) the engine shall be of an internal combustion type;
(b) the engine fuel tank and electric batteries shall be effectively screened from the body of the vehicle by a fire-resisting shield carried up above the height of the load and down to within twelve inches of the ground; and
(c) the exhaust shall be wholly in front of the fire-resisting shield.

(2) If the windows are provided in the fire-resisting shield they shall be fitted with wired glass.

(3) The fuel tank of every such vehicle other than an articulated vehicle may be behind the fire-resisting shield if –

(a) a fuel feed apparatus, placed in front of the shield, is used to lift the contents from the fuel tank; and

(b) the fuel tank is protected from blows by the frame or by stout steel guards and the filling hole cover is provided with a lock.

(4) The fuel tank of any vehicle may be behind the fire-resisting shield if the fuel used in the engine is heavy petroleum.

(5) A quick action cut-off valve shall be fitted to the fuel feed pipe of every such vehicle in any easily accessible position, which shall be clearly marked.

80. Speed limit for vehicles. – Without prejudice to the operation of any other provision of law for the time being in force whereby a lower limit of speed is imposed, the speed of a motor tank wagon or a motor lorry transporting petroleum in receptacles shall not exceed 30 miles per hours if fitted with solid tyres.

81. Exemptions. – (1) If the Chief Inspector is satisfied that in respect of any class of vehicle any of the requirements of rules 68, 78 and 79 may be safely suspended or relaxed, he may authorize such suspension or relaxation for such period and under such condition as he may think fit.

(2) Nothing in rules 68, 70, 77, 78 and 79 shall apply to vehicles and trailers in the possession of Armed Forces of Pakistan.

82. Special provision of motor conveyances. – (1) Rules 63 to 80 shall not apply to the conveyance of petroleum in any motor vehicle for use only in the propulsion of such vehicle.

(2) No motor conveyance carrying passengers on hire shall carry any petroleum other than:

(i) petroleum in the fuel tank incorporated in the conveyance, and

(ii) petroleum not exceeding 20 gallons in quantity intended to be used to generate motive power for the conveyance and kept in the manner provided in sub-section (2) of section of the Act.

(3) During the filling or replenishment of the fuel tank of a vehicle licensed for conveyance of more than six passengers on hire, the driver or other person in charge of the vehicle shall not allow any passenger to remain in the vehicle.

(4) All petroleum tins carried in a vehicle carrying passengers for hire shall be securely closed and shall be carried in a specially prepared receptacle which is not accessible to passengers in the vehicle and is not on the roof.

PART V

TRANSPORT BY PIPE LINES

83. Application. – The rules in this part apply only to the transport of petroleum by means of pipe lines other than those in any area in which operations for the winning of natural petroleum or natural gas or both are carried on or within the limits of refineries and installations.

84. Casing. – (1) An approved casing shall be put over the pipe line where it passes under any railway or public road and an approved protective casing shall be constructed round the pipe where it crosses over any railway or protected work

Provided that the Chief Inspector may require an extra casing to be put over the pipe line where it crosses any steam, road, railway or protected work.

85. Patrol. – The whole of every pipe line shall be efficiently patrolled.

86. Prevention of excessive pressure. – As a precaution against excessive pressure in the pipe line, an automatic by-pass relief valve and a reliable pressure gauge shall be placed on the common discharge pipe at pumping station.

87. Telegraph and telephone. – A telephone or telegraph line shall be provided with connections at frequent intervals along the pipe line. One telephone or telegraph lien shall suffice for a series of parallel pipe lines.

Provided that this rule shall not apply to a pipe line connecting railway siding with installations if the length of such pipe line does not exceed one mile.

88. Gate valves. – Gate valves shall be provided at reasonable intervals.

89. Checking of tank gauges. – Tank gauges shall be checked between stations at frequent intervals.

CHAPTER IV

Storage of Petroleum Requiring License

90. License for storage. – Save as provided in section 7, 8 and 9 of the Act and by rule 109 no one shall store any petroleum except under a license granted under these rule

Provided that no licence shall be necessary for storage in a well-head tank.

91. Precautions against fire. – (1) No person shall smoke in any installation or storage shed.

(2) No person shall carry matches, fuses or other appliance for producing ignition or explosion in any installation or storage shed which is used for the storage of dangerous petroleum.

(3) No fire, furnace or other source of heat or light capable of igniting inflammable vapour shall be allowed in any licensed installation or storage shed save in places specially authorized by the licensing authority for the purpose.

(4) An adequate supply of dry sand or earth together with the necessary implements for its convenient application, or other efficient means of extinguishing petroleum fires, shall always be kept in every installation and in or adjacent to every storage shed.

92. Supervision of operations within an installation or storage shed. – All operations within an installation or storage shed shall be conducted under the supervision of an experienced responsible agent or supervisor.

93. Cleanliness of installation or storage shed. – The ground in the interior of an installation, and the protected area surrounding any storage shed or installation shall be kept clean and free from all inflammable material, waster vegetation and rubbish.

Explanation. – In this rule “protected area” means the areas necessary for the maintenance of the distances required and the conditions of the license to be kept clear between any installation or storage shed and any protected work.

94. Drainage. – (1) All enclosures surrounding tanks or buildings belonging to an installation or storage shed shall be kept drained and no water shall be allowed to accumulate in the enclosure.

(2) Where drainage is affected by means of a pipe, the pipe shall be fitted with a valve actuated from the outside of the enclosure:

Provided that this sub-rule shall not apply to storage sheds which are not required under these rules or the terms of the license to be provided with an enclosure wall or embankment.

(3) All valves and other openings for draining off water shall be kept closed except when water is being drained off.

(4) The nature of the drainage arrangements shall be shown in the plan submitted with the application for the license.

95. Exclusion of unauthorized persons. – (1) Every installation shall be surrounded by a wall or fence of at least six feet in height:

Provided that nothing in this sub-rule shall apply to an installation licensed under the rules in force immediately before these rules come into operation unless its fencing is considered by the licensing authority to be unsatisfactory:

Provided further that the Chief Inspector may waive this sub-rule in the case of an installation connected with a pump outfit and floating storage barges, under such conditions as he deems necessary.

(2) Precaution shall be taken to prevent unauthorized persons from having access to any storage shed or installation.

96. Children. – No persons under the age of 15 years shall be employed in or allowed to enter any premises licensed under these rules.

97. Receptacles for petroleum. – The provisions of rules 26, 27, and 28 shall apply to petroleum stored under license.

98. Petroleum only to be stored. – No installation or storage shed shall without permission in writing from the Chief Inspector be used for any purpose other than the storage and distribution of petroleum and purposes directly connected therewith.

98A. Approval of ancillary facilities. – The pump premises for the approval of ancillary facilities shall conform to the minimum standard as laid down in Schedule IV at the end of these rules.

99. Marking of capacity of tanks. – The capacity in gallons of every tank in an installation shall be conspicuously marked in the tank.

The “capacity” of the tank is to be calculated and marked according to the nature of the petroleum proposed to be stored therein leaving margin for airspace prescribed in the Rules. The object of this provision is to ensure that the capacity thus marked constitutes the actual licensable capacity of the tank.

100. Construction of tank. – Every tank or other receptacle used for the storage of petroleum in bulk other than well-head tank shall be constructed of iron or steel properly erected and designed according to sound engineering practice and, together with all pipes and fittings shall be so constructed and maintained as to prevent any leakage of petroleum.

101. Testing of tanks. – (1) Storage tanks or other receptacles for the storage of petroleum in bulk other than well-head tanks, after being placed in a final position and before being brought into use, shall, unless they were in use before the 1st April 1937, be tested by water pressure by the licensee in the presence of an Engineer accepted as qualified for the purpose by the licensing authority.

(2) The water used for testing shall be free from petroleum and shall not be passed through any pies or pumps ordinarily used for the conveyance of petroleum:

Provided that, where the licensing authority is satisfied that it is not reasonably possible to convey water by pipes or pumps other than those ordinarily used for the conveyance of petroleum, he may permit the use of a petroleum-pipe or pump for the conveyance of water subject to such condition as he may impose.

(3) The test referred to in sub-rule (1) shall also be made before any receptacles for the storage of petroleum in bulk are brought into use after being repaired.

102. Earthing of tanks. – All tanks or other receptacles for the storage of petroleum in bulk other than well-head tank or tanks for receptacles of less than 10,000 gallons capacity containing heavy petroleum shall be electrically connected with the earth in an efficient manner by means of not less than two separate and distinct connections placed at opposite extremities of such tank or receptacles. The roof and all metal connections of such tank or receptacle shall be in efficient electrical contact with the body of such tank or receptacle.

103. Inspection of earth connection. – (1) The connections and contacts required by rule 102 shall be inspected and tested at least once in every year by an Inspector or Assistant Inspector of Explosives in the manner prescribed by the Chief Inspector.

(2) The inspection under this rule should be carried out in the following manner:
(i) Examine visually all joints and connections above ground to discover if any of these are loose or disconnected. The number of joints should be as few as possible but where they are necessary, they should be properly soldered as well as riveted to ensure both mechanical and electrical soundness.

(ii) The electrical resistance to earth should be tested and measured either by means of a direct reading instrument or by the procedure laid down in the "Code of Instruction for the Guidance of Public Works Officers in the Erection and Testing of Lightning Conductors".

(iii) The conditions of the connections and contacts will not be considered satisfactory unless the resistances to earth are found to be less than 10 ohms.

CAUTION: - The use of any testing instrument, capable of producing a spark, which is not so shielded as to be incapable of igniting inflammable vapours, is prohibited under Rule 91.

(3) A fee of one hundred rupees, for the service, shall be payable by the licensee for the test prescribed in Rule 103(1). In the event of the test proving unsatisfactory a fee of fifty rupees shall be payable by the licensee for each subsequent test until the circuit is passed by the Testing Officer as satisfactory:

Provided that (1) not more than one hundred rupees shall be charged for all tests made on a circuit during any one day; and

(2) where two or more earthing circuits are connected to the same tank, fee for testing all such circuits shall not exceed the fee prescribed for testing one circuit.

The Inspection under this Rule should be carried out in the following manner:-

(1) Examine visually all joints and connections above ground to discover if any of these are loose or disconnected.

(2) While testing an individual earth connection other connection fitted on the object should be disconnected. The electrical resistance to earth should be tested and measured either by means of a direct reading instrument or by the procedure laid down in the "Code of Instruction for guidance of Public Works Officers in the erection and testing of lightning conductors". The "British Standard Code Practice C.P. 326.101(1948)" may be consulted for further details.

(3) Earth resistance should not ordinarily exceed 1 ohm though 10 ohms is the permissible limit.

(4) The test record should be maintained in the following form:

Name of the licensee. _____

License No. _____

Tank No. _____

Date of inspection. _____

Resistance in ohms in each connection:
(a) First reading, _____
(b) Second reading, _____
(c) Third reading, _____
(d) Mean (average). _____

Weather report for the previous week. _____

Nature of the soil. _____

104. Night working. – No installation or storage shed shall be open, and no work in any installation or storage shed shall be permitted, between sunset and sunrise except where approved electric lighting as specified in rule 105 is exclusively used.

105. Electric apparatus. – (1) All electric wires installed at less than 15 feet from the ground in any petroleum installation or situated within 20 feet of any building or tank containing dangerous petroleum shall consist of insulated cables, enclosed in metallic coverings which shall be gas-tight, electrically and mechanically continuous throughout, and effectively earthed outside the building.

(2) No electric wire shall pass over any petroleum tank, filling, painting or storage shed.

(3) In filling, painting and storage sheds and pump rooms used for – (i) dangerous petroleum –

(a) all electric meters, distribution boards, switches, fuses, plugs and sockets shall be placed outside the building and shall be of flame-proof construction satisfying the requirements of the British Standard Specification No. 229, and the frame shall be effectively earthed;
(b) all electric fixed lamps shall be enclosed in a well glass flame-proof fitting, either double enclosed with an inner and an outer well glass or singly enclosed with substantial metal protection; such lamps shall be installed at 12 feet where possible, but in no case less than 8 feet, above the floor level;
(c) all electric portable hand lamp of the self-contained pattern shall be of a type approved by the Chief Inspector.
(d) for the examination of cans and other containers, electric torches employing a separate battery may be used; these torches shall be fitted with substantially protected flame-proof globes and shall be supplied through a cable of cab-tyre or other suitable sheathing and properly constructed flame-proof connectors; and
(e) no single fixed lamp shall exceed 150 watts.

(ii) non-dangerous petroleum:

(a) all electric meters, distribution boards, switches, fuses, plugs and sockets shall be enclosed in iron-clad, gas-tight cases and shall be fixed at least 5 feet above the floor level in well-ventilated positions close to the door;
(b) all electric fixed lamps shall be enclosed in a gas-tight well glass fitting provided with substantial metal protection;
(c) all electric portable hand lamps shall be fitted with substantially protected gas-tight globes and supplied through a flexible cab-tyre or other suitable sheathing and properly constructed gas-tight connectors; and
(d) no single fixed lamp shall exceed 200 watts and no hand lamp shall exceed 30 watts.

106. Pumping. – No internal combustion engine or electric motor shall be used for driving pumps for pumping petroleum save in a pump house specially constructed for the purpose and under such conditions as may be approved by the Chief Inspector.

Provided that this rule shall not apply where the motor, control switchgear and starting apparatus are of flame-proof construction satisfying the requirements of the British Standard Specification No. 229.

107. Posting up of rules and conditions. – Copies of the preceding rules in this Chapter and of the conditions of the license shall be exhibited in a conspicuous place in very licensed installation and storage shed.

108. Petroleum in possession of the Armed forces of Pakistan. – Nothing in rules 90, 95, 98, 101 and 104 shall apply to petroleum in the possession of the Armed Forces of Pakistan.

2.3.32 Myanmar Engineering Council Law (2013)

The project developer commits to comply with the sections 34 and 37.

Section 34. The Executive Committee may, if it finds the violation of any of the provisions of this Law, or any prohibition of rules, orders and directives issued under this Law, or any condition mentioned in the register certificate by any person who has obtained the register certificate, impose any of the following administrative penalties against him/her:

(a) warning;
(b) causing to pay the stipulated fine;
(c) suspending the register certificate for a limited period;
(d) cancelling the register certificate.

Section 37. Any person without the register certificate issued by the Council, except engineering civil service personnel appointed at the Government departments and Government organizations carrying out the public works, shall not practice engineering and technical works which may endanger the public safety and which are stipulated under the rules made under this Law.

2.3.33 Myanmar Fire Brigade Law (2015)

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

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

2.3.34 Export and Import Law (2012)

The project developer commits to comply with the section 7.
Section 7. A person who obtained any license shall not violate the conditions contained in the license.

2.3.35 Aquaculture Law (1989)

The project developer commits to comply with the section 29 (b).
Section 29 (b). No one shall disturb the water transport and water flow or pollute the water of the aquacultural business water body or encourage and assist to do so.

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

The project developer commits to comply with the sections 15 (a), (b), 16 (b), (c), (d), (e), (f), (g), (h), (i) and (j), 17, 22, 27 (a), (b), (c) and (d).
Section 15. A person who has obtained a licence, before starting the respective chemical and related substances business:

(a) shall be inspected for the safety and the power of resistance of the machinery and equipments by the respective Supervisory Board and Board of Inspection;
(b) shall be attended the person who serve in the work to the respective foreign trainings or the trainings and the expert trainings on prevention of hazard from the chemical and related substances opened by the government department and the government organizations.

Section 16. A person who has obtained a licence:

(b) shall perform to abide strictly the instructions for being safety in using the chemical and related substances by himself and also the persons who serve the work;
(c) shall keep the required safety equipments enough in the chemical and related substances businesses, furthermore, shall grant the personal protection equipments and dresses free of charge to the working persons;
(d) shall make the course of training and study and instruction if necessary to the working persons for using the occupational safety equipment, the personal protection equipment and the dresses systematically in the chemical and related substances business;
(e) shall be inspected by the respective Supervisory Board and Boards of Inspection in respect of whether or not the hazard may impact on the Human Being and Animals' health and the environment;
(f) shall make medical check up the working persons who will work in the chemical and related substances business and shall permit to serve in that work after obtaining the recommendation that his health is suitable for that work. This medical check up records shall be kept systematically;
(g) shall send the copy of informative letter of the permission to the respective Department of Township Administration, if the hazardous chemical or related substances are permitted to store;
(h) shall acquire in advance the guidance and agreement of the respective Department of Fire Brigade, if the business that is worried to fire hazard is operated by using the fire hazard substances or the explosive substances;
(i) shall transport only the permitted amount of the chemical and related substances in accordance with the prescriptive stipulations, if they are transported in local;
(j) shall take the permission from the Central Supervisory Board if the chemical and related substance is altered and transferred from one place to any other place which contained in the licence;

Section 17. A person who has obtained a licence, shall put the insurance in accordance with the prescriptive stipulations to be able to pay the compensation, if the impact and damage is occurred on the Human Being and Animals or the environment in respect of the chemical and related substances businesses.
Section 22. A person who has obtained the registration certificate shall abide the regulations consisted in the registration certificate furthermore shall also abide the order and instructions issued occasionally by the Central Supervisory Board.
Section 27. A person who has obtained the licence to be complied the following matters to control and decrease the hazard of the chemical and related substances:

(a) classifying the hazard level to protect in advance the hazard according to the properties of the chemical and related substances;
(b) expressing the Material Safety Data Sheet and Pictogram;
(c) providing the safety equipments, the personal protection equipments to protect and decrease the accident and attending to the training to be used systematically;
(d) performing in accordance with the stipulations in respect of transporting, possessing, storing, using, discharging the chemical and related substances;

2.3.37 Explosive Substances Act (1908)

The project developer commits to comply with the sections (3), (4) and (5).

Section 3. Any person who unlawfully and maliciously causes by any explosive substance an explosion of a nature likely to endanger life or to cause serious injury to property shall, whether any injury to person or property has been actually caused or not, be punished with transportation for life or any shorter term, to which fine may be added, or with imprisonment for a term which may extend to ten years, to which fine may be added.
Section 4. Any person who unlawfully and maliciously

a) does any act with intent to cause by an explosive substance, or conspires to cause by an explosive substance, an explosion in the Union of Myanmar of a nature likely to endanger life or to cause serious injury to property; or
b) makes on has in his possession or under his control any explosive substance with intent by means thereof to endanger life, or cause serious injury to property in the Union of Myanmar, or to enable any other person by means thereof to endanger life or cause serious injury to property in the Union of Myanmar; shall, whether any explosion does or does not take place and whether any injury to or property has been actually caused or not, be punished with transportation for a term which may extend to twenty years, to which fine may be added, or with imprisonment for a term which may extend to seven years, to which fine may be added.

Section 5. Any person who makes or knowingly has in his possession on under his control any explosive substance, under such circumstances as to give rise to a reasonable suspicion that he is not making it or does not have it in his possession or under his control for a lawful object, shall, unless he can show that he made it or had it in his possession or under his control for a lawful object, be punishable with transportation for a term which may extend to fourteen years, to which fine may be added, or with imprisonment for a term which may extend to five years, to which fine may be added.

2.3.38 Industrial Explosive Materials Law (2018)

The project developer commits to comply with the sections 6 (c), 7 (c), 11 (b), 13, 14 (b), 15, 16, 18, 19, 20 and 21.
Section 6 (c). On receipt of the direction from the Ministry under sub-section (b), the Chief Inspector shall notify the applicant to construct a magazine with specified features on the approved plot.
Section 7 (c). If the Office of the Commander-in-Chief (Army) found that the finding and remark of the sub-committee for procurement, provision, storage and distribution of explosives is in conformity with the specifications, the office shall grant permission to the applicant to carry out any one or more of import, transport, store, manufacture, use, process or transfer of industrial explosive materials. A copy of permission shall be sent to the Ministry.
Section 11. When the application for a licence under section 10 is received, the Chief Inspector shall inspect whether the magazine is constructed in specified features and:
(b). grant a licence to the applicant with the approval of the Ministry if the magazine is constructed in specified features.
Section 13. The licensee shall apply to renew the licence, 30 days before expiration to the Chief Inspector in accordance with the stipulations if he wishes to continue to store industrial explosive materials.
Section 14. When the application for renewal of the licence under section 13 is received, the Chief Inspector shall inspect the magazine of the applicant and:

(c) may renew the licence with the approval of the Ministry if the magazine is constructed in specified features.

Section 15. A licensee shall:

a) systematically store industrial explosive materials without excessing the permitted amount in accordance with the specifications;
b) accept the inspection of the Chief Inspector or an inspector from time to time;
c) if damage to property, injury to or death of people occurs due to loss, burning or explosion of industrial explosive materials, inform about it to the nearest police station immediately, and report it to the Chief Inspector timely;
d) pay licence fees stipulated by the Ministry to the Department.

Section 16. A permission holder shall:

a) store industrial explosive materials only in the licensed magazine;
b) take necessary preventive measures in accordance with the specifications to avoid harm in transport, manufacture, use or possession of industrial explosive materials.

Section 18. Any licensee or permission holder shall not refuse inspection of the Chief Inspector or an inspector.
Section 19. No one shall:

a) import, transport, store, manufacture, use, possess or transfer industrial explosive materials without permission in accordance with this Law;
b) destroy industrial explosive materials without approval of the Executive Committee of Defence Service Council under section 8;
c) fail to act in accordance with the rules, regulations, by-laws, notifications, orders and directives issued under this Law.

Section 20. No one, in an unlicensed magazine, shall:

a) accept to store industrial explosive materials;
b) deliver to store industrial explosive materials.

Section 21. No licensee shall:

a) accept to store industrial explosive materials more than the limited amount mentioned in the licence issued by the Ministry;
b) fail to inform the nearest police station immediately and to report the Chief Inspector timely if anything mentioned in sub-section (c) of section 15 occurs due to industrial explosive materials;
c) continue to store industrial explosive materials without renewal after expiration of the licence.

2.3.39 Electricity Law (2014)

The project developer makes commitments for the use of electricity based on the sections 20, 21 (a), 24, 27, 29, 33, 40 and 68.
The project developer commits to abide by the rules, regulations, bye-laws, notifications, orders, directives and procedures issued by the Ministry for the utilization of electricity.
The project developer shall, if causes damages and losses to any person and entity for failing to abide by this law, rules, procedures, regulations, bye-laws, order and directives and failing to abide by the prescribed qualities and standardization, be liable according to law. The relevant Ministry shall exactly prescribe the rules and procedures to take action against the matters mentioned beforehand.

If damages or losses arise to any other electric power user due to negligence of any electric power user, the calculated compensation in accord with the method prescribed by the Ministry for the value of damage or loss shall be paid by the project.
In the event of electricity hazard occurs in respect of utilization of electric power, the developer shall report to the Chief Inspector and in-charge of the relevant department as soon as possible.
The Ministry shall inspect the specification of quality and standardizations in respect of the factories, equipment installed to them, business buildings, and electrical equipment which are manufactured, imported and sold from the local and foreign country.
The Chief Inspector, Inspectors and persons conferred duty by them have the right to enter and inspect any place or building to perform their duties in accord with stipulations.
The project developer shall carry out in accord with the rules, standardizations and procedures issued by the Ministry and shall be subjected to necessary inspection of relevant Government department and organizations.
If a person is injured, or disabled or killed by the electric shock or outbreak of fire due to negligence or default of the project developer or the person designated by him, the aggrieved person shall have the right to claim for compensation from the project developer as follows:

a) if the aggrieved person is applied to the existing Workmen's Compensation Act, the compensation prescribed under such law;
b) if the aggrieved person is not applied to the existing Workmen's Compensation Act, the compensation prescribed by the rules issued under this Law.

2.3.40 Boiler Law (2015)

The project developer commits to comply with the sections 12, 14, 18, 19, 20, 21, 24, 29 (b), 31 and 40.
Section 12. The owner shall:

a) apply to the respective inspector to obtain certificate in accord with the prescribed manner;
b) apply to register only for the boiler constructed in accord with Myanmar standards or international standards;
c) the prescribed fee shall be paid when the application is made under sub-section (a).

Section 14. The owner shall apply to the respective inspector in advance in order to obtain permission though he or she has obtained the certificate or the provisional order if desirous to carry out any of the following matters:

a) using of the boiler at more than allowable pressure;
b) repairing, altering, adding or renewing any steam-pipe, feed-pipe or any mounting or other fitting attached to such steam pipe, feed-pipe or mounting or other fitting attached to the boiler.

Section 18. The owner shall inform immediately to the inspector if any accident occurs.
Section 19. The owner shall not:

a) use a boiler at a pressure higher than allowable pressure;
b) repair and alter or force to repair and alter the safety valve to exceed allowable pressure;
c) do any act contained in sub-section (b) of section 14 without permission.

Section 20. The owner shall not use the following boiler:

a) boiler without certificate or provisional order;
b) boiler of which certificate or provisional order is void;

c) boiler of which certificate or provisional order is revoked.

Section 21. The owner shall engrave the register number specified by the chief inspector in accord with the prescribed manner.
Section 24. The owner shall not:

a) carry out with the person who has not boiler repairer certificate on the receipt of notice to repair, alter, add or renew any boiler, steam-pipe, feed-pipe or any mounting or other fitting attached to such boiler, steam-pipe and feed-pipe;
b) assign any person to charge the boiler used in the work except the person who operates and maintains the boiler.

Section 29 (b). A boiler attendant shall comply with the terms and conditions contained in boiler attendant certificate.
Section 31. The boiler attendant shall not use the boiler at more than allowable pressure.
Section 40. During performing under section 38, an inspector may enter and inspect any place or building in which he has reason to believe that a boiler is in use.

2.3.41 Inland Vessel Law (2015)

The project developer commits to comply with the sections (33), (34), (35) and (36).
Section 33. The department shall:

a) take necessary measures and stipulate terms and conditions not to discharge or emit or seep or leak oil or mixing oil, chemicals, gases and any pollution substance from the vessels to prevent from environmental pollution with the approval of the Ministry in accord with environmental quality standard which is stipulated under Environmental Conservation Law;
b) assign duty to the inspectors to inspect whether or not there is discharge, leakage and emission of the gases which causes environmental water pollution, dangerous goods, hazardous chemicals, oil and mixing oil and other materials from the vessel into the inland water and to take action as may be necessary.

Section 34. No one shall discharge the dangerous goods, hazardous chemical, oil or mixing oil or other material into the inland water to pollute water environment except emergency measure for safety of vessel which will be endangered or life of a person.

Section 35. The ship owner and master shall, as the crew member or the passenger from their vessel discharge the dangerous goods or hazardous chemical or oil or mixing oil or other material into the inland water to pollute water environment and that caused any loss and damage, discharge and damage due to any environmental water pollution arise the grievance, compensate to the aggrieved person for such loss and damage.

Section 36. A master shall inform the following accidents and events to the department or the nearest police station from the scene of crime within 24 hours as possible:

(a) capsizing, sinking, abandon ship or damage of vessel;

(b) serious injury or loss of life on board due to vessel accident;

(c) damage due to collision;

(d) occurrence of environmental water pollution.

2.4 International Conventions, Treaties and Agreements

The government of the Republic of the Union of Myanmar has also ratified international agreements and treaties which are related to environmental and social issues. It is also

essential for the project proponent to take into consideration these treaties and agreements in commencing the project. The following international treaties, covenants, guidelines and standards are considered in conducting the EIA of this project.

No	International Convention and Agreement on Environment	Year
1	Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC)	23 February 2005
2	Montreal Protocol on Substances that Deplete the Ozone Layer	1 January 1989
3	UNFCC	21 March 1994
4	UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage	1985
5	Plant Protection agreement for the South-East Asia and the Pacific Region, Rome	1956 (1959)
6	Treaty Banning Nuclear Weapons Test in the Atmosphere in Outer Space and Under Water, Moscow	1963
7	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other weapons of Mass Destruction on the Sea-Bed and Ocean Floor and in the Subsoil thereof, London, Moscow, Washington	1971
8	Convention of the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction, London, Moscow, Washington	1972
9	International Convention for the Prevention of Pollution from Ships, London	1973
10	Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships, London	1988
11	United Nations Convention on the Law of the Sea, Montego Bay	1982 (1996)
12	Convention on Biological Diversity, Rio de Janeiro	1992 (1994)
13	Treaty on the Non-Proliferation of Nuclear Weapons, London, Moscow, Washington	1968 (1992)
14	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and their destruction, Paris	1993
15	International Tropical Timber Agreement (ITTA), Geneva	1994 (1996)
16	Vienna Convention for the Protection of the Ozone Layer, Vienna	1985 (1993)
17	Montreal Protocol on Substances that Deplete Ozone Layer, Vienna	1985 (1993
18	ICAO Annex 16: Annex to the Convention on International Civil Aviation Environmental Protection Vol I Aircraft Noise	
19	Annex to the Convention on International Civil Aviation Environmental Protection Vol II Aircraft Engine Emission	
20	Treaty on Principles of Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and the Other Celestial Bodies (Outer Space Treaty), London, Moscow, Washington	1967 (1970)
21	Agreement on the Networks of Aquaculture Centers in Asia and the Pacific, Bangkok,	1988 (1990)
22	United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa, Paris,	1994 (UNCCD) (1997)
23	South East Asia Nuclear Weapon Free Zone Treaty, Bangkok,	1995 (1996)
24	United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa, Paris,	1994 (UNCCD) (1997);
25	Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington D.C., 1973, and this Convention as amended in Bonn,	Germany 1979 (CITIES) (1997)
26	Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 Dec 1982,	NY, 1994 (2006)
27	Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, Rome,	1973 (1994)

28	ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur	1985 (1997)
29	Cartagena Protocol on Bio-safety, Cartagena,	2000 (2008)
30	ASEAN Agreement on Transboundary Haze Pollution	(1997)
31	International Treaty on Plant Genetic Resources for Food and Agriculture,	2001 (2004)
32	Declaration on ASEAN Heritage Parks	(2003);
33	Stockholm Convention on Persistent Organic Pollutants (POPs),	2001 (2004)
34	The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 as amended in 1982 and 1987	(2004)
35	Establishment of ASEAN Regional Centre for Biodiversity	(2005)
36	Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen	1992 (2009)
37	International Tropical Timber Agreement (ITTA), Geneva	2006 (2011)
38	Montreal Amendment, 1997 and Beijing Amendment, 199 to the Montreal Protocol on Substances that Deplete Ozone Layer	1997 (2012)
39	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Basel	1989 (2015)
40	International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)	1990

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CHAPTER 3:
PROJECT DESCRIPTION & ALTERNATIVES

3. PROJECT DESCRIPTION & ALTERNATIVES

3.1 Project Location and Description

3.1.1 Project Location

The new refinery project is planned to be constructed at the nearby area of petrochemical complex (Thanbayakan) located in Minhla Township, Magway Region.

Map showing location of Minhla and Saku Township , Magway Region, where the New Refinery Project and New Pipeline will be constructed

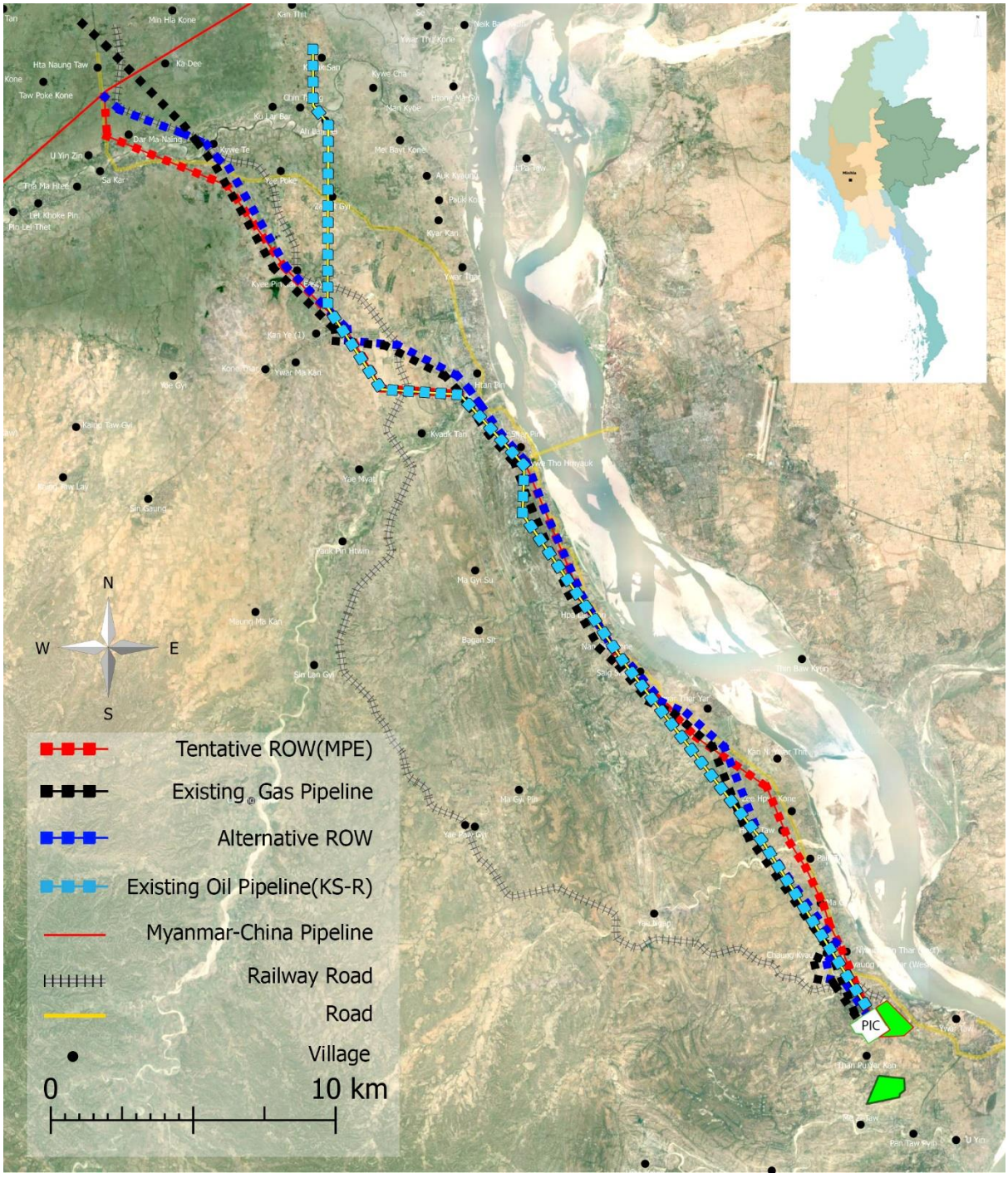


Figure 2: Project location (See larger map in appendix 24)

The study area will include:

a) Off-take Point area (Area of crude oil storage tanks nearby off-take point)
b) Crude Oil Pipeline area from Off-take Point to New Refinery Project location.
c) Area of New Refinery Project.

3.1.2 Map showing boundary for the New Refinery Project

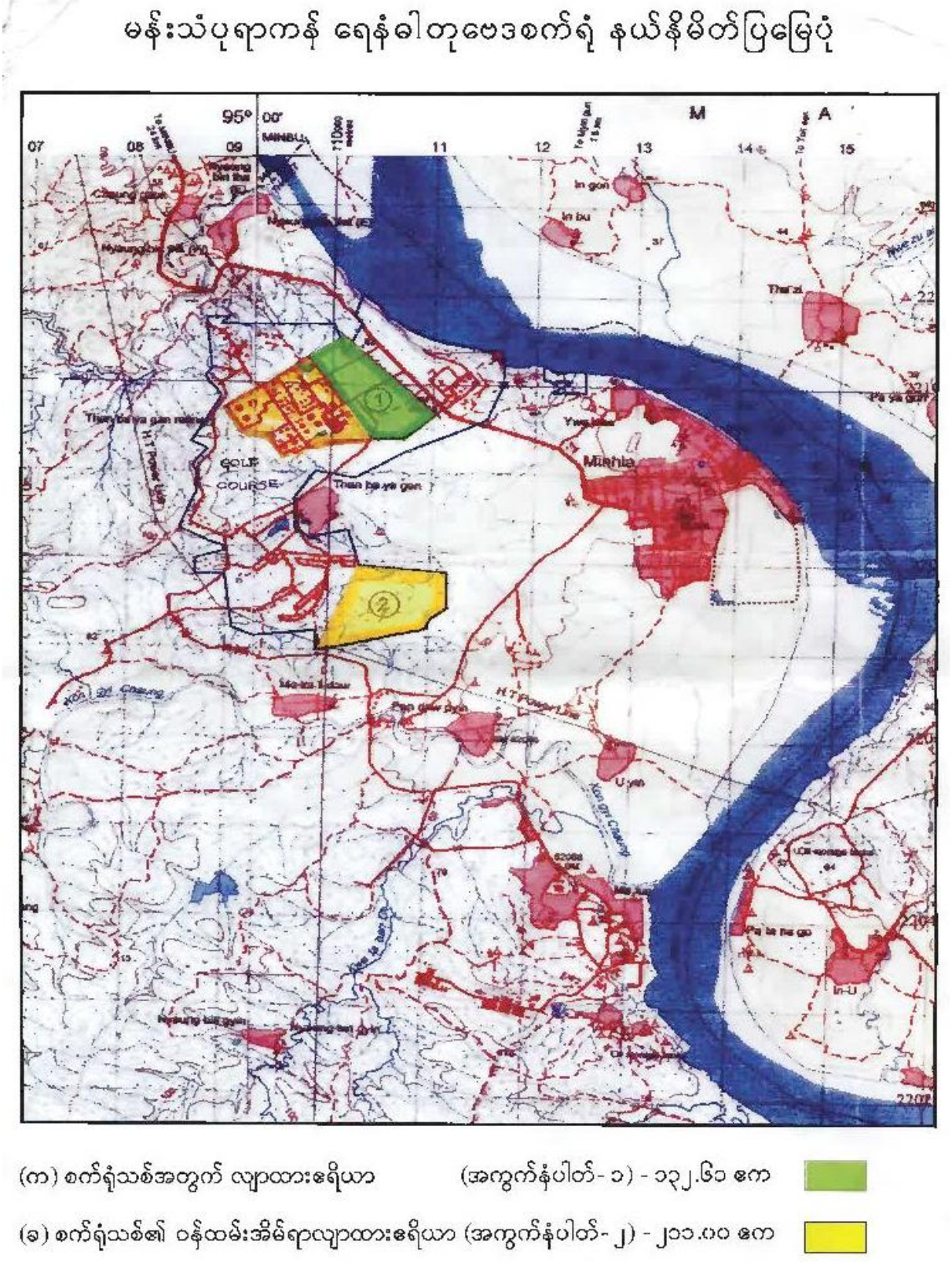


Figure 3: Project boundary area (See larger map in appendix 25)

ROW alignment from Off-Take Point on the Myanmar-China SEAP oil pipeline in Saku to the proposed oil refinery site near Petrochemical Complex near Thanbayakan Village in Minhla

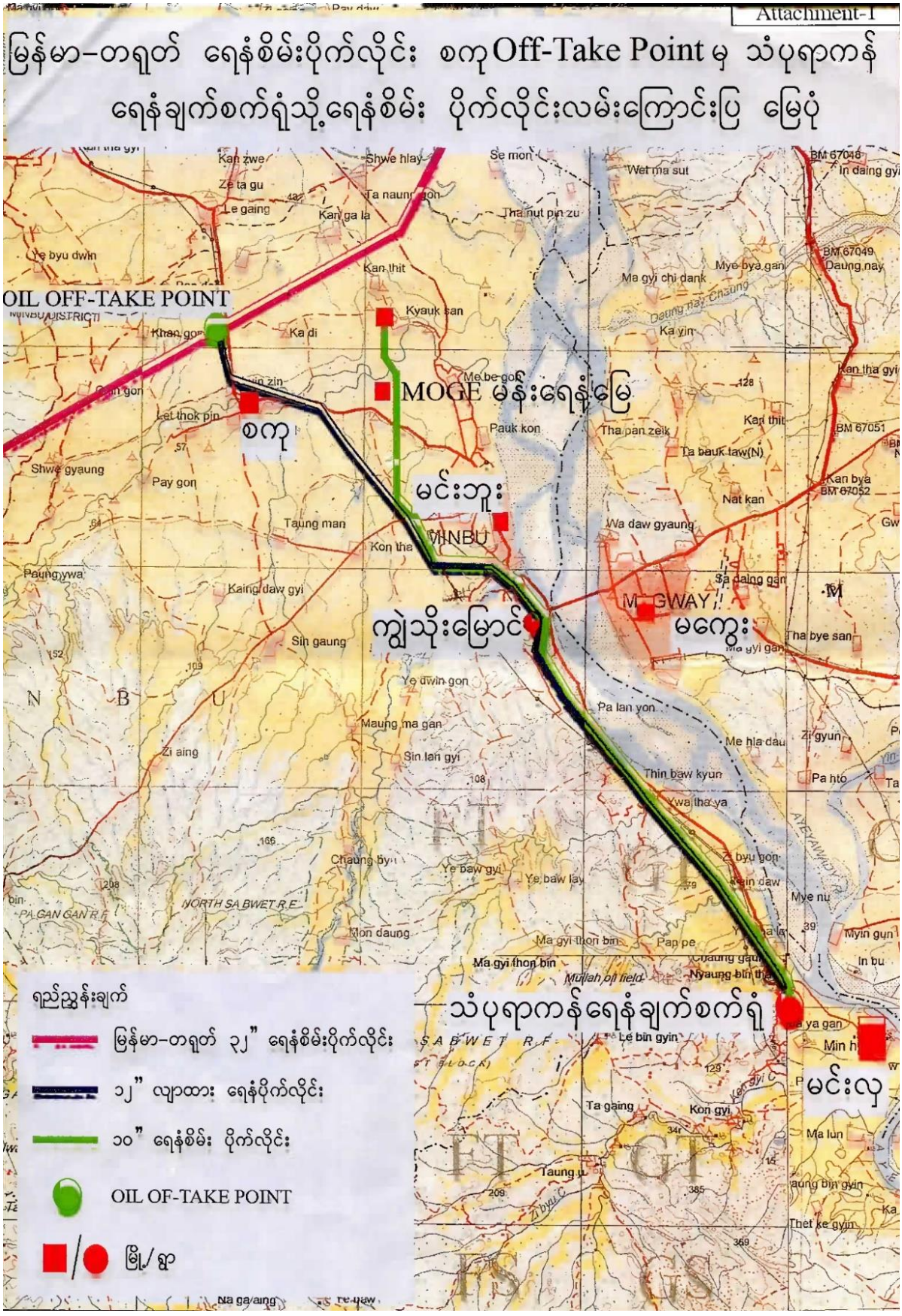


Figure 4: Proposed pipeline from off-take point to Refinery project area (See larger map in appendix 26)

3.2 Project location, overview map and site layout maps

The proposed project site is situated within the vicinity of existing Petrochemical Complex (Thanbayakan) in Minhla Township, Magway Region, 530 km by road, or 600 km by river from Yangon. Allocated area for the new oil refinery, 132.61 acres, and for storage tanks and other associated structures, 211 acres, totals 343.61 acres.

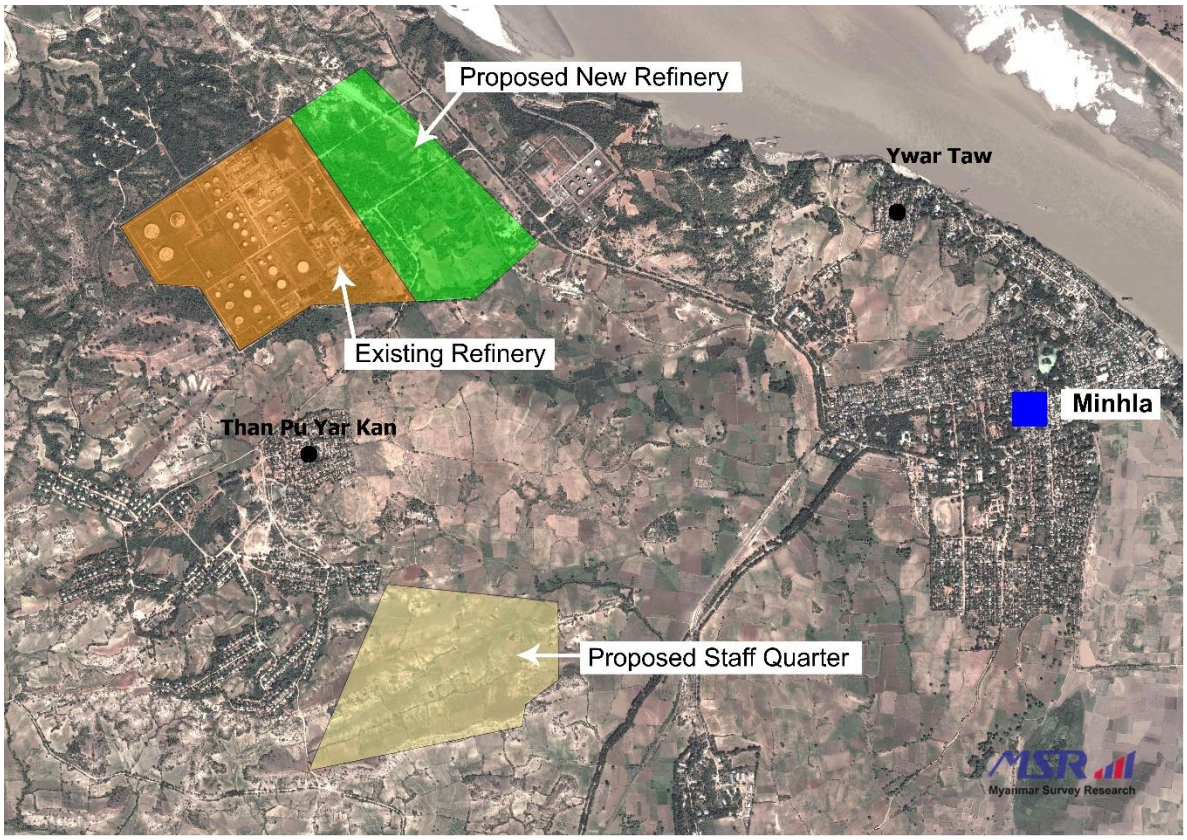


Figure 5: Existing refinery and new refinery location (See larger map in appendix 27)

Figure 6: Existing Petrochemical Complex (Thanbayakan)

3.2.1 Land use Pattern

The breakup of land of New refinery plant complex is presented in *table 1* and figure 7. This table indicates that the total land area proposed for the New refinery plant project is 133 acres and proposed units would occupy about 344 acres of land apart from 108 acres of land utilized for public/semi- public/greenbelt and transportation. The proposed residential complex will be set up in an area of 211 acre. The commercial complex would occupy 1473 acre. The change in the landuse/land cover pattern remains insignificant.

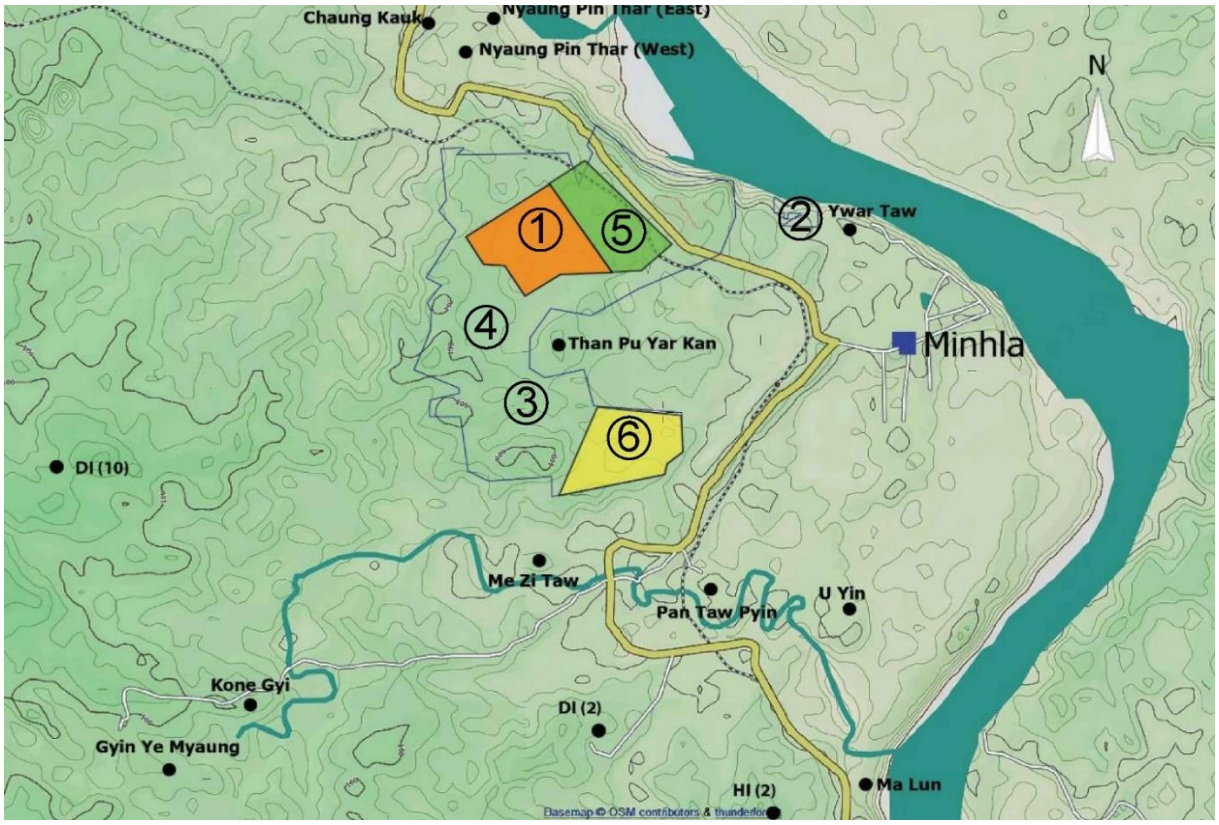


Figure 7: Land use pattern

Table 1: Description of land use pattern

Block No	Description	Location		Area (acre)
Block-1	Existing refinery plant	19°58'25.29"N	95° 0'4.94"E	192
Block-2	Existing Terminal area (refined product storage, jetty)	19°58'51.02"N	95° 1'7.81"E	77
Block-3	Existing Residential (staff) area	19°57'37.10"N	94°59'59.47"E	675
Block-4	Vacant land area	19°58'14.68"N	94°59'27.72"E	108
Block-5	Proposed new refinery plant	19°58'40.56"N	95° 0'23.61"E	133
Block-6	Proposed staff quarters	19°57'18.38"N	95° 0'16.98"E	211
	Total area			**1473**

3.3.2 Surrounding Environment

There are existed four industries and eight community around the proposed project site within 5 km radius of the study area. These are No.2 Heavy Industry, N0.2 Defense Industry, No.10 Defense Industry, existing refinery and Than Pu Yar Kan, Me Zi Taw, Pan Taw Pyin, U Yin, fortress Min Hla, Ywa Taw, Nyuang Pin Tha and Chaung Cauk village. Their locations and distances from project site are presented in table 2.

Table 2: Distance from the center of proposed project footprint (km)

Sr. No	Description	Location		Distance from the center of proposed project footprint (km)
1	Existing refinery plant	19°58'25.29"N	95° 0'4.94"E	0
2	Than Pu Yar Kan	19°57'53.36"N	95° 0'10.38"E	1.5
3	Existing Residential (staff) area	19°57'37.10"N	94°59'59.47"E	2.0
4	No.10 Defense Industry	19°56'47.62"N	94°58'7.17"E	4.0
5	Me Zi Taw	19°56'39.93"N	95° 0'15.58"E	3.5
6	No. 2 Defense Industry	19°55'35.23"N	95° 0'48.53"E	5.0
7	Pan Taw Pyin	19°56'29.41"N	95° 1'4.56"E	4.0
8	No.2 Heavy Industry	19°55'13.16"N	95° 1'54.80"E	6.5
9	U Yin	19°56'20.23"N	95° 1'50.75"E	5.0
10	Min Hla Town	19°58'14.55"N	95° 2'36.46"	3.0
11	Ywa Taw	19°58'42.13"N	95° 1'25.63"E	2.0
12	Nyaung Pin Tha	19°59'34.18"N	94°59'39.47"E	2.0
13	Chaung Kauk	19°59'40.81"N	94°59'19.68"E	2.5

3.3 Description of Project (New Refinery)

The new oil refinery is expected to be built in near future. This plant will produce propane, butane, gasoline, jet fuel, kerosene, diesel fuel, fuel oil, Sulphur, asphalt and BTX raw meterial.

This refinery will have the capacity of refining 3.5 million tons of crude oil per year (78,484.84 barrels per day). The foreign crude oil will be taken from the Southeast Asia Crude Oil Pipeline and the products will be produced to meet the Euro IV standard.

The proposed refinery to build is designed to produce high-quality oil products to meet the growing demand of Myanmar; thereby Myanmar's oil self-sufficiency rate can be raised greatly to facilitate the local economic development. The construction of new refinery is designed to fully rely on the crude oil supply from the Southeast Asia Crude Oil Pipeline.

The proposed refinery, after being built and put into operation, will continue to implement the strategy of staff localization for promoting the local employment.

The project construction shall facilitate the development of Myanmar's oil refining industry, and train its oil refining technical talents.

Currently, there are three refineries in Myanmar, with a total design capacity of about 51,000 BPSD. They are becoming old, with aging units and equipment, coupled with low level of technology and management, the actual processing capacity is only one third of the design, and features a low level of processing capability, unable to make in-depth processing and the production of clean fuels.

The project refinery is proposed to taken an advanced, well proven and reliable refining technology, with processing capacity greater than the sum of the existing refining capacities of Myanmar; therefore, it can greatly improve the technical level of the oil refining industry in Myanmar.

3.3.1 Feedstock

The refinery feedstock is crude oil, which is a mixture of hydrocarbon compounds. The hydrocarbons in crude oil are a mixture of three chemical groups including paraffins (normaland isoparaffins), naphthenes, and aromatics. The most common distinction between crude oil types is 'sweet' or 'sour'. Sweet crude oil is normally low in sulfur and lightly paraffinic. Sour crude oil is usually high in sulphur (more than 0.5 wt percent) and heavily naphthenic. Crude oils are also classified into light, medium and heavy, dependent on their content of paraffins, naphthenics, and aromatics.

3.3.2 Elemental Composition of Crude

Table 3: Elemental Composition of Crude

Element	Weight %
Carbon	83.9 - 86.8
Hydrogen	11.4 - 14.0
Sulphur	0. 06 - 8.0
Nitrogen	0.11 - 0 .17
Oxygen	0.5
Metals (Fe, V, Ni, etc)	0.03

The hydrocarbon mixture may involve different chemical composition and molecular structures with some impurities. Most of these impurities, such as sulphur (largely in the form of organic compounds such as mercaptans and sulfides), nitrogen,vanadium and nickel are chemically bound to the hydrocarbon structures. Others, such as sand/clay, water and water-soluble salts of zinc, chromium and sodium are present as inorganic material.

3.3.3 Main Unit and Capacity

The list of main Unit Capacity are given in **Table 4.**

Table 4: Main unit and capacity

S/N	Unit	Capacity *(10^4t/a)*
1	CDU/VDU	350
2	Delayed Coker Unit (DCU)	90
3	Hydrocracker Unit (HCU)	100
4	Diesel Hydrotreater (DHT)	110

5	Kerosene Hydrotreater (KHT)		40
6	Catalytic Reformer combined unit	Naphtha Hydrotreater	70
		Naphtha Catalytic Reformer (NCR)	65
7	Hydrogen Production		3
8	Sulfur Recovery		6

3.3.4 Properties of Raw Materials

Taken with a blending ratio of 2:1:1-Kuwait crude oil of 1.75million t/a, Saudi mediate crude oil of 0.875 million t/a, and Saudi light crude oil of 0.875 million t/a.

Table 5: Properties of raw meterials

	Main Raw Materials			
1	Kuwait Crude oil	10^4 t/a	175	Percentage of 50%
2	Saudi Light Crude oil	10^4 t/a	87.5	Percentage of 25%
3	Saudi Mediate Crude oil	10^4 t/a	87.5	Percentage of 25%

3.3.5 Main Products

The project is designed to manufacture gasoline, diesel and jet fuel as the main products, with LPG, high-sulfur coke, sulfur and other by-products.

Table 6: Main products

	Product		
1	Gasoline	10^4 t/a	80
2	Jet Fuel	10^4 t/a	50
3	Diesel Fuel	10^4 t/a	150
4	LPG Product	10^4 t/a	1
5	Sulfur	10^4 t/a	6
6	Coke	10^4 t/a	30

3.3.6 Refined Product Transportation

The main refined products are Gasoline, Kerosene, Aviation Turbine Fuel-ATF, Diesel and Liquefied Petroleum Gas- LPG.

Refined Products shall be distributed to the whole country by utilizing Costal Tanker, Barges, Rail Freight and Lorry Trucks. Barges are used for domestic logistics on a long route, mainly via Ayayarwaddy river to lower and upper Myanmar. Lorry Trucks are used for short routes and Rail Freight will transport between refinery and depot.

3.3.7 Utilities

For the proposed oil refinery the following infrastructure facilities will be created. The proposed utilities and infrastructure are as follows:

3.3.8 New oil refinery layout plan / Land use

Figure 8: New oil refinery layout plan (See larger map in appendix 28)

The total area acquired for the integrated oil refinery is approximately130 acres, out of which the proposed plant will be set up in an area of 107 acres. The proposed plant site is generally flat. The land use for the proposed plant site is under single crop of (pigeon pea) agriculture land category and consent of land owners has been obtained and will be negotiated with the concerned party or as per mutual agreement with the concerned party. The break-up of land requirement for the projects is given in table-.

Refinery Area (ISBL)

Table 7: Refinery Area

S/N	Unit	Land Area (m^2)
I.	**Production Unit**	
1	CDU + VDU	27000
2	Delayed Coker Unit (DCU)	21000
3	Hydrocracker Unit (HCU)	21000
4	Diesel Hydrotreater (DHT)	10500
5	Kerosene Hydrotreater (KHT)	10500
6	Naphtha Catalytic Reformer (NCR)	21000
7	Hydrogen Production Unit (HPU)	21000
8	Sulfur Recovery Unit (SRU)2	27000
	Subtotal	**159000**
II.	**Utility Works**	
1	ASU Air Station	3000
2	Utility Substation	250
3	Tank Farm Substation	150
4	Water Purification Plant	17600
5	Waste Water Treatment Plant	74000
	Subtotal	**95000**
III.	**Auxiliary Facilities and Warehouses for Production**	
1	Tank Farm	73500
2	Integrated warehouse	16000
3	Warehouse of Chemicals	1000

4	Electromechanical Maintenance Facilities	5000
5	Cooling Water Station	10000
6	Water Supply and Firewater Pump Station	42000
7	Central Laboratory	8000
8	Central Control Room	7000
9	Fire Station	5000
10	Accommodation Facilities, Parking Lot	12000
11	Power Station, Demin Water Station	42000
	Subtotal	**248900**
IV.	**Roads, Walkways, Greening and Miscellaneous Facilities**	**23771**
	Total	**526,671**

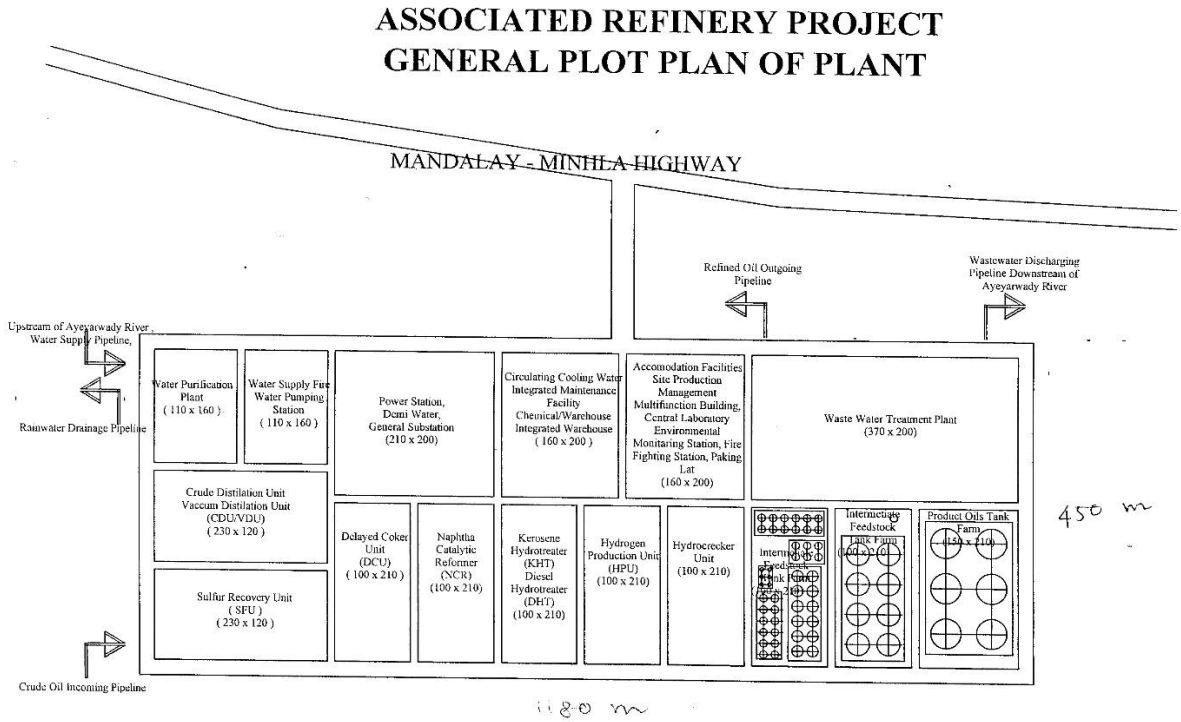


Figure 9: New refinery project general plot plan

3.3.9 Typical Oil Refinery Process Units

The new refinery will be built with international standard to include nine main process units and waste water treatment plant, and a flare system.

Flow Diagram of a Typical Oil Refinery

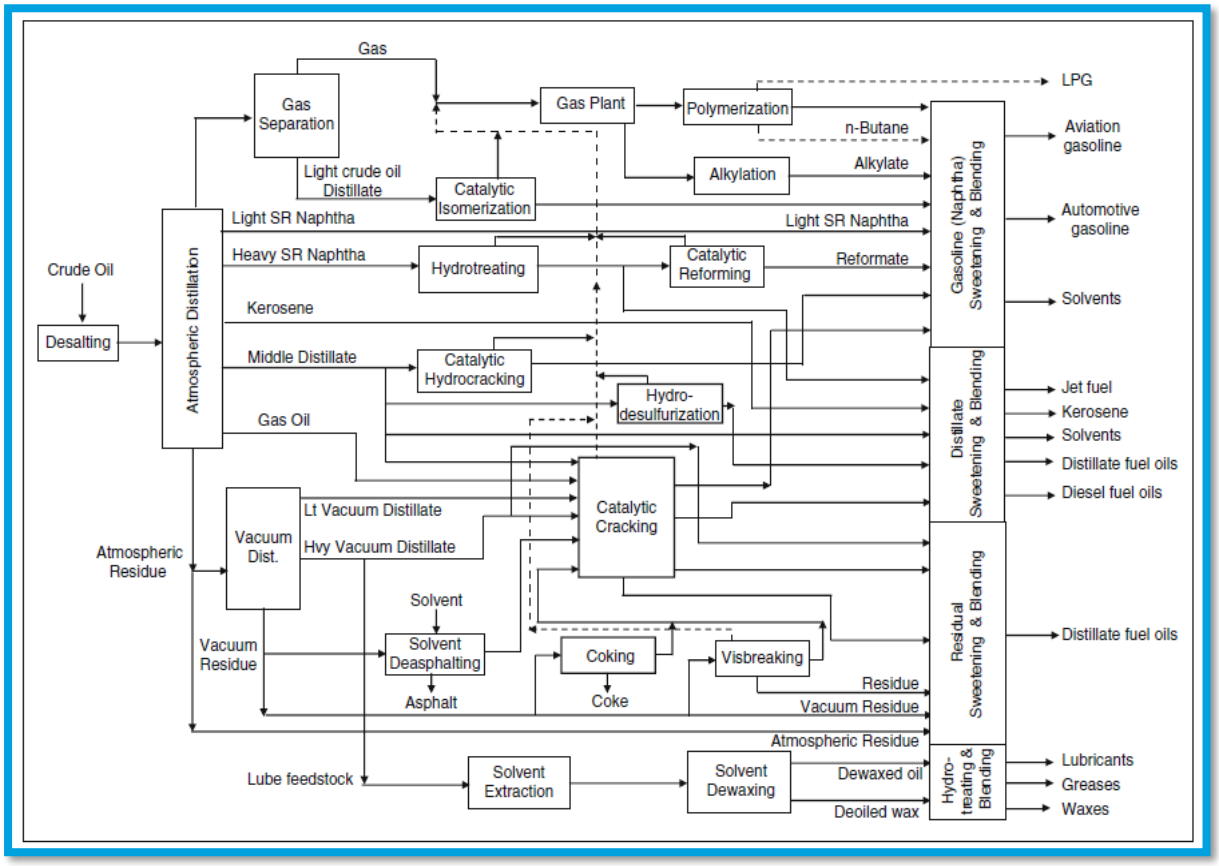


Figure 10: Flow Diagram of a Typical Oil Refinery (See larger map in appendix 30)

3.3.9.1 Desalting

Desalting is a process to wash the crude oil with fresh water at high temperature and pressure to dissolve, separate and remove the salts and solids. Crude oil and/or reduced crude (commonly referred as oily feedstock) and fresh water are the inputs to the Desalting Unit, and washed crude oil and contaminated water are its outputs.

3.3.9.2 Primary Distillation Units

These units include the Atmospheric Distillation Unit (Topping or CDU) followed by Vacuum Unit (HVU). Desalted crude oil is fed to a distillation tower working at atmospheric pressure where the various fractions composing the crude oil are separated according to their boiling range. The heaviest fractions recovered at CDU bottom (atmospheric residue) do not vaporize under the tower atmospheric pressure, and require further fractionation under vacuum conditions in the vacuum distillation tower.

3.3.9.3 Bitumen Production Unit

The Bitumen Production Unit is fed with vacuum residue. In the Bitumen Blowing Unit (BBU), air is blown into hot bitumen, which causes dehydrogenation and polymerization reactions and yields a harder product with higher viscosity, a higher softening point and reduced penetration. The blown bitumen is removed from the bottom of the oxidation vessel and cooled before being sent to storage. Bitumen is typically stored in heated, insulated and nitrogen blanketed cone roof tanks fitted with safety valves. The nitrogen discharged into the atmosphere may contain hydrocarbons and sulfur compounds in the form of aerosol-containing liquid droplets.

3.3.9.4 Hydrogen Consuming Processes

Hydrotreating and hydro-processing processes are used to remove impurities such as sulfur, nitrogen, oxygen, halides and traces of metal impurities that may deactivate the noble metals catalysts. Hydrotreating also upgrades the quality of the processed fractions by converting olefins and di-olefins into paraffins for the purpose of reducing gum formation in fuels.

Hydroprocessing cracks heavy molecules into lighter, more saleable products. Both processes are usually placed upstream of process units, such as the Catalytic Reforming Unit and the Hydrocracking Units, in which sulfur and nitrogen could have adverse effects on catalyst operation. Hydrogen consumption is high and requires the presence of a Hydrogen Plant in the refinery.

The C5 – C6 isomerization units are based on skeletal isomerization processes (e.g. 'once-through' and 'recycle' types), used to convert a linear molecule into a branched one with the same raw formula. Typically, low molecular weight normal paraffins (C4-C6) are converted into isoparaffins which have a much higher octane index. There are three distinct different types of catalysts currently in use, including chloride promoted catalysts, zeolites, and sulfated zirconium catalysts.

The Dienes Hydrogenation and Butylenes Hydroisomerization Unit is placed upstream of the alkylation and based on a highly selective catalytic process. This process hydrogenates acetylenes and dienes into the corresponding mono-olefins without affecting the valuable olefin content of the feedstock, while converting linear butene-1 into linear butenes -2 which in alkylation leads to higher octane gasoline components than those derived from butene-1.

3.3.9.5 Pretreating and Catalytic Reformer Unit

The typical feedstocks are heavy virgin naphtha (HVN) from the crude distillation unit and, when applicable, the hydrotreated heavy naphtha from the hydrocracker unit. Naphtha feed, mixed with a hydrogen-rich gas stream, is heated and vaporized and then fed into the hydrotreater reactor (pretreating), which contains a fixed bed of cobalt / nickel / molybdenum catalyst. The C5-minus hydrocarbons contained in the product, after the separation of hydrogen, are removed in a stripping tower. The heavy naphtha, free from nitrogen and sulfur compounds, leaving the hydrotreating section, enters the Catalytic Reformer Section to be upgraded for use as high octane gasoline blend- stock.

There are four major types of reactions which occur during the reforming process: (1) dehydrogenation of naphthenes to aromatics; (2) dehydrocyclization of paraffins to aromatics; (3) isomerization; and (4) hydrocracking. There are several catalytic reforming processes in use and they can be classified into three categories including 'continuous', which makes use of moving bed reactors, as well as 'cyclic' and 'semi-regenerative', both making use of fixed bed reactors.

3.3.9.6 Catalytic Cracking Units (Catcrackers)

Catalytic Cracking is by far the most widely used conversion process to upgrade heavy hydrocarbons into more valuable lower boiling hydrocarbons. It makes use of both heat and catalyst to break the large hydrocarbon molecules into smaller, lighter molecules. Unlike the hydrocracker unit, no hydrogen is used and, consequently, limited desulfurization takes place during the process. Catalytic cracking designs include moving- bed reactors, fluidized-bed reactors (e.g. Fluid Catalytic Cracking Unit [FCCU], Residue Catalytic Cracking Unit [RCCU]), and once-through units. FCCU feed stream is the desulfurized heavy vacuum gasoil coming from hydrocracking. RCCU treats heavier feedstocks, such as the atmospheric distillation residue.

In both processes, oil and vapor are contacted with hot catalyst in the 'Riser Reactor'. The cracking process takes place in presence of a zeolite type catalyst. The fluidized catalyst and the reacted hydrocarbon vapor separate mechanically in a cyclone system and any oil remaining on the catalyst is removed by feeding steam in the stripping section of the reactor. The catalytic cracking processes produce coke. This is deposited on the catalyst surface, thereby reducing activity and selectivity. Catalysts should be continuously regenerated, essentially by burning off the coke from the catalyst at high temperature in the regenerator. Products are separated by means of a fractionation train.

3.3.9.7 Gas Plant Units

Low boiling hydrocarbons are usually treated in a common separation plant operating at elevated pressure. Gas plants allow recovery and separation by distillation of C1 - C5

hydrocarbons and higher compounds from the various refinery off-gases. The Gas Plant consists of a fractionation train where the following streams are separated: C1-C2 fraction; C3 fraction (propane); C4 fraction (butane); and debutanized gasoline. Amine Treating Units remove hydrogen sulfide and carbonyl sulfide from all product streams. Before being sent to the relevant storages, liquid products pass through to Sweetening Units based on selective adsorption on molecular sieves.

3.3.9.8 Etherification Units

The feedstocks of MTBE/ETBE units are the C4 hydrocarbons stream coming from the FCCU, and methanol or ethanol.

Isobutylene reacts with methanol or ethanol to yield directly MTBE (methyl-tert-butyl-ether) or ETBE (ethyl-tert-butyl-ether), respectively. The reactors can be of adiabatic or tubular type or combined with a fractionation tower (this type of reactor is normally referred as Catalytic Distillation Reactor or Reactor Column). The catalyst is a sulfonic resin. The feedstock of TAME units is LCN, (composed of C5 hydrocarbons, both paraffins and olefins). However, only the reactive isoamylenes (2-methyl-butene-1 and 2-methyl-butene-2) react with methanol to directly yield TAME (tert-amyl-methyl-ether). Adiabatic type reactors are used, and the catalyst is the same as for the MTBE/ETBE Units.

3.3.9.9 Alkylation Units

The purpose of the alkylation unit is to produce a high-quality gasoline blending component called alkylate. Alkylation is the reaction of C3 and C4 olefins with isobutane to form higher molecular-weight isoparaffins with high octane number (preferably iso-octane). The process involves low-temperature reaction conditions conducted in the presence of very strong acids (hydrofluoric acid or non fuming sulfuric acid). The reaction in hydrofluoric acid alkylation produces acid soluble oil (normally referred as ASO) which, after neutralization, is burned in a furnace by means of a dedicated burner. The reaction in sulfuric acid alkylation produces acid sludges (spent acid), which are burned to recover sulfuric acid (sulfuric acid regeneration).

The acid sludges are fed into a decomposition furnace together with fuel gas, where, at 1,050°C, the decomposition of the sulfuric acid into sulfur dioxide takes place. The gas leaving the furnace is cooled down to 350*C in a waste heat boiler, and then further cooled and filtered. The gas and condensed water are fed to the gas treatment system.

3.3.9.10 Polymerization Unit

In polymerization process unit, the C3 and C4 olefins are dimerized and oligomerized to produce the so called polymeric gasoline as high octane blending component. The process is similar to alkylation in its feed and products, but is often used as a less expensive alternative to alkylation. The reactions typically take place under high pressure in the presence of a phosphoric acid catalyst adsorbed onto natural silica.

3.3.9.11 Coking Units

Coking is a severe thermal cracking process used primarily to reduce refinery production of low-value residual fuel oils and transform them into transportation fuels, such as gasoline and light and heavy gas oils. As a part of the process, coking also produces petroleum coke, which is essentially solid carbon, with varying amounts of impurities and containing 5–6 percent hydrocarbons. Two types of coking processes exist: the delayed coking and the fluid coking processes. The flexi-coking process is similar to fluid coking, but has fully integrated gasification suitable to gasify the fluidized coke in order to produce coke gas.

The hot vapors from the coke drums contain cracked lighter hydrocarbon products, hydrogen sulfide and ammonia, and are fed back to the fractionator where these lighter hydrocarbon products can be treated in a sour gas treatment system. The condensed hydrocarbons are reprocessed, whereas water is re- used for coke drum quenching or cutting.

The sulfur contained in the coke is converted in flexicoking gasifiers, primarily into hydrogen sulfide, and into traces of carbonyl sulfide. The nitrogen contained in the coke is converted into ammonia.

3.3.9.12 Visbreaking Unit

The Visbreaking Unit is a well-established non catalytic thermal cracking process that converts atmospheric or vacuum residues to gas, naphtha, distillates and tar. It uses heat and pressure to break large hydrocarbon molecules into smaller lighter molecules.

The most important factor in controlling the cracking severity should always be the stability and the viscosity of the so called visbroken residue, which is fed to the fuel oil pool. In general, an increase in the temperature in or residence time results in an increase in cracking severity. Increased severity increases gasoline yield and, at the same time, produces cracked residue (fuel oil) of lower viscosity. Excessive cracking, however, leads to an unstable fuel oil, resulting in sludge and sediment formation during storage.

There are two types of visbreaker operations: coil or furnace cracking and soaker cracking. The gas produced is fed to an amine treating unit, to remove hydrogen sulfide.

3.3.9.13 Lube Oil Production Units

A base oil complex typically consists of a vacuum distillation tower, a deasphalting unit, an aromatic extraction unit, a dewaxing unit, an optional high pressure hydrogenation unit and a hydrofinishing unit to improve color and stability, to meet product specifications and to remove impurities. A conventional base oil complex is very labor intensive, mainly due to its batch operation, the many grades of base oil normally produced and the associated intensive product handling operations.

3.3.9.14 Gas Treatment and Sulfur Recovery Units

Sulfur is removed from a number of refinery process off-gas streams (sour gas) in order to meet the SOX emission limits and to recover saleable elemental sulfur. Process off-gas streams, or sour gas, from the coker unit, FCCU, hydrotreating units and hydroprocessing units, contain high concentrations of hydrogen sulfide and carbonyl sulfide mixed with light refinery fuel gases. Before elemental sulfur is recovered, the fuel gases (primarily methane and ethane) need to be separated from hydrogen sulfide and carbonyl sulfides. This is typically accomplished by dissolving hydrogen sulfide and carbonyl sulfides in a chemical solvent. The solvents most commonly used are amines, such as diethanolamine (DEA). Dry adsorbent, such as molecular sieves, activated carbon and iron sponge are also used.

In the amine solvent processes conducted in the amine gas treating units, DEA solution, or another amine solvent, is pumped to an absorption tower where the gases are contacted and hydrogen sulfide and carbonyl sulfide are dissolved in the solution. The fuel gases, free from hydrogen sulfide and carbonyl sulfide, are removed and sent to refinery fuel gas network. The amine-hydrogen sulfide and carbonyl sulfide solution is regenerated by heating and steam stripping to remove the hydrogen sulfide gas before recycling back to the absorber. Hydrogen sulfide and carbonyl sulfide are sent to the

Claus Unit for sulfur recovery. Air emissions from sulfur recovery units will consist of hydrogen sulfide, SOX, and NOX in the process tail gas, as well as fugitive emissions.

The Claus process consists of the partial combustion of the hydrogen sulfide and carbonyl sulfide-rich gas stream and then of reacting the resulting sulfur dioxide and unburned hydrogen sulfide in the presence of a bauxite catalyst to produce elemental sulfur. Claus units remove only 90 percent of hydrogen sulfide and carbonyl sulfide, and are followed by other processes to comp lete sulfur removal (up to 99.5 percent).

3.3.9.15 Sour Water Stripper Unit (SWSU)

Many process units generate sulfides and ammonia- contaminated water, normally referred as sour water. Sour Water Stripper Unit (SWSU) permits reusing sour water by removing sulfides and ammonia. The process operation is complicated by the presence of other chemicals, such as phenol, and cyanides.

3.3.9.16 Hydrogen Plant

Normally the feedstock the hydrogen plant is the methane obtained by the refinery process units, LPG, or refinery external natural gas, if available. This unit normally consists of a reformer and produces hydrogen – carbon monoxide mixture, referred as synthetic gas (syngas). After passing through a heat recovery section, cold syngas enters the shift conversion reactor where, under an iron or copper based catalyst, carbon monoxide is reacted with water to yield more hydrogen and carbon dioxide. The latter is separated in amine absorption – regeneration unit. A closed drain system collects and recovers any amine drains and spills, thereby preventing them from being purged into the WWTU.

3.3.9.17 Chemical Treatment Units

Chemical treatments are used to achieve certain product specifications. The Extraction Sweetening Units are designed to reduce the mercaptans content of hydrocarbon streams to mitigate odor nuisance and to reduce corrosivity. These treatments are accomplished by either extraction or oxidation or both, depending on the treated process stream. The extraction process removes the mercaptans by caustic extraction, resulting in lower sulfur content. The sweetening process causes the mercaptans to be converted into less odorous and less corrosive disulfides which remain in the product. As a result, no reduction in the total sulfur content takes place during sweetening and, consequently, it is only applied to those streams where sulfur content is not a problem.

The spent caustic scrubbing liquor (spent caustic) coming from the Extraction Unit is one of the most problematic waste streams generated in refineries. This is primarily due to the very high sulfides concentration which make it non- suitable for direct discharge into the WWTU. High levels of sulfides can also create odor and safety problems when released as gas. In the Caustic Oxidation Unit, the reactive sulfides contained in the spent caustic liquor are oxidized into soluble thiosulfates, sulfites and sulfates. The treated stream is then suitable for bio-treatment in the WWTU.

3.3.9.18 Gasification Units

The gasification units include Coke Gasification, Hydrocarbons Gasification (Partial Oxidation), and Hydrogen Purification (i.e., Wet Scrubbing, Membrane Systems, Cryogenic Separation and Pressure-Swing Adsorption). The synthetic gas produced by coke gasification contains hydrogen sulfide and carbonyl sulfide, and the gas is treated in an Amine Treating Unit.

3.3.9.19 Blending Facilities

Blending is the final operation in petroleum refining. It consists of mixing the products in various proportions to meet commercial specifications. Blending can be carried out in-line or in batch blending tanks. Air emissions from blending include fugitive VOC from blending tanks, valves, pumps and mixing operations.

3.3.10 Auxiliary Facilities

Auxiliary facilities at petroleum refineries typically consist of waste water treatment units, blow down and flare systems, vapor recovery units (e.g. thermal oxidation, absorption, membrane separtion and cryogenic condensation), and energy/electricity systems (e.g. boilers, furnaces, gas turbines).

3.3.10.1 Wastewater treatment

(a) The sour water treatment

The sulfur-containing wastewater (sour water) discharged from the individual units is to be routed to the sour water stripper unit, and the steam stripped sour gas is sent to the sulfur recovery unit (SRU) for the recovery of sulfur, while a portion of purified water is returned to CDU/VDU for reuse, and the rest is sent to the wastewater treatment plant for disposal.

(b) The wastewater treatment plant

According to the characteristics of drainage from the project's process units and auxiliary facilities, the wastewater drainage system is divided into the sub systems of sanitary wastewater, oily production wastewater, salt production wastewater, alkaline wastewater, efflux drainage, clean rainwater drainage, contaminated rainwater drainage, and accident drainage.

According to water quality, treatment method and reuse process of the wastewater from the process units, the project's integrated wastewater treatment plant can be divided into the sections of oily wastewater treatment and reuse.

Oily wastewater is mainly composed of production wastewater from process units, and the plant-wide sanitary wastewater and accident/contaminated rainwater. The oily wastewater is discharged at a flow of 83m^3/h. The treatment plant operates with a treatment process of oil removal, air floatation, A/O biochemical treatment, sedimentation, BAF and filtration. Normally, the quality of oily wastewater treated is up to the reuse water quality under the Design of Industrial Circulating Cooling Water Treatment, so the water can be reused as the makeup water to the cooling water station.

The salt wastewater is composed of the electro-desalting drainage, the treated caustic effluent, cooling water drainage, and the reverse osmosis drainage from demi water station. The salt wastewater is to be discharged at a flow of 158m^3/h to the wastewater treatment plant that is proposed to take the treatment process of oil removal, air flotation, A/O biochemical treatment, sedimentation filtration, ultrafiltration, and secondary reverse osmosis. The discharging effluent is to be reused as demi water, while the reverse osmosis discharging water is routed to the Ayeyarwady River, after satisfying the discharge standard.

(c) The wastewater treatment effectiveness

The project's salt wastewater treatment and reuse unit is designed to discharge the effluent at a flow of 79m^3/h to the Ayeyarwady River, after satisfying the NEQEG discharge standard.

3.3.10.2 Waste gas control measures

(a) The control of heater flue gas emission

As the heater of the process plant burns a fuel that is mostly dry gas from desulfurization (with the shortage to be made up by the fuel oil produced from the project plant). The dry gas content of H_2S is < 20mg/Nm^3, so the concentration of pollutants in the flue gas is significantly reduced. In addition, exhaust stack of appropriate height is to be provided to ensure that the emission limits are satisfied.

(b) The control of boiler flue gas emission

The project's power station is designed to using coke as the fuel for the 4 × 130t/h circulating fluidized bed boilers (three working and one spare) + 2 × 30MW extraction condensing turbine generator units. As coke's sulfur content is quite high, it's required to adopt a two-level desulfurization technology of furnace-in desulfurization and furnace-out limestone gypsum wet desulfurization. The former can give a desulfurization efficiency of 80%, and the latter 95.8%, resulting in a total of 99% desulfurization efficiency, whereby the flue gas emission limits are satisfied.

(c) Reduced loss of hydrocarbons

In order to reduce the loss of oil hydrocarbons from the breathing valves of oil tank during storage, different methods are taken for storing different oils; for instance, floating roof tank is used for storing crude oil, and internal floating roof tank is used for the storage of reforming feedstock, naphtha, gasoline, light slop oil. In comparison with vault tank, floating roof tank can reduce hydrocarbon loss by more than 90%. Liquid product to be exported out of the plant is loaded in sealing method of oil and gas recovery facilities to reduce fugitive emissions and meet the requirements of clean production.

(d) High-altitude emissions

For CDU/VDU, DCU, HCU, DHT, KHT,NCR and other process units, the furnace flue gas emissions have the principal pollutants of NOx , SO2, and dust, etc; they shall be vented at high altitude to mitigate the environmental impact. For the power plant, the flue gas emissions from coal-fired boilers shall be vented through a 35m high stack to reduce pollution of the surrounding environment.

(e) Sulfur Recovery

The project scope includes a sulfur recovery unit (SRU) that is composed of sulfur recovery and tail gas treatment. The hydrogen sulfide, dry gas stripped from the sour water stripping unit shall mix with the sour gas from LPG desulfurization system, and the mixture gas is routed to SRU for conversion to onspec sulfur, with the offgas (tailgas) subject to hydrogenation treatment before it's led to incinerator for disposal and emission to standard limits.

(f) Other Emissions

The HCI contained offgas from NCR catalyst regeneration section shall be subjected to the alkali scrubbing of the alkaline scrubber that is located in the area of NCR, so that the venting emissions can be scrubbed of HCI gas, and ultimately be able to meet the emission limits. The startup and shutdown, purging of the individual units, and the safety valve pop up, and the supply failure of electricity, water, and other upsets of operation, may lead to hydrocarbon gas emissions that shall all be routed to the flare system. The large quantities of gas or hot venting gas from operation upsets, and the exhaust gas from the automatic shutoff of gas holder inlet valve, shall all be discharged into the flare to burn off.

3.3.10.3 Hazardous waste

Solid and liquid hazardous wastes will be generated from equipment maintenance and lubrication, surface coating, on-site fabrication, empty containers of paints/solvents/oils and accidental spills. These wastes typically include used lube oil, batteries, empty drums of paint/solvent/additives, floor sweepings from material storage yard, oily sludge, contaminated soils from spills, off-specification materials, electrical and mechanical components, etc. Most of these cannot be recycled or disposed off-site. Type of hazardous wastes in construction phase is listed in following table.

Type of hazardous wastes in construction phase

No.	Waste type	Description
1	Oily waste	Engine, transformer oil, waste fuel, waste lube oil, cooking oil
2	Oily container/drum	Oil filters, empty chemical drums, maintenance waste-grease oil, cotton waste, rags, etc
3	Used batteries/ cartridges	Dry batteries, Li, Cd, batteries, Lead acid batteries/acid, toner, used photocopy cartridges, used fluorescent tubes, aerosol containers/cans, used smoke ionic detectors, refrigerant Residues, Pigging residues,
4	Contaminated materials	Solvents/ paints/ thinners residue, sealants/mastic, spill absorbents, contaminated soil,

5	Lab and medical wastes	Medical /clinical/first aid waste, laboratory waste e.g. expired chemicals
6	Radioactive waste	Radioactive waste

3.3.10.4 Hazardous waste Disposal

In the operation phase, sludge is collected from Refinery and is also generated on site as a result of tank cleaning operations. All sludge is treated in the sludge reprocessing plant which involves centrifugal separation to produce solids hydrocarbon and oily water. The remaining solids are stored in drums and held on site in a designated area. Hydrocarbon liquids recovered from the centrifuge are returned to crude and the resultant oily water is sent to the separator. Caustic sludge produced from gasoline and LPG sweetening is sent to caustic sludge treatment facility.

Hazardous waste that cannot be recycled, such as waste ceramic balls, waste desulfurizer, desulfurization waste residues and so on, is sent to Hazardous waste treatment plant and will be disposed to designate area in line with the Environmental Rule and Regulation.

3.3.10.4.1 Solid waste disposal during construction period

The construction waste will be collected during this project's construction and fully recycled to minimize the impact on the environment.

- The waste welding material generated from equipment installation and welding of pipes and tanks mainly composes of metal, which can be collected and recycled.
- The empty buckets generated from spraying corrosion-protected material are hazardous waste, which shall be processed by qualified company.
- Set up trash bins in living area of the construction site to collect domestic garbage. After centralized collection, put it into the local garbage processing system to avoid its affecting on the environment during construction.
- The discarded earth and stone generated from the excavation of tunnel and embankment which shall be moved to the dumping site for the project.
- Keep the topsoil and use for back filling and rehabilitate the green after the construction.

After taking appropriate treatment and disposal measures, it can minimize the impact of the solid waste from construction on the surrounding environment.

3.3.10.4.2 Solid waste disposal during operation period

After the project is completed, the whole plant will generate solid waste, domestic garbage and desulphurization slag. There are hazardous solid wastes, mainly including spent catalyst, waste ceramic balls, waste desulfurizer, caustic sludge, sludge from waste water treatment plant, oil sludge from tank cleaning, etc.

According to the principles of Reduction, Recycling, Harmless for solid waste and its composition and nature, solid wastes generated in the project will be treated/ disposed as per the following measures:

1. **Utilization:** The reforming catalyst and isomerization catalyst contain noble metals, which can be recycled. For the Flue gas desulfurization gypsum (FGD gypsum) from self-contained power plant, its main component is calcium sulfate dehydrate, which can be utilized for producing building materials or embankment backfilling.

2. **Sludge treatment facility:** Sludge is collected from Refinery and is also generated on site as a result of tank cleaning operations. All sludge is treated in the sludge reprocessing plant which involves centrifugal separation to produce solids hydrocarbon and oily water. The remaining solids are stored in drums and held on site in a designated area. Hydrocarbon liquids recovered from the centrifuge are returned to crude and the resultant oily water is sent to the separator. Caustic sludge produced from gasoline and LPG sweetening is sent to caustic sludge treatment facility.
3. **Landfilling:** The spent wastes that cannot be recycled, such as waste ceramic balls, spent catalysts, waste desulfurizer, desulfurization waste residues and so on, is sent to the self-built solid waste landfill for the landfilling.
4. **Domestic garbage:** The domestic garbage is regularly collected, and sent to the local waste disposal system for a unified collection and disposal.

3.3.10.5 Utilization and disposal of solid and liquid wastes

The project is proposed to build a solid waste landfill, with a total capacity of approximately 150,000 m^3 and a lifetime of 20 years. The landfill site is to be partitioned in layout to tentatively comply with the specific requirements. The solid wastes generated from the production process of the project plant include: spent catalyst, spent absorbent and desiccant, as well as the sludge from the wastewater treatment plant. Given that there is no local environmental facilities to rely on, it's tentatively determined that all the solid wastes are sent to landfill treatment. The sludge can also be delivered to Delayed Coker Unit (DCU) for utilization. The lime-ash and gypsum from the power station shall be utilized by tentatively sending to the local community for paving road and other uses.

3.3.10.6 Secured Landfill facility

A secured landfill facility is developed for disposal of hazardous waste within the refinery complex. The facility is located behind refinery ETP and Fire Training Ground. The secured landfill facility consists of disposal pit having dimensions of 27mx22mx3m. The facility is designed with double liner at sides and bottom with primary and secondary leachate collection system. Three mm thick HDPE membrane is provided as the liner at bottom and sides. Life of the disposal total five such disposal pits having volume of 1000 cum each cater to the requirement of 30 years of refinery operation for the disposal of hazardous waste. Provision of

two vent pipe is made to take care of methane generation within the pit once it is closed after effective life of usage Once the volume of pit becomes full, a cover of protective clay of minimum 30 cm will be laid on the top and compared to achieve permeability of 10"3 m/sec. A suitable groundwater monitoring facility is available in secured landfill facility.

3.3.10.7 Source control of noise

In order to control noise from the source, engineering and procurement shall choose low-noise equipment to reduce noise generation. Additionally, a rational layout of equipment shall be designed to prevent noise superposition and interference. The flare is to locate at the boundary of the production plant, coupled with a variety of measures for sound insulation and absorption. Centralized control room and dedicated soundproof rooms are to be provided to reduce the intensity and duration of noise exposure to workers.

3.3.11 Power Requirement

The power requirement for the proposed plant operation has been estimated to be about 58 MW, its supply by captive power plant.

The power requirement is envisaged to be met by entering in to an appropriate arrangement with (EPC) which have a 220/ 110 KV high tension line passing nearby proposed site. Requisite power is understood to be sourced either by direct tapping from the high tension line using appropriate infrastructure of from the nearest grid substations(s).

3.3.12 Water Supply and Drainage

The project is proposed to take water from the Ayeyarwady River. The project plans to build a water intake pumping station, with a design capacity of 520 m^3/h, and an intermediate raw water pump station is to be built accordingly, with a lifting capacity of 520 m^3/h. Two DN400 raw water pipelines are to be built, sending water to the project's battery limit.

3.3.12.1 The Water Supply System Design

a. The production water treatment plant is designed with a capacity of 500m^3/h.
b. The potable water treatment plant design is designed with a capacity of 10m^3/h.
c. **The HP firewater supply system:** HP firewater pump station is designed with a water supply capacity of 1500m3/h, and the B.L. supply pressure of 1.0Mpa (G), and the one-time consumption supply of 9000 m^3. The firewater pump station is provided with firewater electric pumps, diesel engine pumps, and pressure stabilization pumps. The firewater tank has an effective volume of 9,000 m^3, and the firewater replenishment time is designed to be 48 hours.
d. **The cooling water system:** the cooling water station is designed with a capacity of 25000m^3/h, and provided with five cooling towers, with each of a design capacity of 5000m^3/h.
e. **The demi water system:** raw water desalination unit is designed with a capacity of 35m3/h, and the process condensate processing unit with a design capacity of 90m^3/h. the turbine condensate processing unit is designed with a capacity of 60m^3/h.

3.3.12.2 Water Drainage System

a. ***The sanitary wastewater drainage system:*** the sanitary wastewater of 8m^3/h is to be discharged into integrated wastewater treatment plant for biochemical treatment.
b. ***The production only wastewater drainage system:*** the oily wastewater of 75m^3/h is to be sent to the integrated wastewater treatment plant and water reuse unit for treatment, with the treated water to be reused as makeup water to the cooling water system.
c. ***The production salt wastewater drainage system:*** normally the salt wastewater collected is discharged at a flowrate of 158m^3/h to the integrated wastewater treatment plant and the water reused unit for treatment, with the treated water to be reused as makeup water to the cooling water system.
d. ***The alkaline wastewater drainage system:*** alkaline wastewater collected and sent through pressure pipeline to the spent alkaline effluent treatment system, and the treated wastewater is routed into the salt wastewater treatment system of the integrated wastewater treatment plant.
e. ***Clean drainage discharging system:*** the clean drainage from thermal power plant shall be reused directly as the makeup water to the cooling water system, and that from the demin water station is routed to the production water treatment unit.
f. ***The drainage external discharge system:*** the drainage of 79m^3/h is designed to discharge externally.
g. ***The clean rainwater drainage system:*** the clean rainwater collected is discharged into the local water bodies.
h. ***The contaminated rainwater drainage system:*** the contaminated rainwater collected from the production plant and auxiliary facilities are to be discharged into the pool of early rainwater contaminated, before sending to the integrated wastewater treatment plant for treatment.
i. ***The accident water drainage system:*** accident water pool is designed with an effective volume of 15000m^3. The collected water is to be pumped to the integrated wastewater treatment plant.

3.3.13 Central Laboratory

The proposed refinery project to be built in Myanmar shall be provided with a central laboratory, for the analysis in relation to all the process units and Auxiliary facilities. The laboratory shall also be responsible for the analysis of the local utility facilities, such as cooling water and demin water, as well as the local environmental monitoring analysis, ensuring the discharge of production pollutants meets the standard limits.

3.3.14 Fire-fighting System

A complete fire fighting system will be installed with following aspects:

- A suitable high-pressure system of fire hydrants consisting of suitable number of fire hydrants
- A complete separate fire fighting water piping network for feeding the hydrants
- Heavy duty ABC powder type firefighting water piping network for feeding the hydrants
- Portable CO_2 extinguishers will be provided in the entire area of the proposed
- Automatic fire extinguishing system utilizing water will also be considered.

3.4 Description of Crude Oil Transportation

The Myanma Petrochemical Enterprise of The Ministry of Energy of the Republic of the Union of Myanmar has commissioned Myanmar Survey Research (MSR) on November 25, 2014, to conduct ESIA study on the proposed Myanma Petrochemical Enterprise's new oil refinery project to be located near the existing Thanbayakan Petrochemical Complex (located near Thanbayakan Village) in Minhla Township of Magway Region in Myanmar.

The proposed new oil refinery project has three components, namely,

1. The proposed new oil refinery.
2. The Off-Take Point near the town of Saku where the crude oil for the proposed refinery will be syphoned off from the South East Asia Pipeline (SEAP).
3. The on-shore pipeline which will carry the crude oil from the Off-Take Point to the proposed new oil refinery.

In that first instance, the ESIA has identified the potential impacts the proposed new oil refinery could have on the surrounding environment and communities together with recommended mitigating measures.

As a second step, MSR conducted a supplementary ESIA study which includes assessment of the potential impacts the Off-Take Point in Saku, and the crude oil pipeline to be laid from the Off-Take Point to the proposed new oil refinery in Thanbayakan, and the surrounding environment and communities together with recommended mitigating measures.

3.4.1 Off-Take Point

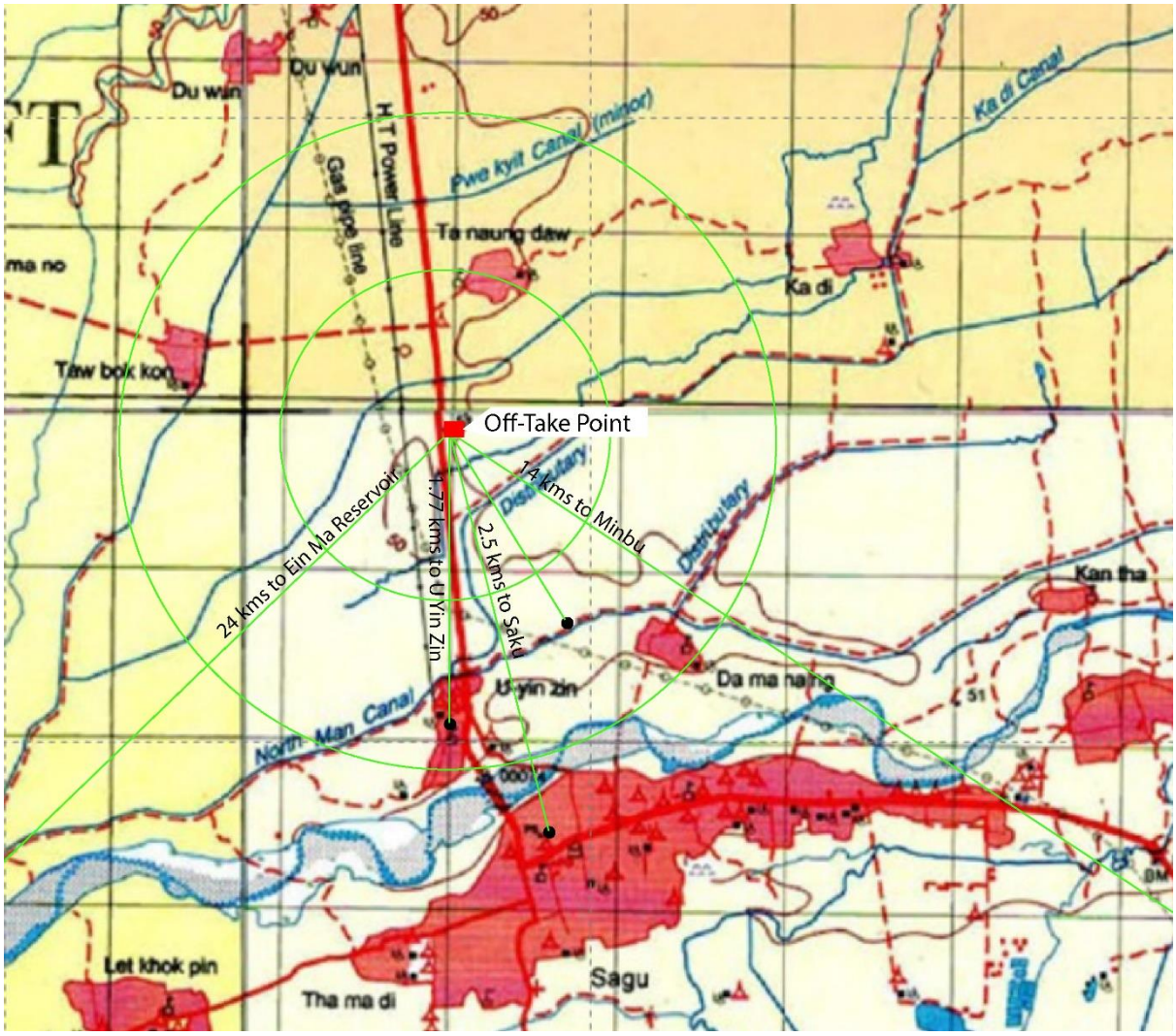


Figure 11: Off-Take Point Location

The Off-Take Point station for the crude oil pipeline to the proposed new oil refinery is located at beside the Seikphyu - Salin - Pwintbyu - Saku - Minbu road, near the small town of Saku which is 2.5 kms away in Minbu Township of Magway Region. The Thayet - Minbu railroad segment of the Pathein - Monywa railroad passes about 400 meters east of the Off-Take Point station.

Figure 12: Direction signboard beside an irrigation canal in U Yin Zin Village showing the way to Ein Ma Reservoir 24 kms away

As the region receives very little rainfall, an intensive irrigation network has been installed since a long time back. Farmers grow paddy where irrigation water is available and, where it is not, non-paddy crops such as sesame, beans and pulses, and cotton in the cultivation fields around their villages.

The source of the irrigation system for Saku area is the Ein Ma Reservoir located west of Minbu in the Rakhine Yoma foothills. The reservoir is 24 kms away from the off-take point. The intensive irrigation network extends down from Saku for about 15 kms. The Man Creek also receives the water overflow from the spillway of the Ein Ma Reservoir. The following images are Off-Take Point station.

The photographies and Google Images of Off-Take Point Station

Figure 13: Off-Take Point Station

3.4.2 Tentative Pipeline suggested by MPE

The tentative pipeline suggested by MPE for inclusion in the present Supplementary ESIA is drawn on a satellite map and shown below.

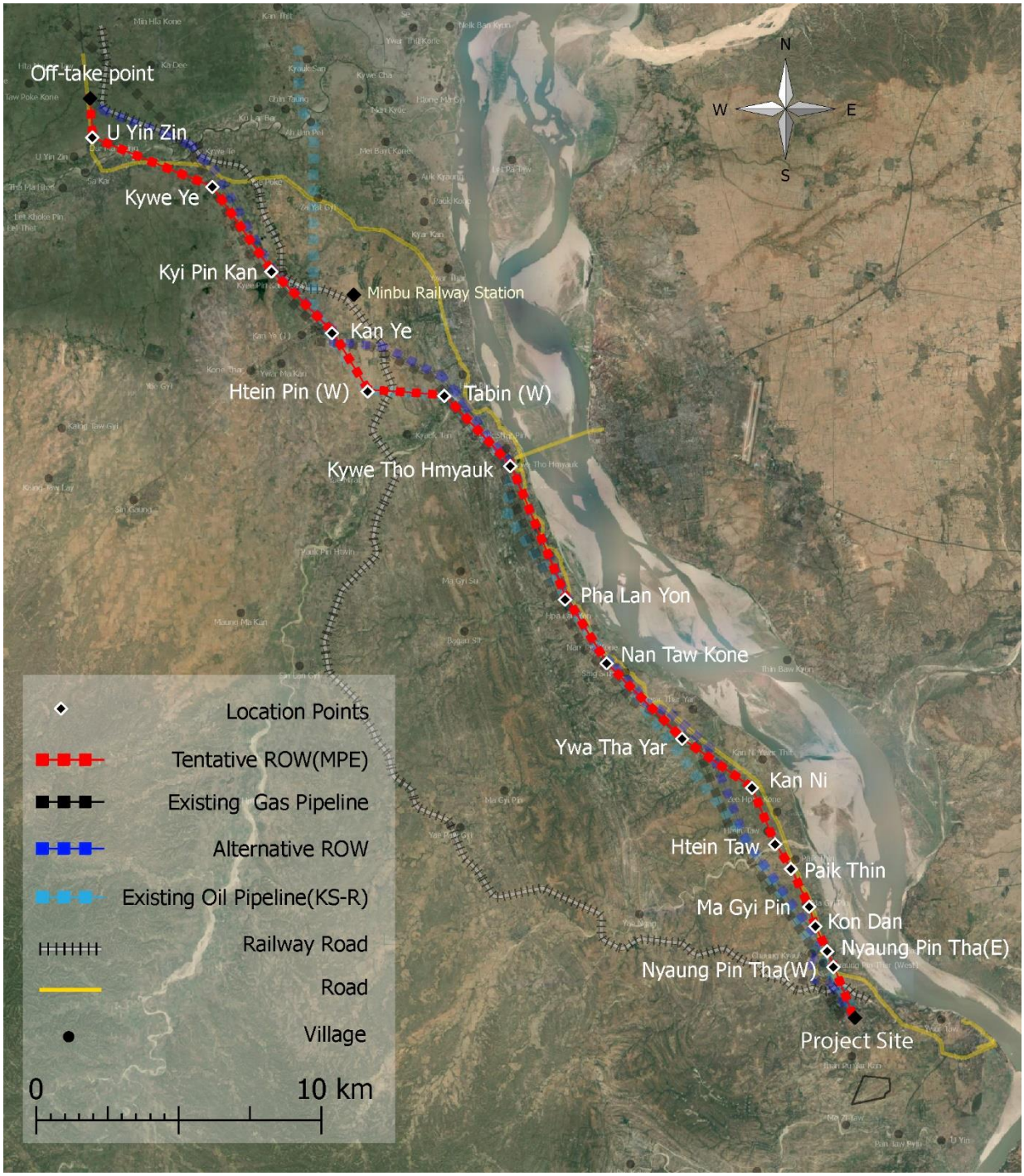


Figure 14: Tentative Pipeline suggested by MPE (See larger image in appendix 31)

3.4.3 Pipeline Alignment

According to the alignment of the crude oil pipeline suggested by MPE, it starts from the Off-Take Point in Minbu Township and ends at the proposed oil refinery site in Minhla Township.

The whole length of the oil pipeline route has two distinct directions: from the Off-Take Point to Kywe Tho Myaung Village, it takes a roughly southeastern direction while, from Kywe Tho Myaung, it takes a south-southeastern direction to the proposed oil refinery site.

The route of the oil pipeline takes it south from the Off-Take Point, and parallel to an existing motor road, to a point on the northern outskirts of U Yin Zin Village. Then, it takes a southeast direction to a point south of Kywe Te Village located beside the Saku-Minbu motor road.

From that point, the pipeline takes a southeast direction and passes west of Kyi Pin Kan (West) Village and continues on till Kan Ye Village. From there, the crude oil carrier crosses the Minbu-Ann road and travels in a southeast direction to Htein Pin (West). Then, it continues on to Ta Bin (West) Village in the east. Ta Bin (West) Village is located in the western outskirts of Minbu Town. Afterwards, the pipeline crosses the Thayet-Minbu railroad. Then, it travels in a southeast direction to Kywe Tho Myaung Village. This village is host to the western end of the Magway Bridge (Ayeyarwady).

From Kywe Tho Myaung Village, the pipeline then takes a south-southeast direction to Htauk Shar Pin-Kan Ni oilfield. There is an existing booster pump station in Htauk Shar Pin-Kan Ni oilfield.

From Htauk Shar Pin-Kan Ni oilfield, the pipeline takes a south-southeast direction to Pha Lan Yon Village and thence to Nan Taw Kone Village, thence to Ywa Thar Yar Village, thence to

Kan Ni Village, thence to Htein Taw Village, thence to Paik Pin Village, thence to Ma Gyi Pin Village and thence to Kone Dan Village.

The pipeline parallels the Minbu-Minhla road from Kywe Tho Myaung till Kone Dan. It crosses that road after Kone Dan and continues to Chaung Kauk Village. Then, it crosses Chaung Kauk Creek and continues on to Nyaung Pin Thar (West) Village. Afterwards, on its progress toward the proposed refinery site, it again crosses the Minbu-Minhla road and the Thayet-Minbu railroad.

Starting from Kywe Tho Myaung and till the proposed refinery site, the pipeline roughly parallels the Ayeyarwady River. All the villages the pipeline passes are located on the west bank of, and close to, the Ayeyarwady.

3.4.4 GPS locations of villages mentioned in above tentative pipeline route suggested by MPE

Table 8: GPS locations of villages (tentative pipeline route)

SN	Village	GPS Location	SN	Village	GPS Location
1	Off-Take Point	N 20˚15 ' 00 " E 94˚45 ' 36 "	11	Nan Taw Kone Point	N 20˚04 ' 46 " E 94˚55 '26 "
2	U Yin Zin Point	N 20˚14 ' 12 " E 94˚45 ' 36 "	12	Ywa Tha Yar Point	N 20˚03 ' 34 " E 94˚56 '46 "
3	Kywe Te Point	N 20˚13 ' 21 " E 94˚47 ' 48 "	13	Kan Ni Ywa Thit Point	N 20˚02 ' 44 " E 94˚58 '06 "
4	Kyee Pin Kan (East)	N 20˚11 ' 48 " E 94˚49 ' 02 "	14	Htein Taw Point	N 20˚01 ' 44 " E 94˚58 ' 36 "
5	Kan Yae Point	N 20˚10 ' 48 " E 94˚50 '06 "	15	Paik Pin Point	N 20˚01 ' 12 " E 94˚58 ' 52 "
6	Htan Pin (West) Point	N 20˚09 ' 33 " E 94˚50 '58 "	16	Ma Gyi Pin Point	N 20˚00 ' 38 " E 94˚59 ' 08 "
7	Ta Bin (West) Point	N 20˚09 ' 21 " E 94˚52 '03 "	17	Kon Dan Point	N 20˚00 ' 13 " E 94˚59 ' 16 "

8	Kywe Tho Hmyaun Point	N 20˚08 ' 24 " E 94˚53 '30 "	18	Chaung Kauk Point	N 19˚59 ' 48 " E 94˚59 ' 31 "
9	Kan Ni Oilfield Point	N 20˚07 ' 29 " E 94˚53 '45 "	19	Nyaung Pin Thar Point	N 19˚59 ' 29 " E 94˚59 ' 37 "
10	Pha Lan Yon Point	N 20˚05 ' 59 " E 94˚54 '37 "	20	Refinery	N 19˚58 ' 41 " E 94˚59 ' 55 "

3.4.5 Identification of oil pipeline ROW

A survey was carried out from November 27-30, 2015, in order to know the profile of the Right of Way (ROW) suggested by MPE and identify any potential impacts that may arise from the proposed project and to take appropriate mitigation measures. The exercise was carried out by trekking on selected portions of the proposed ROW through access routes.

During the survey exercise, it was observed that the proposed ROW passes mostly through cultivation fields. Mostly, sesame and beans and pulses are grown in these fields by farmers from nearby villages. There is extensive cultivation of rice around Saku Town.

ROW trekking and further discussions with the project implementers also revealed that the proposed ROW will cross only a single major water body: Man Creek.

3.4.6 Summary of observations on Tentative ROW suggested by MPE

The summary of observations on the Tentative ROW suggested by MPE is presented in Table below.

Table 9: Summary of observations of tentative ROW

No.	Access to Alternative ROW	GPS Location	Issue	Distance (km) Heading(˚)
1	Off-Take Point	N 20˚15 ' 00 " E 94˚45 ' 36 "	Place where crude oil will be diverted from SEAP pipeline to the proposed new refinery in Minhla.	
2	U Yin Zin Point	N 20˚14 ' 12 " E 94˚45 ' 36 "	The ROW travels in a straight line from the Off-Take Point to U Yin Zin Point. The ROW runs parallel to the Seikphyu-Salin-Pwintbyu-Saku-Minbu Road till U Yin Zin Point. It crosses two irrigation canals and passes through paddy fields. The distance between the two points is approximately 1400 meters.	1.35 kms (175.37˚)
3	Kywe Te Point	N 20˚13 ' 21 " E 94˚47 ' 48 "	The ROW then runs in a straight line to Kywe Te Point through plantations and cultivation fields and crosses the Man Creek three times at its S-shape loop before passing through the town's eastern part. In that area where the ROW passes the town, there are a concentration of many pagodas and monasteries. It then crosses the Saku-Minbu Road and the access road to a monastery and a road inside an army compound. The distance between U Yin Zin Point and	4.20 kms (112.18˚)

			Kywe Te Point is approximately 4200 meters.	
4	Kyi Pin Kan Point	N 20˚11 ' 48 " E 94˚49 ' 02 "	The ROW then runs in a straight line to Kyi Pin Kan Point. The distance between Kywe Te Point and Kyi Pin Kan Point is approximately 3600 meters. It crosses two dried-up creek beds, one irrigation canal and passes mainly through paddy fields and cultivation fields all along.	3.59 kms (143.45˚)
5	Kan Ye Point	N 20˚10 ' 48 " E 94˚50 ' 06 "	The ROW then runs in a straight line to Kan Ye Point. The distance between Kyi Pin Kan Point and Kan Ye Point is approximately 2700 meters. It crosses a creek and a road and passes mainly through cultivation fields all along.	2.65 kms (136.08˚)
6	Htan Pin (West) Point	N 20˚09 ' 33 " E 94˚50 ' 58 "	The ROW then runs in a straight line to Htan Pin (West). The distance between Kan Ye Point and Htan Pin (West) Point is approximately 2700 meters. It crosses the Minbu-Ann Road.	2.72 kms (145.44˚)
7	Ta Bin (West) Point	N 20˚09 ' 21 " E 94˚52 ' 03 "	The ROW then runs in a straight line to Ta Bin (West) Point. The distance between Htan Pin (West) Point and Ta Bin (West) Point is approximately 1900 meters. It crosses the Pathein-Monywa railroad, a motor road, three dried-up creeks and passes mainly through cultivation fields all along.	1.90 kms (99.84˚)
8	Kywe Tho Hmyaun Point	N 20˚08 ' 24 " E 94˚53 ' 30 "	The ROW then runs in a straight line to Kywe Tho Hmyaun Point. The distance betweenTa Bin (West) Point and Kywe Tho Hmyaun Point is approximately 3100 meters. It crosses the Minbu-Ta Bin Road, Sar Pwet Creek and two dirt tracks, and passes mainly through cultivation fields all along.	3.14 kms (126.13˚)
9	Pha Lan Yon Point	N 20˚05 ' 59 " E 94˚54 ' 37 "	The ROW then runs in a straight line to Pha Lan Yon Point. The distance between Kywe Tho Hmy-aun Point and Pha Lan Yon Point is approximately 4900 meters. It crosses two dirt tracks and four dried-up creeks and some hillocks and passes through some cultivation fields.	4.86 km (157.68˚)
11	Nan Taw Kone Point	N 20˚04 ' 46 " E 94˚55 ' 26 "	The ROW then runs in a straight line to Nan Taw Kone Point. The distance between Pha Lan Yon Point and Nan Taw Kone Point is approximately	2.68 km (147.13˚)

			2700 meters. It runs parallel to the Minbu-Minhla motor road since Kywe Tho Myaun and passes within 100 m of the nearest loop of the motor road at Pha Lan Yon. It crosses two roads and two creeks. It also passes through mainly cultivation fields all along.	
12	Ywa Tha Yar Point	N 20˚03 ' 34 " E 94˚56 ' 46 "	The ROW then runs in a straight line to Ywa Tha Yar Point. The distance between Nan Taw Kone Point and Ywa Tha Yar Point is approximately 3300 meters. It crosses two tracks and a dried-up creek bed. It also passes through mainly cultivation fields all along.	3.23 km (133.73˚)
13	Kan Ni Ywa Thit Point	N 20˚02 ' 44 " E 94˚58 ' 06 "	The ROW then runs in a straight line to Kan Ni Ywa Thit Point. The distance between Ywa Tha Yar Point and Kan Ni Ywa Thit Point is approximately 3800 meters. It crosses two dried-up creek beds, two village access roads and one irrigation canal. It also passes through mainly cultivation fields all along.	2.78 km (123.79˚)
14	Htein Taw Point	N 20˚01 ' 44 " E 94˚58 ' 36 "	The ROW then runs in a straight line to Htein Taw Point. The distance between Kan Ni Ywa Thit Point and Htein Taw Point is approximately 2100 meters. It crosses three dried-up creek beds and one village access road. It also passes through mainly cultivation fields all along.	2.07 km (155.13˚)
15	Paik Pin Point	N 20˚01 ' 12 " E 94˚58 ' 52 "	The ROW then runs in a straight line to Paik Pin Point. The distance between Htein Taw Point and Paik Pin Point is approximately 1200 meters. It crosses the dried-up Htein Taw Creek and another dried-up small creek. It also passes through mainly cultivation fields all along.	1.15 km (154.88˚)
16	Ma Gyi Pin Point	N 20˚00 ' 38 " E 94˚59 ' 08 "	The ROW then runs in a straight line to Ma Gyi Pin Point. The distance between Paik Pin Point and Ma Gyi Pin Point is approximately 1100 meters. It crosses three dried-up creeks. It also passes through mainly cultivation fields all along.	1.12 km (157.11˚)
17	Kon Dan Point	N 20˚00 ' 13 " E 94˚59 ' 16 "	The ROW then runs in a straight line to Kon Dan Point. The distance between Ma Gyi Pin Point and Kon Dan Point is approximately 800 meters. It crosses just one very small	0.82 km (164.16˚)

			dried-up creek being used as cart track. It also passes through mainly cultivation fields all along.	
18	Chaung Kauk Point	N 19˚59ˈ48" E 94˚59ˈ31"	The ROW then runs in a straight line to Chaung Kauk Point. The distance between Kon Dan Point and Chaung Kauk Point is approximately 900 meters. It crosses just one small dried-up creek bed, the Minbu-Minhla motor road and two village access roads. It also passes through cultivation fields.	0.90 km (151.34˚)
19	Nyaung Pin Thar Point	N 19˚59ˈ29" E 94˚59ˈ37"	The ROW then runs in a straight line to Nyaung Pin Thar Point. The distance between Chaung Kauk Point and Nyaung Pin Thar Point is approximately 600 meters. It crosses the Chaung Kauk Creek and also passes through cultivation fields.	0.60 km (163.19˚)
20	Refinery	N 19˚58ˈ41" E 94˚59ˈ55"	The proposed ROW then runs in a straight line to the Refinery. The distance between Nyaung Pin Thar Point and Refinery is approxi-mately 1600 meters. It crosses the Minbu-Minhla motor road and the Thayet-Minbu railroad and then passes through the Petrochemical Complex land.	1.60 km (160.22˚)

As the proposed oil pipeline is 41.36kms long from Off-Take Point to the refinery and a 35m wide strip of land required all along its length, the total area of land required comes to 1.44760 sq.kms.

3.4.7 Segment-wise ROW Portrayal on Satellite Map with Descriptions

Off-Take Point (N 20˚15ˈ00", E 94˚45ˈ36")

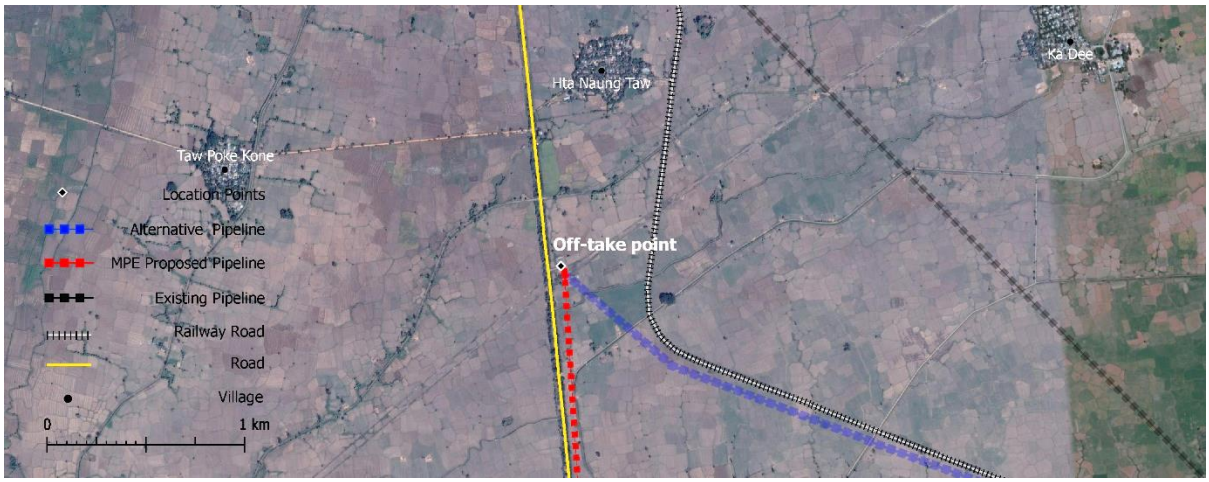


Figure 15: Off-Take Point (N 20˚15ˈ00", E 94˚45ˈ36")

Place where crude oil will be diverted from SEAP pipeline to the proposed refinery site in Minhla.

Off-Take Point - U Yin Zin Point, U Yin Zin Point - Kywe Te Point

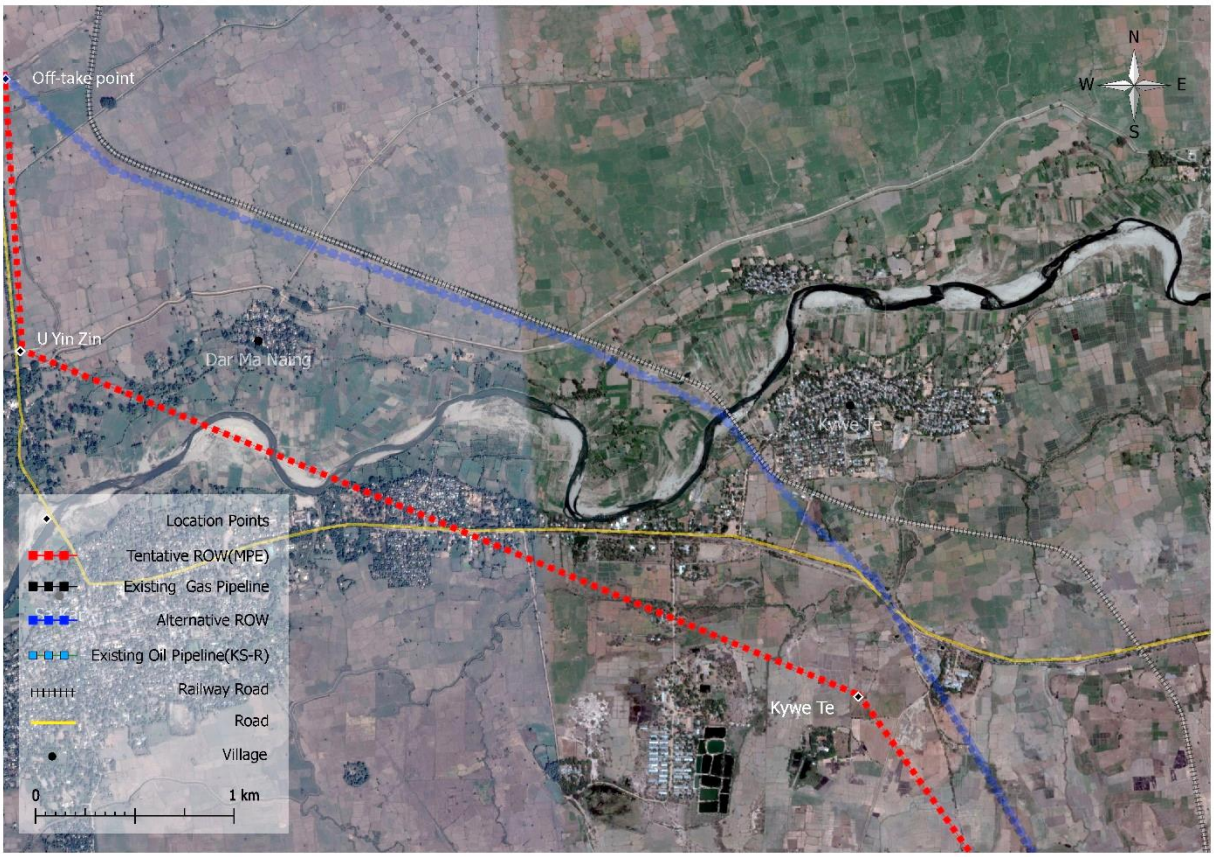


Figure 16: Off-Take Point - U Yin Zin Point - Kywe Te Point

Off-Take Point - U Yin Zin Point (N 20˚14ˈ12", E 94˚45ˈ36")

The proposed ROW travels in a straight line from the Off-Take Point to U Yin Zin Point. The proposed ROW runs parallel to the Seikphyu- Salin-Pwintbyu-Saku-Minbu Road till U Yin Zin Point, crosses two dirt tracks and passes through cultivation fields. The distance between the two points is approximately 1400 meters.

U Yin Zin Point (N 20˚14 ' 12 ",E 94˚45 ' 36 ")

U Yin Zin Point - Kywe Te Point (N 20˚13 ' 21 ", E 94˚47 ' 48 ")

The ROW suggested by MPE will pass through this area in Saku which is full of pagodas and monasteries which will have impact on cultural heritage.

Kywe Te Point (N 20˚13 ' 21 ", E 94˚47 ' 48 ")

The proposed ROW then runs in a straight line to Kywe Te Point through cultivation fields and crosses the Saku Creek three times at its S-shape loop before passing through the town's eastern part. It then crosses the Saku-Minbu Road and the access road to a monastery and the Army Road. The distance between U Yin Zin Point and Kywe Te Point is approximately 4200 meters.

Kywe Te Point - Kyi Pin Kan Point (N 20˚11 ' 48 ", E 94˚49 ' 02 ")

The above photo shows how the pipeline was laid avoiding residential area and passing only through cultivation fields and irrigated area.

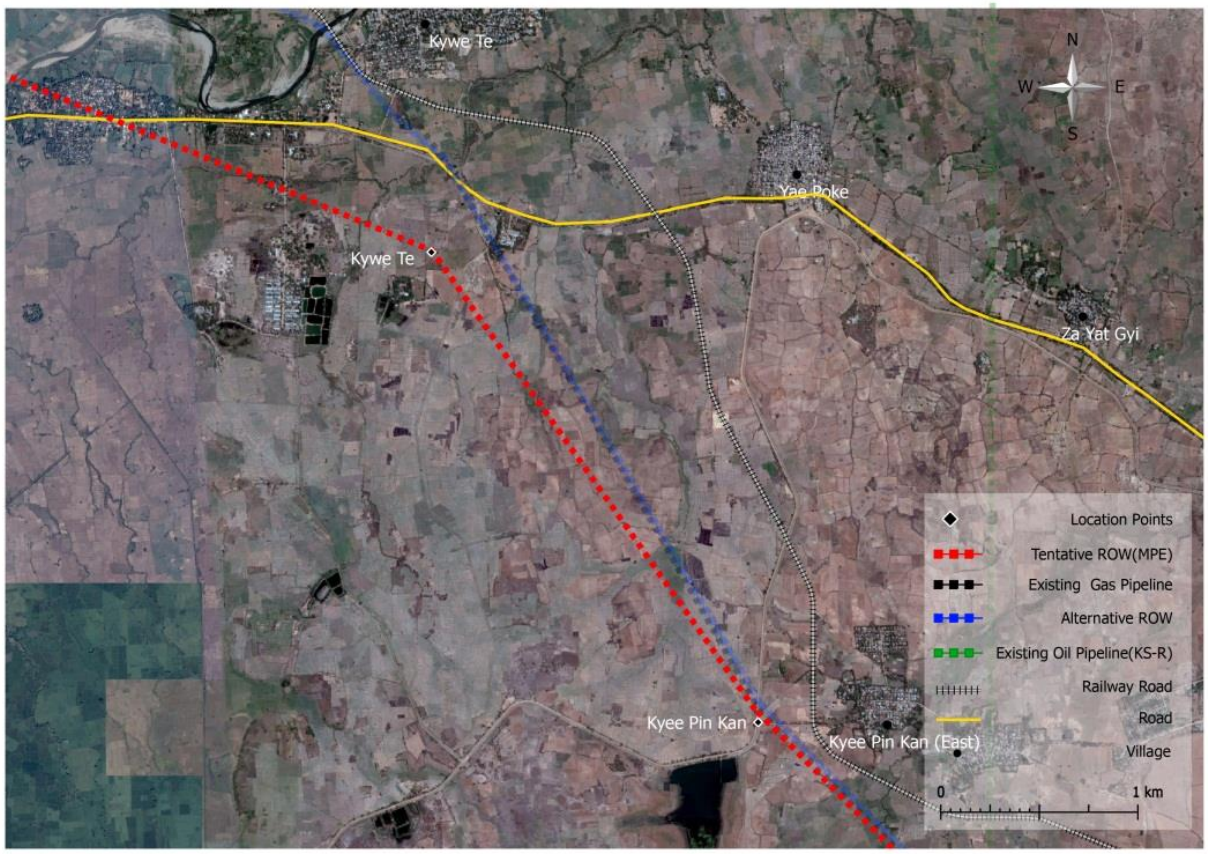


Figure 17: Kywe Te Point - Kyi Pin Kan Point

The proposed ROW then runs in a straight line to Kyi Pin Kan Point. The distance between Kywe Te Point and Kyi Pin Kan Point is approximately 3600 meters. It crosses two dirt tracks and passes mainly through cultivation fields all along.

Kyi Pin Kan Point - Kan Ye Point (N 20˚10 ˈ48 ", E 94˚50 ˈ 06 ")

The above photo shows how the pipeline is systematically marked with stone markers on both sides of the road when it crosses one.

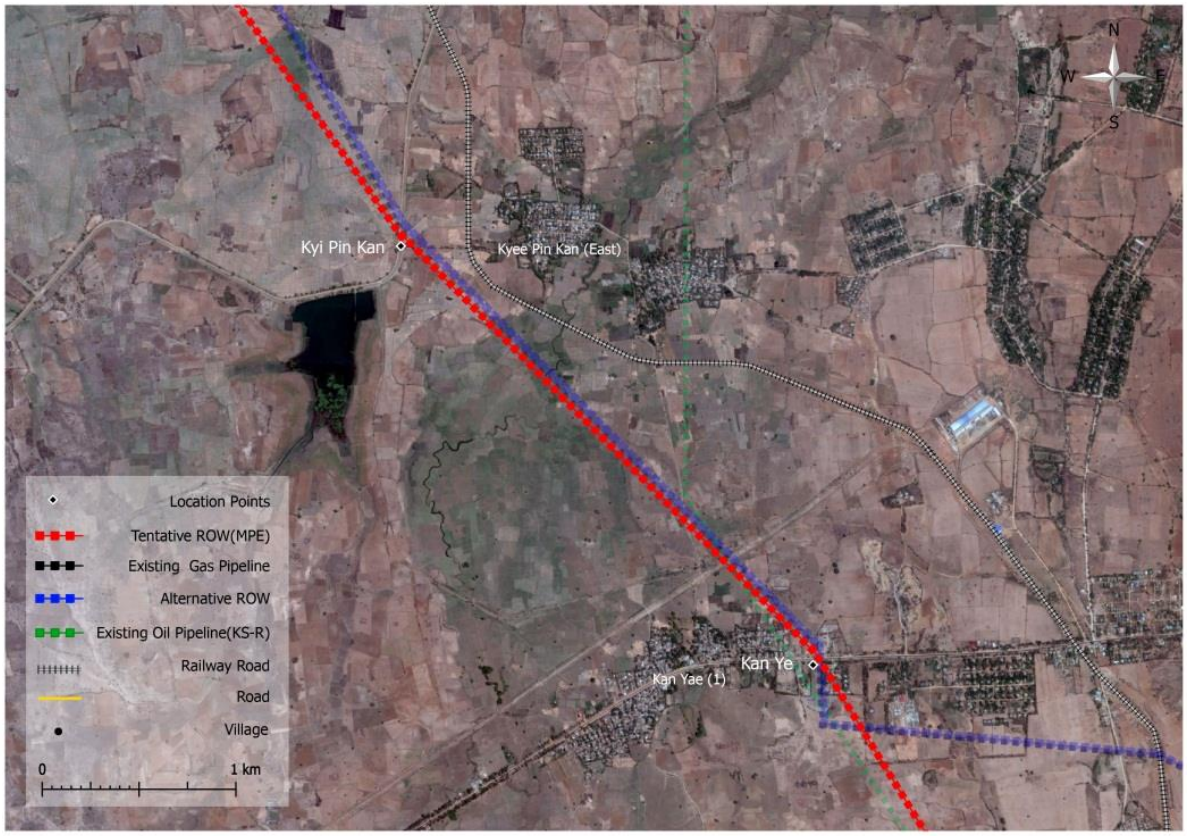


Figure 18: Kyi Pin Kan Point - Kan Ye Point

The proposed ROW then runs in a straight line to Kan Ye Point. The distance between Kyi Pin

Kan Point and Kan Ye Point is approximately 2700 meters. It crosses a creek and a road and passes mainly through cultivation fields all along.

Kan Ye Point - Htan Pin (West) Point

Htan Pin (West) Point - Ta Bin (West) Point

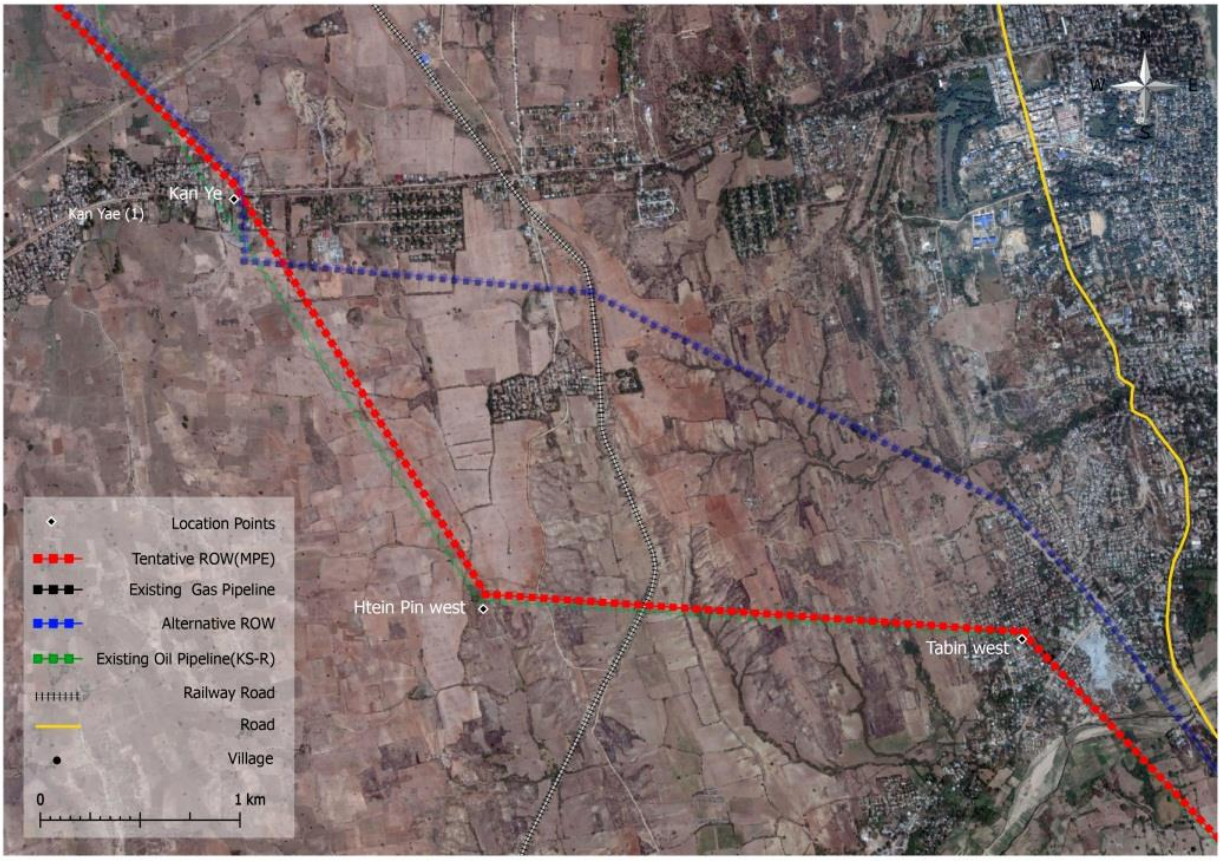


Figure 19: Kan Ye Point - Htan Pin (West) Point - Ta Bin (West) Point

Kan Ye Point - Htan Pin (West) Point (N20˚09 ꞌ33 ", E94˚50 ꞌ58")

The proposed ROW then runs in a straight line to Htan Pin (West). The distance between tan Pin (West) Point and Kan Ye Point is approximately 2700 meters. It crosses the Minbu-Ann Road.

Htan Pin (West) Point - Ta Bin (West) Point (N20˚09 ꞌ21 ", E94˚52 ꞌ03)

The proposed ROW then runs in a straight line to Ta Bin (West) Point. The distance between Htan Pin (West) Point and Ta Bin (West) Pointis approximately 1900 meters. It crosses the Pathein-Monywa railroad, a motor road, three dried-up waterways and passes mainly through cultivation fields all along.

Ta Bin (West) Point - Kywe Tho Hmyaun Point (N 20˚08 ' 24", E 94˚53 ' 30)

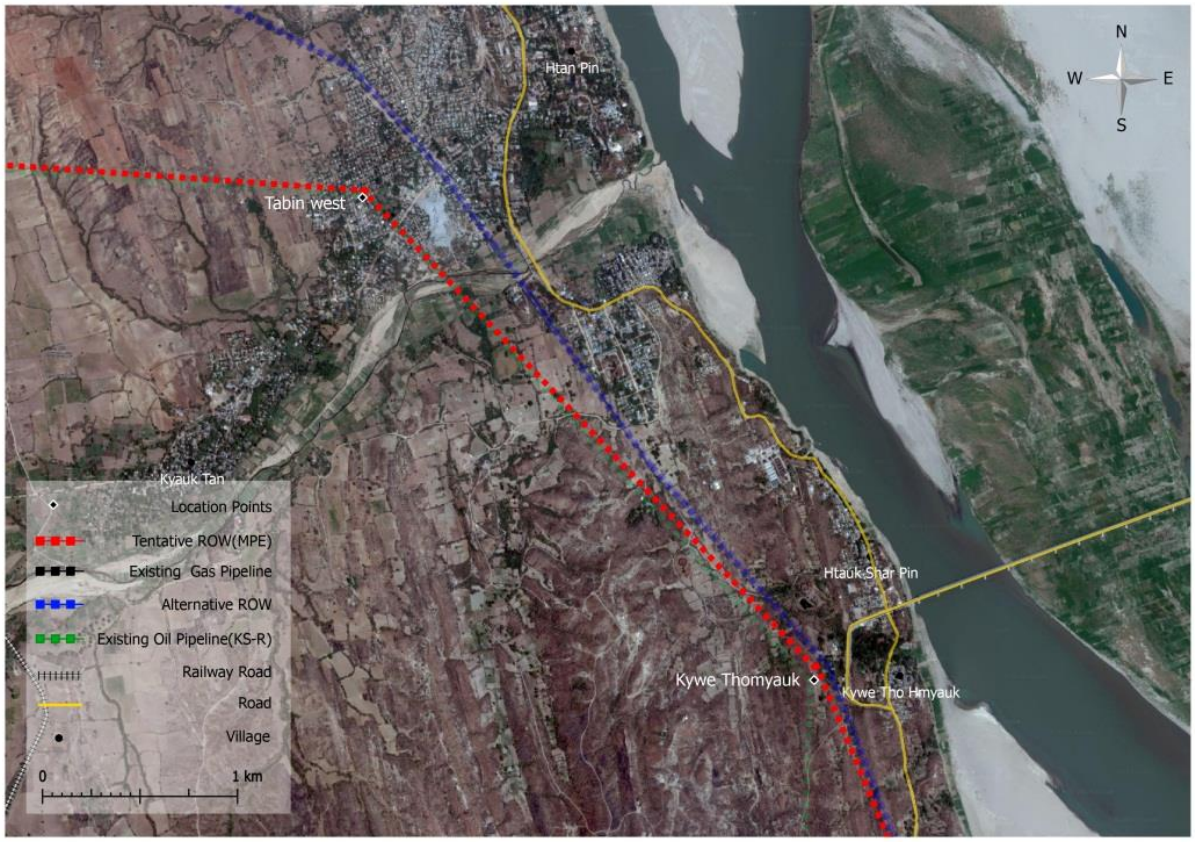


Figure 20: Ta Bin (West) Point - Kywe Tho Hmyaun Point

The proposed ROW then runs in a straight line to Kywe Tho Hmyaun Point. The distance betweenTa Bin (West) Point and Kywe Tho Hmyaun Point is approximately 3100 meters. It crosses the Minbu-Ta Bin Road, Minbu Creek and another two roads, and passes mainly through cultivation fields all along.

Kywe Tho Hmyaun Point Pha Lan Yon Point (N20˚05' 59", E94˚54 '37)

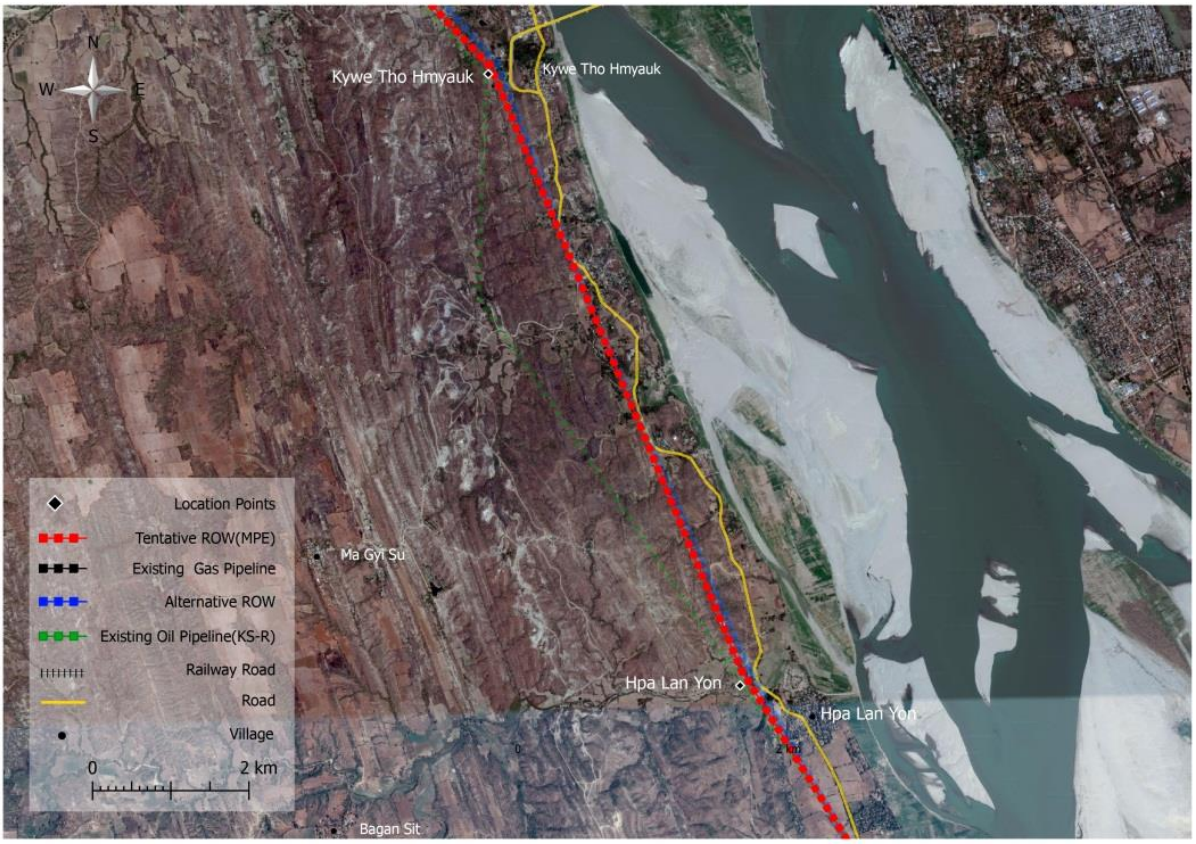


Figure 21: Pha Lan Yon Point (N20˚05' 59", E94˚54 '37)

The ROW then runs in a straight line to Pha Lan Yon Point. The distance between Kywe Tho Hmy-aun Point and Pha Lan Yon Point is approximately 4900 meters. It crosses two dirt tracks and four dried-up creeks and some hillocks and passes through some cultivation fields.

Pha Lan Yon Point - Nan Taw Kone Point (N20˚04'46", E 94˚55' 26")

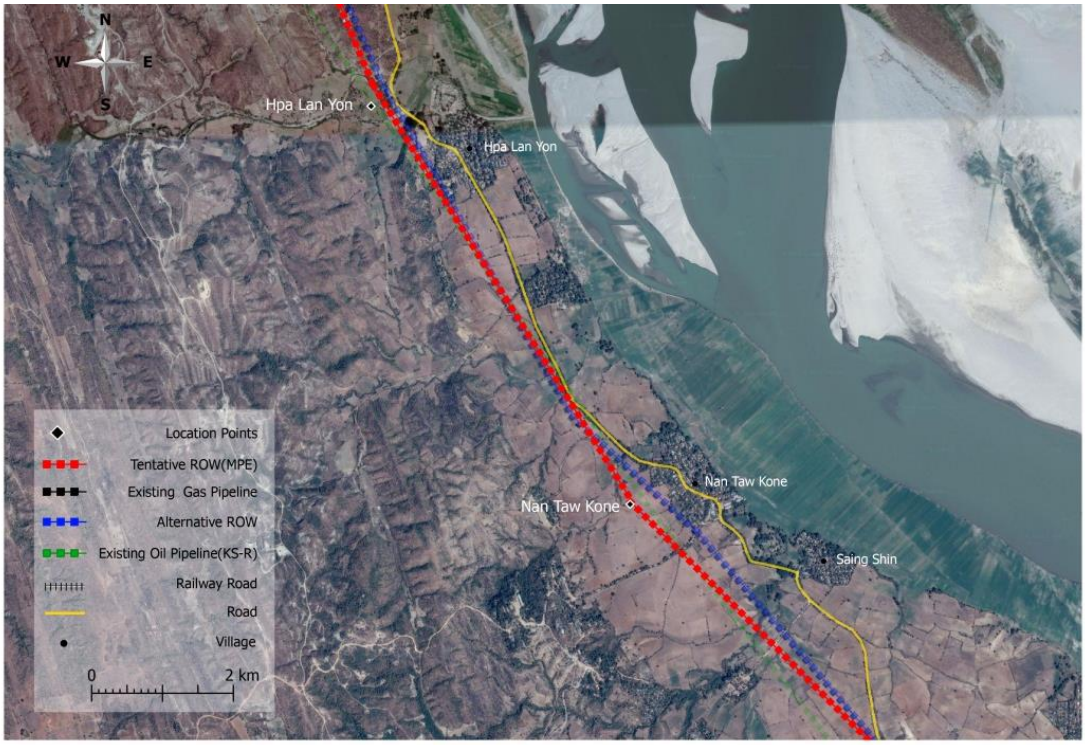


Figure 22: Pha Lan Yon Point - Nan Taw Kone Point

The proposed ROW then runs in a straight line to Nan Taw Kone Point. The distance between

Pha Lan Yon Point and Nan Taw Kone oint is approximately 2700 meters. It runs parallel to the Minbu-Minhla motor road since Kywe Tho Myaun and passes within 100 m of the nearest loop of the motor road at Pha Lan Yon. It crosses two roads and two creeks. It also passes through mainly cultivation fields all along.

Nan Taw Kone Point - Ywa Thar Yar Point (N20˚03 ' 34 ", E94˚56 ' 46 ")

Ywa Thar Yar Point - Kan Ni Point (N 20˚02 '44 ", E 94˚58 ' 06)

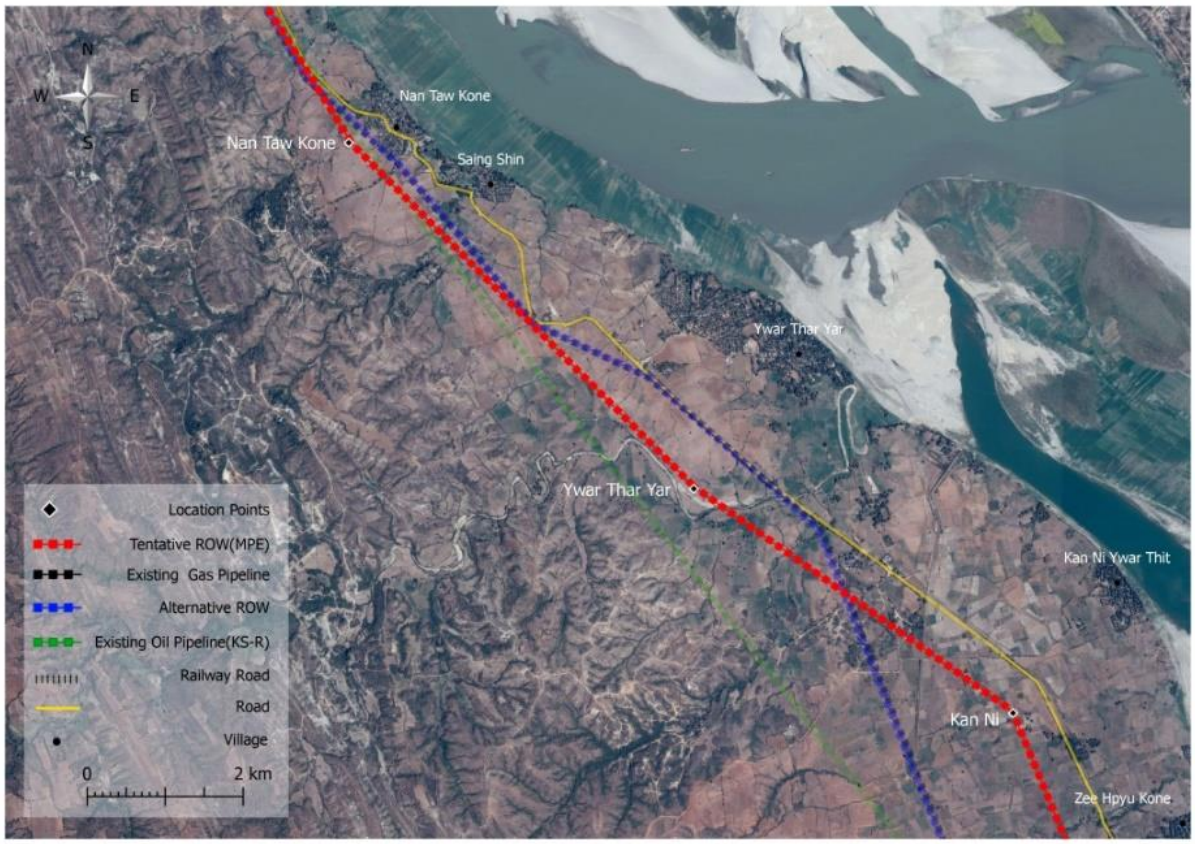


Figure 23: Nan Taw Kone Point - Ywa Thar Yar Point - Kan Ni Point

Nan Taw Kone Point - Ywa Thar Yar Point (N20˚03 ' 34 ", E94˚56 ' 46 ")

The proposed ROW then runs in a straight line to Ywa Tha Yar Point. The distance between Nan Taw Kone Point and Ywa Tha Yar Point is approximately 3300 meters. It crosses two tracks and a dried-up creek bed. It also passes through mainly cultivation fields all along.

Ywa Thar Yar Point - Kan Ni Point (N 20˚02 '44 ", E 94˚58 ' 06)

The proposed ROW then runs in a straight line to Kan Ni Point. The distance between Ywa Tha Yar Point and Kan Ni Point is approximately 3800 meters. It crosses two dried-up creek beds, two village access roads and one irrigation canal. It also passes through mainly cultivation fields all along.

Kan Ni Point - Htein Taw Point (N20˚01 ' 44 ", E94˚58 ' 36")

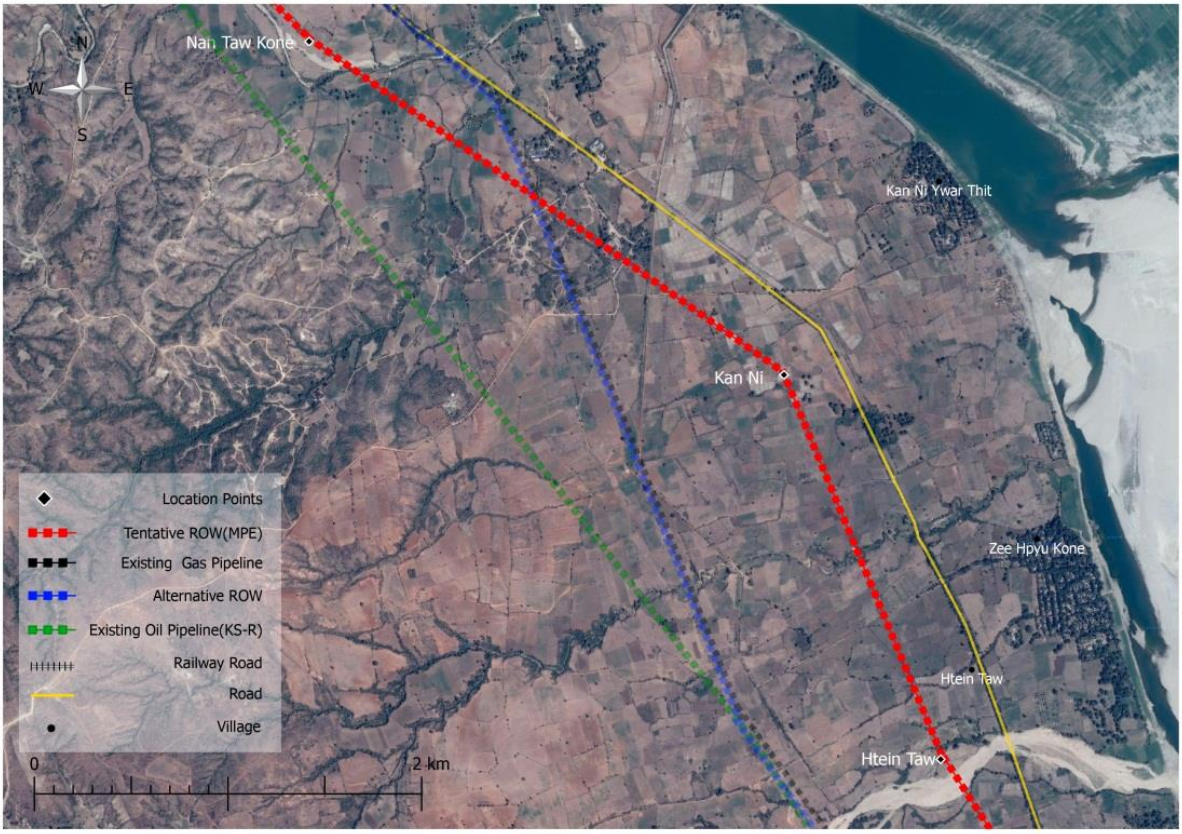


Figure 24: Kan Ni Point - Htein Taw Point

The proposed ROW then runs in a straight line to Htein Taw Point. The distance between Kan Ni Point and Htein Taw Point is approximately 2100 meters. It crosses three dried-up creek beds and one village access road. It also passes through mainly cultivation fields all along.

Htein Taw Point - Paik Pin Point (N 20˚01 ' 12 ", E 94˚58 ' 52 ")

Paik Pin Point - Ma Gyi Pin Point (N 20˚00 ' 38 ", E 94˚59 ' 08 ")

Ma Gyi Pin Point - Kon Dan Point (N 20˚00 '13 ", E 94˚59 '16 ")

Kon Dan Point - Chaung Kauk Point (N 19˚59 ' 48 ", E 94˚59 ' 31)

Chaung Kauk Point - Nyaung Pin Thar Point (N 19˚59 ' 29 ", E 94˚59 ' 37 ")

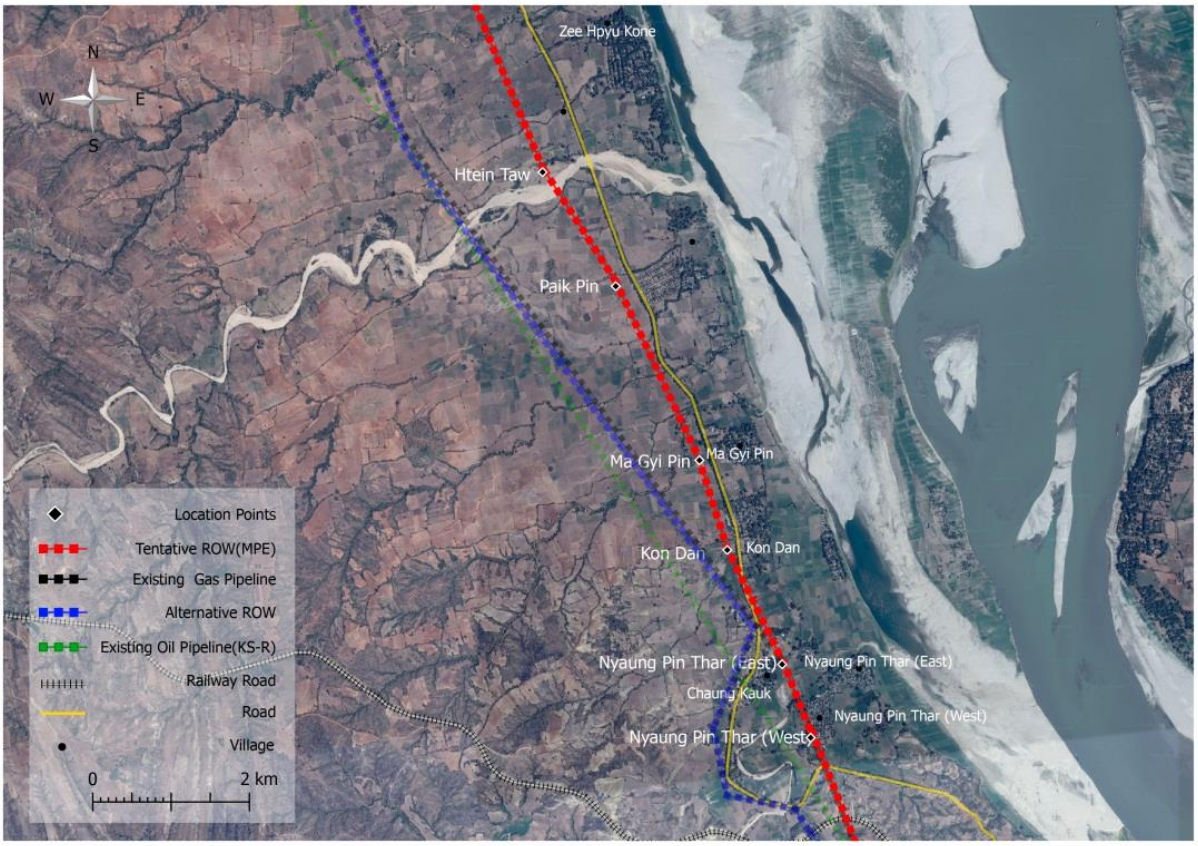


Figure 25: Htein Taw Point - Paik Pin Point - Ma Gyi Pin Point - Kone Dan Point, Chaung Kauk Point - Nyaung Pin Thar (West) Point

Htein Taw Point - Paik Pin Point (N 20˚01 ' 12 ", E 94˚58 ' 52 ")

The proposed ROW then runs in a straight line to Paik Pin Point. The distance between Htein Taw Point and Paik Pin Point is approximately 1200 meters. It crosses the dried-up Htein Taw Creek bed and one small creek. It also passes through mainly cultivation fields all along.

Paik Pin Point - Ma Gyi Pin Point (N 20˚00 ' 38 ", E 94˚59 ' 08 ")

The proposed ROW then runs in a straight line to Ma Gyi Pin Point. The distance between Paik Pin Point and Ma Gyi Pin Point is approximately 1100 meters. It crosses three dried-up creek beds. It also passes through mainly cultivation fields all along.

Ma Gyi Pin Point - Kon Dan Point (N 20˚00 '13 ", E 94˚59 '16 ")

The proposed ROW then runs in a straight line to Kon Dan Point. The distance between Ma Gyi Pin Point and Kon Dan Point is approximately 800 meters. It crosses just one very small dried-up creek bed. It also passes through mainly cultivation fields all along.

Kon Dan Point - Chaung Kauk Point (N19˚59 ' 48 ", E94˚59 ' 31)

The proposed ROW then runs in a straight line to Chaung Kauk Point. The distance between Kon Dan Point and Chaung Kauk Point is approximately 900 meters. It crosses just one small dried-up creek bed, the Minbu-Minhla motor road and two village access roads. It also passes through cultivation fields.

Chaung Kauk Point - Nyaung Pin Thar Point (N19˚59 ' 29 ", E94˚59 ' 37 ")

The proposed ROW then runs in a straight line to Nyaung Pin Thar Point. The distance between Chaung Kauk Point and Nyaung Pin Tha Point is approximately 600 meters. It crosses the Chaung Kauk Creek and also passes through cultivation fields.

Nyaung Pin Thar Point - Refinery (N19˚58ˈ41", E94˚59ˈ55")

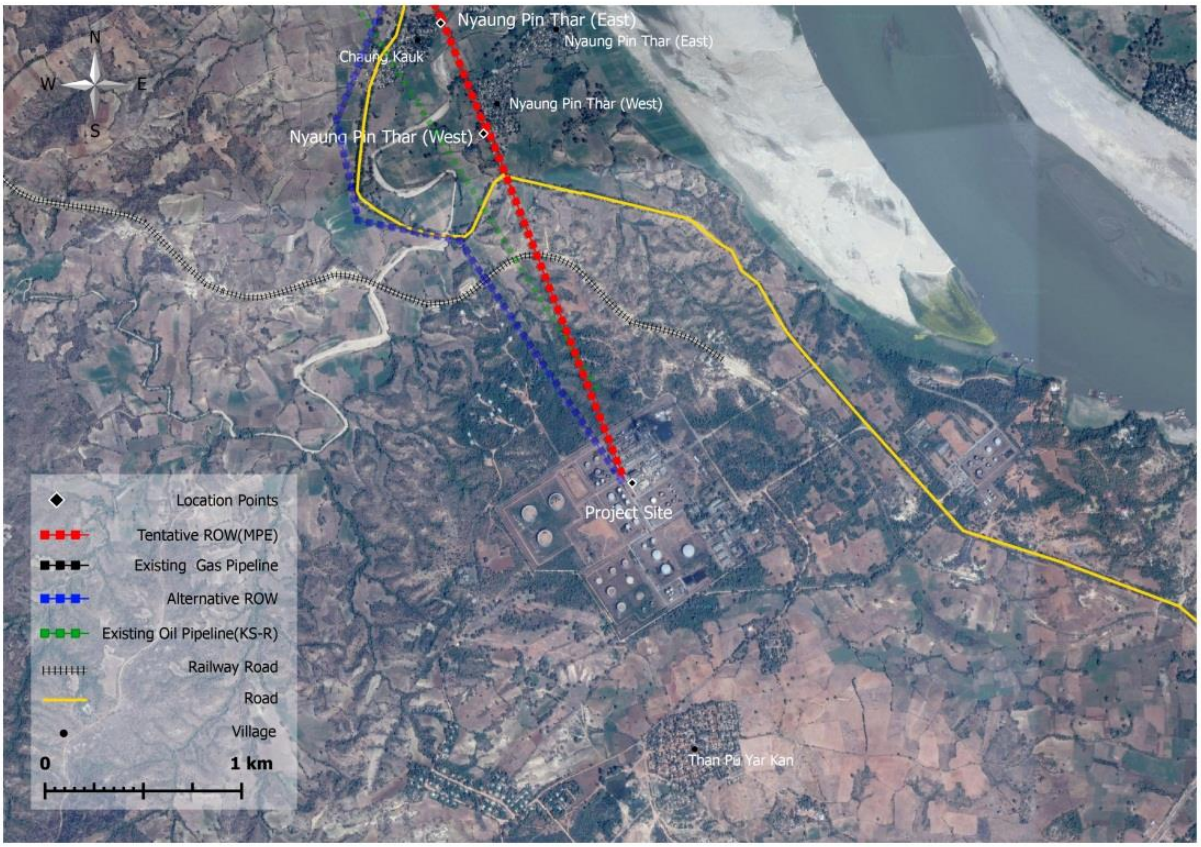


Figure 26: Nyaung Pin Thar Point - Refinery

The proposed ROW then runs in a straight line to the Refinery. The distance between Nyaung Pin Thar Point and Refinery is approximately 1600 meters. It crosses the Minbu-Minhla motor road and the Minbu-Minhla railroad and then passes through the Petrochemical Complex land.

3.5 Pipeline Construction

The pipeline will be assembled in a conventional way by a construction spread that follows along the pipeline corridor. First, the top soil is stripped away and stored separately, and then a trench is excavated. Individual 8 to 18 m long joints of pipe are then welded to the pipeline string which is subsequently lowered into the trench. The soil is placed back into the trench and the landscape reinstated while the construction spread moves forward.

In flat soft terrain the average construction progress will be up to 600 m/day, in hilly or mountainous regions the average progress will be between 300 and 450 m/day whilst in difficult sections like steep slopes and rock the average progress could be as low as 50m/day.

For communication and data exchange during operation, a fibre optic cable will be laid alongside the pipeline within the pipeline trench. Specialised techniques will be used for crossing of roads and railways. The crossing of main roads/highways, railways and larger channels may require the use of trenchless methods (e.g. horizontal drilling). Whether performing an open-cut or a trenchless installation, the pipeline shall be installed at least 2-3m below the existing infrastructure to be crossed.

The standard pipeline construction, applicable along most parts of RoW, has the following main elements:

- The working strip requires a width of approximately 40 m. The fertile top soil (typically 0.3-0.5 m thick) will be stripped off over a width approximately 22-24 m. The top soil is temporarily stored on one end of the working strip (see *Figure x.1*).
- The non-fertile “sub-soil” obtained from the pipeline trench excavation will be stored on the opposite side of the working strip. Fertile top soil must be re-deposited on top of the non fertile soil to assure adequate crop- or vegetation growth.

- The width of the working strip must provide room for pipeline fabrication (pipe stringing and welding, protective coating and quality testing of the fabricated pipeline section, lowering into the trench), and for simultaneous vehicle movements, both to happen in a safe manner.

In areas where there are construction constraints (e.g. environmental or land use constraints) and in general where limited room is available, the working strip may be reduced from 40 m to 30 m (see *Figure x.2*).

The main limitations on land use above the pipeline will be a narrow corridor of maximum 10 m in which the growing of deep routing trees will be restricted, a corridor of maximum 60 m in which the construction of houses will be restricted and a corridor of maximum 200 m in which the establishment of cluster of houses and/or industrial infrastructure is limited. The preferred route was selected to accommodate this criteria and allows sufficient space also for future developments of neighbouring communities.

Regular Working Strip

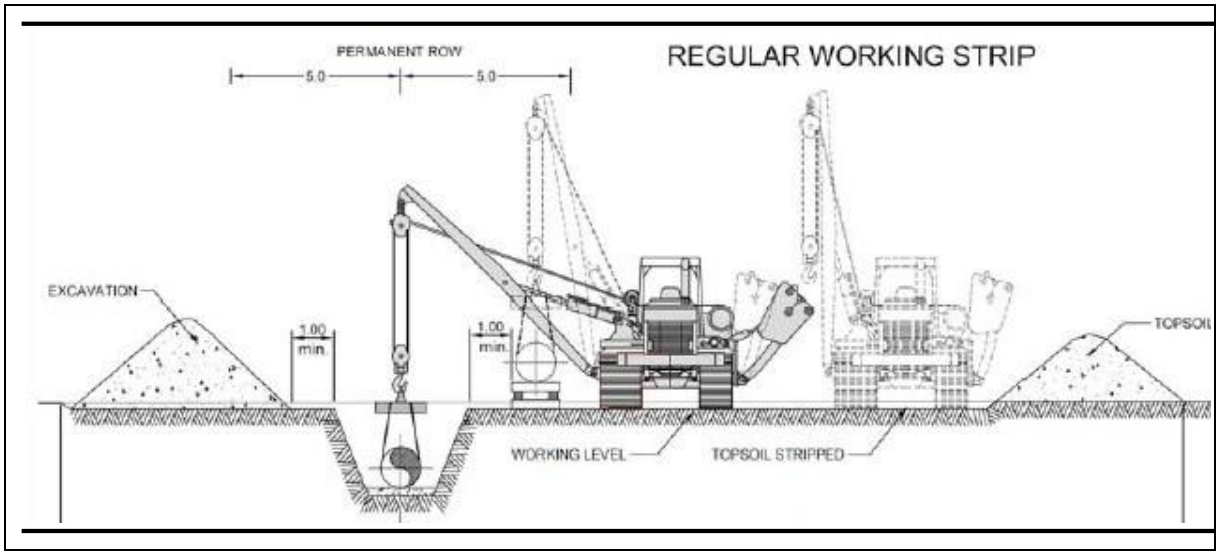


Figure 27: Regular Working Strip

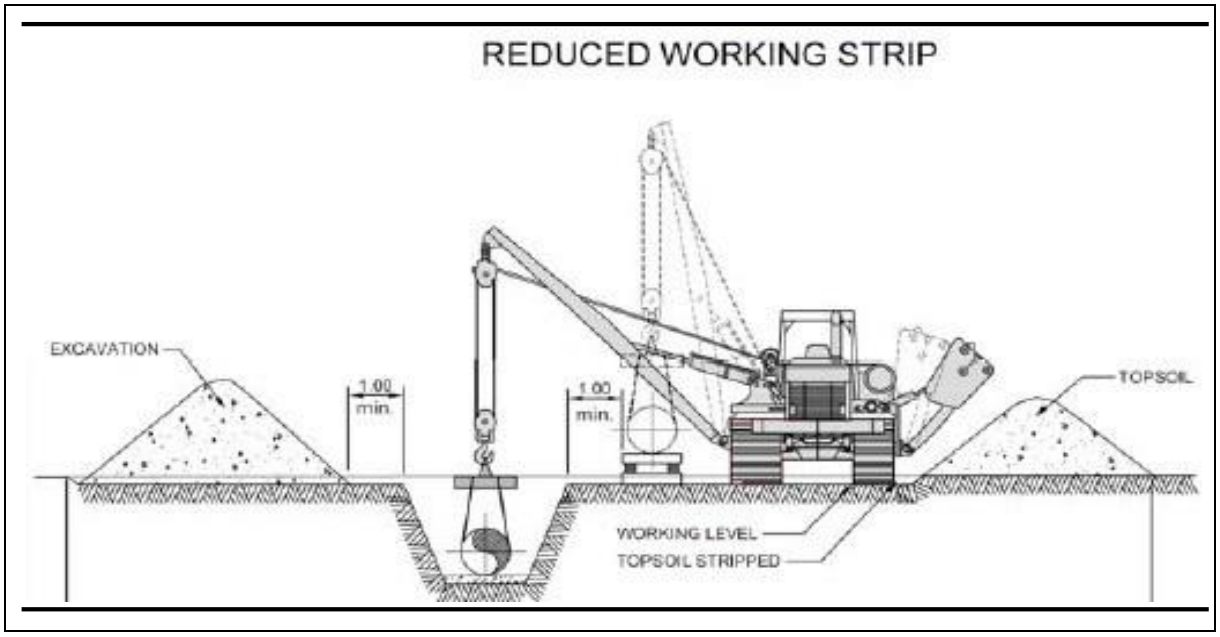


Figure 28: Reduced Working Strip

The pipeline crosses 1 highway, 2 major roads, 15 secondary roads, 2 carriage ways and tracks and 3 railroad. In addition, it requires 5 river crossings, including 2 major creeks. Where

necessary, construction methods that avoid interferences or visible long term impacts will be used in order to minimise impacts on traffic and the environment.

3.5.1 Block Valve Stations

To enhance pipeline safety, the pipeline will have block valve stations. With these valves the operator can isolate any segment of the line for maintenance work or isolate a rupture or leak. The block valves are unmanned and contain a small building with a fence around them to avoid any interference, covering a total surface area of approximately 20x30m. In line with international best practice, these stations will be installed in regular intervals of around 20km and the main equipment of such station will be installed underground.

3.5.2 Associated Facilities

For the storage and handling during construction, Myanmar Oil and Gas Enterprise (MOGE) will need 2 temporary stock yards for the pipes, one storage area for equipment (trucks etc.) and one worker camps. The selection of the location of associated facilities was conducted on the basis of access to the construction sites and right of way (RoW). A desk-top assessment of the environmental, socioeconomic and cultural heritage impacts of the sites and roads was performed with the aim to minimise interferences.

Pipe yards sizes will range between 15000 m² - 24000 m² with capacities ranging between 1260 – 2772 pipes. Regular pipes of diameter 20” will be stacked in three layers, concrete coated pipes (e.g. for river crossings) will be stacked in two layers maximum.

Workers camps will range between 20000 m^2 (200 x 100 m) and 50000 m^2 (200 x 250 m) and will accommodate between 80 and 200 workers. The pipe yards and workers camps are expected to be operating for approximately one year during the construction phase.

3.5.3 Hydrostatic Testing

Testing procedures

The entire pipeline will be subjected to hydrostatic pressure testing to prove the strength and integrity of the pipeline system, in accordance with the relevant standard (ASME B31.4). Hydrostatic testing of the pipeline will involve filling sections with water and raising the pressure to a minimum of 1.25 times the maximum allowable operating pressure (equivalent to 90% of the specified minimum yield strength of the material). (Note: although the governing engineering standard ASME B31.4 calls for an eight-hour test period a more rigorous test period of up to 24 hours may be adopted for this project).

The pipeline will be tested in sections to:

- Limit the volume of test water needed at one time
- Limit elevation changes, allowing the test pressure to be maintained between the minimum required test pressure and maximum pressure which the pipeline will safely withstand
- Suit availability of water sources and the projects waste minimization objectives
- Accommodate the maximum stress criteria for each wall thickness

Hydrostatic testing activities will be carried out in sequence and will include the following:

- Welding of certified test ends onto each end of the pipeline test section
- Internal cleaning of pipeline sections using air or water-driven cleaning and gauging pigs to remove construction debris
- Gauging pig run to confirm the internal geometry is within specified limits
- Controlled filling of pipeline sections with water
- A temperature stabilization period to allow the water and line pipe steel temperature to stabilize
- Pressurization of the pipeline test section

- A test pressure hold period (ie, commencement of up to 24 hour strength and leak test)
- De-pressurization of the pipeline test section
- Controlled dewatering of the pipeline test section
- Swabbing of the pipeline test section to remove as much water as practicable
- Removal of test ends

The displaced hydrostatic test water may be transferred to another section of pipe or discharged at a suitable location. Filters and break tanks will be used to remove any solids and control the rate of discharge. Discharge locations and rates will be agreed in advance with the relevant authorities. If chemical additives have been used, the water will be tested and treated, as required, to ensure all discharges are in compliance with applicable environmental requirements. During discharging operations, samples for water quality analysis will be taken and stored for reference.

Following successful hydrostatic testing and dewatering of two consecutive test sections a tie-in closing weld will be carried out to link the two sections together.

Hydrotest water supply

Water for hydrostatic testing will be clean, contain the minimum achievable concentrations of contaminants (eg, sediment, bacteria) and be non-corrosive. Water abstraction sources will be selected to suit the geographical location of the pipeline and will be of sufficient quantity and quality to facilitate filling of the pipeline test sections without any detrimental effect to the surrounding ecology and downstream consumers.

The number of hydro-test sections, their volume and the amount of water that can be reused for more than one section will not be known until the completion of the construction contractors' detailed plans for construction and commissioning.

Hydro-test water will be abstracted from surface water bodies located near the pipeline. The preferred source will be from one of the larger rivers crossed by the pipeline such as the Mann creek (river). Hydro-test water will only be taken from and disposed of at pre-approved locations. The testing program will likely require continuous water abstraction for periods of several days at each abstraction point.

Before the commencement of the testing program, the construction contractor will prepare, and submit for approval, a Hydrostatic Test, and Monitoring Plan. The plan will detail methods to be used for water quality analysis for pipeline filling and discharge, and the environmental controls to be implemented to prevent or minimize the following potential impacts:

- Erosion at intake location (eg, by using a buoy intake)
- Erosion /scour protection at the discharge location
- Fish entrainment into the pump (ie, in identified fish habitats)
- Fuel spillage (eg, secondary containment of pump)
- Inadequate reinstatement of disturbed lands.

Potential hydro-test water abstraction points identified by the construction contractor(s) will be subject to an environmental review by the project team before their adoption. All necessary permits required for water abstraction and disposal will be obtained from the owner/occupier/local authorities and will be under project environmental requirements. The test water will be analyzed to check the quality before and after use; the use of chemicals will be minimized but it may be necessary to add corrosion inhibitors, oxygen scavengers, or biocides.

The cleaning and hydrotesting effluent generated from pipeline and tank-farm cleaning and hydrotesting process is assumed the biggest volume in construction phase. Depending on

cleaning and hydrotesting alternative (use chemicals or not), estimation of this effluent is assumed based on the volume of biggest tank and onshore pipeline system.

Daily crude oil pipeline transportstion, based on the proposed project capacity, is approximately 100,000 barrel per day. Based on above information, 20" diameter double pipeline or 48" single pipeline shoule be installed. Estimation of hydrotest water requirement is approximatrly 48,000 m3.

Estimation of domestic wastewater in the construction phase is based on average manpower of 3,800 (4,000 in round) persons and peak manpower requirements of 6,700 (7,000 in round) persons. Anticipated construction period to mechanical completion is 36 months which equate to approximately 930 working days, based on a 6-day working week. Estimation of effluent in the construction phase is 2046,000 m^3.

Commissioning

Commissioning of the pipeline, block valves and associated above-ground installations will ensure that the pipeline system has been constructed in accordance with the design and that the system is ready for operation. Commissioning will also ensure that there are no defects in the pipeline system, which could cause problems during start-up (introduction of crude oil) or operation.

Commissioning activities for the pipeline and block valves will be carried out in sequence and will include the following:

- Checking the opening, closing, sealing and operation of mainline block valves
- Operational checks on all instrumentation
- Operational checks on all control equipment
- Operational checks on all metering
- Checking the operation of all pressure protection systems
- Checking the operation and settings of all pumping and associated equipment (eg, block valves, filters, pre-heaters)
- Checking the operation of other facilities (eg, generators)
- Checking the Cathodic Protection system to ensure that it is operating
- Undertaking integrity surveys to confirm continuity of pipeline coating

Operation

Detailed operating procedures for the pipeline system will be developed. These procedures will be in place ahead of pipeline operation. The operating procedures will typically address the following:

- An administration system covering legal considerations, work control and safety;
- Clear and effective emergency procedures and operating instructions;
- Adequate and regular training of all personnel involved in operational and maintenance issues;
- A comprehensive system for monitoring, recording and continually evaluating the condition of the pipeline and auxiliary equipment;
- A system to control all development or work in the vicinity of the pipeline;
- Effective corrosion control and monitoring;
- A system to collect and collate information on third party activities;
- Monitoring of restoration, and the undertaking of remedial work as necessary.

The pipeline will be monitored and controlled from a central control room at a location yet to be confirmed. During operation, leak detection will be by continuous measurements of pressure and flow rates at inlet and outlet of the pipeline. If a leak is detected, emergency

shutdown procedures will be implemented. To allow internal inspection, pigging facilities will be installed. The pipeline system has been designed to allow use of instrumented pigs, if necessary.

Decommissioning

The expected service lifetime of the pipeline is 50 years. Decommissioning of the pipeline will be undertaken in accordance with the legislation prevailing at that time, in liaison with the relevant regulatory authorities. The eventual decommissioning requirements will be taken into account in the design stage by ensuring that all possible options will be available. The pipeline will carry only processed gas and therefore it is unlikely that the disposal of spent cleaning fluid will be of concern.

3.6 Project Development and Implementation Time Schedules

3.6.1 The Project Life Cycle

The life span of the Project is intended to be approximately 25 years but may be extended. The following is a general listing of the anticipated Project activities in each of the four stages of the New Refinery Project.

Pre-Construction Phase (20 months)

- Basic Engineering (MPE):
- Bidding contest for EPC contractor
- Ground Improvement (EPC); and
- Detailed engineering design (EPC).

Construction phase: (36 months)

- Clearance of Project area;
- Mobilisation;
- Site preparation;
- Construction of infrastructure and utilities;
- Construction of process units and storage tanks; and
- Systems and equipment testing and start-up.

Operation phase: (25 years)

- Set up production facilities;
- Production;
- Monitoring; and
- Inspection and maintenance.

Decommission phase: (>20 years)

- At the end of the production phase;
- End of operation and demolition; and
- Final restoration.

CONSTRUCTION SCHEDULE

MPE aims to have the mechanical completion of the new refinery complex in the year 2025. Duration for the FEED work is estimated to be 16 months from the effective date of FEED contract to the completion of FEED package including total cost estimation and preparation of EPC-Developer documents. The overall project schedule is shown in Figure 29.

Activity	Pre-Construction					Construction												Operation	
	21	2022				2023				2024				2025				2026	
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
Basic Engineering (MPE)																			
Bidding contest																			
Overall		EPC Contractor																	
EPC (Milestones)																			
Front End Engineering Design FEED (EPC)																			
Ground Improvement																			
Procurement																			
Construction Phase																			
Infrastructure, Utilities/ Offsite																			
Civil, Structure & Buildings																			
Mechanical Works																			
Piping																			
Electrical Works																			
Instrumentation																			
Paints																			
Insulation																			
Pre-commissioning																			
Unit performance test																			
Plant performance test																			
Operation Phase																			
Start up and Operation																			

Figure 29: Time schedule for Basic and Detailed Engineering

3.7 Analysis Of Project Alternative

3.7.1 Justification of selecting the present site

Myanmar Petrochemical Enterprise (MPE) had formed a committee to select the site of the new oil refinery which can be near the Myanmar-China Oil Pipeline at the area of central Myanmar.

The committee has identified the present location to be the most appropriate place for the new oil refinery. The following advantages favour the selection of the site.

1 The land to be used for the building of the proposed project of new oil refinery is the property of existing petrochemical complex of Myanmar Petrochemical Enterprise under The The Ministry of Energy. Therefore, no claim from local people on the ownership of land, no land acquisition is needed.

2 People living in Thanbayakan village and Minhla township have been familiar with the existence of petrochemical factory where no significant negative impact has been known since the establishment of the existing oil refinery in 1982.

3 The location is just near the Ayawaddy River where needed amount of water can be pumped up to the factory

4 The Saku Off-take Point where crude oil will be taken out from Myanmar-China Oil Pipe Line, SEAP is just 25 mile away from the project site.

5 Needed electricity can be obtain from Minbu substation by building an additional transformer.

6 In the construction period, water, electricity, and staffs from the existing petrochemical complex can be shared for new one.

7 A rail-road just crossing just in front of the current factory can be used for transportation and logistics need of new one.

8 Two complementary projects: (1) The cost of excavation of silted land near jetty will be approximately Kyats 240 million and (2) The cost of reservoir building will Kyats 175 billion approximately. These project facilities will help in the use of the Ayewaddy River for the new refinery plant.

9 If more crude oil is available for further refining, the existing plant can be upgraded.

3.7.2 Comparison and Selection of Alternatives

1) The Ministry of Energy and CNPC of the People's Republic of China signed an MoU and Cooperation Agreement and discussed the facilitation of acquiring 2 million tons of crude oil for internal use. Myanmar will get an additional 1.5 million tons and a total 3.5 million tons of crude oil per year from the CNPC South-East Asia Pipeline Co Ltd. The proposed new oil refinery will be built within the property of the existing Petrochemical Complex (Thanbayakan) by using the crude oil acquired from the Myanmar-China Oil pipeline.

2) As a result of the feasibility study for the construction of a new refinery, the capacity of refining 2 – 5 million tons of crude oil, the estimated requirement are as following,

- Land 250 acres (100 hectare)
- Freshwater 425 tons per hour
- Cool water 19707 tons per hour
- Electricity 57731 Kilowatt

3) The Myanmar Petrochemical Enterprise (MPE) runs the country's three oil refineries—in Chauk (6,000 barrels per day or BPD), Thanlyin (20,000 BPD) and Thanbayagan (25,000 BPDs)—with a total installed capacity of 51,000 BPD. They are becoming out-dated, with aging units and equipment, coupled with low level of technology and management, the actual processing capacity is only one-third of the design, and features a low level of processing capability, unable to make in-depth processing and the production of clean fuels. In recent year, Thanlyin refinery is shutdown.

Following are the list of refinery and it constructed year;

- Chauk Refinery (Built-in 1963)
- Thanlyin Refinery (Built-in 1963)
- Thanbayakan Refinery (Built-in 1982)

4) Estimated distance from the offtake point to each refinery is as following,

- To Chauk refinery 73 kilometers
- To Thanlyin refinery 419 kilometers
- To Thanbayakan refinery 38 kilometers

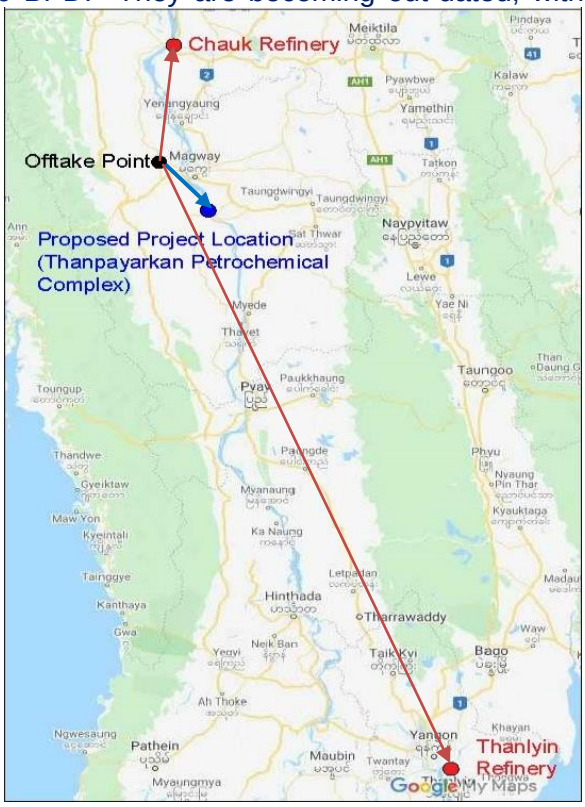


Figure 30: Alternative sites for the project

5) Above mentioned refineries, Petrochemical Complex (Thanbayarkan) location selection is more feasible compared to others. Advantage of location selection of new refinery is as follow;

Advantage and disadvantage of New Refinery

	Advantage (Thanbayarkan)	**Disadvantage (Chauk)**	**Disadvantage (Thanlyin)**
Land	More than enough, No land confiscation needed	Not feasible	Not feasible
Location	Feasible	Not Feasible – close to the community	Not Feasible – close to the community
Crude oil	Close to off-take point	Far from off-take point	Far from off-take point
Water	Easy to access Ayeyar waddy river water	Easy to access Ayeyar waddy river water	Easy to access Yangon river water
Electricity	Feasible	Feasible	Feasible
New Pipeline	Length of the pipeline is shortened then others	Not feasible, Far from off-take point crude oil source	Not feasible, Far from off-take point crude oil source

Production Processes Alternatives

In general, crude oil refining initially involves the separation of crude into various hydrocarbon fractions of specific distillation ranges. Thus, three major possible processing objectives are globally set for the refinery. These are:

- Treating the straight run streams to remove impurities and undesirable components with the minimum amount of upgrading;
- Significantly altering the straight run product state and quality with conversion processes, and
- Obtaining special cuts and utilizing specific processes for lube oil or petrochemical production

Depending on the proposed project requirements, the under listed major categories of refinery processes/units are considered as possible alternatives for meeting any of these specific goals in line with the production processes and design of the proposed Refinery plant vis-à-vis above stated project production alternatives:

- **Physical separation processes:** Atmospheric distillation, Vacuum distillation; Aromatics extraction, De-waxing/de-asphalting and Gas separation plant;
- **Chemical conversion processes:** Isomerisation, Alkylation, Reforming, Catalytic cracking, Hydrocracking, Thermal cracking/visbreaking and Asphalt blowing;
- **Purification or treating processes:** Desalting, Hydrotreating/ hydro desulphurisation (HDS) / hydro finishing, Sour gas concentration (Acid gas removal), Sulphur recovery from hydrogen sulfide, Sour water treatment, and Lubricating oil refining;
- **Utilities and General facilities:** Steam and/or power supply, Refinery liquid/gas fuel system, Flare system for disposal of vapour releases, Water, air, hydrogen, Nitrogen supply, Cooling water system, Wastewater and hydrocarbon slops treatment, Blending, storage and loading facilities
- **Environmental Controls:** Aqueous effluent treatment, Combustion and other air emission controls, Waste disposal, odour and noise control.

The above major categories of production processes have been globally accepted for an environment friendly operation of petroleum refinery. Nevertheless, the refinery processes that the proposed refinery plant will adapt to a large extent depends on the Engineering, Procurement and Construction (EPC) contractor selected bearing in mind that each potential contractor has different alternative production processes. In general, the processing methods involved in refining usually depend on the quality of the crude oil and the product distribution required.

Best Alternative Technology

The technology associated with crude oil refining is well defined due to the fact that petroleum refining is an established industry. MPE shall adopt a technology that conforms with the Oil and Gas Sector (MOGE) accepted standards. Specifically, the BAT assessment will ensure that most efficient and state-of-the-art technologies or processes are implemented by the proposed project to reduce the environmental impact.

3.7.3 Recommended alternative considerations

3.7.3.1 Need for the project

The evaluation of alternatives to the proposed project in the context of the ESIA process has been carried out based on the current status of the South East Asia Pipeline (SEAP) operated by China National Petroleum Corporation (CNPC) and the MOU signed between Myanmar's Ministry of Energy and CNPC for cooperation on the proposed new oil refinery project. The SEAP pipeline runs from Kyaukphyu Port to Kunming in Yunnan Province of China.

The new refinery project is of national importance. It will increase local production of fuel and reduce the amount of fuel imports significantly. It is expected to contribute to the ultimate goal of energy independence.

3.7.3.2 Transportation of crude oil

The goal for any business owner is to minimize transportation costs while also meeting the demands of production. Transportation costs generally depend upon the distance between the source and the destination, the means of transportation chosen, and the size and quantity of the product to be shipped. In many cases, there are several sources and many destinations for the same product, which adds a significant level of complexity to the problem of minimizing transportation costs.

The decisions a business owner must make regarding transportation of products are closely related to a number of other distribution issues. For example, the accessibility of suitable means of transportation factors into decisions regarding where best to locate a business or facility. The means of transportation chosen will also affect decision making regarding the form of packing used for products and the size or frequency of shipments made. Although transportation costs may be reduced by sending larger shipments less frequently, it is also necessary to consider the costs of holding extra inventory. The interrelationship of these decisions means that successful planning and scheduling can help business owners to save on transportation costs.

The crude oil for the proposed oil refinery will have to be obtained from the existing SEAP pipeline and there are two options for transporting crude oil.

- road transport; and/or
- pipeline transmission.

3.7.3.3 Road Transport Option

Crude Oil Transportation

The efficient and effective movement of the crude oil from the SEAP source to the oil refinery will require an extensive transportation system, necessitating thousands of trips by oil tankers to transport 3.5 million tons of crude oil per year. However, vehicular transport of the crude oil to the oil refinery in Minhla Township will not be cost-effective.

Refined Product Transportation

The proposed refinery plant will produce 5 refined products such as Gasoline, Kerosene, Aviation Turbine Fuel-ATF, Diesel, and Liquefied Petroleum Gas- LPG.

The refined products shall be circulated all over the country by Coastal Tanker, Barges along the river, Railway freight, and oil and gas container trucks.

3.7.3.4 Pipeline Transmission Option

Transporting crude oil thousands of miles through pipelines is a safe and swift method of transportation. Pipelines are the most common, and usually the most economic, delivery system to transport oil. Pipelines are a fixed, long-term investment that can be uneconomic for smaller and more remote oil fields.

The volume of crude oil that can be transported is based on two main factors: the pipeline operating pressure and pipe diameter. The maximum diameter of pipelines continues to increase every few years.

The pipeline transmission of crude oil will reduce the incidence of accidents and fire since pipes will be buried, and will be cheaper in the long term. Therefore, the pipeline transmission of the crude oil from the Off-Take Point in Minbu Township to the oil refinery in Minhla Township is the preferred option.

The alternative pipeline routes could be either offshore or onshore transmission but in the case of the proposed oil refinery project, it could only be onshore transmission. The primary objective is to locate different routes and evaluate on their suitability based on right-of-way, geotechnical issues and general construction constraints. The options have been further discussed below.

3.7.3.5 Route selection criteria

The route selection criteria were established early in the route development process on the basis of community input in combination with relevant statutory, technical, environmental and project requirements as well as relevant codes and standards to ensure smooth implementation of the project. The route selection criteria used are listed below:

- Minimum total pipeline length;
- Constructability;
- Minimum number of pipeline/cable crossing. If crossing is unavoidable, crossing angle shall be as close to 90° as possible, but in no case less than 60°;
- Environmental sensitivity;
- Avoid any land slide area;
- Minimum clearance of 2m in horizontal direction between the proposed pipelines and any existing pipeline;
- Minimum separation of 300mm between the proposed pipeline and any existing buried service.

3.7.3.6 Recommended Alternative ROW

Taking the above route selection criteria into account, this ESIA proposes an alternative ROW for the proposed development project as follows:-

Summary of Observations on the Recommended Alternative ROW

Table 10: Summary of Observations on the Recommended Alternative ROW

SN	Access to Alternative ROW	GPS Location	Issue	Distance (km) Heading (˚)
1	Off-take Point	N 20˚15 ' 00 " E 94˚45 ' 36 "	Place where crude oil will be diverted from SEAP pipeline to the proposed refinery site in Minhla.	
2	AP1 Point	N 20˚14 ' 43 " E 94˚45 ' 50 "	The ROW travels in a straight line from the Off-take Point to AP1 Point. It crosses two irrigation canals and passes through paddy fields. The distance between the two points is approximately 700 meters.	0.67 kms (130.43˚)
3	AP2 Point Dama Naing Village	N 20˚14 ' 32 " E 94˚46 ' 22 "	The ROW then travels in a straight line from AP1 Point to AP2 Dama Naing Point. It passes through paddy fields and crosses one irrigation canal. The distance between the two points is appro-ximately 1000 meters.	1.01 kms (110.72˚)
4	AP3 Point	N 20˚14 ' 18 " E 94˚47 ' 04 "	The ROW then travels in a straight line from AP2 Dama Naing Point to AP3 Point. It passes through paddy fields and crosses one irrigation canal. The distance between the two points is appro-ximately 1300 meters.	1.3 kms (110.10˚)
5	AP4 Point Man Creek	N 20˚14 ' 07 " E 94˚47 ' 29 "	The ROW then travels in a straight line from AP3 Point to AP4 Man Creek Point. It passes through paddy fields and crosses Man Creek. The distance between the two points is approximately 800 meters.	0.8 kms (116.02˚)
6	AP5 Point Access Road	N 20˚13 ' 50 " E 94˚47 ' 43 "	The ROW then travels in a straight line from AP4 Point to AP5 Access Road Saku Railway Station Point. It	0.64 kms

	Saku Railway Station		passes through paddy fields and crosses the access road to Saku Railway Station. The distance between the two points is appro-ximately 600 meters.	(141.07˚)
7	AP6 Point Kywe Te Village	N 20˚13˙41˝ E 94˚47˙54˝	The ROW then travels in a straight line from AP5 Access Road Saku Railway Station Point to AP6 Kywe Te Village Point. It passes through paddy fields and crosses the Minbu-Saku road. The distance between the two points is approximately 500 meters.	0.45 kms (131.36˚)
8	AP7 Point Kyi Pin Kan Village	N 20˚11˙53˝ E 94˚48˙59˝	The ROW then runs in a straight line from AP6 Kywe Te Village Point to AP7 Kyi Pin Kan Village Point. It passes through paddy fields and crosses an irrigation canal and the access road to Kyi Pin Kan Village. The distance between the two points is approximately 3800 meters.	3.81 kms (150.28˚)
9	AP8 Point Kan Ye (North) Village	N 20˚10˙49˝ E 94˚50˙07˝	The ROW then runs in a straight line from AP7 Kyi Pin Kan Village Point to AP8 Kan Ye (North) Village Point. It crosses two dirt tracks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2800 meters.	2.81 kms (135.1˚)
10	AP9 Point Kan Ye (South) Village	N 20˚10˙37˝ E 94˚50˙06˝	The ROW then runs in a straight line from AP8 Kan Ye (North) Village Point to AP9 Kan Ye (South) Village Point. It crosses the Minbu-Ann road. The distance between the two points is approximately 400 meters.	0.40 kms (173.83˚)
11	AP10 Point Overhead Crossing	N 20˚10˙33˝ E 94˚51˙05˝	The ROW then runs in a straight line from AP9 Kan Ye (South) Village Point to AP10 Overhead Crossing Point. It passes mainly through cultivation fields all along and crosses a dirt track. It then crosses the railway track. The distance between the two points is approximately 1700 meters.	1.65 kms (95.28˚)
12	AP11 Point Minbu (West)	N 20˚09˙59˝ E 94˚52˙13˝	The ROW then runs in a straight line from AP10 Overhead Crossing Point to AP11 Minbu (West) Point. It crosses four dried-up creeks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2300 meters.	2.25 kms (117.09˚)
13	AP12 Point Minbu-Ann Road Junction	N 20˚09˙45˝ E 94˚52˙27˝	The ROW then runs in a straight line from AP11 Minbu (West) Point to AP12 Minbu-Ann Road Junction Point, near the 'mud volcano'. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 600 meters.	0.64 kms (139.22˚)
14	AP13 Point Northern Bank of Sar Pwet Creek	N 20˚09˙32˝ E 94˚52˙37˝	The ROW then runs in a straight line from AP12 Minbu-Ann Road Junction Point to AP13 Point located on the northern bank of Sar Pwet Creek. It passes through the outskirts of west Ta Bin Village. The distance between the two points Is approximately 500 meters.	0.46 kms (144.12˚)
15	AP14 Point Southern Bank of Sar Pwet Creek	N 20˚09˙27˝ E 94˚52˙42˝	The ROW then runs in a straight line from AP13 Point located on the northern bank of Sar Pwet Creek Point to AP14 Point located on the southern bank of Sar Pwet Creek. It crosses Sar Pwet Creek. The distance between the two points Is approximately 200 meters.	0.23 kms (143.73˚)
16	AP15 Point Shwe Tabin (South) Village	N 20˚08˙58˝ E 94˚34˙05˝	The ROW then runs in a straight line from AP14 Point located on the southern bank of Sar Pwet Creek to AP15 Shwe Tabin (South) Village Point. It passes through Shwe Tabin (South) Village. The distance between the two points is approximately 1000 meters.	1.09 kms (145.10˚)
17	AP16 Point Kywe Tho	N 20˚08˙28˝ E 94˚53˙32˝	The ROW then runs in a straight line from AP15 Shwe Tabin (South) Village Point to AP16 Kywe Tho Hmyaun Village Point. It crosses a dirt track and passes mainly	1.26 kms (138.36˚)

	Hmyaun Village		through cultivation fields all along. The distance between the two points is approximately 1300 meters.	
18	AP17 Point Htauk Shar Pin-Kan Ni Oilfield	N 20˚07 ' 36 " E 94˚53 ' 51 "	The ROW then runs in a straight line from AP16 Kywe Tho Hmyaun Village Point to AP17 Htauk Shar Pin-Kan Ni Oilfield Point. It crosses hillocks and passes mainly through dry forest. The distance between the two points is approximately 1700 meters.	1.65 kms (159.36˚)
19	AP18 Point Pha Lan Yon Village	N 20˚06 ' 09 " E 94˚54 ' 35 "	The ROW then runs in a straight line from AP17 Kan Ni-Lan Ywa (Oilfield) Point to AP18 Pha Lan Yon Village Point. It crosses a dirt track, a dried-up creek and some hillocks and passes mainly through dry forest. The distance between the two points is approximately 3100 meters.	3.14 kms (156.63˚)
20	AP19 Point Nan Taw Kone Village	N 20˚04 ' 38 " E 94˚55' 10 "	The ROW then runs in a straight line from AP18 Pha Lan Yon Village Point to AP19 Nan Taw Kone Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 2900 meters.	2.94kms (145.57˚)
21	AP20 Point Road Bend	N 20˚04 ' 14 " E 94˚56 ' 06 "	The ROW then runs in a straight line from the AP19 Nan Taw Kone Village Point to AP20 Road Bend Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 1500 meters	1.5 kms (139.43˚)
22	AP21 Point Ywa Tharyar Village	N 20˚04 ' 01 " E 94˚56 ' 34 "	The ROW then runs in a straight line from AP20 Point to AP21 Ywa Tharyar Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields. The distance between the two points is appro-ximately 900 meters	0.92 kms (114.99˚)
23	AP22 Point Ywa Tharyar Creek	N 20˚03 ' 27 " E 94˚57 ' 18 "	The ROW then runs in a straight line from AP21 Ywa Tharyar Village Point to AP22 Ywa Thayar Creek Point. It crosses two dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 1700 meters	1.66 kms (131.06˚)
24	AP23 Point Htein Taw (West) Village	N 20˚01 ' 45 " E 94˚57 ' 56 "	The ROW then runs in a straight line from the AP22 Ywa Tharyar Creek Point to AP23 Htein Taw (West) Village Point. It crosses three dirt tracks, a dried-up creek, two irrigation canals and passes mainly through cultivation fields all along. The distance between the two points is approximately 3200 meters	3.2 kms (158.47˚)
25	AP24 Point Kone Dan Village	N 19 ˚54 ' 57 " E 94˚59 ' 24 "	The ROW then runs in a straight line from AP23 Htein Taw (West) Village Point to AP24 Kone Dan Village Point. It crosses two dirt tracks and eight dried-up creeks and passes mainly through cultivation fields. The distance between the two points Is approximately 4300 meters.	4.29 kms (144.34˚)
26	AP25 Point Chaung Kauk (West) Village	N 19˚59 ' 32 " E 94˚59 ' 13 "	The ROW then runs in a straight line from the P24 Kone Dan Village Point to AP25 Chaung Kauk (West) Village Point. It crosses three dirt tracks and passes mainly through cultivation fields. The distance between the two points is approximately 800 meters.	0.79 kms (202.56˚)
27	AP26 Point West of Nyaung Pin Thar (West) Village	N 19˚59 ' 17 " E 94˚59 ' 16 "	The ROW then runs in a straight line from AP25 Chaung Kauk (West) Village Point to AP26 Point west of Nyaung Pin Thar (West) Village. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.	0.49 kms (167.6˚)

28	AP27 Point Chaung Kauk Bridge	N 19˚59ˈ14ˮ E 94˚59ˈ33ˮ	The ROW then run in a straight line from AP26 Point west of Nyaung Pin Thar (West) Village to AP27 Chaung Kauk Bridge Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.	0.51 kms (101.4˚)
29	AP28 Point Railway Track	N 19˚59ˈ08ˮ E 94˚53ˈ37ˮ	The ROW then runs in a straight line from AP27 Chaung Kauk Bridge Point to AP28 Railway Track Point. It crosses the railway track and a dirt track and passes mainly through cultivation fields. The distance between the two points Is approximately 200 meters.	0.22 kms (148.28˚)
30	Project Site	N 19˚58ˈ37ˮ E 94˚59ˈ59ˮ	The ROW then runs in a straight line from AP28 Railway Track Point to the Project Site in Minhla Township. It crosses the Minbu-Minhla railroad and then passes through the Petrochemical Com-plex land. The distance between AP30 Railway Track Point and the Refinery is approximately 1200 meters.	1.15 kms (145.98˚)
Total 41.47 kms ,Area 1.45145 sq kms				

3.7.3.7 Location Map of Recommended Alternative ROW

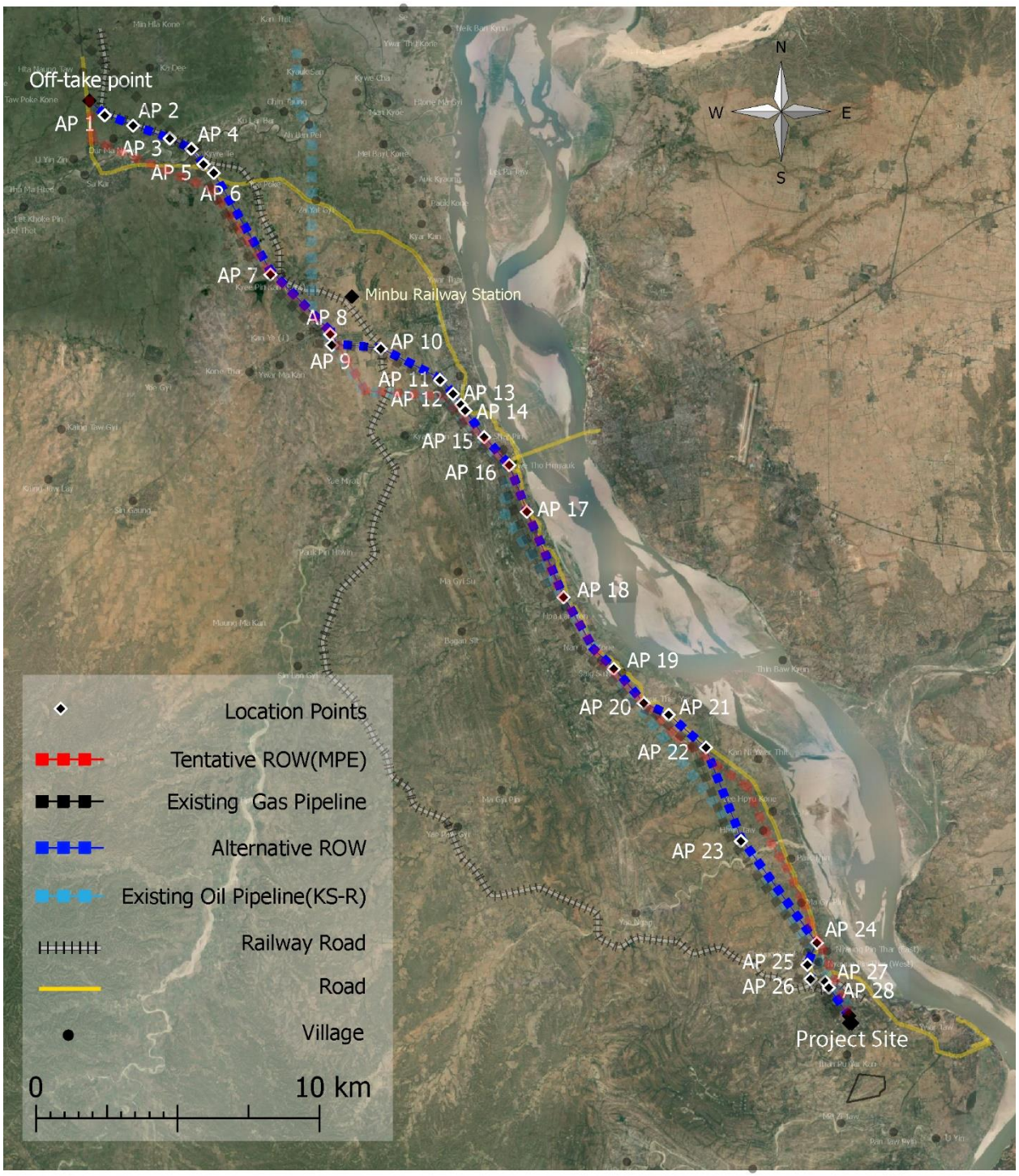


Figure 31: Map of Alternative pipeline ROW (See larger map in appendix 32)

3.7.3.8 Segment-wise portrayal of Suggested alternative ROW with photographs and satellite maps

Off-take Point

Place where crude oil will be diverted from SEAP pipeline to the proposed refinery site in Minhla.

Off-take Point(N 20˚15'00",E 94˚45'36")

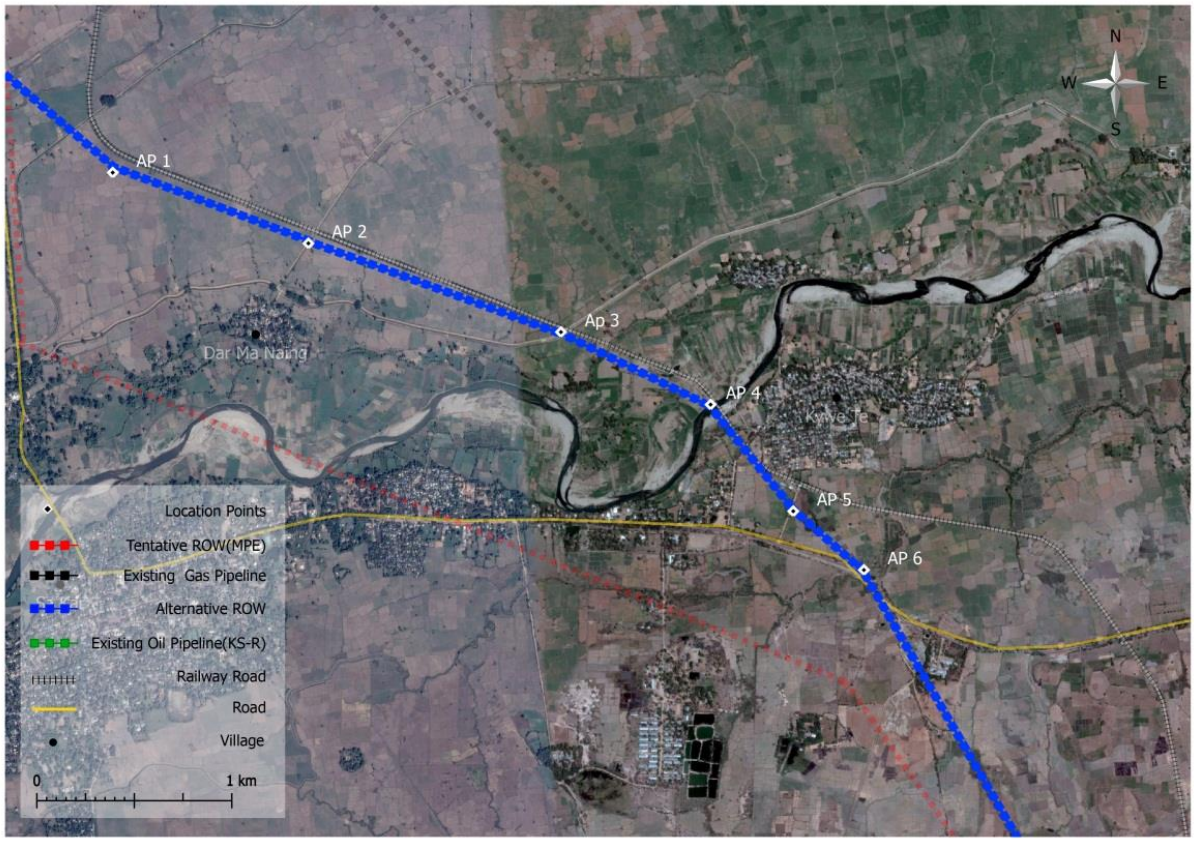
AP1 Point (N 20˚14'43",E 94˚45'50") Du Won

The ROW travels in a straight line from the Off-take Point to AP1 Point. It crosses two irrigation canals and passes through paddy fields. The distance between the two points is approximately 700 meters.

AP2 Point (N20˚14'32", E94˚46'22") Dama Naing Village

The ROW then travels in a straight line from AP1 Point to AP2 Dama Naing Point. It passes through paddy fields and crosses one irrigation canal. The distance between the two points is approximately 1000 meters.

AP3 Point (Irrigation canal)



AP3 Point (N 20˚14'18", E 94˚47'04") Irrigation canal

The ROW then travels in a straight line from AP2 Dama Naing Point to AP3 Point. It passes through paddy fields and crosses one irrigation canal. The distance between the two points is approximately 1300 meters.

AP4 Point (Man Creek)

AP4 Point (N 20˚14'07", E 94˚47'29") Man Creek

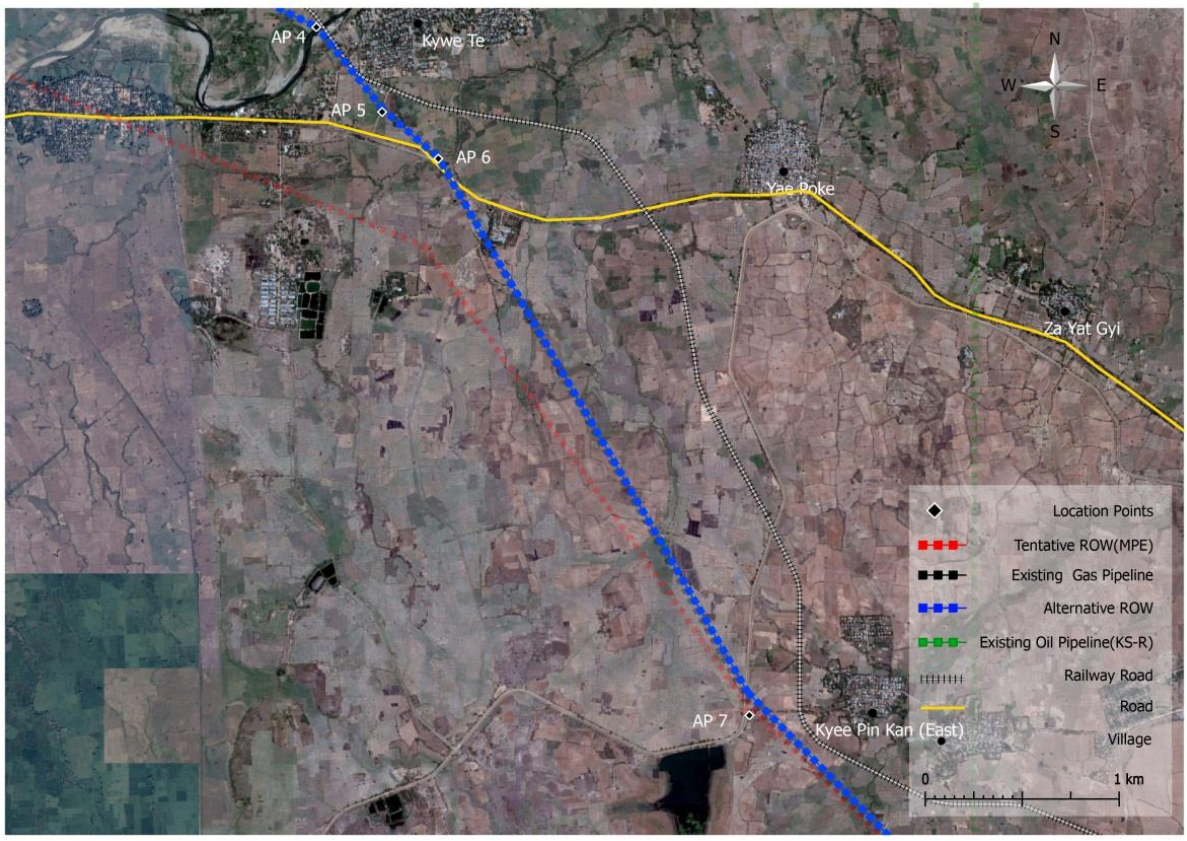
The ROW then travels in a straight line from AP3 Point to AP4 Man Creek Point. It passes through paddy fields and crosses Man Creek. The distance between the two points is approximately 800 meters.

AP5 Point (Access Road Saku Railway Station)

AP5 Point (N 20˚13'50", E 94˚47'43") Access Road Saku Railway Station

The ROW then travels in a straight line from AP4 Point to AP5 Access Road Saku Station Point. It passes through paddy fields and crosses the access road to Saku Station .The distance between the two points is approximately 600 meters.

AP6 Point (Kywe Te Village)



AP6 Point (N20˚13'41", E94˚47'54") Kywe Te Village

The ROW then travels in a straight line from AP5 Access Road Saku Station Point to AP6 Kywe Te Village Point. It passes through paddy fields and crosses the Minbu-Saku road. The distance between the two points is approximately 500 meters.

AP7 Point (Kyi Pin Kan Village)

AP7 Point (N20˚11'53", E94˚48'59") Kyi Pin Kan Village

The ROW then runs in a straight line from AP6 Kywe Te Village Point to AP7 Kyi Pin Kan Village Point. It passes through paddy fields and crosses an irrigation canal and the access

road to Kyi Pin Kan Village. The distance between the two points is approximately 3800 meters.

AP8 Point (Kan Ye (North) Village)

AP8 Point (N20˚10'49", E94˚50'07") Kan Ye (North) Village

The ROW then runs in a straight line from AP7 Kyi Pin Kan Village Point to AP8 Kan Ye (North) Village Point. It crosses two dirt tracks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2800 meters.It then crosses Minbu-Ann

road (shown above) and continues on to P9 Kan Ye (South) Village Point 400 meters away.

AP10 Point (Overhead Crossing)

AP10 Point (N 20˚10'33", E 94˚51'05") Overhead Crossing

The ROW then runs in a straight line from AP9 Kan Ye (South) Village Point to AP10 Overhead Crossing Point. It passes mainly through cultivation fields all along and crosses a dirt track. It then crosses the railway track. The distance between the two points is approximately 1700 meters.

AP11 Point (Wes -Minbu)

AP11 Point (N 20˚09'59",E 94˚52'13") Minbu (West)

The ROW then runs in a straight line from AP10 Overhead Crossing Point to AP11 Minbu (West) Point. It crosses four dried-up creeks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2300 meters.

AP12 Point (Minbu-Ann Road Junction)

AP12 Point (N 20˚09'45", E 94˚52'27") Minbu-Ann Road Junction

The ROW then runs in a straight line from AP11 Minbu (West) Point to AP12 Minbu-Ann Road Junction Point, near the 'mud volcano'. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 600 meters.

AP13 Point (Northern Bank of Sar Pwet Creek)

AP13 Point (N 20˚09'32", E 94˚52'37") Northern Bank of Sar Pwet Creek

The ROW then runs in a straight line from AP12 Minbu-Ann Road Junction Point to AP13 Point located on the northern bank of Sar Pwet Creek. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 500 meters.

AP14 Point (Southern Bank of Sar Pwet)

AP14 Point (N 20˚09'27, E 94˚52'42") Southern Bank of Sar Pwet Creek

The ROW then runs in a straight line from AP13 Point located on the northern bank of Sar Pwet Creek Point to AP14 Point located on the southern bank of Sar Pwet Creek. It crosses

Sar Pwet Creek. The distance between the two points is approximately 200 meters.

AP15 Point (Shwe Tabin (South) Village)

AP15 Point (N20˚08'58", E94˚34'05") Shwe Tabin (South) Village

The ROW then runs in a straight line from AP14 Point located on the southern bank of Sar Pwet Creek to AP15 Shwe Tabin (South) Village Point. It passes through Shwe Tabin (South) Village. The distance between the two points is approximately 1000 meters.

AP16 Point Kywe Tho Hmyaun Village

AP16 Point Kywe Tho Hmyaun Village (N20˚08'28",E94˚53'32")

The ROW then runs in a straight line from AP15 Shwe Tabin (South) Village Point to AP16 Kywe Tho Hmyaun Village Point. It crosses a dirt track and passes mainly through cultivation fields all along. The distance between the two points is approximately 1300 meters.

AP17 Point Htauk Shar Pin-Kan Ni Oilfield

AP17 Point (N 20˚07' 36", E 94˚53' 51")Htauk Shar Pin-Kan Ni Oilfield

The ROW then runs in a straight line from AP16 Kywe Tho Hmyaun Village Point to AP17 Htauk Shar Pin-Kan Ni Oilfield Point. It crosses hillocks and passes mainly through dry forest. The distance between the two points is approximately 1700 meters.

AP18 Point (Pha Lan Yon Village)

18 Point (N 20˚06' 09", E 94˚54' 35")Pha Lan Yon Village

The ROW then runs in a straight line from AP17 Kan Ni-Lan Ywa (Oilfield) Point to AP18 Pha Lan Yon Village Point. It crosses a dirt track, a dried-up creek and some hillocks and passes mainly through dry forest. The distance between the two points is approximately 3100 meters.

AP19 Point (Nan Taw Kone Village)

AP19 Point (N 20˚04' 38", E 94˚55' 10") Nan Taw Kone Village

The ROW then runs in a straight line from AP18 Pha Lan Yon Village Point to AP19 Nan Taw Kone Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 2900 meters.

AP20 Point (Road Bend)

AP20 Point (N 20˚04' 14", E 94˚56' 06") Road Bend

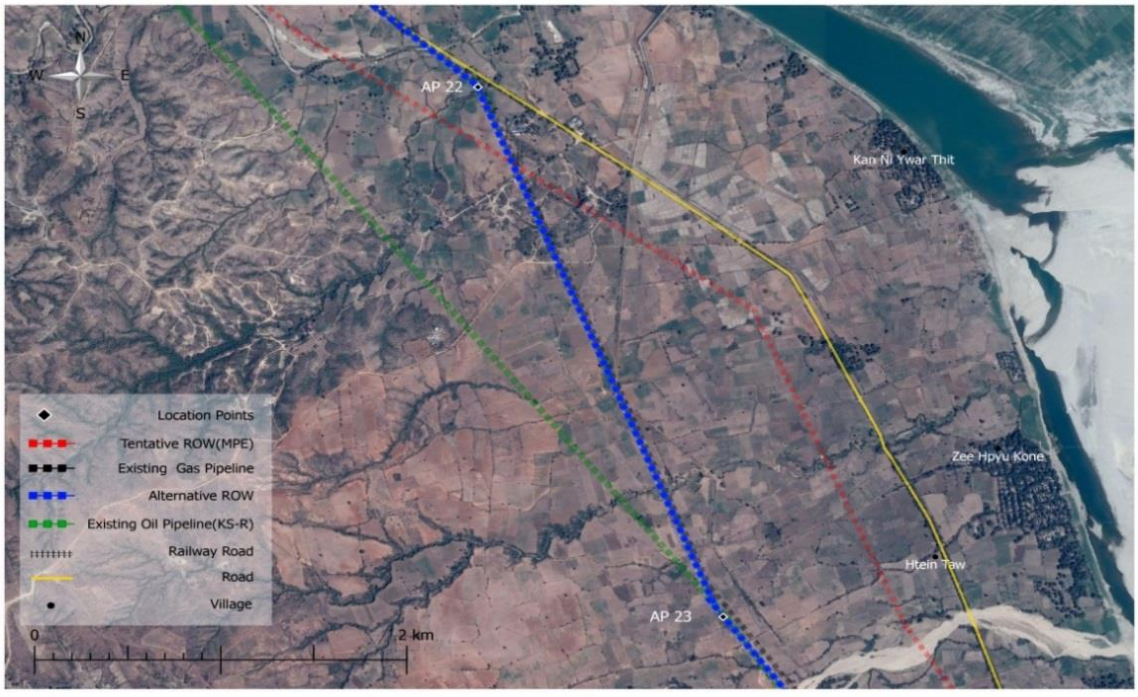
The ROW then runs in a straight line from the AP19 Nan Taw Kone Village Point to AP20 Road Bend Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 1500 meters.

AP21 Point (Ywa Tharyar Village)

AP21 Point (N 20˚04' 01", E 94˚56' 34") Ywa Tharyar Village

The ROW then runs in a straight line from AP20 Point to AP21 Ywa Tharyar Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields. The distance between the two points is approximately 900 meters.

AP22 Point (Ywa Tharyar Creek)



AP22 Point (N 20˚03' 27", E 94˚57' 18")Ywa Tharyar Creek

The ROW then runs in a straight line from AP21 Ywa Tharyar Village Point to AP22 Ywa Thayar Creek Point. It crosses two dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 1700 meters.

AP23 Point Htein Taw (West) Village

AP23 Point (N 20˚01'45", E 94˚57' 56") Htein Taw (West) Village

The ROW then runs in a straight line from the AP22 Ywa Tharyar Creek Point to AP23 Htein Taw (West) Village Point. It crosses three dirt tracks, a dried-up creek, two irrigation canals and passes mainly through cultivation fields all along. The distance between the two points is approximately 3200 meters.

AP24 Point (Kone Dan Village)

AP24 Point (N19 ˚54' 57", E 94˚59' 24")Kone Dan Village

The ROW then runs in a straight line from AP23 Htein Taw (West) Village Point to AP24 Kone Dan Village Point. It crosses two dirt tracks and eight dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 4300 meters.

AP25 Point Chaung Kauk (West) Village

AP25 Point (N 19˚59'32", E 94˚59' 13") Chaung Kauk (West) Village
AP26 Point (N 19˚59'17", E 94˚59' 16") West of Nyaung Pin Thar (West) Village
AP27 Point (N 19˚59'14", E 94˚59' 33") Chaung Kauk Bridge
AP28 Point (N 19˚59'08", E 94˚53' 37") Railway Track
Project Site (N 19˚58' 37", E 94˚59' 59")

The ROW then runs in a straight line from AP23 Htein Taw (West) Village Point to AP24 Kone Dan Village Point. It crosses two dirt tracks and eight dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 4300 meters.

AP26 Point (West of Nyaung Pin Thar (West) Village)

The ROW then runs in a straight line from AP25 Chaung Kauk (West) Village Point to AP26 Point west of Nyaung Pin Thar (West) Village. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.

AP27 Point (Chaung Kauk Bridge)

The ROW then run in a straight line from AP26 Point west of Nyaung Pin Thar (West) Village to AP27 Chaung Kauk Bridge Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.

AP28 Point (Railway Track)

The ROW then runs in a straight line from AP27 Chaung Kauk Bridge Point to AP28 Railway Track Point. It crosses the railway track and a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 200 meters.

Project Site

The ROW then runs in a straight line from AP28 Railway Track Point to the Project Site in Minhla Township. It crosses the Minbu-Minhla railroad and then passes through the Petrochemical Complex land. The distance between AP30 Railway Track Point and the Refinery is approximately 1200 meters.

3.8 Justification for the alternative ROW

3.8.1 Weakness of ROW suggested by MPE

The tentative ROW suggested by MPE is plausible for the first segment from the Off-Take Point to U Yin Zin Village Point as it parallels the motor road which makes construction logistics easier.

However, the segment from U Yin Zin Village Point to Kywe Te Village Point could meet with a host of problems. Firstly, it involves crossing Man Creek three times which could lead to serious soil erosion. Secondly, it involves passing through a concentration of pagodas, congested residential areas and offices and schools in the eastern part of the town of Saku. This will create serious social and cultural impact. Thirdly, it involves crossing the main road in Saku diagonally and a cantonment area causing unnecessary impact.

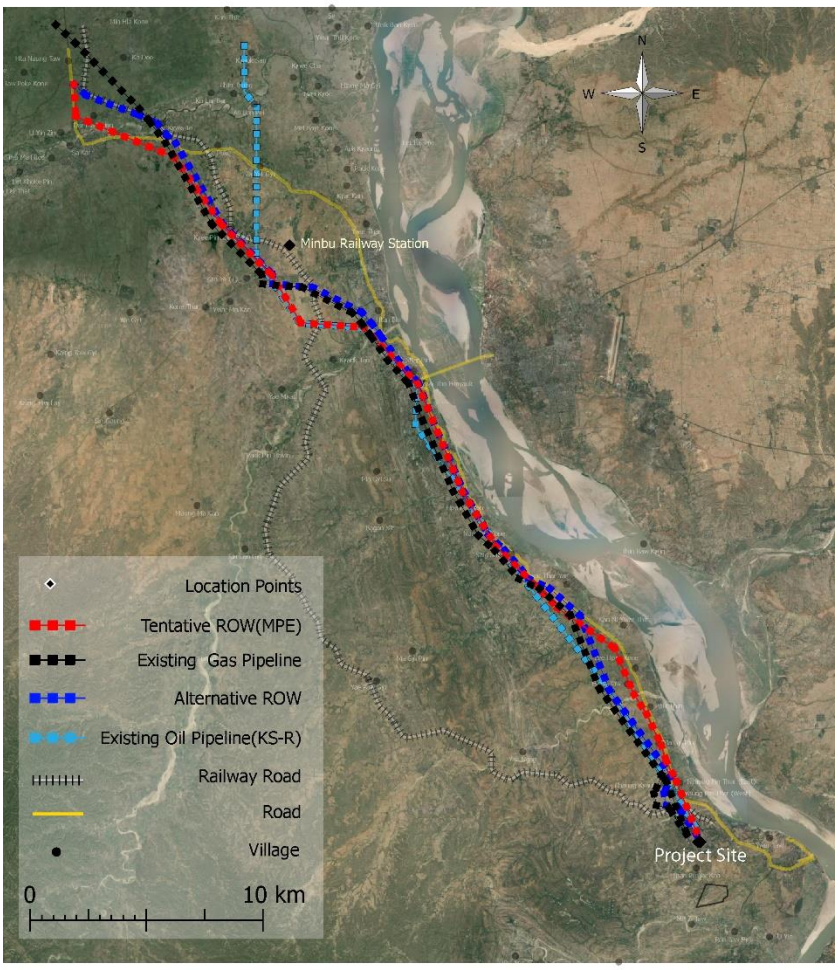


Figure 32: Pipeline ROW

The segment from Kywe Te Point-Kyi Pin Kan Point-Kan Ye Point passes through uninhabited cultivation fields and it follows the same route as an existing gas pipeline which will create only impacts that could be mitigated.

3.8.2 Weakness of alternative ROW proposed in Main ESIA Report

The Main ESIA Report has proposed a ROW the route of which starts from the Off-Take Point in an easterly direction to a point near Kyauk San Village which is also the starting point of an existing oil pipeline to the existing refinery in the Petrochemical Complex in Thanbayakan in Minhla Township. However, the Off-Take Point-Kyauk San route involves passing through rich paddy fields in an intensively irrigated area which see three harvests every year. The distance in a straight line from the Off-Take Point to Kyauk San is approximately 7500 meters (about

4.7 miles). The ROW construction logistics for that huge area will take a heavy toll of damage on these rich paddy fields.

3.8.3 Strength of the recommended alternative ROW

Therefore, the present Supplementary tesk recommends an alternative ROW. The alternative ROW seeks to avoid the problems posed by the ROW suggested by MPE in the Saku area. The alternative ROW takes its route more easterly to the nearest point to the Pathein-Monywa railroad and then parallels the railroad till Man Creek. In this way, the alternative ROW seeks to cross Man Creek only once, thus reducing the impact of soil erosion. It also seeks to avoid residential areas and cultural areas in order to reduce the social and cultural impacts. Then, by taking the alternative ROW quickly to parallel the railroad, it seeks to strengthened construction logistics by taking advantage of rail transportation for its huge transportation capacity and comparative low cost.

Statistics

MPE suggested pipeline length	**41.36kms**	**Land area required**	**1.44760 sq.kms**
Suggested alternative pipeline length	41.47kms	Land area required	1.45145 sq.kms
Increased length	+0.11km	Increased land area requirement	+0.0035 sq.km

The proposed alternative oil pipeline is 41.47kms long from Off-Take Point to the refinery and, with a 35m wide strip of land required all along its length, the total area of land required comes to 1.45145 sq.kms.

As mentioned in Chapter 4, the pipeline proposed by MPE is 41.36kms long and, with a 35m wide strip of land required all along its length, the total area of land required for that pipeline route comes to 1.44760 sq.kms.

Therefore, the alternative pipeline route increases its length by 0.11kms and the land requirement is increased by 0.0035 sq.kms.

As the proposed new alternative ROW is just 100 meters longer than the ROW suggested by MPE, the increases in land acquisition and amount of compensation could be regarded as negligible.

Furthermore, the proposed new alternative ROW traverses privately owned land from the Off-Take Point to Kywe Te Point (where it crosses Saku-Minbu motor road marked with stone markers) and it traverses only government-owned land from that point onwards. Therefore, the land acquisition and compensation issue arises only in the first segment and total monetary compensation to be paid out would be less compared to the pipeline suggested by MPE.

3.8.4 Pipeline Materials

There are basically three (3) types of natural gas pipe materials; namely steel pipe, fibreglass pipe and plastic based pipe. Steel pipe has the advantage over the others when comparing their physical characteristics of steel, if pressure is the critical factor. Steel pipe pressure ratings

can exceed 5,000 psi depending on pipe size and location of installation. High Density Polyethylene (HDPE) pipe use in natural gas transportation is not used for pressures typical of transmission or trunk distribution lines. Fibreglass Reinforced Pipe (FRP) prepared from aromatic amine cure epoxy resins have been tested at pressures > 3,500 psi in diameters ranging from 2-3", and approximately 2,750 psi in 4-10" diameter pipe. Aliphatic amine cured epoxy pipe has been certified at 3,750 psi for 2" and up to 1,100 psi for 8" diameter pipe, however this investigation did not find any instances where natural gas was being transported in composite pipe at high pressures.

Thermoplastic pipe is susceptible to a reduction in mechanical properties at elevated temperatures. FRP mechanical properties are reduced with increased heat, but not generally as dramatically as HDPE. Fibreglass based pipe pressure certifications are generally valid up to around 200°F (93.3°C). There are some vinyl ester pipe materials that retain properties up to about 300° F (148.9°C) but in general temperature is much more of an issue than with steel pipe.

There are other advanced composites that are currently being used in oil and gas field production applications. These spoolable composites are manufactured in sizes ranging from

1 – 4½ inches and continuous lengths up to 35,000'. This type of pipe has a thermoplastic liner surrounded by a hybrid laminate made of carbon, glass or other fibres in an epoxy resin base. All of the strength in this pipe comes from the outer laminate layer. This allows for use of different materials for the thermoplastic liner.

This spoolable pipe has pressure ratings ranging from 750 – 5000psi. A drawback with this system is that due to the spooling process, microcracks will develop in the laminate layer. Testing has shown that some outer laminate layers will begin to "weep" due to micro-permeation at pressures exceeding 600 psi when no liner is used. The type of thermoplastic liner material chosen determines the suitability for each application.

Generally speaking, the weakest point in a composite pipeline is at the joint. There are a number of joining systems available for composite pipe. Joining methods include Butt-and-Wrap, O-Ring, Flush Thread, Flanged, Keway Joint, Socket Joint (coupled), Threaded and Bonded, Bell and Spigot (matched tapered). With FRP, the strongest joint is a butt-and-wrap joint. Unfortunately this type of joint is both labour and time intensive, requiring multiple applications of resin and reinforcing material with curing time between each application. Coupled joints required gluing or cementing the joints of pipe together using couplings made of the same material. This system works well with low-pressure distribution systems, but is generally not used in higher pressure transmission pipeline applications. A variation of this is the couple-and-wrap method that is similar to a butt-and-wrap with a coupling. Threaded FRP pipe with a box and pin configuration is also widely used in oilfield applications. Maintaining a complete seal in natural gas pipelines at higher pressures however is a challenge with this method of connection. Pipe with flanged connections is quick to install, but larger diameters are difficult to work with, and flanged pipe is not cost competitive. With spoolable composite pipe, the joints are minimized and installations over long distances are maximized. Unlike FRP, the joints do not rely on secondary bond characteristics. Spooled pipe can be laid at rates considerably higher than conventional steel or fibreglass "stick" pipe.

3.8.5 Advantages of Steel Pipe (Preferred option)

In an age when communities depend more than ever upon a continual, economic supply of energy sources, steel is the ideal and proven material of choice for high-pressure gas transmission pipelines. Pipelines need to consistently deliver product year in and year out under a range of operating conditions. The pipe needs to be handled, transported and installed with minimal risk of damage. Pipe also needs to be resistant to long-term loss of strength or damage through corrosion, ageing and other external effects.

3.8.6 Strength to weight ratio

Steel offers a very high strength to weight ratio. Of all commercial piping materials, steel has the greatest strength in proportion to pipe wall thickness. This attribute has weight-saving implications due to the reduction in pipe wall thicknesses, or through increases in gas supply via higher operating pressures. The less steel that is utilized in a pipeline, the less it costs.

3.8.7 Longevity, durability and property stability

As the physical properties of steel do not appreciably degrade over time, the material will reliably perform over many generations of pipeline operation. The longevity of a pipeline has considerable and positive technical, maintenance and financial ramifications. Through use of modern coatings and well-established cathodic protection techniques, steel pipe is resistant to corrosion, allowing many decades of service.

3.8.8 Ability to absorb deformation

The ductility of steel allows the pipe to deform locally under extreme loads, such as those from vehicles, as well as earth movements and soil erosion, while maintaining resistance to the load and ensuring pipeline integrity.

Steel also possesses a work-hardening – or strain-hardening – characteristic. This strengthening occurs because of complex dislocation interactions within the crystal structure of the steel. The benefit of this property is that it provides a buffer against fluctuations in operating loads.

3.8.9 Response to static and variable internal pressures

How a pipe material responds over time to the pressures created by the product it is transporting is vital, as steel is an elastic material. When subjected to a load less than the yield stress, steel will bear the load irrespective of the time the load is applied; it has a time-independent response to loads applied for sustained durations.

Unlike other materials, steel exhibits a defined fatigue strength, or endurance limit, below which the number of stress cycles required to cause failure increases to tens of millions, which can imply infinite endurance.

3.8.10 Ease in laying

For buried pipelines, the strength of steel allows less demanding compaction requirements than pipe with low ring stiffness (the ability of pipe to retain its shape). Steel thus provides the greatest amount of resistance, compared to other available options, to excessive distortion, which could restrict gas flows or result in pipe failure.

The higher beam strength, or stiffness of steel also has the advantage of providing protection against poor bedding and settlement. Often steel pipe can be laid without the need for imported bedding material, thereby lowering project costs.

3.8.11 Joinability

While welding is by far the most common method used for joining high-pressure gas transmission pipe, steel can be joined using a number of mechanical joining techniques including ball and socket joints, threaded joints, clamping and bolted flanges. For high-pressure gas transmission applications, welding eliminates the need for complicated joint designs and special threading equipment. It produces a high-strength joint that does not compromise operating conditions and the pipe has less flow restriction compared to when it is mechanically connected. Overall, the installation cost of welded pipe is lower than that of other connection methods.

Steel grades have been designed to be easily weldable by commonly employed welding processes. This allows for more robust welding procedures and higher welding rates which, in turn, will help lower construction costs.

3.9 No Project Option

The implication of the 'No Project' option (i.e. the proposed pipeline project did not go ahead) is that this aspect of the fuel production infrastructure development would not be realized. Additionally, the cumulative impacts of the project would not occur. In the context of the above, and having regard to national policy as well as regional and national development plans, the 'No Project' scenario is not considered to be a realistic option.

The 'No Project' option also reduces the potential tax revenues and trade balances.

The 'No Project' option would also mean that the status quo is maintained. Thus, the various industries targeted to use the fuel oil and other products will be denied the resources and will therefore be compelled to continue to use costly imported fuels. Thus, the cost of doing business in the country will continue to be high with consequent adverse impacts on the national economy.

3.10 ESIA with/without EMP

3.10.1 Without EMP

This option is based upon the assumption that the proposed development could go ahead without implementing any environmental management plan. Under this assumption, the project impact could turn out to be on the appreciably adverse side. If the project goes ahead without EMP, the adverse impact on the existing environment would be far worse than the impact generated by implementation under an environmental management plan. Thus, the 'Without EMP' option is automatically disqualified and not applicable since the greatest challenge worldwide presently is geared towards sustainable development and sustainable use of natural resources.

3.10.2 With EMP

If the environmental management strategies proposed in Chapter 8 are fully implemented, the adverse impact of the project would be reduced to the utmost extent possible, and there will be an overall improvement in physical, chemical, biological and socio-economic environment of the area. Therefore, the proposed development will be beneficial for the environment of the area, provided the EMP is in place. It is clear from the above that the proposed mixed-use development project would have negative effect without implementing certain environmental management strategies. If EMP, as discussed in Chapter 10, is adopted and implemented, the adverse impacts will be considerably reduced and the overall environmental quality of the area would improve, hence this remains a preferred option.

CHAPTER 4:

DESCRIPTION OF THE SURROUNDING ENVIRONMENT

4. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

4.1 General environment

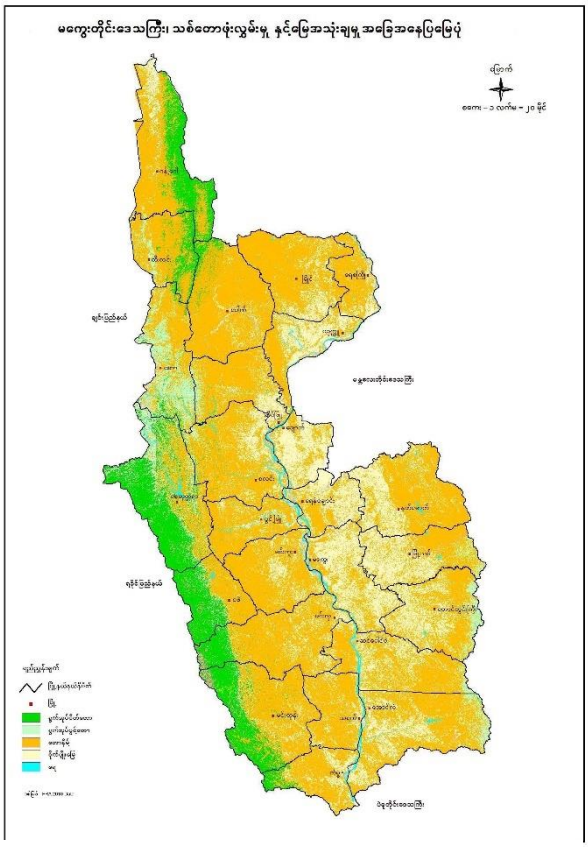


Figure 33: Forest cover and land use map of Magwe Region

The proposed refinery project area is located in the dry zone in the middle part of the country which receives low rainfall and where the natural land cover is dry forest which is basically made up of short and thorny trees and shrubs.

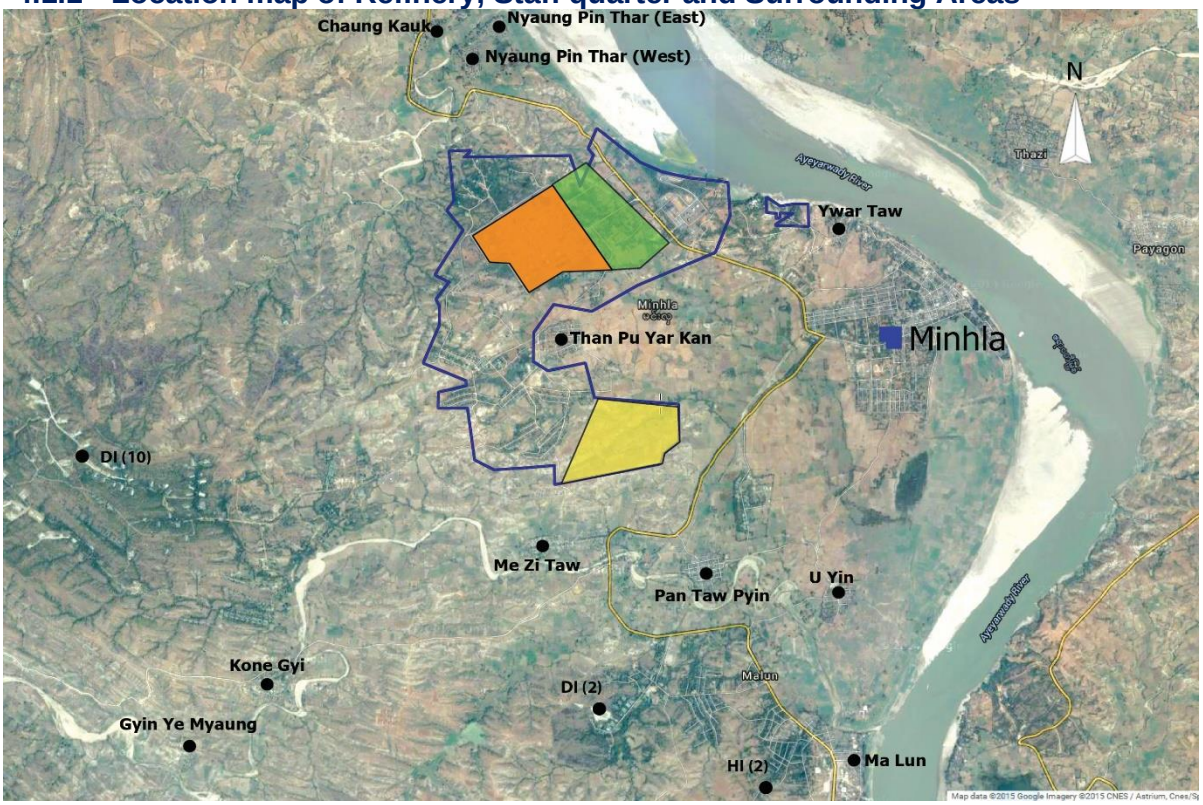
The dry zone covers approximately 8,718,898 hectares or about 13% of Myanmar's total land area and encompasses the lower Sagaing, Mandalay and Magway Regions. The topography is generally undulating. Most of the local streams are dry for much of the year with water flow usually limited to the rainy periods. In addition to rice and millet, crops grown in the dry zone include sugarcane, fruit (such as plantain), legume, peanut or groundnut, maize, onion, sesame, rubber and spices. However, irrigation is required for cultivation. Most of Myanmar's irrigated land is in the dry zone and paddy is planted in almost all of it. The portions of the dry zone that are not irrigated are utilized for the production of crops that are less sensitive than rice to the seasonality or irregularity of rainfall. Cotton and millet are grown in the dry zone but their production is not dependable for secure income. Cattle are also raised there.

The dry zone townships are characterized by clay, sandy loam and sandy soils that include gravel. The soils clearly vary with topography. According to soil survey data, all soil series in the dry zone have low fertility and have declining organic matter levels. Potassium levels are also low for agriculture. Nitrogen is required for all non-legume crops on all soil types. This also suggests the consistent low organic matter level in the soil. The soil moisture holding capacity of the soils of the dry zone are low and, with the high level of evapotranspiration, this impacts agriculture. This lack of moisture in the ground constitutes a major constraint to crop growth during periods of inadequate rainfall, such as in June and July. Farm management practices that conserve soil moisture or increase the water holding capacity of the soils are being practiced to help take advantage of the full growing season. Hard pan formation is common to all the upland areas. In the dry belt of the central region are found red-brown soils rich in calcium and magnesium. In the same region, however, when the soil has a low clay content, it becomes saline under high evaporation recognizable by its yellow or brown colour.

Soil erosion is a serious problem. In some places in the dry zone, the soil has been almost completely removed by water and wind erosion. Soil erosion is particularly severe in the upland areas of Kyaukpadaung and Chaung U, largely as a result of the high intensity of the rainfall and rapid surface runoff. Moreover, since most of the soil in those areas is moderately textured with a slope ranging from 5-15%, the erodibility of the soil is also high. In Chaung U, the most severe erosion occurs in the upland areas. In contrast the incidence of soil erosion in the foot plain is lower Sheet and rill erosion and vertical dissection are widespread, resulting in an uneven topography.
In Magway, there is also a high level of erosion because of the sandy topsoil. The susceptibility of the soil to erosion is compounded by the high level of rainfall occurring over short periods.

Win erosion is a particularly severe problem while sheet and gully erosion are largely confined to wasteland areas. Soil erosion and land degradation are the two components responsible for declining production potential.

4.1.1 Location map of Refinery, Staff quarter and Surrounding Areas



4.1.2 Proposed Site A

Google earth photo showing site for the New Refinery Project

The new oil refinery is centered on the following GPS marking.

GPS marking

Table 11: GPS marking

	Latitude	Longitude
New 1	19°58'50.35"N	95° 0'8.22"E
New 2	19°58'58.36"N	95° 0'20.57"E
New 3	19°58'29.55"N	95° 0'51.23"E
New 4	19°58'20.63"N	95° 0'40.26"E
New 5	19°58'19.66"N	95° 0'12.25"E
New 6	19°58'27.12"N	95° 0'24.14"E

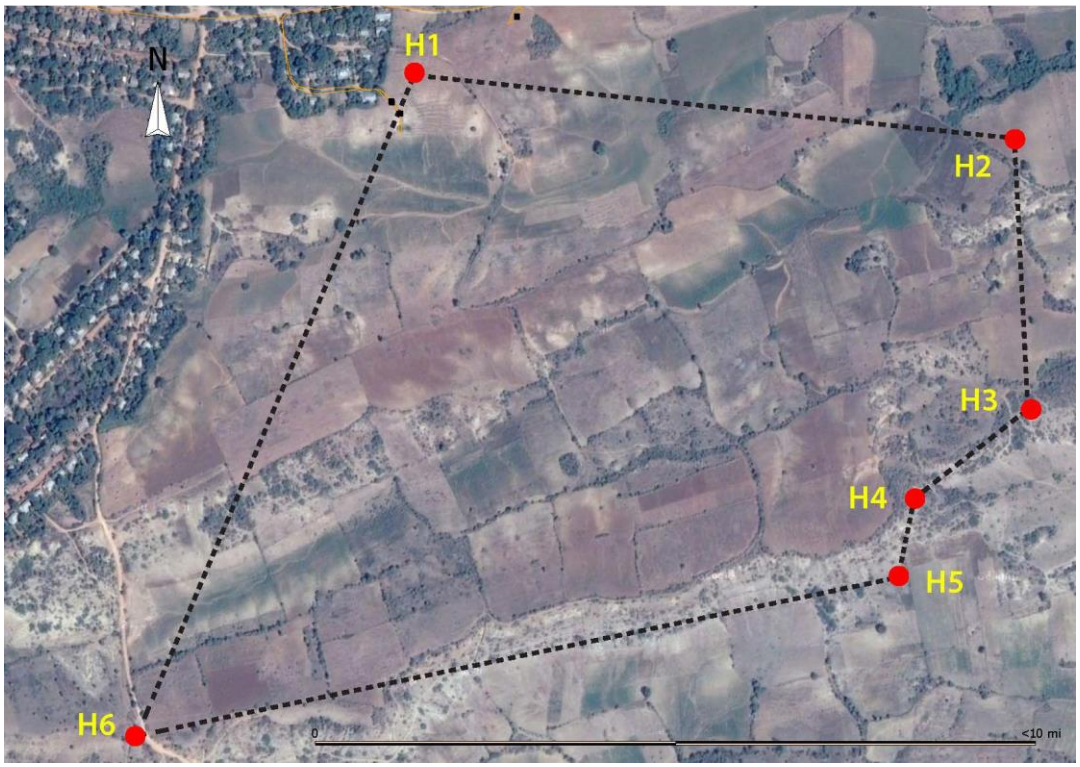
Along with site of the new oil refinery, the following GPS marking indicates the allocated area of staff quarter for the new project.

Coordinates of staff quarters

Table 12: Coordinates of staff quarters

	Latitude	Longitude
H1	19°57'34.60"N	95° 0'25.11"E
H2	19°57'31.55"N	95° 0'54.37"E
H3	19°57'19.08"N	95° 0'54.98"E
H4	19°57'15.20"N	95° 0'49.56"E
H5	19°57'11.29"N	95° 0'48.68"E
H6	19°57'3.96"N	95° 0'11.59"E

Site B



4.2 Existing Petrochemical Complex (Thanbayakan)

Current existing petrochemical complex (Thanbayakan) is located 26 km from Magway, 50 km from China-Myanmar Oil and Gas Pipeline and 2 km away from the Ayeyarwaddy River in Minhla Township. It has a total 1,573 acres, i.e. 192 acres for refinery site, 77 acres for storage tanks at the port, and 1,204 acres for residential and others.

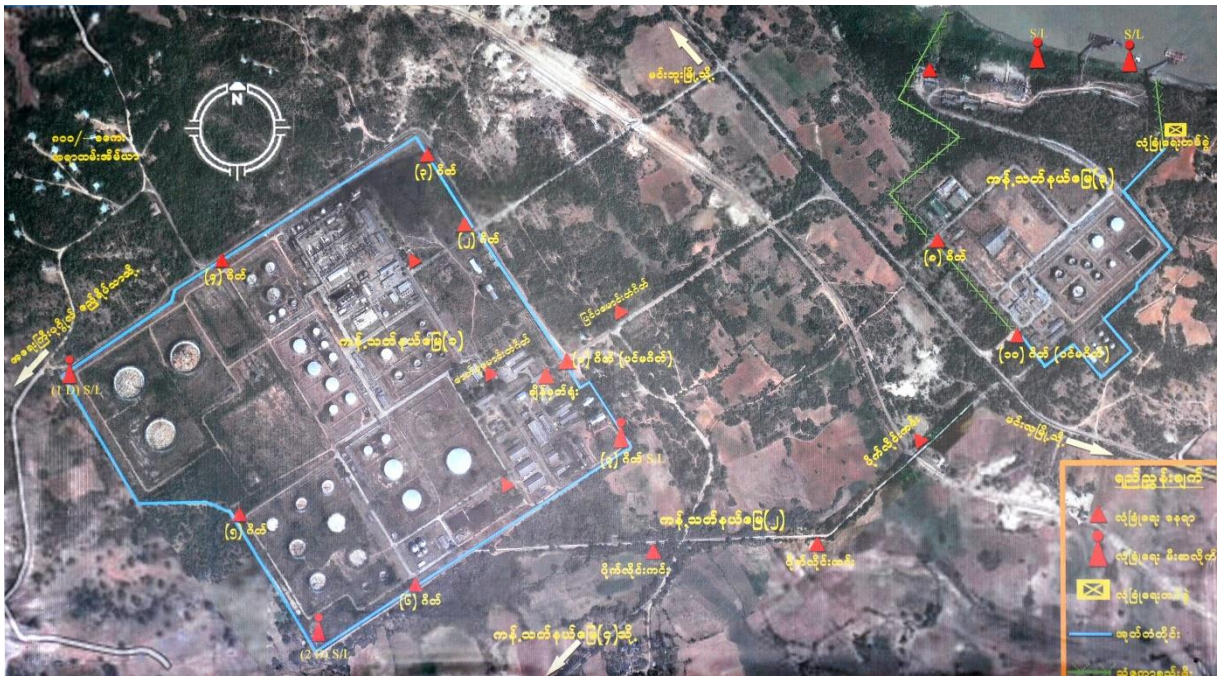
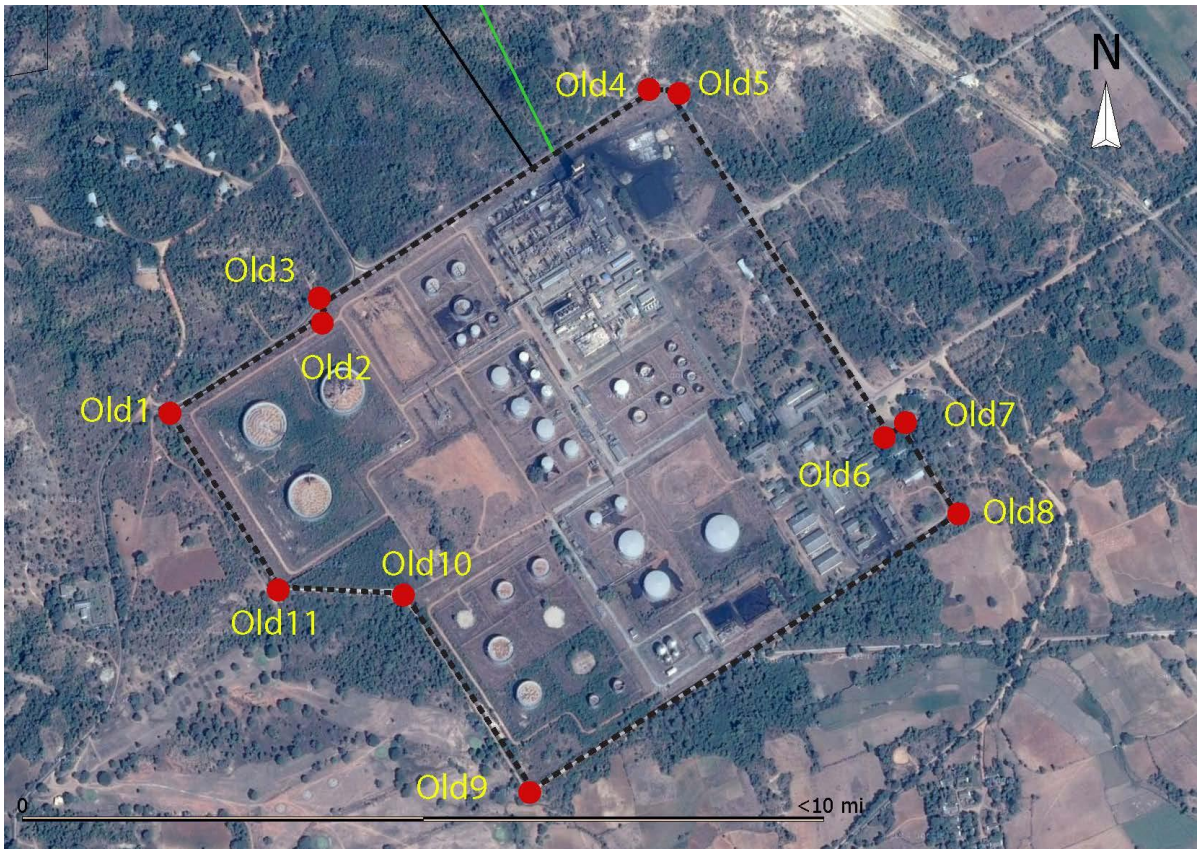


Figure 34: Existing plant layout plan (see larger map in appendix 34)

4.2.1 Currently Existing Petrochemical complex (Thanbayakan)



The GPS marking of Existing Petrochemical complex is:

Table 13: Coordinates of existing petrochemical complex

	Latitude	Longitude
Old 1	19°58'32.56"N	94°59'38.98"E
Old 2	19°58'37.90"N	94°59'47.89"E
Old 3	19°58'38.41"N	94°59'47.61"E
Old 4	19°58'50.02"N	95° 0'6.75"E
Old 5	19°58'49.97"N	95° 0'7.57"E
Old 6	19°58'31.40"N	95° 0'20.16"E
Old 7	19°58'31.88"N	95° 0'20.88"E
Old 8	19°58'27.11"N	95° 0'24.09"E
Old 9	19°58'12.28"N	94°59'59.75"E
Old 10	19°58'22.93"N	94°59'52.46"E
Old 11	19°58'23.13"N	94°59'45.25"E

In terms of landscape, land of the project site slopes imperceptibly toward the river bank, as it is the part of the Ayeyarwaddy valley.

4.2.2 Off-take point (Saku)

The off-take point is located at Saku, a small town 25 miles away from the proposed project site. From this off-take point, the crude oil carried by Myanmar-China SEAP pipeline started at the Deep-sea Port of Maday Island located near the central coast of Rakhine State will be taken. At the Off-take Point, there are two stations namely Gas off-take and Crude oil off-take have already been constructed.

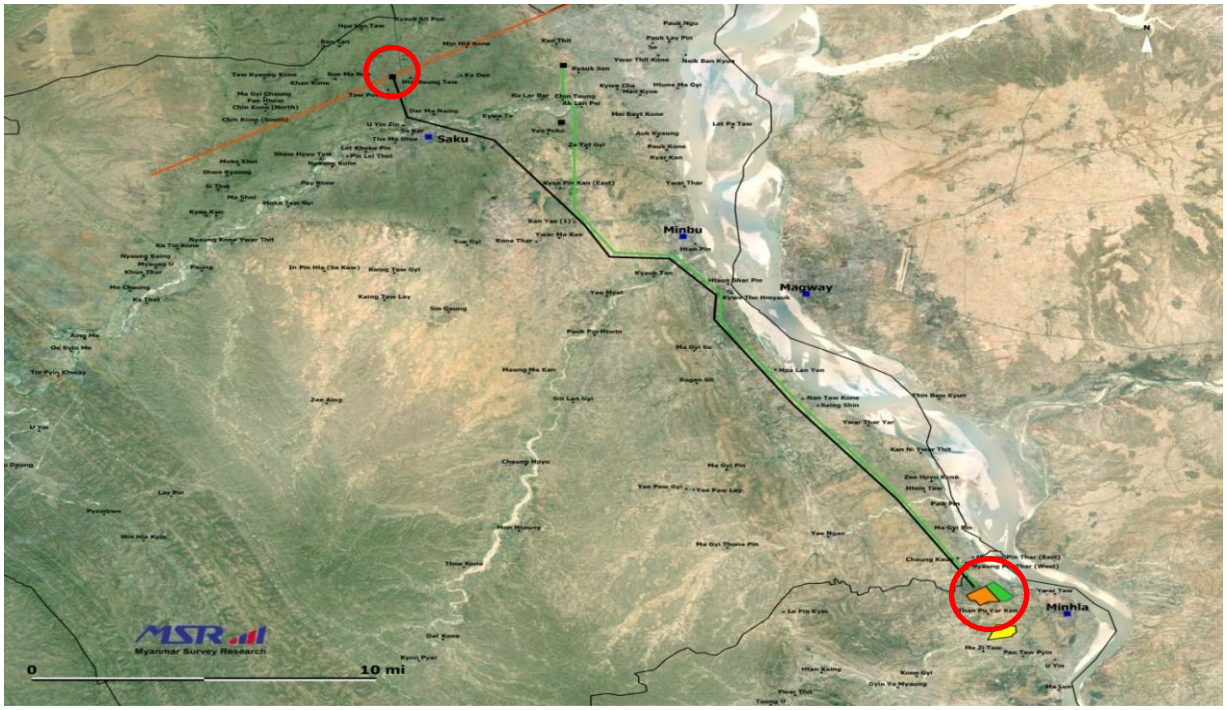


Figure 355: Location map of Off-Take Point and Refinery Plant Location

4.3 Topography

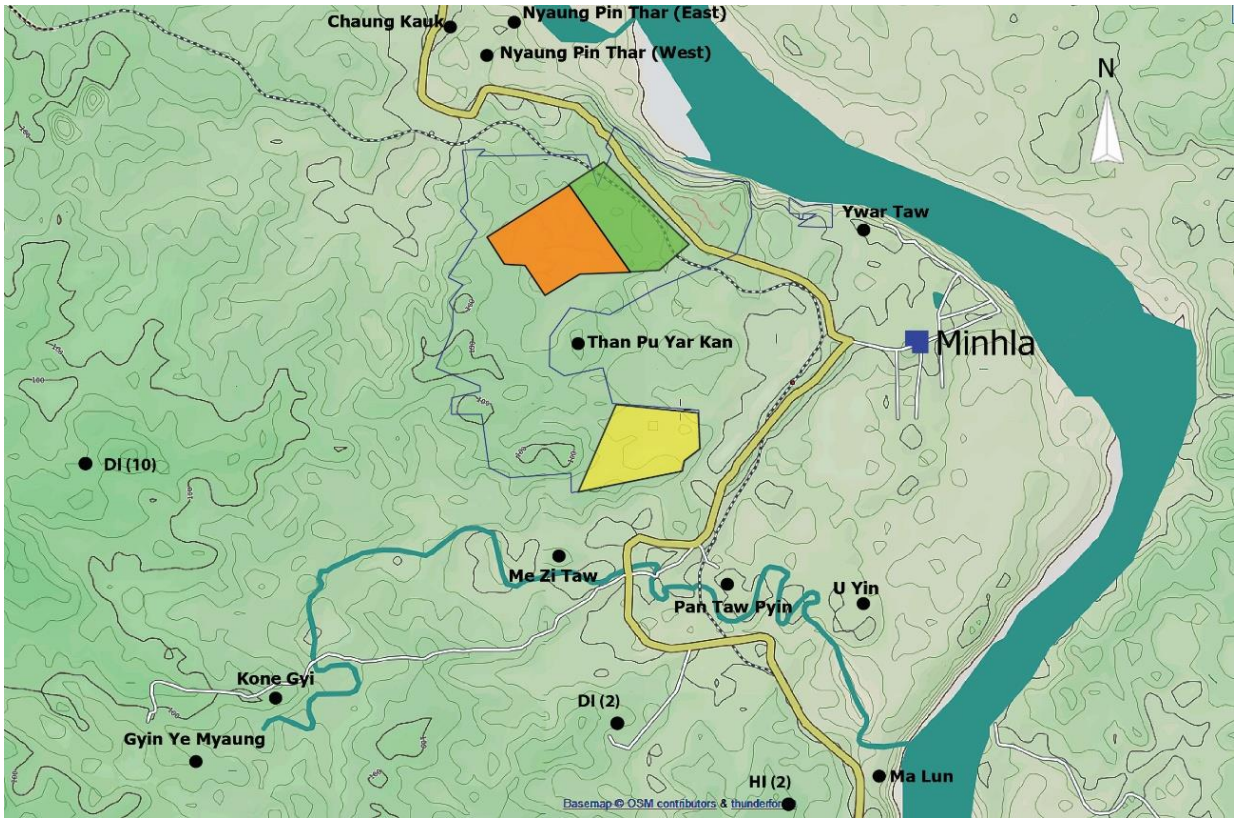


Figure 366: Topography map of project area (See larger map in appendix 35)

The Topographic Map of New Refinery Project Area (Including with Existing Refinery Area) and it's environ is shown as below;

1 North

The Project Area is almost plain from existing factory to the Railroad. There is no more contour intervals form East to West and North to South. The Northern Portion of Proposed site including existing factory has seven valleys which are 50 to 60 Ft deep lead to Chaung Kauk Chaung (Creek) that flows to Ayeyarwaddy River in the rainy season. Ayeyarwady River and the road way (MinHla to Minbu) is situated between western higher plain and the river. The road with the land is sloped to Chaung Kauk Chaung and its contour interval is about 60 Ft.

2 East

The area in the earth of the Project is largely occupied by the Ayeyarwady River and the town of MinHla. The existing jetty and proposed jetty are situated at the east of the project. There is only 10 to 20 Ft Intervals of contour levels at some lower parts but almost plain surface. The road way and railway from Malon to Minhla are at the East of Proposed site. The Existing disposed water drains along the lowest level of contour and its way is from west to East. The drainage of disposed water drain passes through the road way and Railway then leads to the Ayeyarwady River.

3 South

Thanbyakan Village, Storage Tanks, Quarters of existing refinery, MezeTaw and PanTaw Pyin Villages are located in the Southern Portion of the Project. The Contour Interval is very different and there are many valleys situated. Many Valleys leads to Kone Gyi Chaung (Creek) which flows to Ayeyarwady River in the Rainy Season. Kone Gyi Chaung is normally a dried creek in the summer but some surface wells can be dug for domestic purpose usage of water.

4 West

The Western portion of the Project site is elevated plain and higher hills lead to Rakine Yoma. The contour level is only 5 to 10 Ft different towards East near the project site, but many deep valleys are leading to Chaung Kauk Chaung at northern portion and Kone Gyi Chaung at southern portion respectively.

4.4 Climate

4.4.1 Climate and Meteorology

The climate of Myanmar is roughly divided into three (3) seasons: Summer, Rainy Season, and Winter Season. Summer months are from March to Mid-May; the rain falls from Mid-May to the end of October and the Winter Season starts in November up to the end of February. Due to widely differing topographical situations of the country, its climate conditions also differ widely from one place to another. April and May are the hottest months with an average temperature of 32 C° (79 – 83 °F). The coldest month is January, with an average temperature of 21 C° (°F).

The southwest monsoon starts in late March or early April with local turbulence that includes tornados and cyclones, with winds that can reach up to 200 – 300 kph. From October to mid-March the northeast monsoon arrives which is dry and cool. The monsoon rain in the Dry Zone of Myanmar is bimodal with a drought period during July when dry desiccating winds blow from the south of Myanmar.

Rainfall patterns during the dry season are highly variable. There has been an observed decrease of about 45 – 65 % of rainfall over the last five years (2007 – 2012) and further analysis has confirmed the increase in drought occurrence over the past few decades in the Dry Zone region.

The Project site is located in the central plain of Myanmar, and is primarily located in the Dry Zone of Myanmar, which includes the western and middle part of the Magway region; this region is the most susceptible to drought in Myanmar. The region is characterized by low annual rainfall that ranges between 508 mm and 1,016 mm per annum with high variability and uneven distribution. The mean temperature in the Dry Zone is about 27°C and the temperature often rises to about 43°C in the summer period.

4.4.2 Project Site Climatic Conditions

Climatic information for the study was obtained from a weather station located at Minbu, Magway Region, which is situated in latitudes 21° 28' 0" N and longitudes 95° 23' 0" E, approximately 24 km to the northeast from the Project site and meteorology data collected during the baseline survey.

A summary of data available publically for Minbu is provided in *Table 15 and Figure 35, 36.*

Table 14: Climate Data of Minbu, Magway State, Nyanmar 2015

Climate Data	Jan	Feb	Mar	Aprl	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temp ˚C (˚F)	29	32	37	39	37	33	32	32	33	32	30	28	32.8
	84	90	98	102	99	92	90	90	91	90	86	82	91.2
Average mean Temp ˚C (˚F)	21.5	24	29	32	31.5	29	28.5	28.5	28.5	28	25.5	22	27.3
	70.5	75.5	83.5	89.5	84.5	84.5	83.5	83.5	83.5	82.5	77.5	71.5	81.25
Average Min Temp ˚C (˚F)	14	16	21	25	26	25	25	25	24	24	21	16	21.8
	57	61	69	77	70	77	77	77	76	75	69	61	71.3
Average Precipi-tation mm (in)	3	3	5	20	137	150	112	119	157	112	58	10	849
	0.1	0.1	0.2	0.8	5.4	6	4.4	4.7	6.2	4.4	2.3	0.4	35

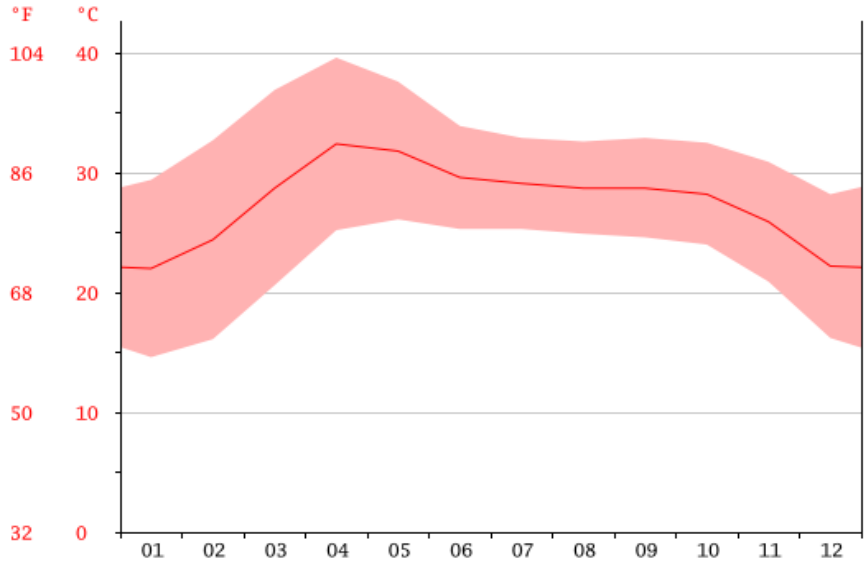
4.4.3 Temperature

The data obtained from the Minbu weather station shows that the hottest months in 2015 were March to May, with average temperatures between 29°C and 32°C. The lowest temperature experienced in 2015 was in January with 14 °C.

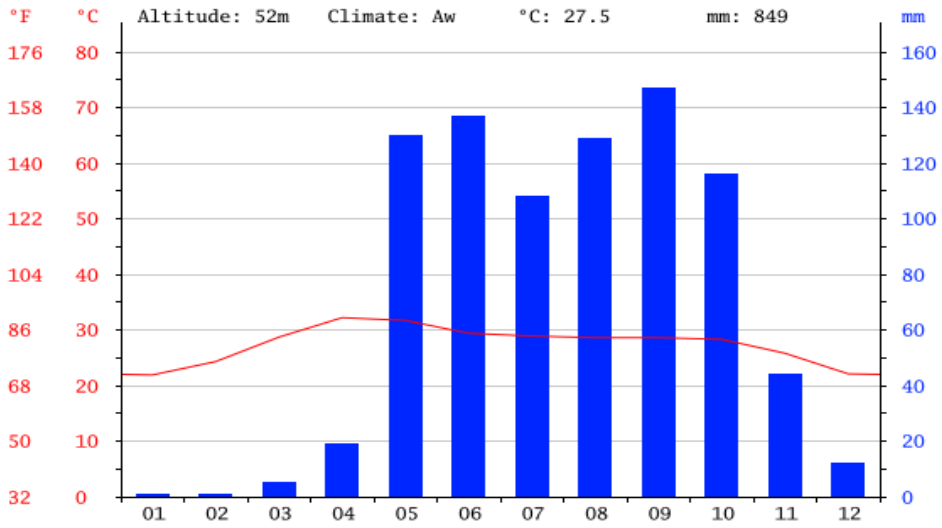
During Jan to Dec 2015, the SRs showed an average mean temperature was 27,3°C, with an average maximum temperature of 32.8°C and an average minimum of 21.8°C. The highest temperature was 39°C (in April 2015) while the lowest temperature was 14°C (in January 2015). This is consistent with the temperatures recorded at the Minbu weather station for the corresponding months for 2015. On site monitoring data is presented in *Table 15.*

4.4.4 Relative Humidity

On site monitoring at the SRs showed that the averaged relative humidity fluctuates between 39.9% and 79.3%, with an annual average mean relative humidity of 64.2%. The maximum and minimum monthly average relative humidity were 86% (in June 2015) and 35.2% (in March 2015), respectively.



Source; http://en.climate-data.org/region/2298/



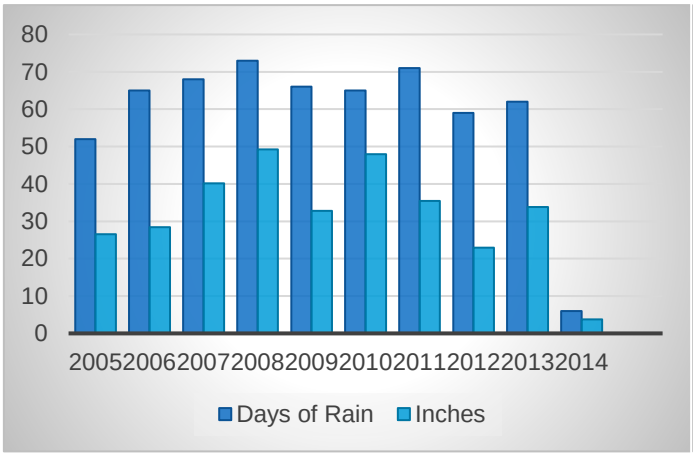
Source; http://en.climate-data.org/region/2298/

4.4.5 Rainfall Status From 2005 to 2014

Minhla Township, Minbu District, Magway Region, is located in the mid-region of Union of Myanmar. Rain fall patterns range from 2005 to 2014, average number of raining day per year is 58.7 and rain fall status is 32.106 inches. Especially, in 2014, it rained only six days and the overall 3.72 inches rainfall is reported by Meteorology and Hydrology Department.

The highest rainfall of the year is 49.21 inches in 2008 and the lowest rainfall of the year is 3.71 inches in 2014 during the ten-year period described below.

Rainfall Status (Minbu District) 2005-2014



4.4.6 Highest and Lowest Temperatures From 2005 to 2014

Average monthly highest and lowest temperatures of Minhla Township in 2013 and 2014 are collected. Notable highest temperature in 2013 is 43˚C on April 26, April 30 and May 1. Notable lowest temperature of Minhla Township 2013 is 5˚C on January 10. Notable highest temperature of Minhla Township in 2014 is 43˚C on April 20 to April 27 and lowest temperature is 13˚C on January 6. *See Appendices Table.*

4.4.7 Relative Humidity From 2005 to 2014

The relative humidity plays an important role in the amount of evaporation and evapotranspiration. The mean monthly values of relative humidity are relatively similar throught the year and relatively high during the summer period. The annual mean of daily relative humidity is on the range of 70-90% (Min Hla, 2014). The monthly mean values of relative humidity for the whole year are presented in table.

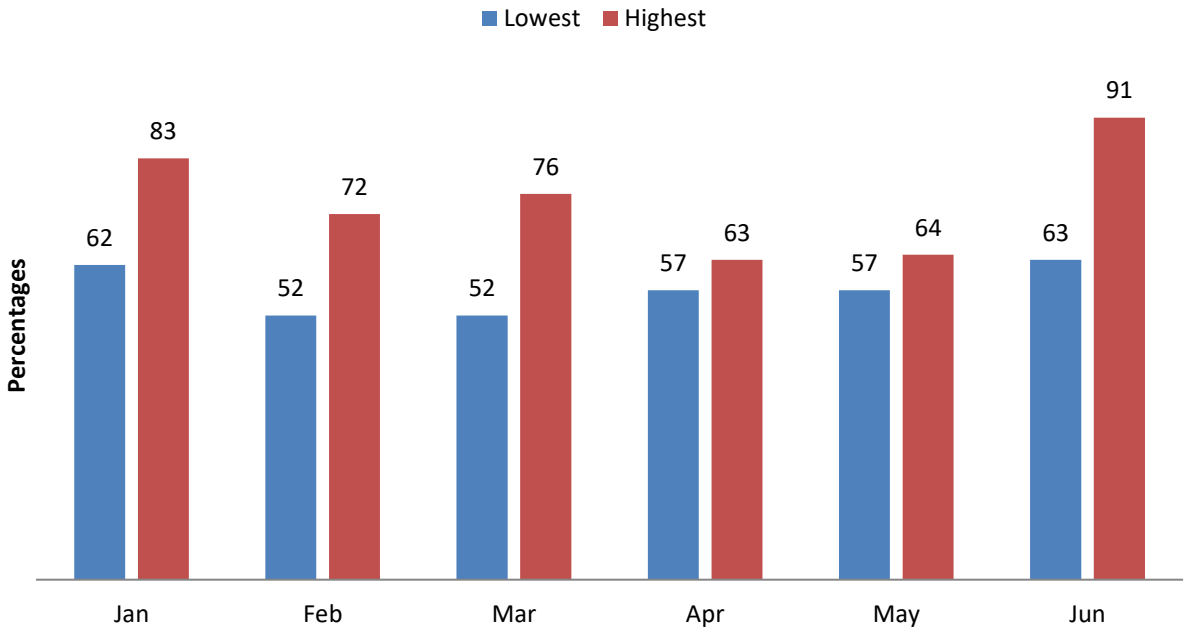
The values of the monthly relative humidity depends on various parameters, such as the local wind, vegetation, general wind circulation. The value of the monthly relative humidity decreases from September (80 %) to March (63 %), where it reaches its minimum value, then increase again to reach its maximum value at June (91 %) as shown in the following table.

Monthly mean values of relative humidity

Monthly Mean Values of Relative Humidity	Relative Humidity (%)
January	(62-83%)
February	(52-72%)
March	(52-76%)
April	(57-63%)
May	(57-64%)
June	(63-91%)
July	(67-88%)
August	(73-89%)
September	(70-90%)
October	(59-80%)
November	(62-73%)
December	(60-70%)

Source: Minhla, 2014

Monthly mean values of relative humidity

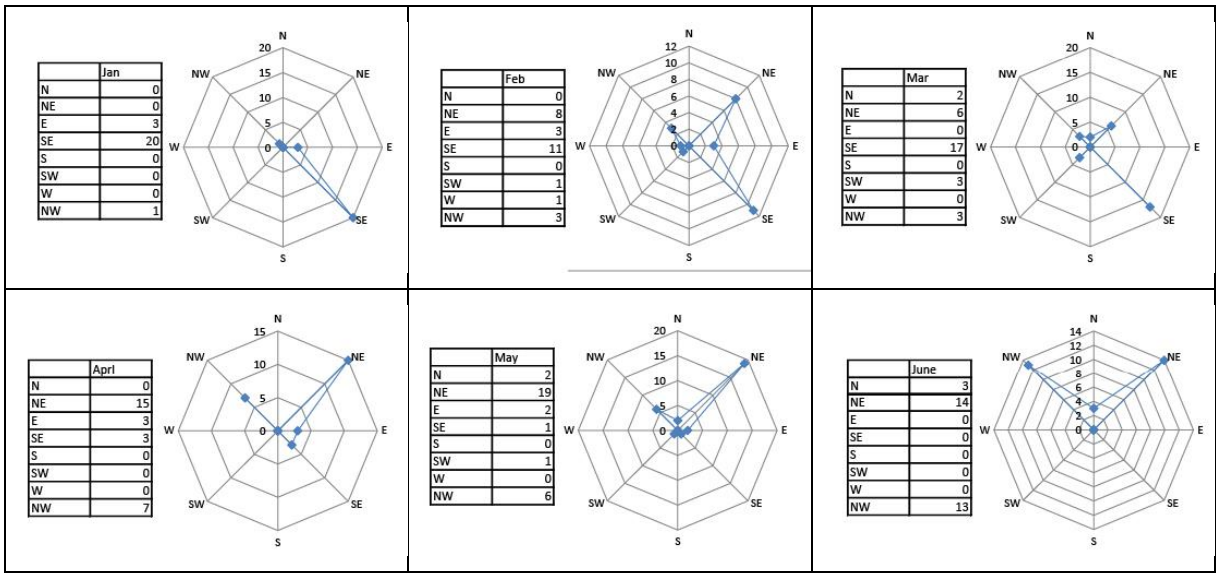


4.4.8 Wind Direction and Wind Speed

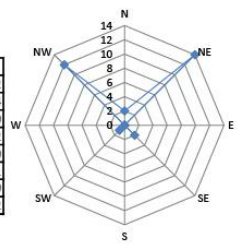
Data of wind direction and wind speed reported by Meteology and Hydrology Department at Minbu District Station are collected and shown as below:

Average wind direction from South-East is in October, November and December, North-East and North-West winds are in April, May, June, July, August and September. The dominant wind direction during the time of monitoring (June 2014 to July 2015) was south to southwest. The wind speed throughout the monitoring period is considered low.

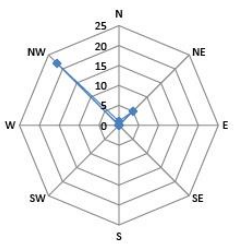
Wind directions



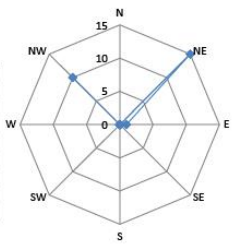
	July
N	2
NE	14
E	0
SE	2
S	0
SW	1
W	0
NW	12



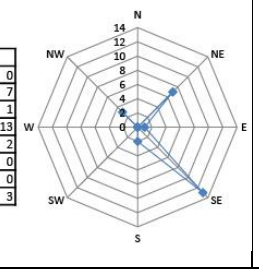
	Aug
N	1
NE	5
E	0
SE	0
S	0
SW	0
W	0
NW	22



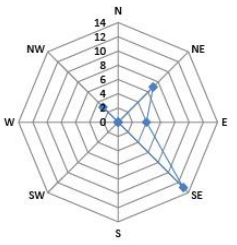
	Sept
N	0
NE	15
E	1
SE	0
S	0
SW	0
W	0
NW	10



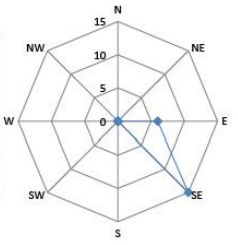
	Oct
N	0
NE	7
E	1
SE	13
S	2
SW	0
W	0
NW	3



	Nov
N	0
NE	7
E	4
SE	13
S	0
SW	0
W	0
NW	3

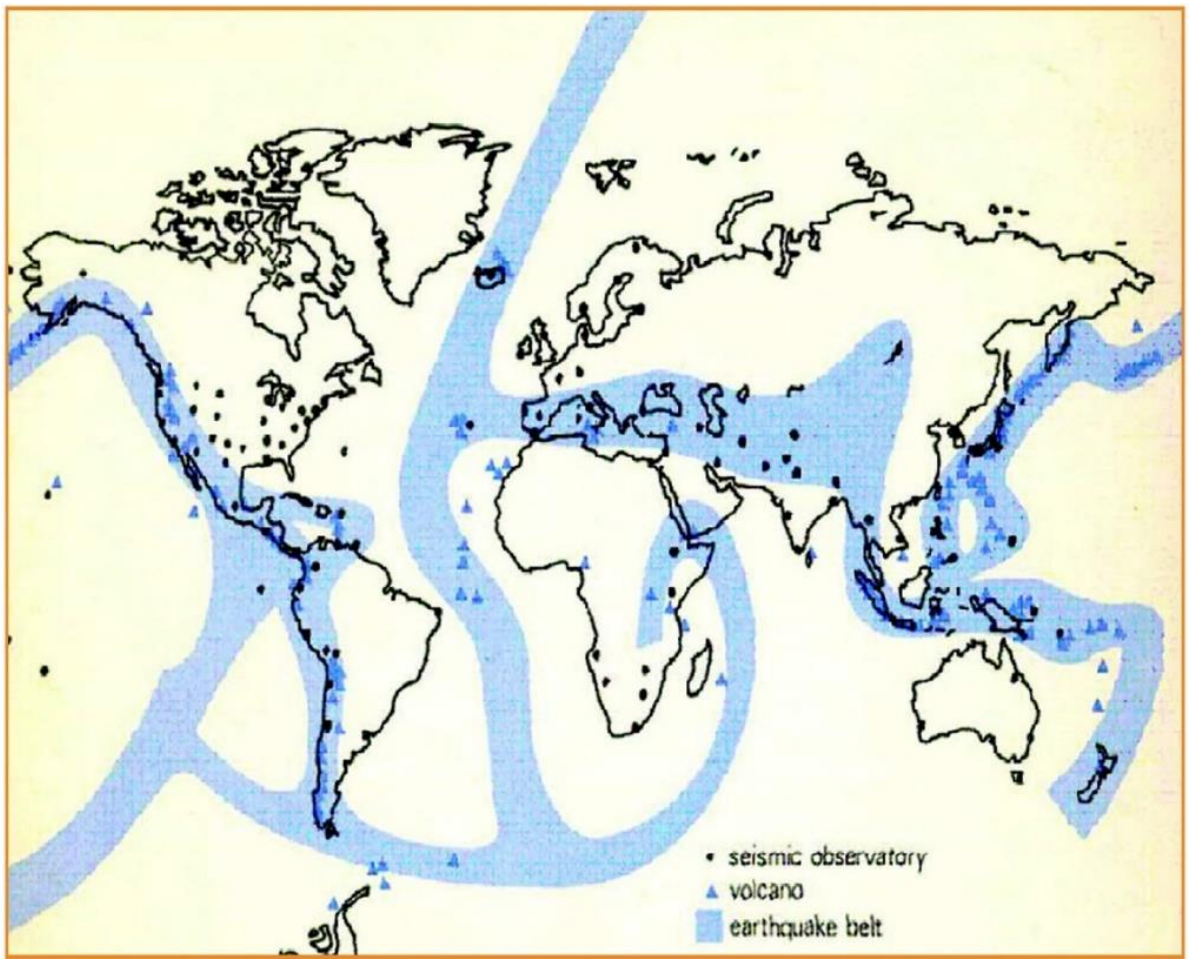


	Dec
N	0
NE	0
E	6
SE	15
S	0
SW	0
W	0
NW	0



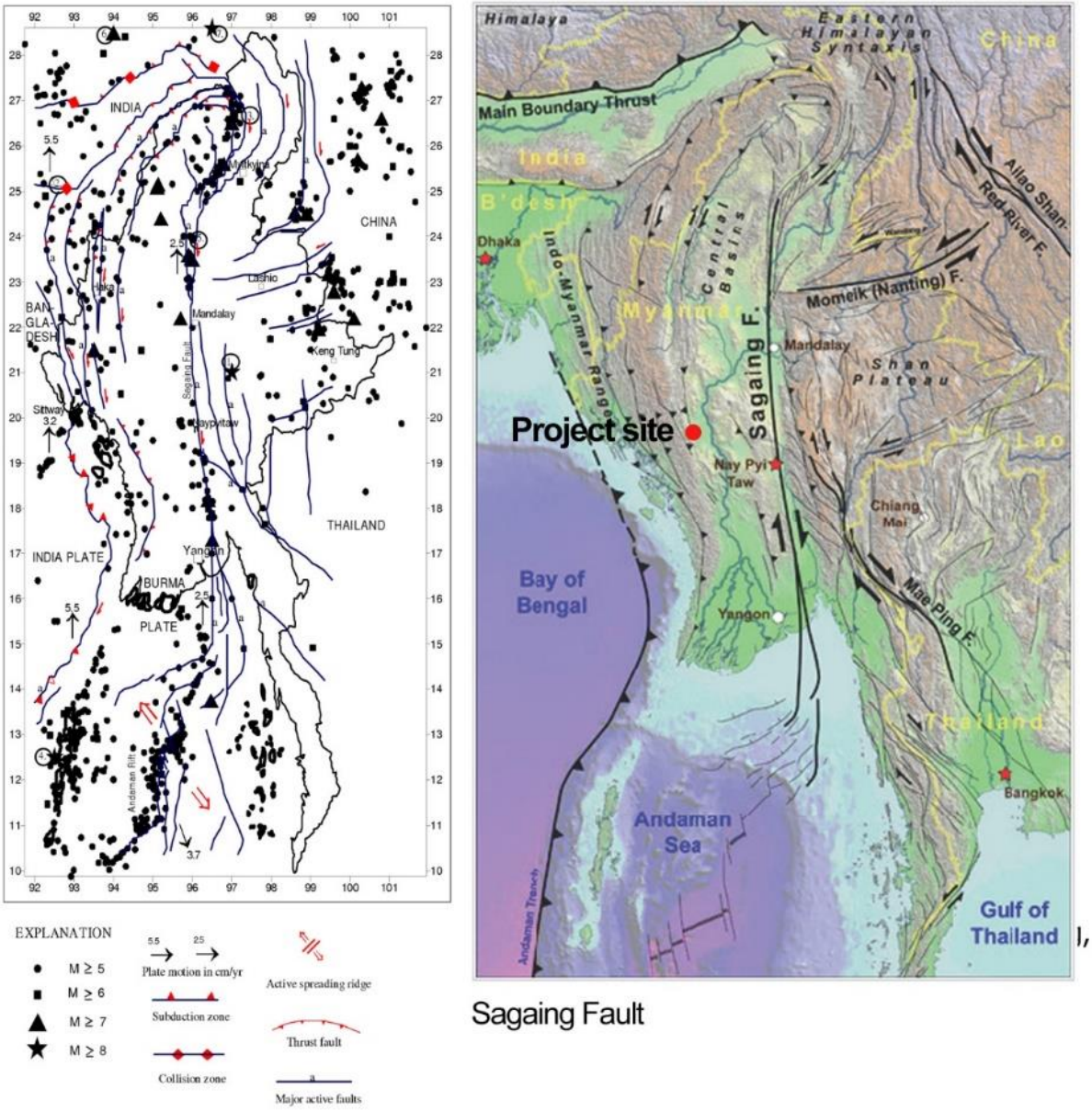
4.5 Earthquake

Map of Myanmar Situated in the Alpide Earthquake Belt



Source: manual on earthquake, un-habitat

The Map of Earthquake Zone and The Map of Sagaing Fault



Source: Department of Geological Engineering, Gadjah Mada University and www.sagaingfault.info/index.html#info

The proposed site is located at approximately 108 kilometers at the west of Sagaing fault.

Earthquake data at Magway region (2013-2016) is shown below and most of them occurred along the Sagaing Fault.

Table 16: Earthquake data of Magway Region (2013-2016)

Table 15: Earthquake data of Magway Region (2013-2016)

No.	Date/Time(UTC)								Epicenter Magnitude Scale (M)			Class
	Date	Month	Year	Hours	Minute	Second	Latitute (N)	Longitude (E)	<5.0	<6.0	<7.0	
1	3	4	2013	12	35	48	19.31	95.56		5.5		Moderate
2	3	4	2013	23	30	23	19.32	95.77	4.7			Slight
3	4	4	2013	15	17	36	19.36	95.67		5.4		Modreate

4	11	4	2013	3	47	4	19.35	95.7		5.5		Modreate
5	8	8	2013	0	0	26	20.565	94.091	4.9			Slight
6	22	3	2014	8	35	35	21.91	94.28	4.3			Slight
7	17	11	2014	4	34	20	20.78	94.32		5.4		Modreate
8												
9	7	3	2016	3	14	27	20.74	94.74	4.8			Slight
10	27	7	2016	4	20	53	21.48	94.53	4.9			Slight
11	1	8	2016	10	1	8	21.29	94.92		5.3		Moderate
12	**24**	**8**	**2016**	**10**	**34**	**55**	**20.9**	**94.63**			**6.8**	**Strong**

*2016 earthquake events recorded in Magway Region is only until September.

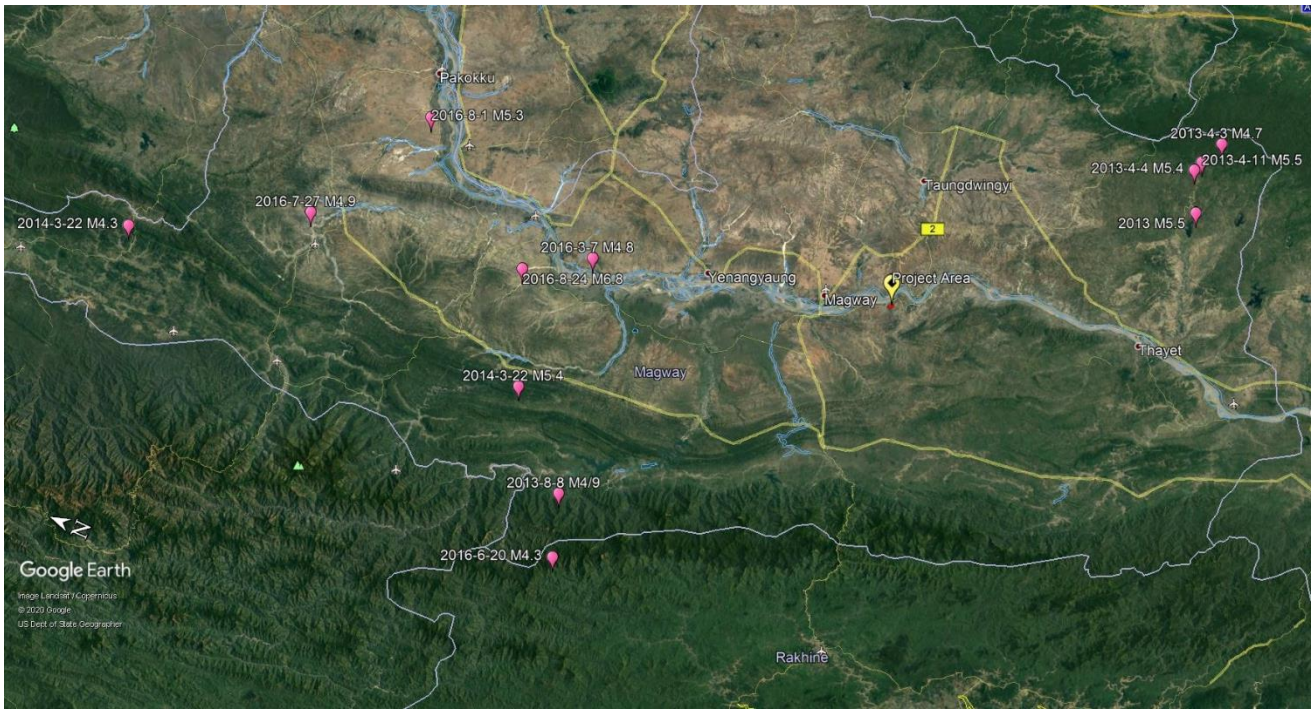


Figure 37: Earthquake Epicenter points between 2013 – 2016 at Magway Region

The summary record of earthquakes in Myanmar is listed in Table:

Date	Location	Magnitude and/or brief description
868	Bago	Shwemawdaw Pagoda fell
875	Bago	Shwemawdaw Pagoda fell
1429	Innwa	Fire-stopping enclosure walls fell
1467	Innwa	Pagodas, solid and hollow, and brick monasteries destroy-ed
24 July 1485	Sagaing	3 well-known pagodas fell
1501	Innwa	Pagodas, etc. fell
13 Sep 1534	Bago	Pagodas including Shwemawdaw and Mahazedi fell
1567	Bago	Kyaikko Pagoda fell
1582	Bago	Umbrella of Mahazedi Pagoda fell
9 Feb 1588	Bago	Pagodas, and other buildings fell
30 Mar 1591	Bago	The Great Incumbent Buddha destroyed
23 June 1620	Innwa	Ground surface broken, river fishes were killed after quake
18 Aug 1637	Innwa	River water flush
10 Sep 1616	Innwa	-
11 June 1648	Innwa	-
1 Sep 1660	Innwa	-

3 April 1690	Innwa	-
15 Sep 1696	Innwa	4 well-known pagodas destroyed
8 Aug 1714	Innwa	Pagodas etc. fell; the water from the river gushed into the city
4 June 1757	Bago	Shwemawdaw Pagoda damaged
2 April 1762	Sittwe	M=7 RS: very destructive violent earthquake felt over Bengal, Rakhine up to Calcutta
27 Dec 1968	Bago	Pon nya yadana Pagoda fell
9 June 1776	Innwa	A well-known pagoda fell
26 April 1850	Innwa	-
21 Mar 1839	Innwa	Oil place and many buildings demolished;
23 Mar 1839	Innwa	Pagodas and city walls fell; ground surface broken; the river's flow reversed foe sometime; Mingun Pagoda shattered; about 300 to 400 persons killed
6 Feb 1843	Kyaukphyu	Eruption of mud volcanoes at the Ram bye (Ramree) Island
3 Jan 1848	Kyaukphyu	The civil line and other buildings were damaged
24 Aug 1858	Pyay	Collapsed houses and tops of pagodas at Pyay, Henzada, and Thayet Myo and felt with some damages in Inwwa, Sittwe, Kyaukphyu and Yangon
8 Oct 1888	Bago	Mahazedi Pagoda collapsed
6 Mar 1913	Bago	Shwemawdaw Pagoda lost its final
5 July 1917	Bago	Shwemawdaw Pagoda fell
10 Sep 1927	Yangon	-
17 Dec 1927	Yangon	M-7 RS: extended to Dedaye
8 Aug 1929	Near Taungoo	Bent railroad tracks, bridges and culver is collapsed , and loaded trucks overturned (Swa Earthquake)
5 May 1930	Near Khayan	M-7.3 RS. 1mix-IX; in a zone tending north-south for 37km south of Bago (on the Sagaing Fault line) about 500 persons in Bago and about 50 persons in Yangon killed
3 Dec 1930	Nyaunglebin	M-7.3 RS: railroad tracks twisted (Pyu Earthquake): about 30 persons killed
27 Jan 1931	East of Indawgyi	M-7.6 RS: 1 mix-IX: numerous fissures and cracks (Myitkyina Earthquake)
10 Aug 1931	Pyinmana	-
27 Mar 1931	Yangon	-
16 May 1931	Yangon	-
21 May 1931	Yangon	-
12 Sep 1946	Tagaung	M-7.5 RS
12 Sep 1946	Tagaung	M-7.75 RS
16 July 1956	Sagaing	M-7.0 RS: Several pagodas severely damaged (40to50 persons killed)
8 July 1976	Bagan	M-6.8 RS: Several pagodas in Bagan Ancient City were severely damaged (only 1 person killed)
22 Sep 2003	Taundwingyi	M-6.8 RS: Severe damaged to rural houses and religious buildings (7 persons killed)
24 Mar 2011	Tarlay	Mw 6.8, Myanmar, Thailand, Laos, China and Vietnam border areas were affected and about 150 person were killed when 130 houses collapsed.
24 Aug 2016	**Chauk**	**Mw 6.8, several temples in the nearby ancient city of Bagan were damaged and four people were reported dead**

Source: Myanmar Geosciences Society

4.6 Cultural and Historical Heritage

There is no formally recognized cultural heritage site near the project site either, though there are some Stupas and pagodas with historical and religiously revered status located near the

town of Sagu. A historical monument, Fort Minhla, is located in the town of Minhla, but the construction of the new oil refinery shall have no impact on it.

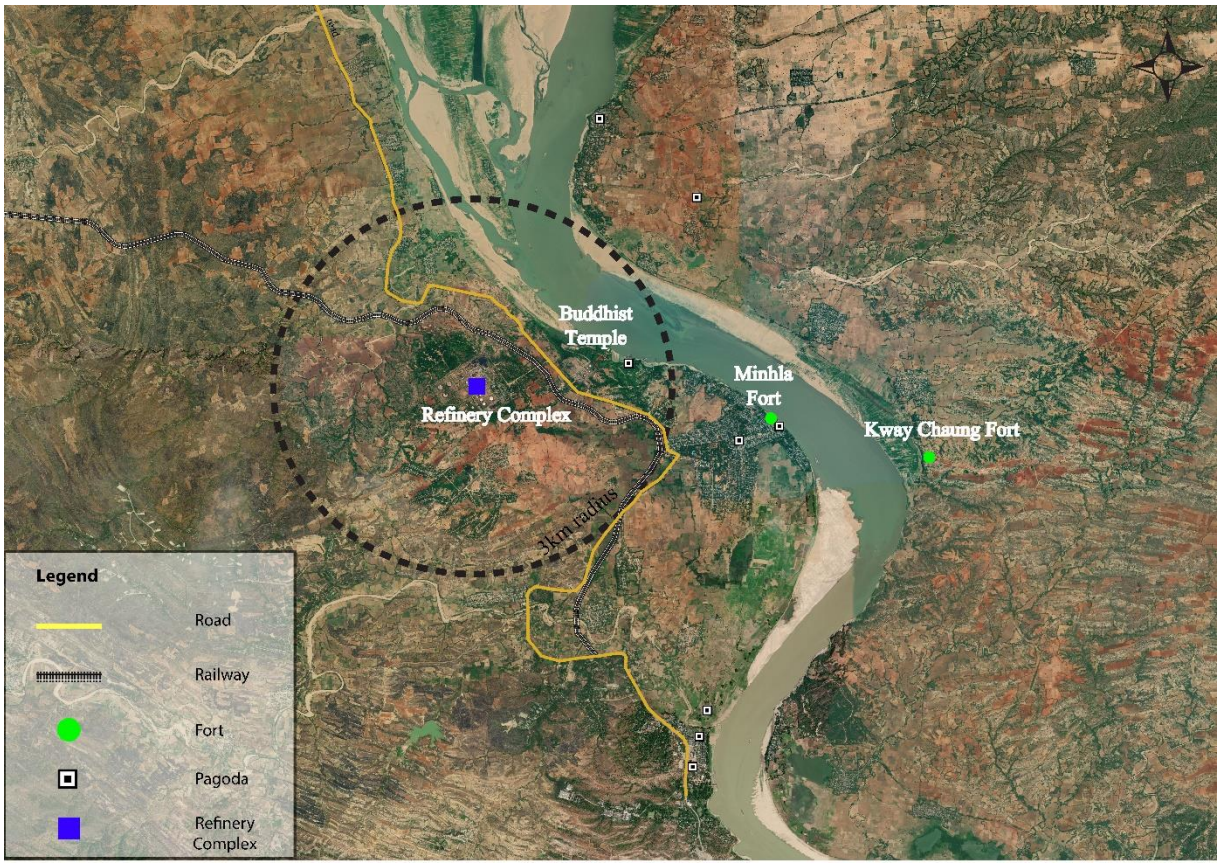


Figure 38: Distance of New Refinery and Cultural and Hostorical heritage site

CHAPTER 5:
BIOPHYSICAL AND SOCIAL ENVIRONMENT BASELINE DATA COLLECTION

5. BIOPHYSICAL AND SOCIAL ENVIRONMENT BASELINE DATA COLLECTION

5.1 Physical Environment

Setting the study limit Myanmar Survey Research sets the study limit 3km radius to the centre of existing oil refinery and 3km radius to the centre of proposed storage tank yard of the new refinery project.

5.1.1 Study Limit

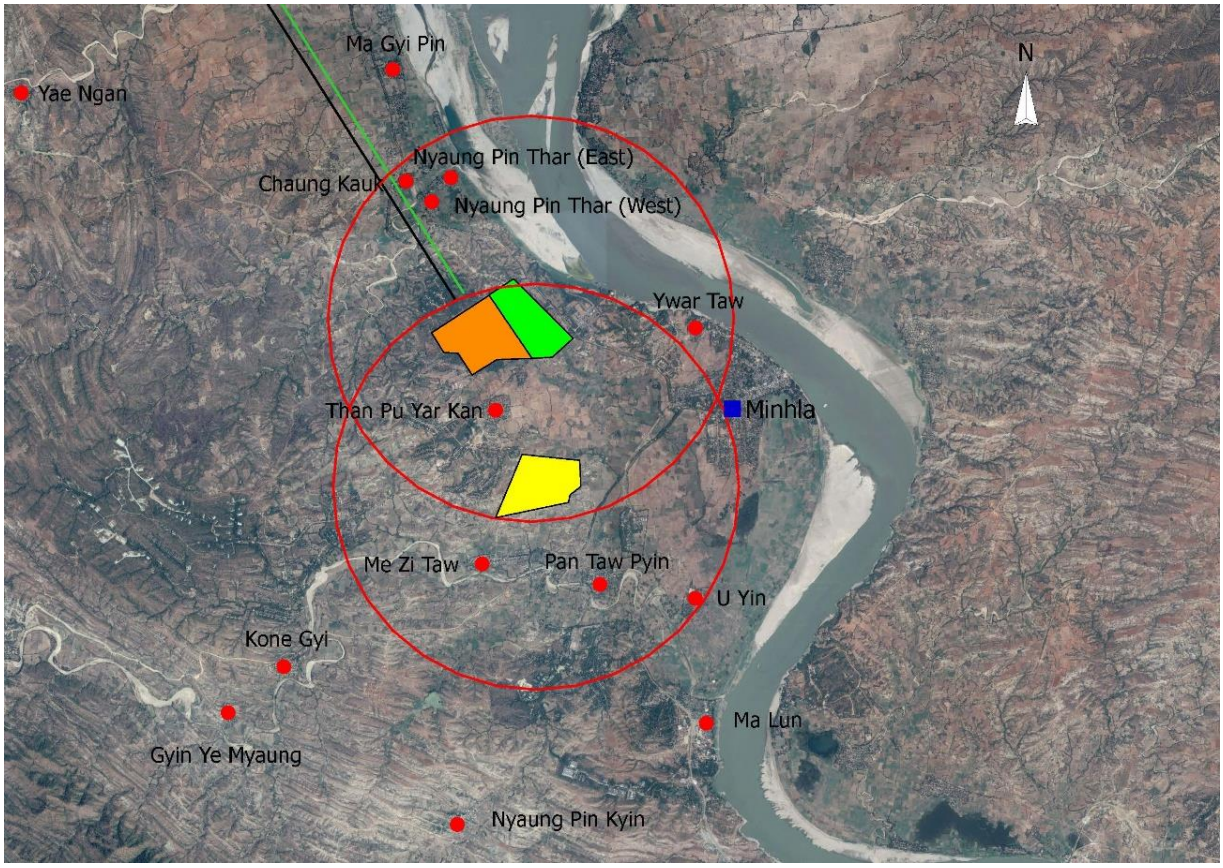


Figure 39: 3 Kilometer Radius Map (See larger map in appendix 36)

5.1.2 Justification of selection of baseline data collection and survey methods

The pollutants of proposed new oil refinery are Particulate matters, Sulfur dioxide, Carbon monoxide, Hydrocarbons, Nitrogen oxides, Ammonia, Ground level Ozone, Lead, Hydrogen sulfite, Oil, Aldehydes and other impacts. Oil refinery emit gases and particulate matters which may impact to natural soil, water body and air body at surroundings. The potential impacts on soil, water body and air body would be determined by research team before establishing the proposed plant. Baseline data collection samples should be collected at justified locations of probably impacted to Soil (**SQ**), Groundwater(**WG**), River water(**WR**), Waste water **(WW**), Air quality **(AQ**) and **Sound Pressure**.

Myanmar Survey Research's survey team selected the locations for Baseline Data Collection for soil samples, ground water samples, river water samples, surface water samples and ambient air quality and noise pressure test points, based on the investigation and findings at primary site surveys, and topographic contour map. Consultations were also made with experts from the labotoraries of Myanmar Agriculture Services in the selection of the sites for soil sample collection and with experts from Occupational and Environmental Health Division in the selection of sites for water, air and noise pressure.

5.1.2.1 Soil survey methods

- Land Use Division, Agricultural Department conducted soil survey by using the Russian soil scientist soil analysis method and F.A.O/UNESCO method.
- When soil survey was conducted physical properties of soil such as soil colour, texture, structure, moisture, hardness, drainage, inclusion and new formation were recorded and gave the soil name by using Hussian soil classification, F.A.O soil classification method.
- When classified the soil types, soil horizontal characteristics were based and identified the soil type. Soil properties are formed according to the soil forming process and it is not possible to give nomenclature on the base of site seeing different norms of the soil characteristics. It needs thousands of million years to from one inch cubic of soil but soil can be easily deteriorated in a few years due to improper use of the land and soil.

5.1.2.2 Water Quality Survey Method

- Ground water samples from nearest tube wells, Irrawaddy river water samples from upstream and downstream and waste water samples from existing disposed water drainage were collected and chemically treated by sampling officer of Occupational and Environmental Health Department.
- Water samples were analysed at the Occupational and Environment Health Department Laboratory by using spectrophotometer, atomic absorption spectrophotometer (Graphite furnace method), pH meter with waste-water analysis standard method and POTATEST incubation method.

5.1.2.3 Air quality survey method

- Air quality sampling sites were chosen with the dispersion model. This model covered 3-5 kilometers radius of the sampling sites. Around the proposed project, there are some villages and residences of some townships. So, this air quality measurement could cover these areas and duplicate for some area.
- Ambient air sampling was conducted at four sites. Each sampling period was based on 24-hour measurement level of TSPM and PM_{10} using high volume air sampler with glass-fibered filter and SO_2 and NO_2 with adsorbent liquids for each gas. The principle of TSPM and PM_{10} sampling applied gravity metric-high volume method and measured by using microbalance. For SO_2 and NO_2, the titration method was used to quantify the level.

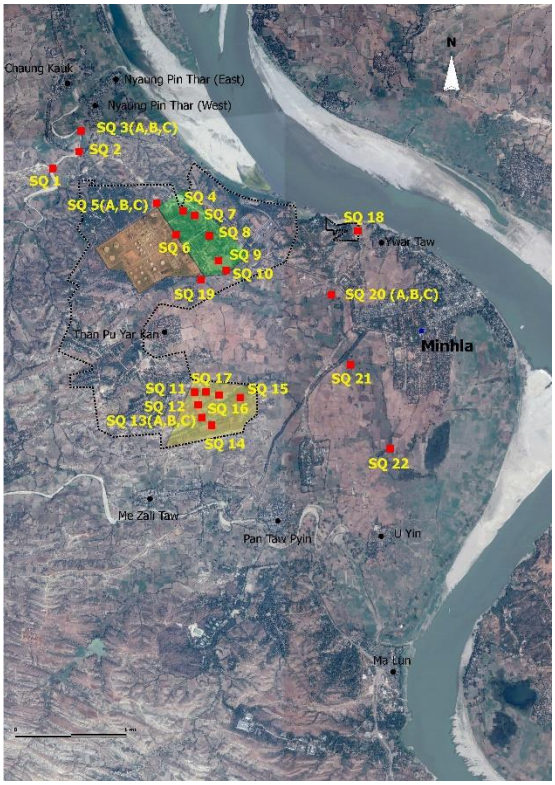
5.1.2.4 Sound Pressure Survey Method

Maximum Sound Pressure Level (Lmax) and the Equivalent Continuous Sound Level (L_{eq}) were measured at available site of the Project area.

Acoustic environment monitoring was performed in accordance with standard procedures adopted by American Conference of Governmental Industrial Hygienist (ACGIH) which is authoritatively and currently used in Myanmar.

5.1.3 Soil Quality Data Collection

5.1.3.1 Location map of soil sample points



Name	Latitude	Longitude
SQ 1	19.98541	94.98866
SQ 2	19.98750	94.99210
SQ 3(A,B,C)	19.99002	94.99234
SQ 4	19.98022	95.00564
SQ 5(A,B,C)	19.98118	95.00218
SQ 6	19.97733	95.00470
SQ 7	19.97968	95.00716
SQ 8	19.97719	95.00905
SQ 9	19.97414	95.01024
SQ 10	19.97295	95.01125
SQ 11	19.95805	95.00714
SQ 12	19.95654	95.00759
SQ 13(A,B,C)	19.95496	95.00807
SQ 14	19.95401	95.00936
SQ 15	19.95739	95.01309
SQ 16	19.95773	95.01032
SQ 17	19.95810	95.00863
SQ 18	19.97780	95.02838
SQ 19	19.97181	95.00796
SQ 20 (A,B,C)	19.96998	95.02494
SQ 21	19.96142	95.02746
SQ 22	19.95116	95.03258

Figure 40: Location map of soil sample points (See larger map in appendix 37)

MSR study team collected soil samples from 22 points selected at proposed site and surrounding by setting 3Km radius from the existing refinery plant (Figure 41) on February 14 and 15, 2015.

5.1.3.2 Justification of selection soil samples

a) Three Points were selected along Chaungkauk Chaung at the entrance to Ayeyarwady river where disposed water from new oil refinery. (SQ-1, SQ-2, SQ-3) may flow down the river.

Justification of selection of soil sample baseline data collection sites

Topographically, the proposed new refinery project will be constructed on 123.61 acres of land which is in front of the existing oil refinery. The North portion of proposed site including existing factory has seven valleys which are 60 to 50 Ft lead to Chaungkauk Chaung (Creek) that flows to Ayeyarwaddy river at the rainy season. Operation of new oil refinery will impact the existing soil and its nutrients. Soil will be degraded by stack emission and raining and flowing into Chaungkauk Chaung. To collect as baseline data of soil nutrient, SQ1, SQ2 and SQ3 points are most suitable in the creek. SQ3 is at the bend of chaungkauk chaung, data collection for surface soil, medium soil and deep soil for heavy metal will be collected.

b) Seven points were selected at proposed site area of about 132.61 acres where new oil refinery would be constructed (SQ-4, SQ-5, SQ-6, SQ-7, SQ-8, SQ-9, SQ-10).

Justification of selection of soil sample baseline data collection sites

The proposed new refinery project will be constructed on 123.61 acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil and its nutrients. Soil will be degraded by stack emission and raining. To collect as baseline data of soil nutrient of existing position SQ4, SQ5, SQ6, SQ7,SQ8, SQ9 and SQ10 points are most suitable in the proposed construction area. SQ10 is at the back

edge of existing plant, data collection for surface soil, medium soil and deep soil for heavy metal will be collected.

c) Seven points were selected at proposed storage tank area, at the southern edge of MPE owned land (about 211 Acres) where huge storage tanks of crude oil for new oil refinery would be constructed and a large number new constructions for worker's quarters and officer's quarters of new oil refinery including some infrastructures including guest house, play ground , park and recreation centres, schools and hospital would be built (SQ-11, SQ-12, SQ-13, SQ-14,SQ-15,SQ-16, SQ-17).

Justification of selection of soil sample baseline data collection sites

Storage Tanks of the proposed new refinery project will construct on 211 acres land including with workers quarters, Officers quarters, guest house, play ground, park , recreation center hospital and other infrastructures which is located at southern edge of MPE's premise. Operation of new oil refinery and oil spill at storage yard will impact the existing soil and its nutrients. Soil will be degraded by stack emission, oil spilling and raining. To collect as baseline data of soil nutrient of existing position SQ11, SQ12, SQ13,SQ14,SQ15,SQ16 and SQ17 points are most suitable in the proposed construction area. SQ13 is at the middle of construction of storage tanks, data collection for surface soil, medium soil and deep soil for heavy metal will be collected.

d) One point was selected at proposed new jetty and terminal area where a jetty, landing stage, and terminal for new products (SQ-18) would be constructed.

Justification of selection of soil sample baseline data collection sites

Jetty and terminal will be constructed at Ayeyarwaddy river bank for new oil refinery. SQ18 is at the proposed area of jetty and terminal area that itat is most suitable to collect data for soil nutrient, most of oil spilling will be impacted jetty and terminal.

e) Four points were selected along the disposed water drainage channel which flows from water treatment plant of existing oil refinery. A large quantities of disposed water is flowing along lower contour level and under-passes through the road way and railway. The flow ends at a lake which is southern to Minhla Town. Survey team noticed a weir at that lake which is probably, the disposed water may stop in summer and can flow through the weir leading to Ayeyarwady river in rainy season (SQ-19, SQ-20, SQ-21, SQ-22).

Justification of selection of soil sample baseline data collection sites

A large quantity of water will be used for refining process at proposed new oil refinery. Excess water will be disposed to existing drain. Dissolved chemicals and gases including with spilled oil will flow through along the drain which becomes a lake at southern Minhla Town. . Soil will be degraded by stack emission, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of soil nutrient of existing position beside the drain, SQ19, SQ20, SQ21 and SQ22 points are most suitable along the drain. SQ20 is nearest point to the proposed new oil refinery's disposal, data collection for surface soil, medium soil and deep soil for heavy metal will be collected.

Soil sample collection

Soil Samples were tested at the Laboratory of Myanmar Agriculture Services (Land Use), Ministry of Agriculture, Livestock and Irrigation. The test results and reports are presented below:

5.1.4.3 Soil quality laboratory results

Sr No.	Profile No	Soil depth & Layer	Location Lat : log	Soil Type
1	SQ -1	A (0- 15")	N 19° 59′ 07.6" E 94° 59′ 19.1"	Young Alluvial Soil
2	SQ – 2	A (0 -15")	N 19° 59′ 07.6" E 94° 59′ 19.1"	Young Alluvial Soil
3	SQ – 3	A(0 - 20")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil
4	SQ - 3	B(20- 30")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil

5	SQ - 3	C(30 -39")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil
6	SQ - 4	A(0 - 15")	N 15° 58′ 48.4" E 94° 00′ 21.9"	Gravelly Red Brown Compact Savanna soil
7	SQ -5	A(0 - 12")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
8	SQ -5	B(12- 20")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
9	SQ -5	C(20-35")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
10	SQ -6	(0 -15")	N 19° 58′ 38.8" E 94° 00′ 17.8"	Gravelly Eroded Red Brown Savanna Soil
11	SQ -7	A (0- 12")	N 19° 58′ 46.8" E 95° 00′ 26.4"	Red Brown Savanna Soil
12	SQ - 8	A (0 -12")	N 19° 58′ 37.3" E 94° 00′ 32.1"	Red Brown Compact Savanna Soil
13	SQ -9	A(0 - 12")	N 19° 58′ 22.0" E 95° 00′ 40.8"	Red Brown Compact Savanna Soil
14	SQ -10	A(0 - 12")	N 19° 58′ 26.9" E 95° 00′ 36.7"	Red Brown Compact Savanna Soil
15	SQ -11	A(0 -19")	N 19° 57′ 29.0" E 94° 59′ 32.5"	Yellow Brown Savanna Soil
16	SQ -12	A (0- 20")	N 19° 57′ 23.6" E 95° 00′ 27.1"	Reddiah Brown Savanna Soil
17	SQ -13	A(0 - 10")	N 19° 57′ 17.9" E 95° 00′ 28.6"	Yellow Brown Savanna Soil
18	SQ -13	B(10- 18")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Yellow Brown Savanna Soil
19	SQ -13	C(18-32")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Yellow Brown Savanna Soil
20	SQ -14	(0 -10")	N 19° 57′ 14.4" E 95° 00′ 33.4"	Red Brown Compact Savanna Soil
21	SQ-15	A(0 -12")	N 19° 57′ 26.7" E 95° 00′ 47.0"	Yellow Brown Savanna Soil
22	SQ -16	A (0- 15")	N 19° 57′ 28.1" E 95° 00′ 36.7"	Gravelly Red Brown Savanna Soil
23	SQ - 17	A (0 -19")	N 19° 57′ 29.3" E 95° 00′ 31.2"	Yellow Brown Savanna Soil
24	SQ -18	A(0 - 12")	N 19° 58′ 40.0" E 95° 01′ 42.2"	Gravelly Red Brown Savanna Soil
25	SQ -19	A(0 - 20")	N 19° 58′ 18.5" E 95° 00′ 22.4"	Brown Compact Savanna Soil
26	SQ -20	A(0 -12")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil
27	SQ -20	B (12- 35")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil

28	SQ -20	C (35 - 42")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil
29	SQ -21	A (0 -20 ")	N 19° 58′ 18.5" E 95° 00′ 28.4"	Meadowish Slightly Compact Soil
30	SQ -22	A (0 -20 ")	N 19° 57′ 04.1" E 95° 01′ 56.7"	Meadowish Slightly Compact Soil

5.1.4.4 Soil properties

Soil samples were collected widely in Chaungkauk Chaung, factory area, 200 acres of the upland cultivated area which is close to the factory and jetty. The soil analysis indicated that there were three main soil types and eight different sub soil types as follow:

(1) Alluvial Soil (F.A.O soil name) fluvisols

(2) Red Brown Savanna Soil (F.A.O soil name Luvisols)

(3) Yellow Brown Savanna Soil (F.A.O soil name, Savanna)

(4) Gravelly Red Brown Savanna Soil (Savanna)

(5) Gravelly yellow Brown Savanna soil (F.A.O soil name, Savanna)

(6) Meadowish Compact soil (F.A.O soil name)

(7) Compact soil (F.A.O soil nameVertisols)

(8) Compact Savanna Soil (Vertisots)

Alluvial Soil

Fluvisol

This type of soil can be found near the bridge in Chaungkauk Chaung. These types of soil are young Alluvial soil composed of coarse sand with few soil content and old Alluvial soil could be found in upland cultivated plot near Chaungkauk Chaung. Young Alluvial soils are high in clay percentage and suitable for agriculture. Eventhough clay soil from rivers and streams is suitable for agriculture, sandy clay soil high in coarse sand is not suitable for agriculture. The soils from Profile Number SQ-1, SQ-2 and SQ-3 were dug and laboratory analysis result is as follow:

Soil texture	Sand, Coarse Sand
Soil Structure	Structureless
Soil pH	Moderately alkaline
Soil Nitrogen content (N_2)	Low
Soil phosphorus content (P_2O_5)	Low
Soil Potassium content K_2O	Low
Humus content	Very low, low
Organic carbon	Low
Calcium (Ca^{++})	High
Magnesium (Mg^{++})	Low
Potassium (K+)	High
Aluminum (Al^{+++})	Low
Hydrogen	Not detected

Sodium (Na^+)	Not detected
C.E.C	Low
Soluble Salts analysis	
Ec	Very low (not sodic and saline condition)
TDS	Low in total dissolved soluble content
SAR	Not Detected
RSC	Not Detected
Dominant salts	Ca $(HCO_3)_2$
Heavy Metals content which have harmful effect to human beings and plant analysed in plant protection department	
Mercury (Hg)	Very high (Maximum Permitted Level)
Lead (Pb)	Low
Arsenic (As)	Not detected

Red Brown Savanna and Yellow Brown Savanna Soils

Red brown savanna and yellow brown savanna soils are found in the area which is located in the south of staff's quarter and demarcated as 200-acres agricultural land by MPE. The land surface is not smoothly flattered, but undulated. Even though it is divided as redbrown savanna and yellow brown Savanna based on the colour of the soil, these soils are suitable for up land crop cultivation. It can be seen continuously with some rocky area and mixture of rock and red brown savanna soil. These soils need to be ploughed immediately when the soils have sufficient moisture content.

These soils have neutral pH value in upper surface and high value in lower surface. These soils are extremely alkaline and high in calcium and magnesium content but sufficient amount of potassium and low in humus and other nutrient content. These soils are sandy soil and top soils erode continuousally. Rill erosion and gully erosion are common due to lack of soil conservation and annual cultivation.

These soils are suitable for seasonal crop and upland crop and applying green manuring should be done. It needs to apply wind break cultivation for soil conservation. Soil test analysis results are as follow:

Soil texture	Sand, Clay Loam
Soil Structure	Crumbly structure
Soil pH	Extremelyalkaline
Nitrogen content (N_2)	Low
Phosphorus content (P_2O_5)	Low
Potassium content K_2O	Medium
Humus	Low
Organic carbon	Low
Calcium (Ca^{++})	High
Magnesium (Mg^{++})	Low to medium
Potassium (K^+)	Low
Aluminium (Al^{+++})	Not detected
Hydrogen (H^+)	Not detected
Sodium (Na^+)	High (5.29)
Cation Exchange Capacity	Low to Medium

Soluble salt content analysis result

Electrical conductivity (Ec)	Low
TDS	Medium
SAR	Low
RSC	Low
Dorminant Salt	Na $(HCO_3)_2$

Gravelly Yellow Brown Savanna and Gravelly Red Brown Savanna Soils

These soils were found in 200-acres upland crop cultivated field in southern part of the Thanpayarkanfactory office staff"s quarter and in the factory compound. These soils were found continuously with Red Brown Savanna and Yellow Brown Savanna soils. Top soils are eroded soil and low in nitrogen, phosphorus, potassium, and humus content. Soil structure is hard and structure less type with the mixture of soil and gravels. If the soil is soild, when it touches with water, the solid soil will become fragile. These soils were found on undulating land form, major upland crop area in dry zone.

Soil texture	Sand, Clay Loam
Soil Structure	Unstable structure
Soil pH	Moderately alkaline
Nitrogen content (N_2)	Low
Phosphorus content (P_2O_5)	Low
Potassium content (K_2O)	Medium
Humus	Low
Organic carbon	Low
Calcium (Ca^{++})	High
Magnesium (Mg^{++})	0.68-0.25 (low)
Potassium (K^{+})	0.13 -0.25 (low)
Aluminium (Al^{+3})	Not detected
Hydrogen (H+)	0.03(low)
Sodium (Na^{+})	5.29 (High)
Cation Exchange Capacity (C.E.C)	Medium to high
Electrical conductivity (Ec)	Low to medium
Soil soluble salts	
Ec	Low (no sodic and saline)
TDS	Medium
RSC	Low
Dorminant salt	Low
Heavy metals content which have harmful effects to human being and plant analysed in Plant Protection Department	
Mercury (Hg)	More than maximum permitted level
Lead (Pb)	Low
Arsenic (As)	Not detected

Meadowish compact soil and compact soil (Vertisols)

Meadowish compact soil and compact soil (Vertisols) are found in low land levelling areas where rice, vegetables and chickpea can be grown. These soils are high in clay content. These soils become hard when dry, and become very sticky when wet. These soils are found in factory sewage drainage, palm and paddy field and near sewage drainage and Profile No. 21, 22 are samples for these soils.

Soil analysis results

Soil texture	Clay Loam
Soil Structure	Sub-angular blocky
Soil pH	Slightly acid (6.17)
Nitrogen content (N_2)	Medium
Phosphorus content (P)	Low
Potassium content (K_2O)	High
Humus	High
Organic carbon	High
Calcium (Ca^{++})	21.92 (High)
Magnesium (Mg^{++})	4.82 (High)
Potassium (K^{+})	0.46 (Medium)
Aluminium (Al^{+3})	Not detected
Hydrogen (H^{+})	0.001(low)
Sodium (Na^{+})	0.74 (High)
Electrical conductivity (Ec)	0.21 (Medium)
Cation Exchange capacity (C.E.C)	High

Soluble salts analysis

pH	Slightly acid
Ec	Low
TDS	Medium
SAR	Low
RSC	Not detected
Dorminant salt	$CaCl_2$, $CaSO_4$ (sub soil)

Heavy metals content which have harmful effect to plant and human analyzed in Plant Protection Department

Mercury (Hg)	More than maximum permitted level
Lead (Pb)	Low
Arsenic (As)	Not detected

Compact Savanna Soil

Clay content in this soil is not more than compact soil and sand content is not more than savanna soil. Therefore, clay and sand content is mixed with suitable ratio. Therefore, soil level is in between of compact and savanna soil. It is up Land crop area and, if water is available, rice can be grown there. Profile No SQ -10, SQ-14 and SQ -19 are this type of soil.

Soil analysis results

Soil texture	Sand Loam, Loam, Silty Clay Loam
Soil Structure	Crumbly of sub angular blocky
Soil pH	Moderately alkaline
Nitrogen content (N_2)	Low
Phosphorus content (P)	Low
Potassium content (K_2O)	Low
Humus	Low
Organic carbon	Low

Calcium (Ca^{++})	13.56 (High)
Magnesium (Mg^{++})	1.36 (Medium)
Potassium (K^{+})	0.20 (low)
Aluminium (Al^{+3})	Not detected
Hydrogen (H^{+})	0.03 (low)
Sodium (Na^{+})	0.44(Medium)
Cation Exchange capacity (C.E.C)	15.59 (Medium)
Electrical conductivity (Ec)	Medium

Soil Soluble Salts analysis

Total dissolved solids TDS	Low
Electrical conductivity (Ec)	Very Low
Sodium Adsorption Ratio SAR	Not detected
Residual Sodium Carbonate RSC	Not detected
pH	Moderately alkaline
Dorminate salts	$Ca(HCO_3)_2$

Heavy metals content which have harmful to plant and human analyzed in plant protection department

Mercury (Hg)	More than maximum permitted level
Lead (Pb)	Low
Arsenic (As)	Not delected

Analytical data evaluation and recommendation

There is no plant nutrient problem in soil analysis of Than Ba Yar Kan field compound in Min Hla Township Magwe Division. Nor soil problems such as saline soil, sodic soil, sodium toxicity, high in calcium and aluminum content etc occur. Higher pH value in the soil of tropical region is a normal case. The tropical region is low in rainfall intensity and high in evapotranspiration. As a result, soluble salts rise with the capillary action and become evaporate and left white salt on the ground and rise the soil pH value. Soluble salts contain potassium, calcium, magnesium and sodium.

There is no distinct problem in total dissolved salt content in water soluble salts analysis. SAR sodium Absorption Ratio also did not show as a soil problem. There is no problem in Electrical conductivity and residual sodium carbonate.

Therefore, there is no nutrients problem and soil soluble salts problem in these soils.

In the result of heavy metal analysis by plant protection department, the contents of lead and arsenic are relatively low but it was found that mercury content is higher than maximum permitted level. It might be due to excessive use of herbicide, fungicide and growth-oriented tonic which are exported from other countries for leguminous crops.

The following are mentioned in the appendix:

Summary of external feature of soil samples

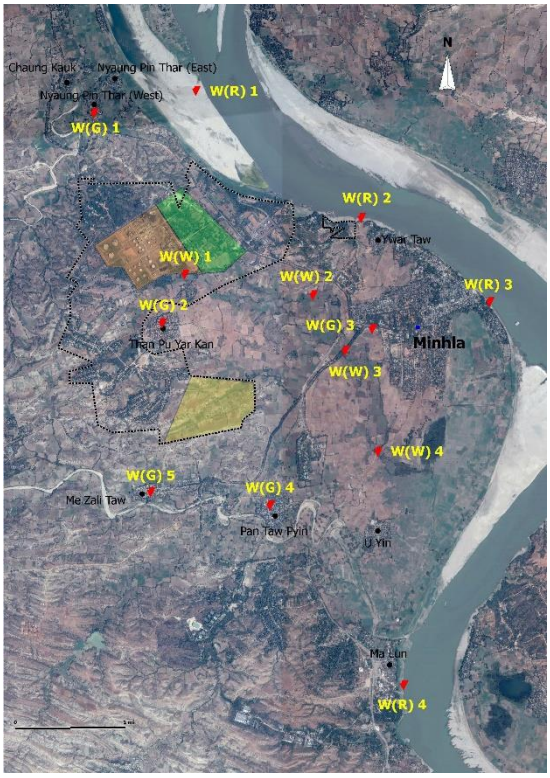
Summary of soil interpretation results

Summary of soil/water extraction interpretation results

Summary of heavy metal analysis

5.1.4 Water Quality Data Collection

Ground Water (WG), Irrawaddy River Water (WR), Waste Water (WW)



Name	Latitude	Longitude
W(G) 1	19.99156	94.99412
W(G) 2	19.96625	95.00309
W(G) 3	19.96553	95.03069
W(G) 4	19.94371	95.01724
W(G) 5	19.94538	95.00158
W(R) 1	19.99499	95.00752
W(R) 2	19.97926	95.02922
W(R) 3	19.96888	95.04612
W(R) 4	19.92150	95.03480
W(W) 1	19.97227	95.00602
W(W) 2	19.96973	95.02290
W(W) 3	19.96283	95.02713
W(W) 4	19.95036	95.03143

Figure 41: Location map of Water Quality Sample points (See larger map in appendix 38)

MSR study team collected water samples from 13 points selected at proposed site and surrounding by setting 3Km radius from the existing refinery plant (Figure 42) on February 18 and 19, 2015.

5.1.4.1 Ground Water (WG)

WG-1

One point for Ground Water sample was selected and collected at nearest tube well which is close to the northern part of the Proposed Site from Nyaungpinthar Village.

(Location is inside U Aung Nyein's compound Nyaungpinthar village west, 2 inch tube well with hand pump, 100 Ft deep. Capacity is 100 gallons per hour)

WG-1 Justification of selection ground water sample

The proposed new refinery project will construct on 123.61 Acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil, Water body and air quality of surrounding. Groundwater will be degraded and polluted by stack emission and, oil spilling , gases, dissolved chemicals and raining. To collect as baseline data of ground water sample which used by village people at surrounding area of different locations should be selected. **WG1** at the northern part of proposed new oil refinery land, its quality of water should be selected. It is at U Aung Nyein's compound, Nyaungpinthar village, 2-inch tube well, 100 ft depth.

WG-2

One point for ground water sample, was selected and collected at the nearest tube well which is close to southern part of Thanbayarkan village. (Location is inside U Kyaw Naing's compound, Northen Thanbyarkan village, 2 inch tube well with compressor pump, 205 Ft deep. Capacity is 100 Gallons per hour)

WG-2 Justification of selection ground water sample

The proposed new refinery project will construct on 123.61 acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil, Water body and

air quality of surrounding. Groundwater will be degrade and polluted by stack emission and, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of ground water which used by village people at surrounding area of different locations should be selected. **WG2** is at the southern part of proposed new oil refinery land, its quality of water should be selected. It is at U Kyaw Naing 's compound, Thanpyarkan village, 2-inch tube well, 205 ft depth.

WG-3

One point for Ground Water sample was selected and collected from Minhla gate way area at Eastern.(Location is infront of U Win Aung's shophouse, Northern Minhla, 2 inch tube well with submersible pump,100 Ft deep. Capacity is 1200 gallon per hour) **(WG-3)**

WG-3 Justification of selection ground water sample

The proposed new refinery project will construct on 123.61 Acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil, Water body and air quality of surrounding. Groundwater will be degrade and polluted by stack emission and, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of ground water which used by village people at surrounding area of different locations should be selected. **WG3** is at the eastern part of proposed new oil refinery Minhla gate way area shophouses at Mnhla, its quality of water should be selected. It is at U Win Aung's shop house, 2-inch tube well 100 ft depth,1200 g/hr capacity.

WG-4

One point for ground water sample of shallowest tube well was selected and collected from Pantawpyin Village.(Location is inside U Myo Win + Daw Aye Than's compound, Northern Pantawpyin village, 1.5 inch tube well with centrifugal pump, 60 Ft deep. Capacity is 180 gallons per hour)

WG-4 Justification of selection ground water sample

The proposed new refinery project will construct on 123.61 acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil , Water body and air quality of surrounding. Groundwater will be degrade and polluted by stack emission and , oil spilling , gases, dissolved chemicals and raining. To collect as baseline data of ground water which used by village people at surrounding area of different locations should be selected. **WG4** s at the southeastern part of proposed new oil refinery land, its quality of water should be selected. It is at U Myo Win's compound 1.5 inch tube well with centrifugal pump, 60 ft Depth , 180 g/hr.

WG-5

One point for ground water samples of shallowest tube well was also selected and collected from Maezetaw Village.(Location is inside Daw Mya Sein's compound, Maezetaw village, 2 inch tube well with hand pump,67 Ft deep, Capacity is 330 gallons per hour)

WG-5 Justification of selection ground water sample

The proposed new refinery project will construct on 123.61 Acres land which is in front of the existing oil refinery. Operation of new oil refinery will impact the existing soil , Water body and air quality of surrounding. Groundwater will be degrade and polluted by stack emission and , oil spilling , gases, dissolved chemicals and raining. To collect as baseline data of ground water which used by village people at surrounding area of different locations should be selected. **WG-5** is at the southeastern part of proposed new oil refinery land, its quality of water should be selected. It is at Daw Mya Sein's compound 12 inch tube well with centrifugal pump, 67 ft depth , 330 g/hr.

Ground water sample collection

5.1.4.2 `Water quality laboratory results

Samples were tested at the Occupational and Environmental Health Laboratory, Ministry of Health. The test results are presented below.

Summary of Ground Water Results

Analyte	Reference	Unit	Results				
			WG-1	WG-2	WG-3	WG-4	WG-5
Color	15	TCU	1	0	0	0	1
Turbidity	5	NTU	0.1	0.1	0.05	0.05	0.05
Arsenic	50	ppb	1.453	0	0	0	0
Copper	2	ppm	0.10	0.42	0.28	0.30	0.40
Fluride	1.5	ppm	0.49	0.75	0.58	0.45	0.29
Lead	10	ppb	0	0	0	0	0
Nitrate	50	ppm	5	0	0	16	0
Chloride	250	ppm	20	50	30	40	30
Hardness	500	ppm as $CaCo_3$	161	265	168	203	167
Iron	1	ppm	0.06	0	0	0	0
pH	6.5-8.5	ppm	7.3	7.8	7.4	7.4	7.5

Sulphate	250	ppm	26	106	146	136	75
Total Dissolved Solid	1000	ppm	320	4570	650	580	390
Magnesium	150	ppm	86	64	94	170	88
Zinc	3	ppm	0.17	0.11	0.25	0.17	0.25
Electro Conductivity	1500	µmhos/cm	490	1340	1140	890	600
Alkalinity	200	ppm	170	325	285	205	145
Phenol	1	ppm	0	0	0	0	0
Bacterial Growth (Total coliform 37˚C)	0	Coliform/100ml	4	No Growth	No Growth	Numerous	No Growth
Bacterial Growth (fecal coliform 44˚C)	0	Coliform/100ml	2	No Growth	No Growth	No Growth	No Growth
Phosphate	0.0-70	ppm	0	0	0	0	0

5.1.4.3 Finding

The result of Occupational and Environmental Health Laboratory (Ministry of Health) indicates at WG-1 (Nyaungpinthar West), the Bacterial Growth (Total Coliform 37 C) and (Fecal Coliform 44 C) are respectively higher than reference value.

At WG-2 Thanpyarkan tube well, total dissolved solid content and alkalinity contents are quite higher than reference value.

WG-3, Four-inch tube well from northern Minhla with submersible pump indicates higher alkalinity.

The Result of WG-4 Northern Pantawpyin tube well indicates Bacterial Growth (Total Coliform 37*C) is numerous and a little bit higher lkalinity.

Samples of tube well WG-5, located at Mezetaw Village, is very clean and no more excess results are indicated. Every result is normally lower than reference value.

5.1.4.4 Ayeyarwaddy River Water (WR)

WR-1

One Point was selected at the shore of the river next to Nyaungpinthar village to collect samples. This is in the up-stream part of existing jetty and proposed jetty. The site is located near the entrance of Chaungkauk Chaung (Creek) to Ayeyarwaddy river. Because, if any pollutant occurs by Chaunkkauk Chaung (polluted by disposed water) and Ayeyarwaddy river (polluted by spills at new jetty) upstream water quality of selected point will become a base line data.

WR-1 Justification of selection river water sample

The proposed new refinery project will construct on 123.61 acres land which is in front of the existing Oil refinery. Operation of new oil refinery will impact the existing soil , Water body

and air quality of surrounding. Riverwater will be degrade and polluted by stack emission and oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of river water which used by village people at surrounding area of different locations should be selected.

WR1 is at the upstream, northern part of proposed new oil refinery land, its quality of Ayarwaddy riverwater should be selected. If any pollutant by Chaungkauk chaung, its baseline data will indicate to original Ayeyarwaddy river water.

WR-2

One Point was selected at proposed jetty and landing stage area which will be busy by temporary jetty for construction period and permanent new jetty at operation phase. A large

quantity of River water will be pumped out for new oil refinery at that location. Huge barge carrier will be anchored at jetty and filling the products of New oil refinery and oil spills can occur there.

WR-2 Justification of selection river water sample

The proposed new refinery project will construct on 123.61 Acres land which is in front of the existing Oil refinery. Operation of new oil refinery will impact the existing soil , Water body and air quality of surrounding. Riverwater will be degrade and polluted by stack emission and oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of river water which used by village people at surrounding area of different locations should be selected. WR2 is at the eastern part of proposed new oil refinery land, its quality of Ayarwaddy riverwater should be selected. If any pollutant at terminal and jetty, its baseline data will indicate to original Ayeyarwaddy river water.

WR-3

One point was selected in Minhla at the Town Water supply system intake pontoon area established by Minhla Township Development Committee (Minhla Municipal Department) which is supplying 120,000 galls per day to Minhla residents. (WR-3)

WR-3 Justification of selection river water sample

The proposed new refinery project will construct on 123.61 acres land which is in front of the existing Oil refinery. Operation of new oil refinery will impact the existing soil , Water body and air quality of surrounding. Riverwater will be degrade and polluted by stack emission and oil spilling , gases, dissolved chemicals and raining. To collect as baseline data of river water which used by village people at surrounding area of different locations should be selected. WR3 is at the Minhla jetty, easthern part of proposed new oil refinery land, its quality of water should be selected. If any pollutant, especially oil spillage by terminal and jetty of new oil refinery, its baseline data will indicate to original Ayeyarwaddy river water.

WR-4

One point was selected at down-stream of Irrawaddy River next to Malun.

WR-4 Justification of selection river water sample

The proposed new refinery project will construct on 123.61 acres land which is in front of the existing Oil refinery. Operation of new oil refinery will impact the existing soil, Water body and air quality of surrounding. River water will be degrade and polluted by stack emission and oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of river water which used by village people at surrounding area of different locations should be selected. WR4 **i**s at the downstream, southern part of proposed new oil refinery land, its quality of water should be selected. If any pollutant at Malun, its baseline data will indicate to original Ayeyarwaddy river water.

Ayeyarwaddy River Water sample collection

5.1.4.5 Summary of River Water Results

Analyte	Reference	Unit	Results			
			WR-1	WR-2	WR-3	WR-4
pH	5.5-9	-	7.2	7.9	7.9	7.8
BOD	20-60	Mg O_2/L	38	39	35	40
COD	200	ppm	28	30	34	25
Total Dissolved Solid	2000	ppm	120	110	110	110
Nitrate	10	ppm	8	7	5	23
Arsenic	50	ppb	0.758	3.093	5.777	3.411
Oil and Grease	10	ppm	2.71	9.03	3.24	15.35
Phenol	1	ppm	0.14	0.03	0.01	0
Sulphate	1000	ppm	22	10	7	6
Chloride	1000	ppm	10	20	20	20
Electro Conductivity	1500	µmhos/cm	210	180	170	160
Lead	10	ppb	0.088	4.452	0	0
Turbidity	5-15	NTU	1	5	5	1
Alkalinity	200	ppm	55	60	55	45
Iron	3	ppm	0.28	0.17	0.19	0.27
Dissolved Oxygen	11	ppm	10.1	11.0	9.8	11.2
Copper	3	ppm	0.24	0.24	0.14	0.16
Phosphate	0.0-70	ppm	0	0	0	0
Color	15	TCU	10	10	10	5
Hardness	500	ppm as $CaCo_3$	73	116	75	64
Fluride	1.5	ppm	0.31	0	0.31	0.10
Magnesium	150	ppm	32	35	37	33
Zinc	3	ppm	0.04	0.03	0.11	0.12

The result of Occupational and Environmental Health Laboratory (Ministry of Health) indicates at no more excess result at **WR-1** which is up-stream of existing jetty and proposed jetty yards. Samples were collected at the location of Nyaungpinthar Village's eastern foreshore.

WR-2, located at proposed new jetty yard's foreshore indicates 9.03ppm oil and grease content which reference value is 10.00ppm. Dissolved Oxygen value is 11.00 ppm which reference value is same as 11.00 ppm.

WR-3, located at Minhla water supply pontoon indicates no more excess results.

WR-4, located at Malun foreshore indicated oil and grease content is 15.35 ppm while the reference value is 10 ppm. Dissolved Oxygen also quite higher to 11.20 ppm which reference value is 11.00 ppm.

5.1.4.6 Surface Water (Waste Water) (WW)

WW-1

ONE POINT FOR SURFACE WATER (WASTE WATER) SAMPLES FROM NEAREST POINT TO TREATMENT PLANT OF EXISTING REFINERY WAS SELECTED AND COLLECTED.

WW-1 Justification of selection surface water (waste water) sample

A large quantities of water will be used for refining process at proposed new oil refinery. Excess water will be disposed to existing drain. Dissolved chemicals and gases including with spilled oil will flow through along the drain which becomes a lake at southern Minhla Town. Waste water will be polluted by stack emission, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of quality of wastewater in the drain, **WW1** point is the most suitable along the drain. **WW1** is nearest point to the proposed new oil refinery's disposal.

WW-2

One point for surface Water (Waste water) samples from any bend of flow, quite distant from sample (1) where farmers use the water for their cultivation of plants was be selected and collected.

WW-2 Justification of selection surface water (waste water) sample

A large quantities of water will be used for refining process at proposed new oil refinery. Excess water will be disposed to existing drain. Dissolved chemicals and gases including with spilled oil will flow through along the drain which becomes a lake at southern Minhla Town. Waste water will be polluted by stack emission, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of quality of wastewater in the drain, **WW2** point is the most suitable along the drain. Location of **WW2** is at a bend which water flows with low velocity and farmers are using the water as farming purpose.

WW-3

One point for surface Water (Waste water) samples from northern part of road side drain was be selected and collected.

WW-3 Justification of selection surface water (waste water) sample

A large quantities of water will be used for refining process at proposed new oil refinery. Excess water will be disposed to existing drain. Dissolved chemicals and gases including with spilled oil will flow through along the drain which becomes a lake at southern Minhla Town. Waste water will be polluted by stack emission, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of quality of wastewater in the drain, **WW3** point is the most suitable along the drain. **WW3** is at the northern part of the roadside and farmers are using for cultivating.

WW-4

One point for surface Water (Waste water) sample from end-lake which location is at the southern outskirts of Minhla was selected and collected.

WW-4 Justification of selection surface water (waste water) sample

A large quantities of water will be used for refining process at proposed new oil refinery. Excess water will be disposed to existing drain. Dissolved chemicals and gases including with spilled oil will flow through along the drain which becomes a lake at southern Minhla Town. Waste water will be polluted by stack emission, oil spilling, gases, dissolved chemicals and raining. To collect as baseline data of quality of wastewater in the drain, **WW4** point is the most suitable along the drain. **WW4** is at the end of waste water flow and animals and farmers are using it.

Surface Water (Waste Water) sample collection

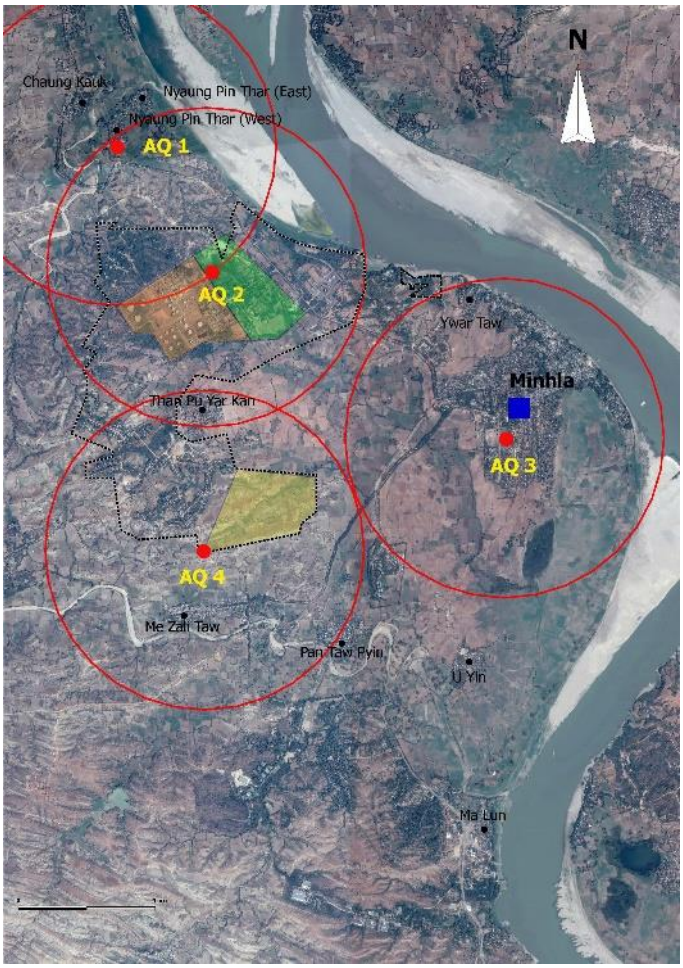
Summary of Waste Water Results

Analyte	Reference	Unit	Results			
			WW-1	WW-2	WW-3	WW-4
Ph	5.5-9	-	7.2	7.3	7.2	7.5
BOD	20-60	Mg O_2/L	35	33	32	37
COD	200	ppm	25	32	33	35
Total Dissolved Solid	2000	ppm	130	130	140	260
Nitrate	10	ppm	0	0	1	0
Arsenic	50	ppb	0.615	0	0	1.853
Oil and Grease	10	ppm	1.68	2.76	2.93	2.87
Phenol	1	ppm	0	0	0	0
Sulphate	1000	ppm	24	23	27	31
Chloride	1000	ppm	20	20	30	20
Electro Conductivity	1500	µmhos/cm	190	200	220	390
Lead	10	ppb	0	0	0	0
Turbidity	5-15	NTU	1	0.05	1	0.1
Alkalinity	200	ppm	25	20	20	65
Iron	3	ppm	0.02	0.02	0	0
Dissolved Oxygen	11	ppm	9.6	9.0	8.8	10.2
Copper	3	ppm	0.76	0.22	0.32	0.64
Phosphate	0.0-70	ppm	0	0	0	0
Color	15	TCU	1	1	1	1
Hardness	500	ppm as CaCo3	72	59	63	93
Fluride	1.5	ppm	0	0.16	0.16	0
Magnesium	150	ppm	39	41	33	85
Zinc	3	ppm	0.24	0.20	0.26	0.30

The results of the analysis of collected Waste Water samples: WW-1, WW-2, WW-3 and WW-4 at the Occupational and Environmental Health Laboratory are normally lower than reference value.

5.1.5 Air quality and noise pressure data collection

Ground ambient air quality and noise pressure (AQ)



Location map of Air Quality and Noise Test

Name	Latitude	Longitude
AQ 1	19.99148	94.99424
AQ 2	19.97909	95.00426
AQ 3	19.96254	95.03532
AQ 4	19.95142	95.00336

Figure 422: Location map of Air Quality and Noise Test (See larger map in appendix 39)

Ambient Air Quality

An assessment of baseline air quality was undertaken to establish the status of exposure of the major sensitive receptors and to assess the background air quality at the project location.

This assessment was accomplished by reviewing historical ambient air quality data, examining sources of air emissions around the proposed site (i.e. the impact zone), and by conducting a site–specific background–sampling program. In this manner, background data collected was expected to be representative of all meteorological conditions. Historical and site–specific data were compared to the applicable National Environmental Quality Guidelines (NEQG) Standards, where appropriate.

The ambient air quality has been affected due to the construction and operation of various industries in Min Bu-Min Hla Township, the movement of vehicles and operation of various construction equipment. In addition, the quality of ambient air will also be affected from the vehicle traffic on the Min Bu- Min Hla road. Several environmental studies have been conducted by MSR from 2015 in the refinery complex area, which included monitoring of the ambient air quality.

Ambient air quality monitoring was undertaken at the selected baseline air sampling locations surrounding the Project site for twenty-four consecutive hours from 25 January 2015 to 29 January 2015. The ambient air pollutants monitored included sulphur dioxide (SO_2),

nitrogen dioxide (NO_2), total suspended particulate matters(TSPM) and respirable suspended particulates (PM_{10}), with measurements logged at 1-minute interval. The measurement data were then processed to obtain relevant averaging periods of each air pollutant for comparison with the respective National Environmental Quality (Emission) Guidelines (NEQG) guidelines. The baseline air sampling location was selected namely AQ-1, Aq-2, AQ-3 and AQ-4 (the location is shown as sensitive receivers are shown in *Figure 43.*

Following the IFC's *Environmental, Health and Safety Guidelines: Air Emissions and Ambient Air Quality* and the current NEQG Air Quality Guidelines should be used. Raw hourly readings for NO_2 and SO_2 were in ppb and converted to µg/m in line with the unit of the NEQG.

As part of the baseline study for New Refinery Plant an air quality measuring station AQMS was installed at four locations within the project site. The locations were selected based on the wind direction and the ease of accessibility for the trucks carrying the AQMS and the DG for the power supply. The UTM Coordinates of the locations and duration of monitoring at the locations are presented in *Table 4-4*. Prior to commencement of monitoring, the analyzers were calibrated using zero air and subsequently subjected to span calibration using the calibration gases from the cylinders housed within the AQMS container.

Air quality monitoring station location and monitoring dates

Sample No.	Receptor Name	Receptor type location	Location		Tested Date
AQ-1	Nyaung Pin Tha	Small polulation	19.99148	94.99424	25-26 Jan 15
AQ-2	Refinery site	Zero population	19.97909	95.00426	26-27 Jan 15
AQ-3	Min Hla Town	Large polulation	19.96254	95.03532	27-28 Jan 15
AQ-4	Than Payar Kan	Small polulation in workers' residential accommodation	19.95142	95.00336	28-29 Jan 15

Efficiency of Ambient air quality and Noise pressure testing machines can roam 5 miles radius circle. But to lead an exact accurate result, MSR team decided, testing points must be roamed one another within 2 miles radius circle.

AQ-1

At the northern of proposed site, Nyaungpinthar Village Primary School compound is very suitable to select the location because about 100 primary students and peoples of Nyaungpinthar and Chaungkauk villages will be effected**.**

AQ-1 Justification of Selection Ambient Air Quality Measurement Location

New oil refinery will emit a large quantities of harmful gases such as Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide, Ground Level Ozone, Ammonia, Hydrocarbon powders and particulate matters. The location of the proposed plant is at dry zone of middle Myanmar many dusts and particulate matters are already covered more than reference value. Air quality scanning machine should place at Northeast direction of the proposed project site because southwest wind direction is mostly hitting as records from Metrology and Hydrology Department of Union of Myanmar.At the northwest direction, Nyaungpinthar village is most suitable to place scanning machine. **AQ1** is placed at Nyaungpinthar village primary school where 100 young students are learning at there.

AQ-2

At the middle point of proposed new oil refinery was selected, an the location has been effected by the existing Oil refinery and the affected area covers with storage tanks, existing

jetty and terminal yard , some monastries and pagodas which are situated at the bank of Irrawaddy river, proposed new jetty and terminal yard ,Guest House, Golf Course, Officer's Quarters, Worker's Quarters and Thanpyarkan Village.

AQ-2 Justification of Selection Ambient Air Quality Measurement Location

New oil refinery will emit a large quantities of harmful gases such as Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide, Ground Level Ozone, Ammonia, Hydrocarbon powders and particulate matters. The location of the proposed plant is at dry zone of middle Myanmar many dusts and particulate matters are already covered more than reference value. Air quality scanning machine should place at the middle point of proposed oil refinery which will affect the storage area and habitat area. The location to place air quality scanning machine is most suitable to place at the middle point of proposed project. **AQ2** is placed at Middle point of proposed project site is most justified for air quality scanning.

AQ-3

By stationing at the compound of Minhla State High School , which is almost the center of the town, the affectiveness of the test machine goes to 1400 students of State High School, people from Government Offices, Markets ,Hospital, Jetty, Bus Terminal compound including MinHla Town residents.

AQ-3 Justification of Selection Ambient Air Quality Measurement Location

New oil refinery will emit a large quantities of harmful gases such as Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide, Ground Level Ozone, Ammonia, Hydrocarbon powders and particulate matters. The location of the proposed plant is at dry zone of middle Myanmar many dusts and particulate matters are already covered more than reference value. Air quality scanning machine should place at Minhla town which is located at eastern portion of the proposed site. A large quantities of habitat area nearest to the proposed project should take records of air quality. Minhla State High School compound is most suitable to place scanning machine. **AQ-3** is placed at Minhla State High School compound to detect 24 hours of air quality where 1400 young students are learning at the State High School.

AQ-4

By stationing at the southern edge of MPE's properties, called Malonzayatkone hill- top area, the affectiveness of the test machine will cover the area of huge crude oil storage tanks, New Officer's and worker's quarters, Thanpyarkan Village, State Middle School, Maezekone village, Pantawpyin Village, U Yin Village, Junction Market Place, No: 10Defense Industries Factory, No.2 Defense Industries Factory, No: 2 Heavy Industries Factory and Malon Village residents.

AQ-4 Justification of Selection Ambient Air Quality Measurement Location

New oil refinery will emit a large quantity of harmful gases such as Sulfur Dioxide, Nitrogen Oxides, Carbon Monoxide, Ground Level Ozone, Ammonia, Hydrocarbaon powders and particulate matters. The location of the proposed plant is at dry zone of middle Myanmar many dusts and particulate matters are already covered more than reference value. Air quality scanning machine should place at southern direction of the proposed project site because wind direction from north is mostly hitting at winter as records from the Department of Metrology and Hydrology Department of Union of Myanmar. At the southern direction, Malonzayartkone hill top is most suitable to place scanning machine. **AQ4** is placed at Malonzayartkone hill top which will cover all Regiments near the project and Heavy Industry Factory.

5.1.5.1 Air quality and noise pressure test results

Air Quality and Noise Pressure Samples were tested at the Occupational and Environmental Health Laboratory, Ministry of Health. The test results are presented below.

Summary of Air Quality Results

Name	Reference Unit	Unit	Results			
			AQ-1	AQ-2	AQ-3	AQ-4
TSPM	200	µg/m^3	181.02	179.33	198.6	229.43
PM_{10} (24 hr mean)	50	µg/m^3	87.74	66.9	107.29	96.57
SO_2 (24 hr mean)	20	µg/m^3	0.003	0.006	0.009	0.008
NO_2 (Annual mean)	40	µg/m^3	0.51	0.97	1.76	0.95
NO_2 (1 hr mean)	200	µg/m^3	30.37	10.37	10.23	8.79

Photography of Air Quality Testing





5.1.5.2 Summary of air quality and noise pressure report

Parameters

Total Suspended Particulate Matter, Respiratory Particulate Matter (PM_{10}), Sulphur dioxide (SO_2) and Nitrogen dioxide (NO_2) in 24hr mean and Nitrogen dioxide for 1hr.

Air Quality Dispersion Model

Air quality sampling sites were chosen with the dispersion model. This model covers the 3-5 kilometers radius of the sampling sites. Around the proposed project, there are some villages and residences of some townships. So, this air quality measuring could cover these areas and duplicate some area.

Frequency

The report covers the observations for the baseline data obtained in one cross-sectional survey.

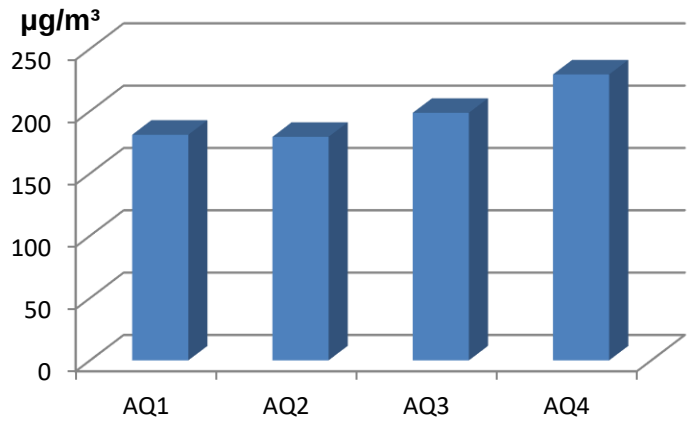
Method

Ambient air sampling was collected at above mentioned four sites. Each sampling period was based on 24-hour measurement level of TSPM and PM_{10} using high volume air sampler with glass-fibered filter and SO_2 and NO_2 with adsorbent liquids for each gas. The principle of TSPM and PM_{10} sampling applied gravity metric-high volume method and measured by using microbalance. For SO_2 and NO_2, the titration method is used to quantify the level.

Ambient air quality test results

Sample No.	Description	TSPM (µg/m³) 24Hr	PM_{10} (µg/m³) 24Hr	SO_2 (µg/m³) 24Hr	NO_2 (µg/m³) 24Hr	NO_2 (µg/m³) 1Hr
AQ1	Nyaung Pin Thar Primary School	181.02	87.74	0.003	0.51	30.37
AQ2	Gate 2 Mann-Thanpayar Kan	179.33	66.9	0.006	0.97	10.37
AQ3	BESHS Minhla	198.6	107.29	0.009	1.76	10.23
AQ4	Malon Zayut Kone	229.43	96.57	0.008	0.95	8.79

Total Suspended Particulate Matter (TSPM)

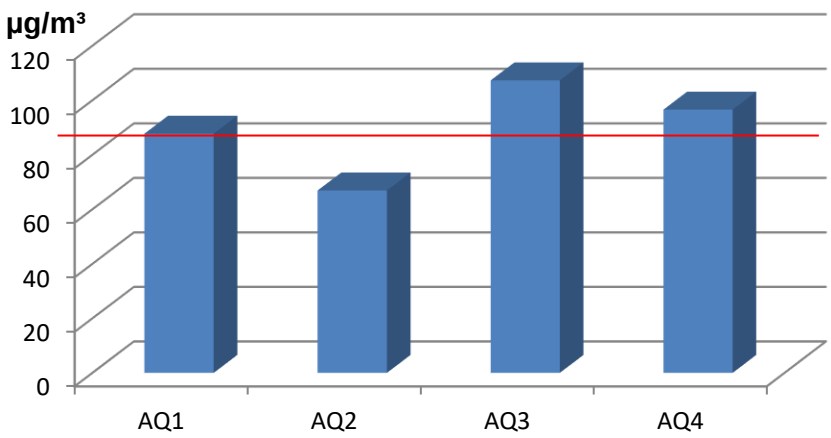


	TSPM
AQ1	181.02
AQ2	179.33
AQ3	198.6
AQ4	229.43

Total Suspended Particulate Matter (TSPM) concentration

The result of Total Suspended Particulate Matter (TSPM) from sample site near Malon Zayut Kone showed higher than guideline values (200µgm/m^3). TSPM values of other sites are less than guide line value.

Respiratory Particulate Matter (PM_{10})



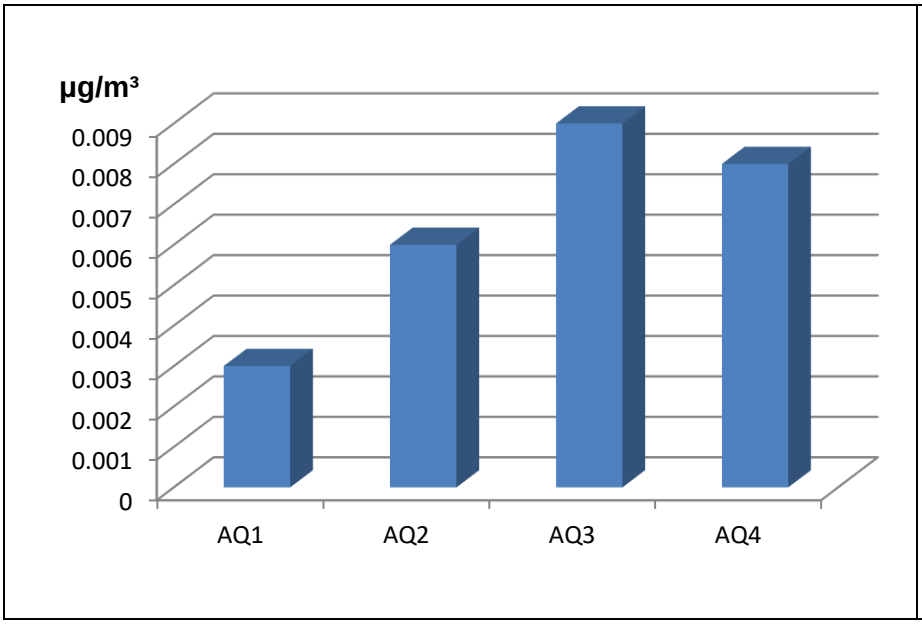
	PM 10
AQ1	87.74
AQ2	66.9
AQ3	107.29
AQ4	96.57

Respiratory Particulate Matter (PM_{10}) concentration in sample sites

The results of Respiratory Particulate Matter (PM_{10}) from sample sites are 87.74 µgm/m^3 in Nyaung Pin Thar Primary School (AQ1), 66.9 µgm/m^3 in near Gate 2 of Mann-Thanpayar Kan refinery industry (AQ2), 107.29 µgm/m^3 in Basic Education State High School of Minhla Township (AQ3) and 96.57 µgm/m^3 in Malon Zayut Kone respectively. (WHO guide line values-50 µgm/m^3)

Respiratory Particulate Matter (PM_{10}) of all sample sites are higher than WHO guideline values.

Sulphur Dioxide (SO_2)



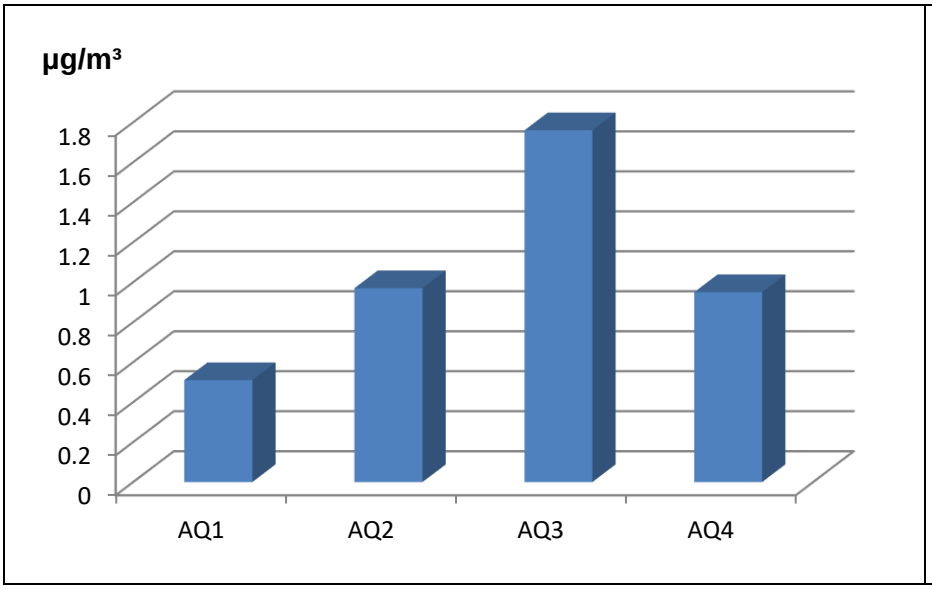
	SO 2
AQ1	0.003
AQ2	0.006
AQ3	0.009
AQ4	0.008

Sulphur Dioxide (SO_2) concentration in sample sites

The results of Sulphur Dioxide (SO_2) concentrations from sample sites are 0.003 µgm/m^3 in Nyaung Pin Thar Primary School (AQ1), 0.006 µgm/m^3 in near Gate 2 of Mann-Thanpayar Kan refinery industry (AQ2), 0.009 µgm/m^3 in Basic Education State High School of Minhla Township (AQ3) and 0.008 µgm/m^3 in Malon Zayut Kone respectively. (WHO guide line values-20 µgm/m^3)

Sulphur Dioxide (SO_2) concentrations of all sample sites are too much lower than WHO guideline values.

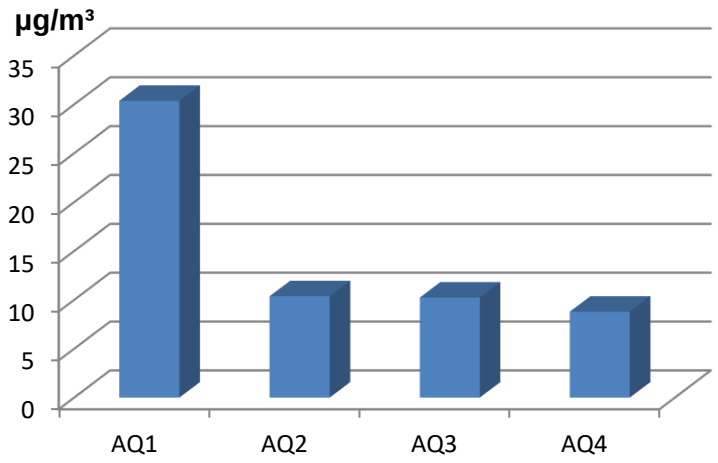
Nitrogen Dioxide (NO_2)



	NO2
AQ1	0.51
AQ2	0.97
AQ3	1.76
AQ4	0.95

The Result of Nitrogen Dioxide (NO_2) from all sample sites for 24hr mean demonstrated as 0.51 µgm/m^3 in Nyaung Pin Thar Primary School (AQ1), 0.97 µgm/m^3 in near Gate 2 of Mann-Thanpayar Kan refinery industry (AQ2), 1.76 µgm/m^3 in Basic Education State High School of Minhla Township (AQ3) and 0.95 µgm/m^3 in Malon Zayut Kone. Measurement values in all sites are lower than the WHO guide line values (40µgm/m^3).

Nitrogen Dioxide (NO_2) concentration for 24hr mean in sample sites



	NO2
AQ1	30.37
AQ2	10.37
AQ3	10.23
AQ4	8.79

Nitrogen Dioxide (NO_2) concentration for 1 Hr in sample sites

The Result of Nitrogen Dioxide (NO_2) from all sample sites for 1hr mean pointed out as 30.37 µgm/m^3 in Nyaung Pin Thar Primary School (AQ1), 10.37 µgm/m^3 in near Gate 2 of Mann-Thanpayar Kan refinery industry (AQ2), 10.23 µgm/m^3 in Basic Education State High School of Minhla Township (AQ3) and 8.79 µgm/m^3 in Malon Zayut Kone are also relatively lower than WHO guideline values (200µgm/m^3).

Condition of Acoustic Environment (Sound Pressure)

The places and locations of air quality scanning machine are very suitable to take records of sound pressure for 24 hours because the sound pressure of proposed project will affect to habitat and animals around the project. Air quality scanning locations are chosen at habitat area. 4 sound pressure (Acoustic Environent Monitoring) location are justified at the same place of air quality scanning place.

Parameters

Maximum Sound Pressure Level (Lmax) and the Equivalent Continuous Sound Level (L_{eq}) are measured at available site of the Project area.

Frequency

The report covers the observations for the baseline data obtained in one cross-sectional survey.

Method

Acoustic environment monitoring was performed in accordance with standard procedures adopted by American Conference of Governmental Industrial Hygienist (ACGIH) which is authoritatively and currently used in Myanmar.

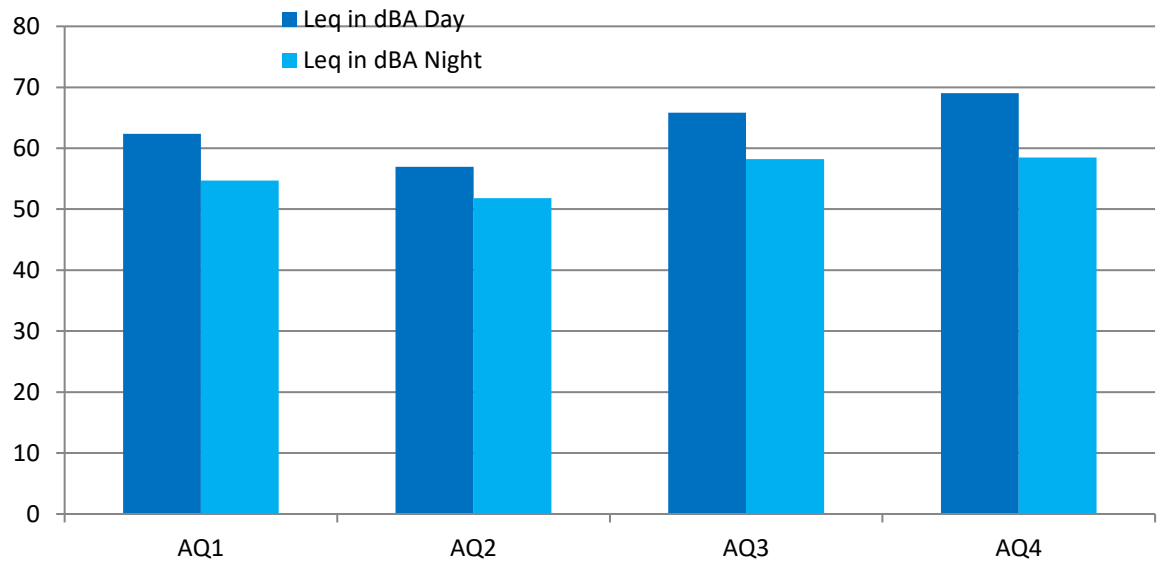
Quality of Ambient Noise

No.	Sample Site No.	Description	Lmax in dBA		Leq in dBA	
			Day	Night	Day	Night
1	AQ1	Nyaung Pin Thar Primary School	48.22	43.09	62.39	54.71
2	AQ2	Gate 2 Mann-Thanpayar Kan	44.83	40.69	56.98	51.83
3	AQ3	BESHS Minhla	52.38	47.9	65.82	58.23
4	AQ4	Malon Zayut Kone	53.51	46.81	69.02	58.47

Equivalent continuous sound level (L_{eq})

Equivalent continuous sound level (L_{eq}), the constant noise level that would result in the same total sound intensity being produced over a given period, in day is 62.39dBA and at night is 54.71dBA at **AQ1**, 56.98dBA in day and 51.83dBA at night in **AQ2**, 65.82dBA in day and 58.23dBA at night in **AQ3** and 69.02dBA in day and 58.47dBA at night in **AQ4**. All values are not increased that the position of observation should be taken into account.

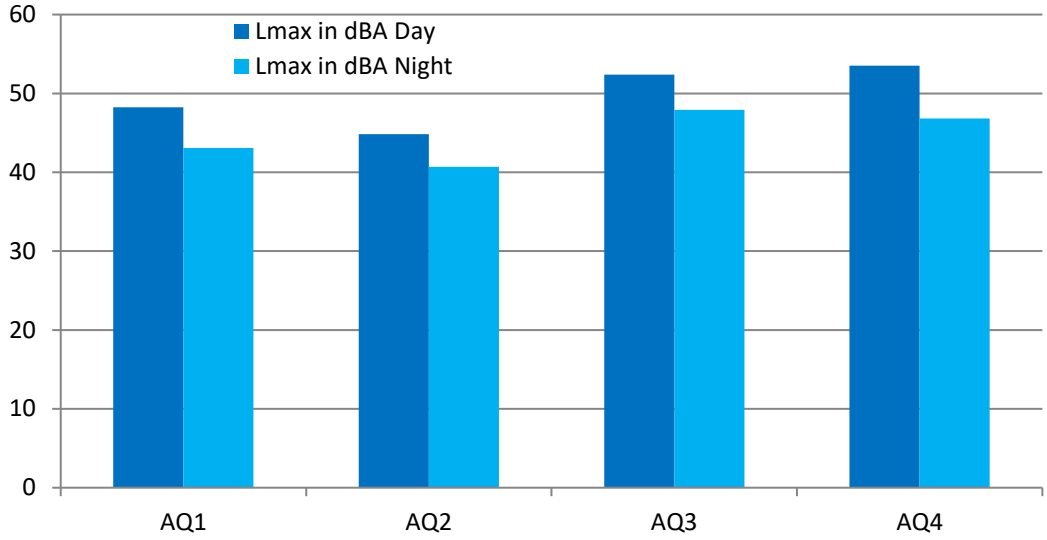
Day and Night Equivalent Continuous Sound Pressure Level



Maximum sound pressure level (Lmax)

Maximum sound pressure level (Lmax), square root of mean of the square of the measurement values (RMS) in day is 48.22dBA and at night is 43.09dBA at **AQ1**, 44.83dBA in day and 40.69dBA at night in **AQ2**, 52.38dBA in day and 47.9 dBA at night in **AQ3** and 53.51dBA in day and 46.81dBA at night in **AQ4**. All values are not increased at the position of observation should be taken into account.

Maximum sound pressure level



5.1.6 Baseline Study of the Pipeline Area

MSR observers visited the survey area from November 27th to 30th, 2015, and indications of an existing pipeline in the survey area.

MSR observed segments of the exposed pipeline in several places in the survey area, namely, at a point P1 Duwon (N20˚16΄16˝, E94˚45΄21) on Saku-Minbu road, at a place northeast of Hta Naung Taw village under pipeline culvert under the railroad, at a place where the pipeline crosses an irrigation canal northwest of Kywe Te village and at a place where the pipeline crosses Man Creek near rail bridge.

After those sightings, MSR observers saw stone markers for the pipeline in two places: one place beside Minbu-Saku motor road near Kywe Te village and the second place beside the Minbu-Ann motor road near Kan Ye Village.

Between the two sets of stone markers that MSR observers saw, they saw an exposed segment where the pipeline crosses an irrigation canal near Kyi Pin Kan village.

Afterwards, MSR observers saw a signboard beside a dirt track between Minbu and Ywa Ma Gan village which declares it to be the Kan Ni-Lan Ywa Gas Pipeline. Lan Ywa is a village in Chauk Township.

Then, MSR observers also saw an exposed segment of that pipeline crossing overhead the Thayet-Minbu railway track near Ywa Ma Gan village.

MSR observers also saw the pipeline and two other pipelines exposed aboveground near Naga Pwet ‘mud volcano’ at the junction of Minbu-Ta Bin motor road and the pipeline ROW inside the town of Minbu.

Also in South Minbu, MSR observers then saw exposed segments of several pipelines at Sar Pwet Creek on its southern bank before they dive underground for creek-crossing.

The existing Kan Ni-Lan Ywa gas pipeline then continues toward the Kan Ni oilfield and its final destination. The summary observation of the Lan Ywa - Kan Ni gas pipeline alignment is shown in table below. The above pipeline is depicted in map.

5.1.6.1 Existing Gas Pipeline

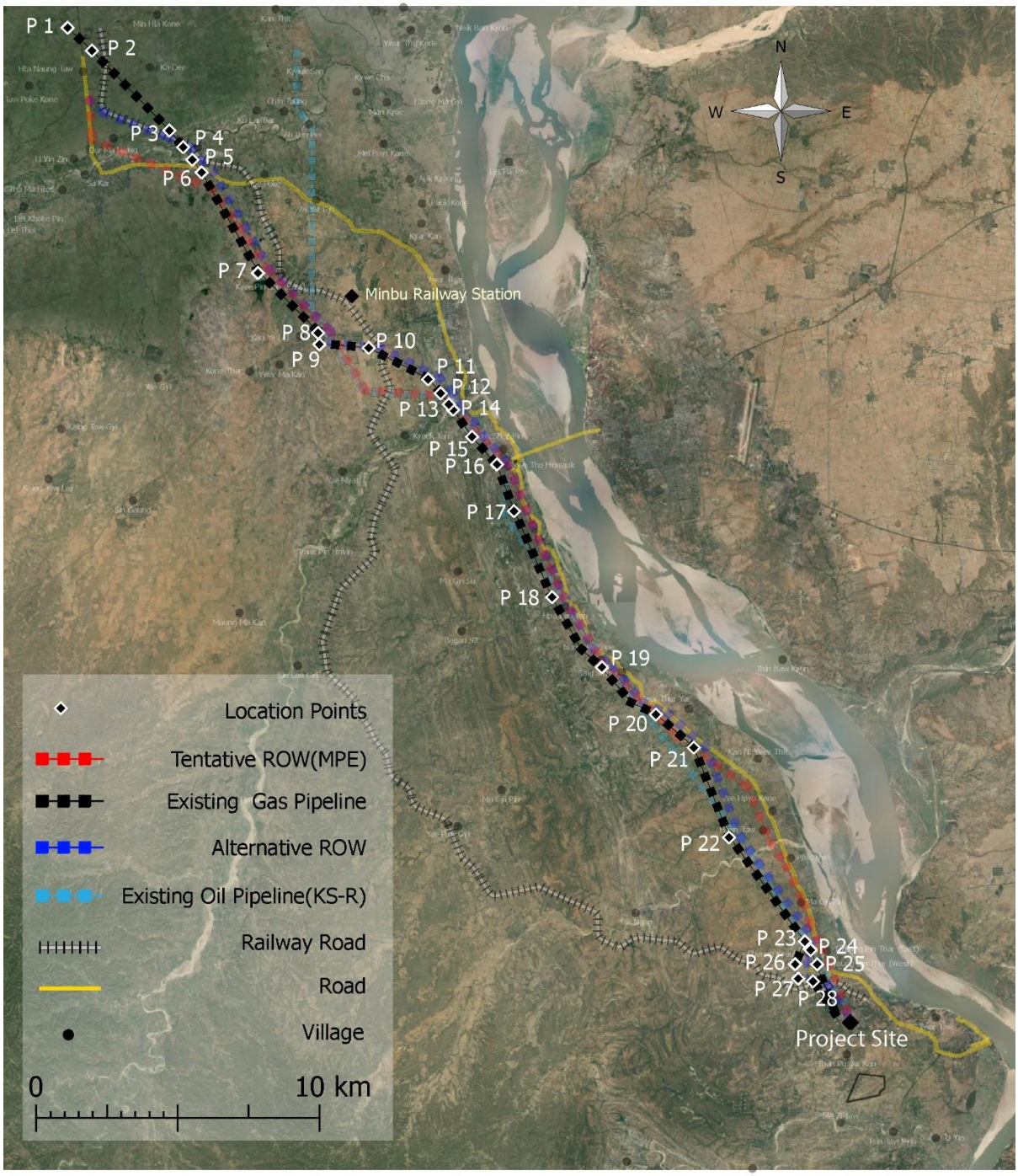


Figure 43: Existing Gas Pipeline (Kan Ni – Lan Ywa) (See larger map in appendix 40)

5.1.6.2 Summary of Observations on the Existing Gas Pipeline (Kan Ni – Lan Ywa)

No.	Access to Alternative ROW	GPS Location	Issue	Distance (km) Heading (˚)
1	P1 Point	N 20˚16 ' 16 " E 94˚45 ' 21 "	The pipeline crosses the Seikphyu-Salin-Pwintbyu-Saku-Minbu road between Hta Naung Taw Village and Kyauk Sit Pon Village.	
2	P2 Point Hta Naung Taw Village	N 20˚15 ' 52 " E 94˚45 ' 49 "	The pipeline travels in a straight line from P1 Point to P2 Hta Naung Taw Village Point. It passes through paddy fields and then crosses railroad. The distance between the two points is approximately 1100 meters.	1.11 kms (133.18˚)
3	P3 Point	N 20˚14 ' 36 " E 94˚48 ' 17 "	The pipeline then runs in a straight line from P2 Hta Naung Taw Village Point to P3 Point in Kywe Te Village direction. It crosses five irrigation canals and the Myanmar-China pipeline and passes through paddy fields. The distance between the two points is approximately 3700 meters.	3.7 kms (153.73˚)
4	P4 Point Man Creek	N 20˚14 ' 08 " E 94˚47 ' 32 "	The pipeline then runs in a straight line from P3 Point to P4 Man Creek Point. It passes through paddy fields and then crosses Man Creek. The distance between the two points is approximately 800 meters.	0.73 kms (141.58˚)
5	P5 Point Saku Station	N 20˚14 ' 08 " E 94˚47 ' 33 "	The Gas pipeline then runs in a straight line from the P4 Man Creek Point to P5 Saku Station Point. It crosses the access road to Kywe Te Village and passes through the extreme outskirts of Kywe Te Village. It then crosses literally under the Saku Station. The distance between the two points is approximately 500 meters.	0.51 kms (143.09˚)
6	P6 Point Kywe Te Village	N 20˚13 ' 41 " E 94˚47 ' 54 "	The pipeline then runs in a straight line from P5 Saku Station Point to P6 Kywe Te Village Point. A set of stone markers for the pipeline were observed at P6 Kywe Te Point. It then crosses the Saku-Minbu Road and paddy fields. The distance between the two points is approximately 600 meters.	0.52 kms (144.03˚)
7	P7 Point	N 20˚11 ' 53 " E 94˚48 ' 59 "	The pipeline then runs in a straight line from P6 Kywe Te Village Point to P7 Kyi	3.81 kms

	Kyi Pin Kan Village		Pin Kan Village Point. It passes through paddy fields and crosses an irrigation canal and the access road to Kyi Pin Kan Village. The distance between the two points is approximately 3800 meters.	(150.28˚)
8	P8 Point Kan Ye (North) Village	N 20˚10ˈ49" E 94˚50ˈ07"	The pipeline then runs in a straight line from P7 Kyi Pin Kan Village Point to P8 Kan Ye (North) Village Point. It crosses two dirt tracks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2800 meters.	2.81 kms (135.1˚)
9	P9 Point Kan Ye (South) Village	N 20˚10ˈ37" E 94˚50ˈ06"	The pipeline then runs in a straight line from P8 Kan Ye (North) Village Point to P9 Kan Ye (South) Village Point. It crosses the Minbu-Ann road. The distance between the two points is approximately 400 meters.	0.40 kms (173.83˚)
10	P10 Point Overhead Crossing	N 20˚10ˈ33" E 94˚51ˈ05"	The pip[eline then runs in a straight line from P9 Kan Ye (South) Village Point to P10 Overhead Crossing Point. It passes mainly through cultivation fields all along and crosses a dirt track. It then crosses the railway track. The distance between the two points is approximately 1700 meters.	1.65 kms (95.28˚)
11	P11 Point Minbu (West)	N 20˚09ˈ59" E 94˚52ˈ13"	The pipeline then runs in a straight line from P10 Overhead Crossing Point to P11 Minbu (West) Point. It crosses four dried-up creeks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2300 meters.	2.25 kms (117.09˚)
12	P12 Point Minbu-Ann Road Junction	N 20˚09ˈ45" E 94˚52ˈ27"	The pipeline then runs in a straight line from P11 Minbu (West) Point to P12 Minbu-Ann Road Junction Point, near the ‘mud volcano’. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 600 meters.	0.64 kms (139.22˚)
13	P13 Point Northern Bank of Sar Pwet Creek	N 20˚09ˈ32" E 94˚52ˈ37"	The pipeline then runs in a straight line from P12 Minbu-Ann Road Junction Point to P13 Point located on the northern bank of Sar Pwet Creek. It passes through the outskirts of west Ta Bin Village. The distance between the two points Is approximately 500 meters.	0.46 kms (144.12˚)
14	P14 Point	N 20˚09ˈ27" E 94˚52ˈ42"	The pipeline then runs in a straight line from P13 Point located on the northern bank of Sar Pwet Creek Point to P14	0.23 kms (143.73˚)

	Southern Bank of Sar Pwet Creek		Point located on the southern bank of Sar Pwet Creek. It crosses Sar Pwet Creek. The distance between the two points Is approximately 200 meters.	
15	P15 Point Shwe Ta Bin (South) Village	N 20˚08 ' 58 " E 94˚34 ' 05 "	The pipeline then runs in a straight line from P14 Point located on the southern bank of Sar Pwet Creek to P15 Shwe Tabin (South) Village Point. It passes through Shwe Tabin (South) Village. The distance between the two points is approximately 1000 meters.	1.09 kms (145.10˚)
16	P16 Point Kywe Tho Hmyaun Village	N 20˚08 ' 28 " E 94˚53 ' 32 "	The pipeline then runs in a straight line from P15 Shwe Tabin (South) Village Point to P16 Kywe Tho Hmyaun Village Point. It crosses a dirt track and passes mainly through cultivation fields all along. The distance between the two points is approximately 1300 meters.	1.26 kms (138.36˚)
17	P17 Point Htauk Shar Pin-Kan Ni Oilfield	N 20˚07 ' 36 " E 94˚53 ' 51 "	The pipeline then runs in a straight line from P16 Kywe Tho Hmyaun Village Point to P17 Htauk Shar Pin-Kan Ni Oilfield Point. It crosses hillocks and passes mainly through dry forest. The distance between the two points is approximately 1700 meters.	1.65 kms (159.36˚)
18	P18 Point Pha Lan Yon Village	N 20˚06 ' 09 " E 94˚54 ' 35 "	The pipeline then runs in a straight line from P17 Htauk Shar Pin-Kan Ni Oilfield Point to P18 Pha Lan Yon Village Point. It crosses a dirt track, a dried-up creek and some hillocks and passes mainly through dry forest. The distance between the two points is approximately 3100 meters.	3.14 kms (156.63˚)
19	P19 Point Nan Taw Kone Village	N 20˚04 ' 38 " E 94˚55 10 "	The pipeline then runs in a straight line from P18 Pha Lan Yon Village Point to P19 Nan Taw Kone Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 2900 meters.	2.94 kms (145.57˚)
20	P20 Point Road Bend	N 20˚04 ' 14 " E 94˚56 ' 06 "	The pipeline then runs in a straight line from the P19 Nan Taw Kone Village Point to P20 Road Bend Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 1500 meters.	1.5 kms (139.43˚)
21	P21 Point	N 20˚04 ' 01 "	The pipeline then runs in a straight line from P20 Road Bend Point to P21 Ywa	0.92 kms

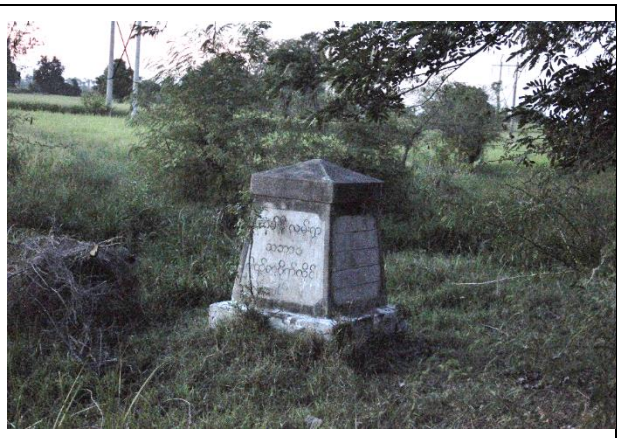
	Ywa Tharyar Village	E 94˚56 ' 34 "	Tharyar Village Point. It crosses two dirt tracks, a dried-up creek and passes mainly through cultivation fields. The distance between the two points is approximately 900 meters.	(114.99˚)
22	P22 Point Ywa Tharyar Creek	N 20˚03 ' 27 " E 94˚57 ' 18 "	The pipeline then runs in a straight line from P21 Ywa Tharyar Village Point to P22 Ywa Thayar Creek Point. It crosses two dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 1700 meters.	1.66 kms (131.06˚)
23	P23 Point Htein Taw (West) Village	N 20˚01 ' 45 " E 94˚57 ' 56 "	The pipeline then runs in a straight line from the P22 Ywa Tharyar Creek Point to P23 Htein Taw (West) Village Point. It crosses three dirt tracks, a dried-up creek, two irrigation canals and passes mainly through cultivation fields all along. The distance between the two points is approximately 3200 meters	3.2 kms (158.47˚)
24	P24 Point Kone Dan Village	N 19 ˚54 '57 " E 94˚59 ' 24 "	The pipeline then runs in a straight line from P23 Htein Taw (West) Village Point to P24 Kone Dan Village Point. It crosses two dirt tracks and eight dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 4300 meters.	4.29 kms (144.34˚)
25	P25 Point Chaung Kauk Village	N 19 ˚59 '48 " E 94˚59 ' 30 "	The pipeline then runs in a straight line from P24 Kone Dan Village Point to P25 Chaung Kauk Village Point. It crosses Minbu-Minhla motor road and a hillock with a small pagoda and passes through a cultivation field. The distance between the two points is approximately 300 meters.	0.32 kms (143.07˚)
26	P26 Point Nyaung Pin Thar (West) Village	N 19 ˚59 '31 " E 94˚59 ' 37 "	The pipeline then runs in a straight line from P25 Chaung Kauk Village Point to P26 Point in Nyaung Pin Thar (West) Village. It crosses Chaung Kauk Creek and passes through cultivation fields belonging to the two villages and passes through the edge of Nyaung Pin Thar (West) Village. The distance between the two points is approximately 600 meters.	0.56 kms (158.58˚)
27	Project site	N 19 ˚58 '37 " E 94˚59 ' 59 "	The pipeline then runs in a straight line from P26 Point in Nyaung Pin Thar (West) Village to the Refinery. It crosses the Minbu-Minhla motor road and the Thayet-Minbu railroad and passes through cultivation fields and the	1.82 kms (158.83˚)

			Petrochemical Complex land. The distance between the two points is approximately 1800 meters.	
28	P27 Point West Chaung Kauk Village	N 19˚59ˈ32" E 94˚59ˈ13"	The pipeline then runs in a straight line from P24 Kone Dan Village Point to P27 West Chaung Kauk Village Point. It crosses two dirt tracks and passes through cultivation fields. The distance between the two points is approximately 800 meters.	0.79 kms (202.56˚)
29	P28 Point Nyaung Pin Thar (West) Village	N 19˚59ˈ17" E 94˚59ˈ16"	The pipeline then runs in a straight line from P27 West Chaung Kauk Village Point to P28 Nyaung Pin Thar (West) Village Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.	0.49 kms (167.6˚)
30	P29 Chaung Kauk Bridge	N 19˚59ˈ14" E 94˚59ˈ33"	The pipeline then runs in a straight line from P28 Point west of Nyaung Pin Thar (West) Village to P29 Chaung Kauk Bridge Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.	0.51 kms (101.4˚)
31	P 30 Rail track	N 19˚59ˈ08" E 94˚53ˈ37"	The pipeline then runs in a straight line from P29 Chaung Kauk Bridge Point to P30 Railway Track Point. It crosses the railway track and a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 200 meters.	0.22 kms (148.28˚)
32	Project site	N 19˚58ˈ37" E 94˚59ˈ59"	The pipeline then runs in a straight line from P30 Railway Track Point to the Refinery in Minhla Township. It crosses the Minbu-Minhla railroad and then passes through the Petrochemical Complex land. The distance between AP30 Railway Track Point and the Refinery is approximately 1200 meters.	1.15 kms (145.98˚)

Summary of Observations on the Existing Gas Pipeline (Kan Ni – Lan Ywa)

5.1.6.3 Segment-wise Portrayal of Existing Gas Pipeline (Kan Ni – Lan Ywa) with Descriptions, Satellite Maps and Photographs

5.1.6.3.1 P1 Point (N 20˚16 ' 16 ", E 94˚45 ' 21 ") Duwon



P1 Point is located on the Kani Ni – Lan Ywa Gas Pipeline and it is 90 kms away from Lan Ywa oilfield. The pipeline crosses the Seikphyu-Salin-Pwintbyu-Saku-Minbu road at P1 Point (Duwon).

5.1.6.3.2 P2 Point (N 20˚15 ' 52 ", E 94˚45 ' 49 ") Hta Naung Taw Village

The above photo shows how a culvert is systematically built for the pipeline when it crosses railway tracks underneath them. The pipeline travels in a straight line from P1 Point to P2 Hta Naung Taw Village Point. It passes through paddy fields and then crosses railroad. The distance between the two points is approximately 1100 meters.

5.1.6.3.3 P3 Point (N 20˚14 ' 36 ", E 94˚48 '17 ") Irrigation Canal

The above photos show how a pipeline is laid in an irrigated area without any disturbance of cultivation fields.

The pipeline then runs in a straight line from P2 Hta Naung Taw Village Point to P3 Point Irrigation Canal in Kywe Te Village direction. It crosses five irrigation canals and the Myanmar-China pipeline and passes through paddy fields. The distance between the two points is approximately 3700 meters.

5.1.6.3.4 P4 Point (N 20˚14 ̍08 ̎, E 94˚47 ̍32 ̎) Man Creek

The above photo shows how the pipeline is anchored to the bed of Man Creek. This method of pipe laying interferes with the waterflow of the creek and causes soil erosion. This method should be avoided.

The pipeline then runs in a straight line from P3 Point to P4 Man Creek Point. It passes through paddy fields and then crosses Man Creek. The distance between the two points is approximately 800 meters.

5.1.6.3.5 P5 Point (N 20˚14 ̍08 ̎, E 94˚47 ̍33 ̎) Saku Railway Station

The above photos show the Saku Railway Station and railway tracks and platform. The pipeline crosses the railway tracks as well as the station building underneath.

The gas pipeline then runs in a straight line from the P4 Man Creek Point to P5 Saku Railway Station Point. It crosses the access road to Kywe Te Village and passes through the extreme outskirts of Kywe Te Village. It then crosses literally under the Saku Railway Station. The distance between the two points is approximately 500 meters.

5.1.6.3.6 P6 Point (N 20˚13 ΄41 ΄΄, E 94˚47 ΄54 ΄΄) Stone Markers, Kywe Te


The above photo shows how the pipeline is systematically marked with stone markers on both sides of the road when it crosses one.

The pipeline then runs in a straight line from P5 Saku Railway Station Point to P6 Kywe Te Village Point. A set of stone markers for the pipeline were observed at P6 Kywe Te Point. It then crosses the Saku-Minbu Road and paddy fields. The distance between the two points is approximately 600 meters.

5.1.6.3.7 P7 Point (N 20˚11 ΄53 ΄΄, E 94˚48 ΄59 ΄΄) Kyi Pin Kan Village


The above photos show how the pipeline was laid avoiding residential area and passing only through cultivation fields and irrigated area.

The pipeline then runs in a straight line from P6 Kywe Te Village Point to P7 Kyi Pin Kan Village Point. It passes through paddy fields and crosses an irrigation canal and the access road to Kyi Pin Kan Village. The distance between the two points is approximately 3800 meters.

5.1.6.3.8 P8 Point (N 20˚10 ΄49 ΄΄, E 94˚50 ΄07 ΄΄) Kan Ye Village


The above photo shows how the pipeline s systematically marked with stone markers on both sides of the road when it crosses one.

The pipeline then runs in a straight line from P7 Kyi Pin Kan Village Point to P8 Kan Ye (North) Village Point. It crosses two dirt tracks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2800 meters.It then crosses Minbu-Ann road (shown above) and continues on to P9 Kan Ye (South) Village Point 400 meters away.

5.1.6.3.9 P10 Point (N 20˚10 '33 ", E 94˚51 '05 ') Overhead Crossing

The above photos show how the pipeline crosses railway tracks overhead systematically and how danger signboards are erected cautioning people about the danger posed by the pipeline.

The pipeline then runs in a straight line from P9 Kan Ye (South) Village Point to P10 Overhead Crossing Point. It passes mainly through cultivation fields all along and crosses a dirt track. It then crosses the railway track. The distance between the two points is approximately 1700 meters

5.1.6.3.10 P11 Point (N 20˚09 '59 ", E 94˚52 '13 ') West Minbu

The photo (above) shows the ROW of the pipeline. The satellite photo shows the pipeline passing through Minbu Town.

The pipeline then runs in a straight line from P10 Overhead Crossing Point to P11 West Minbu Point. It crosses four dried-up creeks and passes mainly through cultivation fields all along. The distance between the two points is approximately 2300 meters.

5.1.6.3.11 P12 Point (N 20˚09 '45 ", E 94˚52 '27 ") Minbu-Tabin Junction

The photo (above) show the ROW of the pipeline and the photo (below) show how the pipeline ROW is laid through residential areas by systematically designating the ROW as a restricted area.

The pipeline then runs in a straight line from P11 Minbu (West) Point to P12 Minbu-Ann Road Junction Point, near the 'mud volcano'. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 600 meters.

5.1.6.3.12 P13 Point (N 20˚09 '32 ", E 94˚52 '37 ") Sar Pwet Creek – Northern Bank

The above photos show how existing pipelines have been laid aboveground on steel supports before crossing the Sar Pwet Creek. However, although the pipelines are thus systematically laid, with clean surroundings free of garbage, squatters should have been prevented setting up homes in the restricted area.

The pipeline then runs in a straight line from P12 Minbu-Ann Road Junction Point to P13 Point located on the northern bank of Sar Pwet Creek. It passes through the outskirts of west Ta Bin Village. The distance between the two points is approximately 500 meters.

5.1.6.3.13 P14 Point (N 20˚09 '27 ", E 94˚52 '42 ") Sar Pwet Creek – Southern Bank

The above shows exposed pipelines aboveground on the point of crossing the Sar Pwet Creek. The bending of the pipelines thus weakens them at those places and could lead to

ruptures.
The pipeline then runs in a straight line from P13 Point located on the northern bank of Sar Pwet Creek Point to P14 Point located on the southern bank of Sar Pwet Creek. It crosses Sar Pwet Creek. The distance between the two points is approximately 200 meters.

5.1.6.3.14 P15 Point (N 20˚08 ′58 ″, E 94˚34 ′05 ″) Shwe Tabin (South) village


The photos above show the pipeline curved in a circle aboveground to withstand the stretching of the steel pipes due to changes in weather.
The pipeline then runs in a straight line from P14 Point located on the southern bank of Sar Pwet Creek to P15 Shwe Tabin (South) village Point. It passes through Shwe Tabin (South) village. The distance between the two points is approximately 1000 meters.

5.1.6.3.15 P16 Point (N 20˚08 ′28 ″, E 94˚53 ′32 ″) Kywe Tho Hmyaun village


The above phot is that of a road junction in Kywe Tho Myaung.
The above photo shows how the pipeline crosses hillocks and forested areas.
The pipeline then runs in a straight line from P15 Shwe Tabin (South) village Point to P16 Kywe Tho Hmyaun village Point. It crosses a dirt track and passes mainly through cultivation fields all along. The distance between the two points is approximately 1300 meters.

5.1.6.3.16 P17 Point (N 20˚07 ′36 ″, E 94˚53 ′51 ″) Htauk Shar Pin Oilfield


The above photo shows the earthen road to the pump station in Htauk Shar Pin - Kan Ni Oilfield.

The pipeline then runs in a straight line from P16 Kywe Tho Hmyaun village Point to P17 Htauk Shar Pin - Kan Ni Oilfield Point. It crosses hillocks and passes mainly through dry forest. The distance between the two points is approximately 1700 meters.

5.1.6.3.17 P18 Point (N 20˚06 ′09 ″, E 94˚54 ′35 ″) Pha Lan Yon village

The pipeline crossing the Pha Lan Yon Creek systematically on raised supports. This method should be adopted unlike the crossing of Man Creek where the pipeline is anchored to the creek bed.

The pipeline then runs in a straight line from P17 Htauk Shar Pin-Kan Ni Oilfield Point to P18 Pha Lan Yon Village Point. It crosses a dirt track, a dried-up creek and some hillocks and passes mainly through dry forest. The distance between the two points is approximately 3100 meters.

5.1.6.3.18 P19 Point (N 20˚04 ′38 ″, E 94˚55’10 ″) Nan Taw Kone Village

The pipeline then runs in a stright line from P18 Pha Lan Yon Village Point to P19 Nan Taw Kone Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 2900 meters.

5.1.6.3.19 P20 Point (N 20˚04 '14 ", E 94˚56 '06 ') Road Bend


The pipeline then runs in a staight line from P18 Pha Lan Yon Village Point to P19 Nan Taw Kone Village Point. It crosses four dirt tracks, a dried-up creek and passes mainly through cultivation fields all along. The distance between the two points is approximately 2900 meters.

5.1.6.3.20 P21 Point (N 20˚04 '01 ", E 94˚56 '34 ') Ywa Thar Yar Village


The above photo shows a shop built on the pipeline in Ywa Thar Yar Village (Kan Ni Oilfield. The photo was aken from the motor road. This should be prevented.

The pipeline then runs in a straight line from P20 Road Bend Point to P21 Ywa Thar Yar Village Point. It crosses two dirt tracks, a dried-up creek and passes mainly through cultivation fields. The distance between the two points is approximately 900 meters.

5.1.6.3.21 P22 Point (N 20˚03 '27 ", E 94˚57 '18 ') Ywa Tha Yar Creek


The above photos show ow the pipeline awkwardly crosses an existing road culvert. This should be avoided.

The pipeline then runs in a straight line from P21 Ywa Tharyar Village Point to P22 Ywa Thayar Creek Point. It crosses two dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 1700 meters.

5.1.6.3.22 P23 Point (N 20˚01 ′45 ″, E 94˚57 ′56 ″) Htein Taw (West) Village

The pipeline then runs in a straight line from the P22 Ywa Tharyar Creek Point to P23 Htein Taw (West) Village Point. It crosses three dirt tracks, a dried-up creek, two irrigation canals and passes mainly through cultivation fields all along. The distance between the two points is approximately 3200 meters.

5.1.6.3.23 P24 Point (N 19 ˚54 ′57 ″, E 94˚59 ′24 ″) Kone Dan Village

1.The above photo shows the pipeline before it crosses a road. Stone markers should be erected to mark the crossing.

2.The above photo shows the pipeline after it crossed the road.

The pipeline then runs in a straight line from P23 Htein Taw (West) Village Point to P24 Kone Dan Village Point. It crosses two dirt tracks and eight dried-up creeks and passes mainly through cultivation fields. The distance between the two points is approximately 4300 meters.

5.1.6.3.24 P25 point (N 19˚59 ′49 ″,E 94˚59 ′29 ″) Chaung Kauk village

The above photos show the pipeline before it crosses, and after it crossed, Chaung Kauk Village. The pipeline should be kept away from residential areas.

The pipeline then runs in a straight line from P24 Kone Dan Village Point to P25 Chaung Kauk Village Point. It crosses Minbu-Minhla motor road and a hillock with a small pagoda and passes through a cultivation field. The distance between the two points is approximately 300 meters.

5.1.6.3.25 P26 Point (N 19˚59 ′31 ″, E 94˚59 ′37 ″) Nyaung Pin Thar (West) Village

The above photo shows the pipeline passing very near to a pagoda on a hillock before Nyaung Pin Thar Village. This should be avoided.

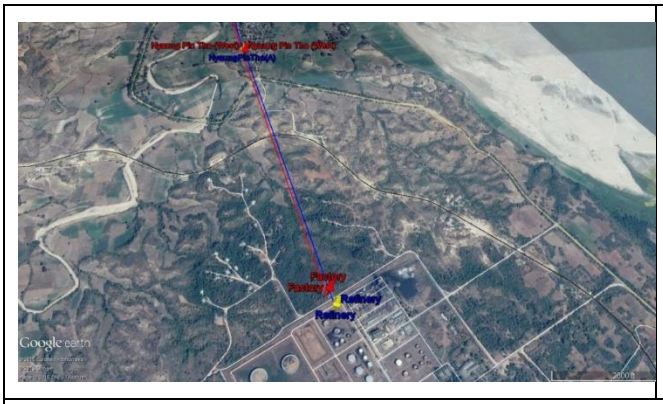
The pipeline then runs in a straight line from P25 Chaung Kauk Village Point to P26 Point in Nyaung Pin Thar (West) Village. It crosses Chaung Kauk Creek and passes through cultivation fields belonging to the two villages and passes through the edge of Nyaung Pin Thar (West) Village. The distance between the two points is approximately 600 meters.

5.1.6.3.26 P27 Point (N19˚59 ′32 ″, E94˚59 ′13 ″) Chaung Kauk (West) Village

The above photos show a man indicating the place where the pipeline passes through in Chaung Kauk (West) Village.

The pipeline then runs in a straight line from P24 Kone Dan village Point to P27 West Chaung Kauk Village Point. It crosses two dirt tracks and passes through cultivation fields. The distance between the two points is approximately 800 meters.

5.1.6.3.27 P28 Point (N 19˚59 '17 ", E 94˚59 '16 ') Nyaung Pin Tha (West) Village



The pipeline then runs in a straight line from P27 West Chaung Kauk Village Point to P28 west of Nyaung Pin Thar (West) Village Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.

5.1.6.3.28 P29 Point (N19˚59 '14 ", E 94˚59 '33 ') Chaung Kauk Bridge

The above photos show two pipelines beside the Chaung Kauk Bridge just before they reach the existing petrochemical complex.

The pipeline then runs in a straight line from P28 Point west of Nyaung Pin Thar (West) Village to P29 Chaung Kauk Bridge Point. It crosses a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 500 meters.

5.1.6.3.29 P30 Point (N 19˚59 ' 08 ", E 94˚53 '37 ') Rail Track

The pipeline then runs in a straight line from P29 Chaung Kauk Bridge Point to P30 Railway

Track Point. It crosses the railway track and a dirt track and passes mainly through cultivation fields. The distance between the two points is approximately 200 meters.

5.1.6.3.30 Mann Thanbayarkan Refinery (N 19˚58 ' 37 ", E 94˚59 ' 59 ") Petrochemical Complex (Final Destination)

The pipeline then runs in a straight line from P30 Railway Track Point to the Refinery in Minhla Township. It crosses the Minbu-Minhla railroad and then passes through the Petrochemical Complex land. The distance between AP30 Railway Track Point and the Refinery is approximately 1200 meters.

The pipeline then runs in a straight line from P26 Point in Nyaung Pin Thar (West) Village to the Refinery (shown above). It crosses the Minbu-Minhla motor road and the Thayet-Minbu railroad and passes through cultivation fields and the Petrochemical Complex land. The distance between the two points is approximately 1800 meters.

5.2 Biological Environment

Main focus area for the biological impact assessment is the project site and ecological aspect observed inside and one to three kilometers range of outside the project site.
However, overall social and biological impacts are not limited to the surrounding areas of the project site. Therefore, the study looks at wider scope as follow:

1. Old refinery compound and surrounding areas specifically new refinery sites covered by secondary growth dry-forest trees and shrubs and teak plantation,
2. Off take point and surrounding area,
3. Surrounding area of old oil pipeline and waste water drainage canal of refinery plant,
4. Surrounding areas of villages namely, Chaung gauk, Nyaungbintha, Thanbayagan, Mezalidaw, Pandawpyin and Uyin,
5. Jetty areas and surrounding pagodas and
6. Army compound of an engineering Corp and hilly places.

5.2.1 Biological Impact Assessment Team

MSR's biological impact study team have three zoologists and one botanist conduct fauna and flora investigation and biological impact assessment.

5.2.2 The *Surrounding* Biological Environment (Existing Biological Conditions)

5.2.2.1 Biological Environment Baseline

The environment setting here is described in terms of habitat types/forest types, selected floral and faunal species, endangered or threatened species, and some special features of existing ecosystem's status and quality with a perspective of ecoregion and conservation.

Land cover map of Magway Region

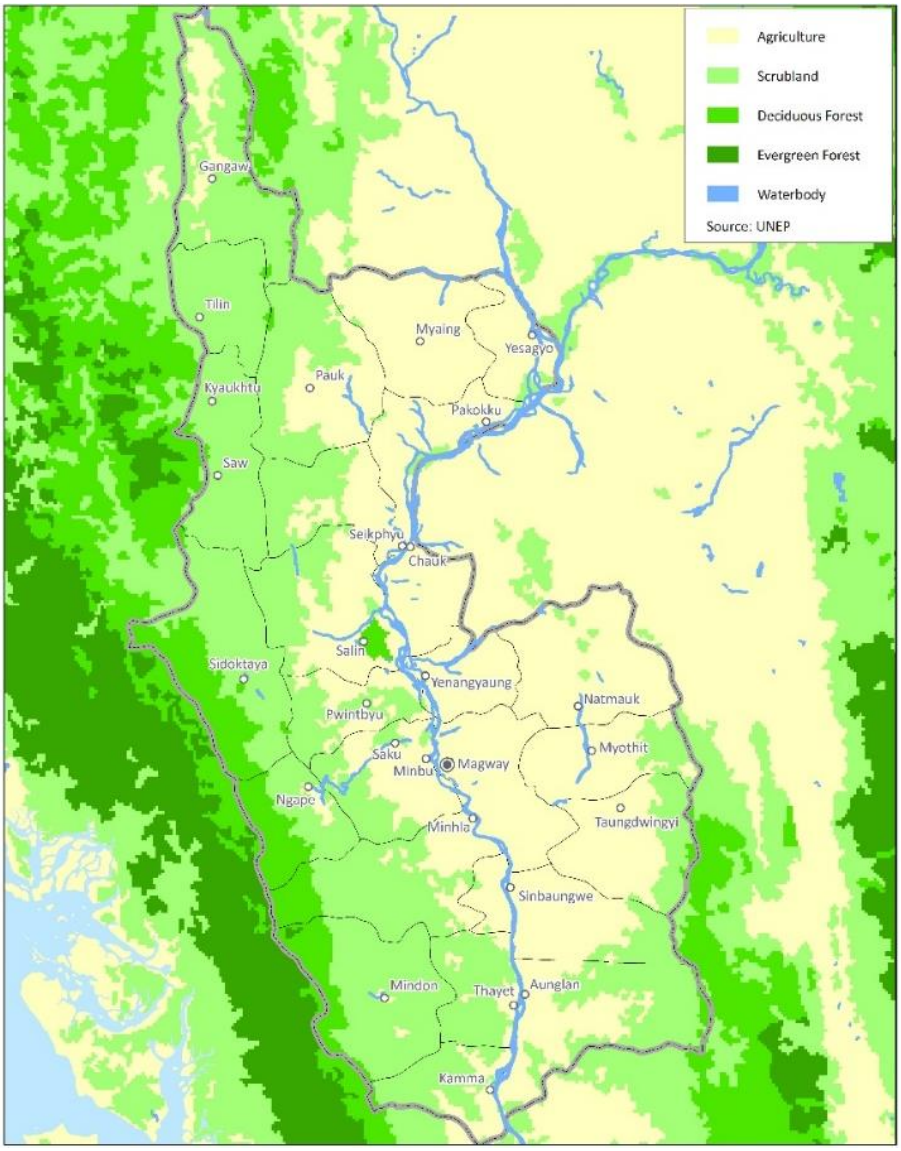


Figure 444: Land cover map of Magway Region

5.2.2.2 Habitat types

The project area located near Minhla, a north-western town of Thayet District of Magwe Region which lies geographically at the center of Myanmar, alongside and at the western bank of the Ayeyawady River's mid-stream section. The new refinery is to be built near the old one which is currently running oil refinery located near the Thanbayakan village 2.5 Km west of Minhla. In fact this area is a western part of Myanmar's major ecoregion, Dry Zone known due to its relatively low rainfall. The landscape of the area has a flat to gently undulating topography with an average elevation of about 150 m (UNDP/FAO, 1983). The soil is alluvial sands and gravels, mixed with sandstones (Chibber, 1933). The western border of the dry zone is to some extent covered by dry deciduous forest, a dominant type among the different vegetation types of Myanmar. This type of Dry Deciduous Forest includes a single type of bamboo known as "Myinwa" (*Dendrocalamus strictus*), but no teak grows naturally.

The Central Dry Zone region has rainfall usually less than 40 inches a year and it includes all of the subtypes of Dry Scrub Forests and the Semi-desert Scrub Forests. This region around the Central Dry Zone includes many of the subtypes of the Dry Deciduous Hardwood Forests and Scrub Forests, and Scrub Forests. Some Dry Upland Forests and Scrub Forests are on upland areas, particularly over the northern part of the Pegu Yomas.

In this region, Terrestrial habitat and Freshwater habitat types are covered.

Forest Cover and Landuse Map of Magway Region

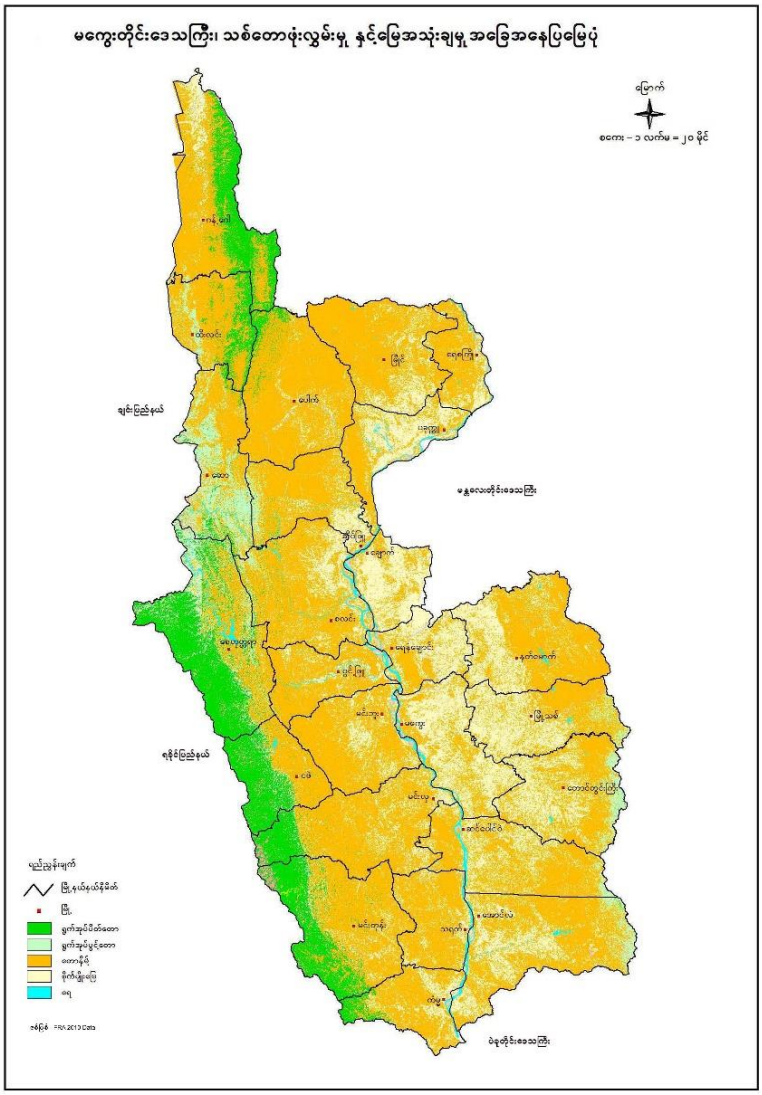


Figure 455: Forest Cover and Landuse Map of Magway Region

Forest type of the dry areas, where the rainfall is less than 50 inches, is Dry Forest. There cannot be swan timber from this type of forest in a reasonable rotation.

Actually forests currently existing near the project area are Than-Dahat forest and Thorn forest. Than-dahat is usually found in the edges of wet zone where the rainfall is 30" to 50". Dominant species grown in such forest are: Than (*Terminelia oliveri*), Dahat (*Tectona hamiltonii*), Sha (*Acacia catechu*) and Ziphu.

Thorn forest grows in drier area where the rainfall is round about 30". Dominant species of this type of forests are Sha (*Acacia catechu*), Tanaung (*Acacia leucophloea*), Zi (*Zizyphus jujube*), and Thanakha (*Limonia acidissima*).

These Dry Deciduous Forests grow on hill slopes with stony, poor soils and generally around 45" of rainfall. Dry Deciduous forests are thought to be widely distributed as a lateral variation of dry teak forest, under decreasing rainfall.

Dry forests with below 50" rainfall produce little or no timber fit for sawing. Fuel wood and house-post are only major forest produce of the dry type. Common trees are *than, daht, sha, tanaung, zi, thanakha* and some *aukchinsa, taukkyan* and *thinwin* (Shirley, 1955).

Where the soil is loamy and especially on hillsides with a rainfall of about 90 cm (35.5 in), the teak forest passes into a type of mixed forest. In the Thayetmyo district, among the many common species of trees are *Vitex* spp.*Heterophragma adenophyllum* ("petthan"),

Dolichandrone stipulate (‘mahlwa”), *Bombax insigne* (“Diidu”), *Firmiana colorata*, *Odina wodier* (“nabe”), *Albizia spp*., *Dalbergia spp*. and *Terminalia bialata* (Kress *et al*, 2002).

Habitats of this region where the proposed project is to be built and natural environment contain the following forest types:

5.2.2.3 Than-Dahat Forest (Tectona hamiltoniana - Terminelia oliveri Forest)

The two dominant species of tree in this type of forest are: *Terminalia olivery* (Than) and *Tectona hamiltoniana* (Dahat). The next most common tree is *Acacia Catechu* (Sha) and the forest grades gradually into *Acaciacatechu -Tectona hamiltoniana* Thorn Forest. Myinwa is common and only bamboo.

This type of forest covers large area on stiff clays with a rain fall of roun about 40 inches. The forest is an excellent example of a stunted and xerophilous forest produced by a dry soil. This type covers considerable areas, mainly those of stiff clays, on the borders of Dry Belt. It has also been described in the riverine tract of Thayetmyo.

5.2.2.4 Sha-Dahat Thorn Forest (Acacia -Tectona hamiltoniana Association)

Sha-Dahat Thorn Forest occurs on clays or loam with a lower rainfall than the Than-Dahat Forest; and on sands at a still lower rainfall, i.e. less than that required for Diospyros Forest. This Thorn Forest is common all over the Dry Belt. With a lower rainfall about 40 inches it becomes dominant occurring both in tree and bush forms. *Tectona hamiltoniana*, Dahat, occurs mainly as small bushy trees. Apart from Dahat, all the trees in this forest are armed with spines or prickles.

5.2.2.5 Sha or Cutch Jungle (Acacia catechu Thorn Scrub)

One of the most characteristic vegetation types of the Dry Belt is a sparse scrub in which *Acacia catechu*, Sha, occurring as low as 1 to 2 meter bushes. The Acacia scrub which occurs in many parts of the Dry Belt where the rainfall is less than 100 cm (about 40 in), varies considerably from place to place, both as a consequence of soil type and amount of rain fall, becoming poorer and sparser towards the heart of Dry Belt. In the eastern part of the Dry Belt, *Acacia leucophloea*, Tanaung, largely replaces Sha especially on level ground (around Mandalay). In the drier parts on sandy land, *Acacia catechu* is accompanied by *Tectona hamiltoniana*, Dahat, (bushes often to 1 m high). Grass is the only undergrowth, but large patches of bare soil are usual.

The forests scattering in the 20km-diameter area of project location where xerophytic vegetation of low trees and shrubs are produced by dry soil and also include *Zizyphus jujube* (Zi), and *Mimosa species.*

<table>
<tr>
<td>  </td>
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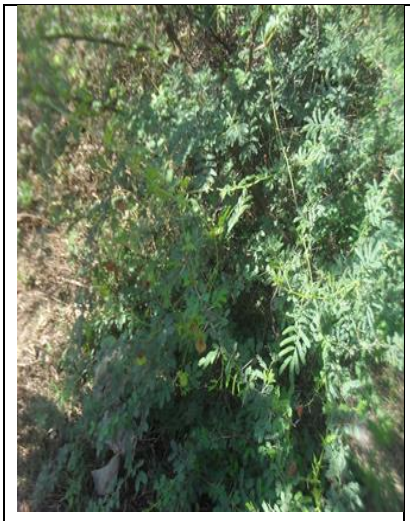
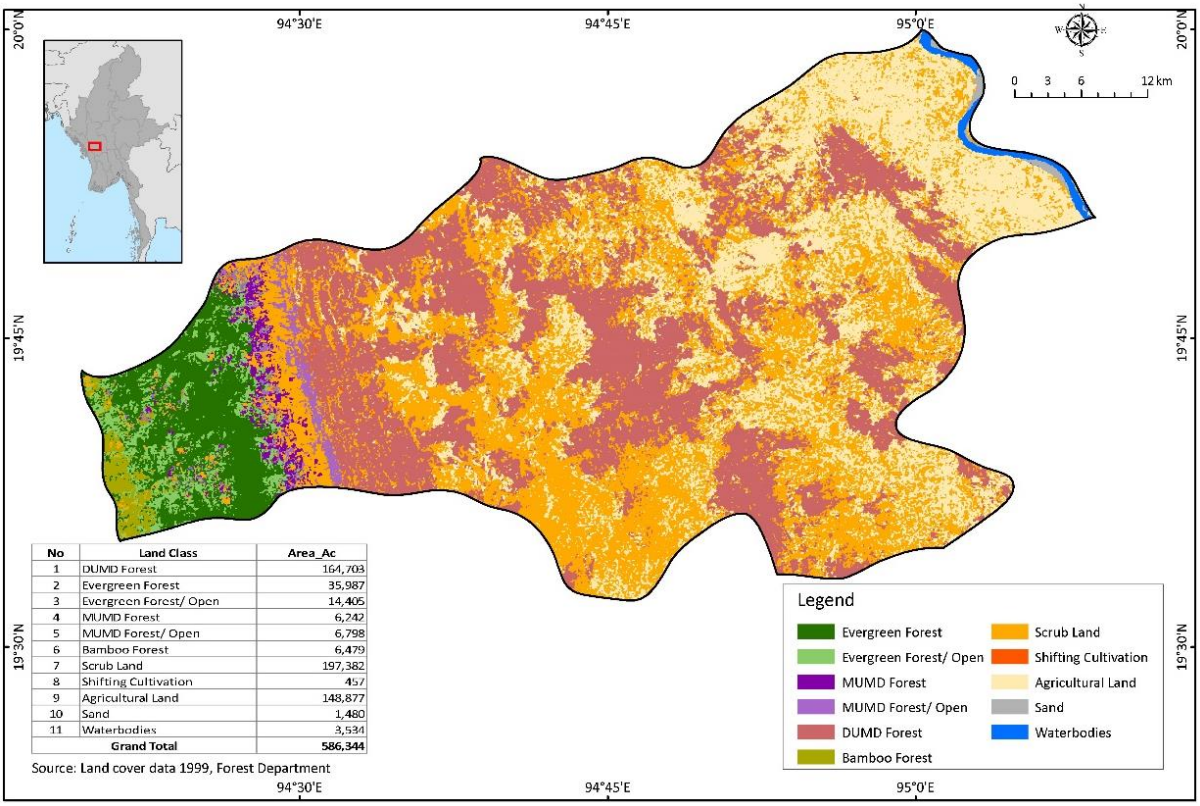
<tr>
<td>Tectona hamiltoniana(Dahat)</td>
<td>Acacia leucophloea (Tanaung)</td>
<td>Terminalia olivery (Than)</td>
</tr>
</table>

		
Lanneacoro mandelica (Nape)	*Osyri sarborea (Zaung-gyan)*	*Terminalia olivery* (Than)

5.2.2.6 Agricultural Land

Most of the surrounding area of the project site and existing petrochemical complex is agricultural land in which Green gram, *Vigna radiate* (L) Wilezek and Pigeon pea, *Cajanus canlan* (Wills) sp both of which are compatable with the soil type and climate of the area. Maize is also a common crop among fruits and vegetables such as garden pea, *Pissum sativum*, rosselle, *Hisbiscus subdarrffa*, sesmum, cotton, etc usually grown in the fields, located at both sides of the waste-water drainage channel.

Land cover map of Minhla Township



No	Land Class	Area_Ac
1	DUMD Forest	164,703
2	Evergreen Forest	35,987
3	Evergreen Forest/ Open	14,405
4	MUMD Forest	6,242
5	MUMD Forest/ Open	6,798
6	Bamboo Forest	6,479
7	Scrub Land	197,382
8	Shifting Cultivation	457
9	Agricultural Land	148,877
10	Sand	1,480
11	Waterbodies	3,534
	Grand Total	**586,344**

Source: Land cover data 1999, Forest Department

Figure 46: Land cover map of Minhla Township

5.2.2.7 Biodiversity Features

The large mammals historically found in this ecoregion of Irrawaddy Dry Forests (35,000 km^2), which is a tropical and subtropical biome of Indochina Bioregion, have been extirpated. Wildlife found in the protected areas includes medium and small mammals. Numerous species of deer such as barking deer, *Muntiacurs muntjak*, Eld's deer, *Cervus eldi*, or sambar deer, *Cervus unicolar*, persist. Mid-sized predators such as the jungle cat, *Felis chua*, Asiatic jackle, *Canis aureus indicus*, leopard, *Panthera pardus fuscus* also persist.

The birds include more than 300 species.

Among reptiles, the dry zone is notorious for viper, *Vipera russelli*, and famous for the Burmese python, *Python molurus bivittatus*. Turtles such as the yellow tortoise, *Testudo elongata*, and soft shelled turtle, *Tryonix* spp. were once common, but now are becoming very rare due to catching and selling to China.

Most of the forests in this ecoregion have been converted to agriculture. Forest that do exist are degraded and lack the full complement of species. Conversion of forests to agricultural land causes habitat loss and fragmentation of remaining habitat.

5.2.2.8 Wildlife Presence

In the past, a good diversity of large mammals occurs in the area, including Thamin (*Cervus eldi*), Gaur (*Bos gaurus*), benteng (*Bos banteng*), serow sambar (*Cervus unicolor*), hog deer (*Axis porcinus*), wild pigs, leopard (*Panthera pardus*), tiger (*Panthera tigris*), clouded leopard (*Neofelis nebulosa*), bear (*Ursus thibetanus* or *U. malayanus*), wild dog (*Cuon alpinus*) and one or more species of primates.

Nowadays, due to loss of vegetation and extension of agricultural land, development activities including establishment of factories and heavy industries for defence and public use at nearby areas, wild animals have receded to the west where forest-covered hills exist. In terms of large mammals, only muntjac (*Muntiacus muntjak*), jungle cat (*Felis chaus*) and jackal (*Canis aureus*) are known to be encountered recently in nearby area of Petroleum Refinery Complex, while overhunting of wildlife for food and use by the local inhabtants and poachers for decades since early 1970s in this region including Shwesettaw Wildlife Sanctuary area. Only hare are and quill are quite abundant at the hilly forested environment in the west of the current factory compound.

Endangered Species

In terms of endangered species, Eld's deer, *Cervus eldi thamin*, is interesting and salient feature of presence of important species. It is IUCN's endangered species and protected by Forestry Department by a regulation (Appendix 70). Though this deer could be encountered this Myanmar species of Eld's deer around the proposed project area's dry scrub and indaind scrub habitats where the historic range of the thamin was share by three large predators: tiger, *Panthera tigris*, leopard, *Panthera pardus*, and dhole, *Cuon alpinus*, near Thanbayarkan until the beginning time of the construction of the existing petrochemical complex, thamin was extirpated by indiscriminate and uncontrolled hunting both for pot and trade in wildlife products along with the spread of permanent agriculture and increased logging in remaining forested area both for firewood and home-build use.

Actually, thamin's distribution is patchy scattering in the Dry Zone and adjacent areas nowadays; but it is everywhere subjected to heavy poaching and habitat destruction. The Shwebo-Minbu-Meikhtila triangle area was a corridor and centre of distribution until 40 years back. Now it is fortunate that barking deer is still present around the project area. Jackal might have been terminated recently or in last two years by over-hunting.

5.2.2.9 Ecosystem Perspective

Forests in the dry zone are also composed of varied ecosystems and communities of plants, trees, shrubs and grasses. They are usually self-sustaining, though some of these communities own balanced functions and structures where environmental factors are interacting each other to have noticeable stable forms of food chain and food webs together with biogeochemical cycles of carbon, nitrogen, phosphorous, sulphur, and water. If one factor of either physical or biological is disturbed, other factors in the ecosystem are disturbed. Then quality of the natural environment is degraded and ecosystem becomes unbalanced and detrimental factors can occur. Some ecosystems, like tundra, coral reefs, wetlands and grasslands are very fragile and

very small changes can affect their health. Larger ecosystems with wide diversity such as marine and forest ecosystems are much more stable and somewhat resistant to harmful changes. Dry forest ecosystem is fragile too. It is subjected to desertification, if conservation actions are not seriously undertaken.

A forest ecosystem community is directly related to species diversity. It is generally known that the more complex the structure, the greater is its species diversity. A forest community is much more than just the sum of its trees. A forest is a system that supports interacting units including trees, insects, animals, and man and abiotic soil, water, climate, sunlight, temperature, rain and wind pattern, etc.

Forest ecosystems tend to always be moving toward maturity or into a climax forest through a process of succession by which the ecosystem increases diversity up to the point of old age where the system slowly collapses. One forestry example of this is growth of trees and the entire system toward an old growth forest. When the ecosystem is exploited and exploitation is maintained or when components of the forest begin to naturally die, then the maturity of the forest ecosystem declines.

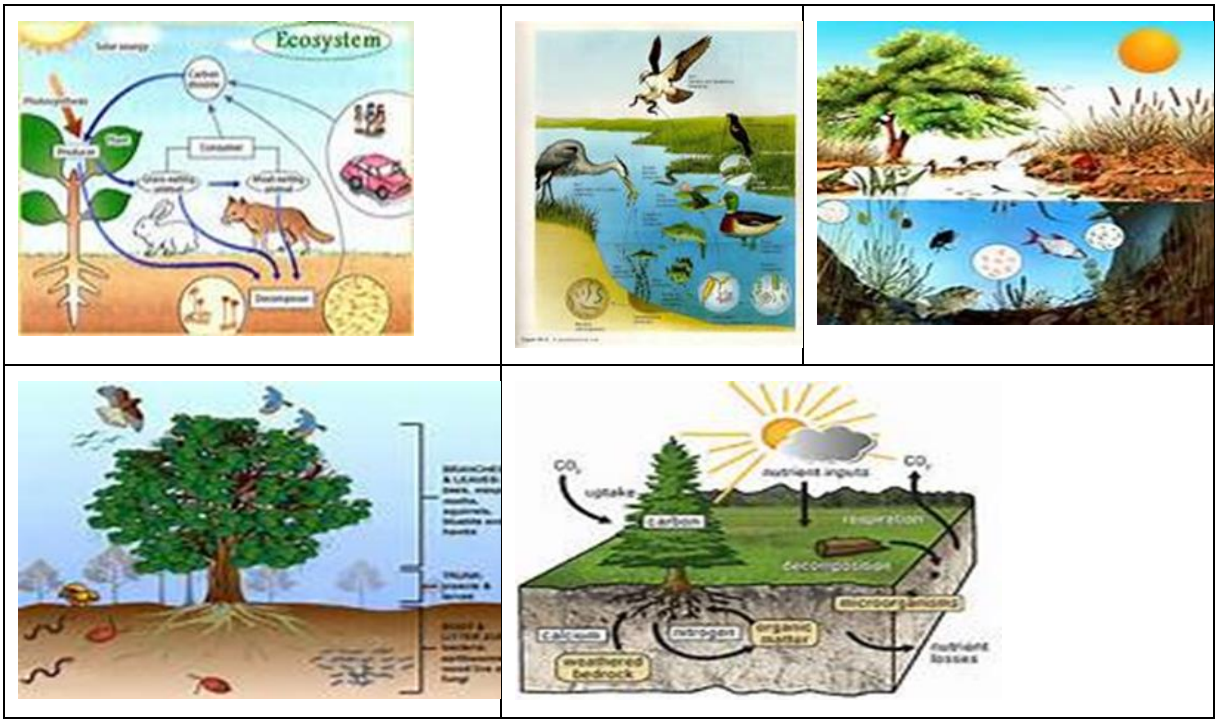
A forest ecosystem is made up of soil, water, plants, animals, insects, fungi and bacteria. All of these things interact with each other to from the ecosystem.

The totality of all the organisms, plants and animals, of a natural environment area, i.e. an open sea, a forest, a lake, a landscape, or a river, where living and non-living environments are interacting each other is usually termed an ecosystem.

The green plants in all ecosystems that produce their own food are termed as producers. They are food source, directly or indirectly, for all animals.

Complex forest ecosystems are extremely diverse, ranging from dry desert shrub land to large temperate rain forests. The animals that cannot manufacture their own food, dependent on the food sources from producers are consumers.

Ecosystem



Each ecosystem has a particular set of abiotic or physical factors, such as light, temperature, pressure, wind, water and soil and these influence the biotic or biological factors of all living things including virus, bacteria, fungi, various plants and animals and their behavior and functions that exist in that ecosystem. Therefore, sustainable development cannot be achieved, without the relevant efforts of maintenance of the quality of ecosystem, by one sided efforts of social and economic development.

5.2.2.10 Ecosystem services

Society benefits in numerous ways from ecosystems, including regulation of the

1. provisioning services (or ecosystem goods), which are products of ecosystems that are directly harvested by people (e.g., food, fibers, and water);
2. regulating services, which are the effects of ecosystems on processes that extend beyond their boundaries (e.g. regulation of climate, water quantity and quality, disease, wildfire spread, and pollination); and
3. cultural services, which are nonmaterial benefits that are important to society's well-being (e.g. recreational, aesthetic, and spiritual benefits;

Many ecosystem processes (e.g. productivity, nutrient cycling, and maintenance of biodiversity) support these ecosystem services.

Many ecosystem services have been degraded globally since the mid-twentieth centaur (Daily, 1997). More than half of these ecosystem services were degraded globally over the last half of the twentieth century – not deliberately, but inadvertently as people sought to meet their material desires and needs. Thanphayarkan's environment cannot be an exception. Even it is worse than others, because dry forest ecosystem is more vulnerable than others due to less availability of water to help plants grow well.

5.2.3 Biological Environment Baseline Data Collection

Primary objective of this study was to provide an overview of the biological status of the terrestrial and aquatic area in and around the proposed refinery construction site and along the pipeline that are likely to be impacted by the proposed development activities. The biological study teams were conducted 2 times between 23 January 2015 to 26 January 2015 and 20 February 2015 to 25 February 2015.

Assessment focuses on identifying any potential impacts to the ecology of the area occurring as a result of the proposed oil refinery.

Other objectives include identifying presence/absence/extent of ecologically or commercially important species of terrestrial and aquatic flora/fauna in the study area; determining potential interactions between natural features, species and habitats during the construction and subsequent operational phases of running the new oil refinery; formulate possible mitigation measures once identified.

The primary terrestrial communities and floral communities were assessed by observing in the field going to the surrounding wild places and agricultural ground walking and visually examined the specimen. The avifauna were documented by photographs taken by tele-lensed camera during the walkthrough exercise. Searching of wildlife's track was made, though evidences of wildlife's visit were not found.

5.2.3.1 Floristic Investigation Methodology

The plant species in both direct impact zone (project area site I, A and B) and indirect impact zone of (project area site II), nearby villages, and oil pipeline which carries oil from Mann Oil Field to the Thanbayakan Petrochemical Complex, were observed, studied, identified and recorded. The method of identification is visual identification carried out by the floral expert.

Plants and trees presents in both direct and indirect zones are observed and classified and recorded under relevant taxonomic categories of flora.

The primary terrestrial communities and floral communities were assessed by observing in the field going to the surrounding wild places and agricultural ground. The visual investigation was undertaken by walking in the field in accordance with the transect line survey method.

Thanpayakan, Maezalitaw and Pantawpyin villages were also visited and observed the plants and trees in the surrounding area, while the study team walked along side of the rail road and crop-fields area.

5.2.3.2 General forest features

There are few patches of natural forests existing with natural species of tree, plant, and shrub in the surrounding area of proposed new oil refinery establishment site (Map…Site 1 A). Being an open type forest, trees of this area are not growing densely in it, but standing in distant position.

Timber value is not considered much from this type of natural trees, while local people use these natural trees mostly for fuel woods.

The direct impact zone of the project area (Site 1, A) is 400 acres where Than-Dahat Scrub forest of open type covers throughout.

The whole project area is mostly covered by Gandarya plants. Some medium-sized trees, small trees, shrubs and herbs are found at the natural habit of the project area.

Terrestrial Ecosystem in direct impact zone

Direct impact zone open forest types

As the project area is situated in the dry zone where dry deciduous forests dominate throughout the region. However, as the area's rainfall is usually less than average 40 inches, the forests around the project sites are: subtypes of Dry Deciduous Hardwood Forests and Scrub Forests, and some Than-Dahat. Some Dry Upland Forests and Scrub Forests are on the upland area. Natural vegetation cover is composed of some common species such as *Terminalia olivery* (Than) and *Tectona hamiltoniana* (Dahat) and *Acacia catechu* (Sha) and xerophilous vegetation of low trees and shrubs produced by a dry soil, while *Mimosa* species is found as dominant instead of *Zizyphus jujube* (Zi) species.,

Normally the ecosystems or communities here in surrounding area keeping their own self-sustaining function as a usual way, they have been disturbed, degraded and becoming unbalanced with loss of wildlife and native trees and plants and too much fragmented. Forests remain patchy without connectivity among them. The remaining grasslands are also becoming fragile. When forest diversity is threatened and resources are overused, forest ecosystems are harmed and disrupted. Therefore, environmental and economic demands exist to have proper management of ecosystems for the long-term sustainability and the ecological integrity of the region.

Plant List in direct impact zone

No.	Common Name	Scientific Name	Family Name
1	Aung-me-nyo	*Clitoria laurifolia*	Fabaceae
2	Bae-bya	*Cratoxylum neriifolium* Kurz	Hypericaceae
3	Bae-bya	*Cratoxylum polyanthum* Korth	Hypericaceae

4	Bauk-thi	*Physalis minima* L.	Solanaceae
5	Bi-zet	*Chromolaena odorata* (L.)R.M.King & H.Robinson	Asteraceae
6	Bi-zet-nwee	*Mikania micrantha* H.B.K	Asteraceae
7	Bu-kha-gyi	*Clerodendrum splendens* G.Don	Verbenaceae
8	Hta-min-sote	*Glochidion puberum* (l.) Hutch.	Euphorbiaceae
9	Kat-se-nae-thay	*Triumfetta bartramia* L.	Tiliaceae
10	Nauk-po-myat	*Chrysopogon acicularis*	Poaceae
11	Pason-sa-yaing	*Alternanthera sessilis* L.	Amaranthaceae
12	Pauk-nwee	*Butea parviflora* Roxb.	Fabaceae
13	Sin-ngo-myet	*Eleusine indica* Gaertn.	Poaceae
14	Tha-but-gyi	*Uvaria cordata* Schum. & Thonn.	Annonaceae
15	Tha-bye	*Syzygium fruticosum* DC.	Myrtaceae
16	Yin-khat-gyi	*Gardenia coronaria* Buch-Ham.	Rubiaceae
17	Zi	*Zizyghus jujube* Lam.	Rhamnaceae
18	Zi-phyu	*Phyllanthus emblica* L.	Euphorbiaceae

Terrestrial Ecosystem in indirect impact zone – closed forest types

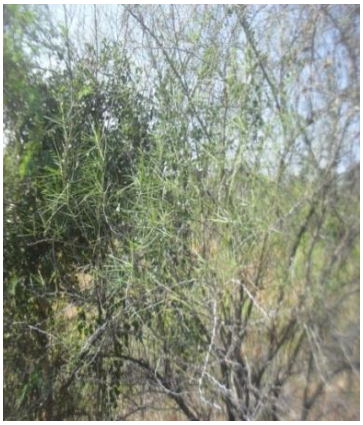



Plant List in indirect impact zone

No.	Common Name	Scientific Name	Family Name
1	Anya-kokko	*Albizzia lebbek* Benth	Mimosaceae
2	Bizat-hpo	*Synedrella nodiflora* (L.)	Asteraceae
3	Bi-zet	*Chromolaena odorata* (L.) R.M.King & Robinson	Asteraceae
4	Bi-zet-nwee	*Mikania micrantha* H.B.K	Asteraceae
5	Chan-si-yoe-pin	*Dracaena ragrans*	Agavaceae
6	Dahat	*Tectona hamiltoniana*	Mimosaceae
7	Dan-da-lun	*Moringa oleifera* Lam	Connaraceae
8	Gandasein	*Prosopis juliflora* DC	Mimosaceae
9	Hti-ga-yone	*Mimosa pudica* L.	Mimosaceae
10	Hti-ga-yone-gale	*Neptunia triquetra* Benth	Mimosaceae
11	Ingyin	*Pentacme siamensis*	Tiliaceae
12	Kala-magyi	*Pithecellobium dulce* (Roxb)	Mimosaceae
13	Kanaso/zo	*Baccaurea flaccida* Muell	Euphorbiaceae
14	Kat-se-nae-thay	*Triumfetta bartramia* L.	Tiliaceae
15	Ket-se-nae-gyi	*Urea lobata* L.	Malvaceae
16	Khwee-dauk	*Cnestis palala* Merr.	Connaraceae
17	Khwe-thay-pan	*Ageratum conyzoides* L.	Asteraceae
18	Kinmum-gyin-nwe	*Acacia rugata* Hum	Mimosaceae
19	Kok-ko	*Albizzia Lebbek* Benth	Mimosaceae
20	Kyetmauk-ni	*Cnestis ramiflora* Griff	Ascleptadaceae
21	Lelu	*Mussaenda macrophylla* Wall	Rubiaceae
22	Letpan	*Salmalia malabarica* (DC)	Malvaceae
23	Let-pan	*Bombax ceiba* L.	Bombacaceae
24	Magyi	*Tamarindus indica* L.	Caesalpiniaceae
25	Ma-la	*Curcuma attenuata* Wall.	Zingiberaceae
26	Ma-lay-sia-pa-dauk	*Acacia auriculiformis* A.Cunn.	Mimosaceae
27	Mo-hnan	*Azima sarmentosa* Benth	Salvadoraceae
28	Nabe	*Lannea coromanelica* (Houtt)	Anacardiaceae
29	Nagye	*Pterospermun semisagittatum*	Anacardiaceae
30	Naukpo-myet	*Chrysopogon aciculatus* (Retz)	Graminaceae
31	Nauk-po-myet	*Chrysopogon acicularis*	Poaceae
32	New-cho	*Albizzia myriophylla* Benth	Mimosaceae
33	New-kazun-byu	*Ipomaea alba* L.	Convolvulaceae
34	New-pan	*Graptophyllum pictum* Griff	Acanthaceae
35	Nibase	*Morinda tinctoria* Roxb.	Rubiaceae
36	Nyaung	*Ficus affinis* Wall	Moraceae
37	Okshit	*Aegle marmelos* (L.)	Rutaceae
38	Padauk	*Pterocarpus macrocarpus* (Kz)	Papilionaceae
39	Pet-than	*Haplophragma adenophyllum* (Wall)	Bignoniaceae
40	Plam	*Bauhinia racemosa* L.	Palmaceae
41	Sayo	*Anogessium acuimata.* Wall.	Cobretaceae
42	Seinban	*Delonix regia* (Bjer ex ltk)	Caesalpiniaceae
43	Sha	*Acacia catechu* Willd	Mimosaceae
44	Sha	*Acacia chundra* Willd	Mimosaceae
45	Sha-ni	*Calliandra griffithii* Benth	Mimosaceae

46	Su-balwe	*Balanites aegyptica* (L.)	Irvingiaceae
47	Subok-gale-new	*Acacia pennata* var	Mimosaceae
48	Subok-gyi	*Acacia pennata* Willd	Mimosaceae
49	Subyu	*Acacia Arabica* Willd	Mimosaceae
50	Su-magyi	*Acacia myaingii* Lace	Mimosaceae
51	Su-padaung	*Hygrophila spinosa* T.Anders	Acanthaceae
52	Swedaw	*Trachylobium verrucosum* Oliver	Caesalpiniaceae
53	Tama	*Azadirachta indica* A.Juss	Meliaceae
54	Tama-kai	*Acacia lebbek* Willd	Mimosaceae
55	Tanaung	*Acacia leucophloea* Willd	Mimosaceae
56	Tanaung-subyu	*Calliandra kingie* Prain	Mimosaceae
57	Tanaung-subyu	*Calliandra kingie* Prain	Mimosaceae
58	Tauk-kyan	*Terminalia tomentosa*	Anacardiaceae
59	Taw-mezali	*Abarema clypearia* (Jack.)	Mimosaceae
60	Taw-thayet	*Mangifera caloneurq* Kz.	Anacardiaceae
61	Ta-yoke-saga	*Plumeria obtuse* L.	Apocynaceae
62	Tha-but-gyi	*Uvaria cordata* Schum.& Thonn.	Annonaceae
63	Tha-bye-gyi	*Syzygium grande* (Wight) Walp	Myrtaceae
64	Tha-mon	*Boscia variabilis*	Combretaceae
65	Than	*Terminalia olivery*	Combretaceae
66	Tha-na-kha	*Limonia acidissma*	Rutaceae
67	Than-pa-ya	*Citrus aurantifolia* (Christm.) Sw.	Rutaceae
68	That-but-gyi	*Miliusa velutina*	Myrtaceae
69	Thin-baw	*Carica papaya L.*	Caricaceae
70	Thinbaw-kakko	*Samanea saman* (Jacq.)	Mimosaceae
71	Thinbaw-ma-gyi	*Albizzia falcate* (L.)	Mimosaceae
72	Thit-magyi	*Albizzia odoratissima* (L.f)	Mimosaceae
73	Thit-san-win	*Dalbergia paniculata*	Mimosaceae
74	Thitsi	*Melanorrhoea glabra* (Wall)	Anacardiaceae
75	Wa-nwe	*Oxytenanthera albo-ciliata* Munno	Gramineae
76	Yin-daik	*Dalbergia cultrate*	Fabaceae
77	Zaung-gyan	*Osyris arborea*	Rhamnaceae
78	Zi	*Zizyphus jujube* Lam.	Rhamnaceae
79	Zinbyu	*Emblica officinalis* Gaertn.	Rhamnaceae
80	Taw-zi-phyu	*Phyllanthus emblica* L.	Rhamnaceae

Mimosa sp in direct impact zone



5.2.3.3 Endangered Species

Dalbergia cultrate (Yin-daik) in indirect impact zone

Only one plant was found to be endangered among the 157 species recorded in 41 Families of plant and trees surveyed in and around the project site. This plant species is known as Yin-daik (*Dalbergia cultrate*). The outstanding characters of this species are: Tall deciduous trees, 3-8m high; Stems cylindrical; Glabrous; Lenticels present; Leaves alternate; Unipinnately compound; Leaflets obovate-oblong; Inflorescences terminal and axillary fasciculated panicles; Flowers hypogynous; The sepal tube companulate, petals with monadelphous anthers; Flowering and fruiting periods from February to April.

Endangered species in indirect impact zone

No.	Scientific Name	Family Name	Vernacular Name	IUCN criteria
1	*Dalbergia cultrate* Grah.	Fabaceae	Yin-daik	EN A 1 cd

Crop Plantation

Paddy plantation is widespread in indirect impact zone area and surrounding of off-take point near Saku where onion, corn and chick pea are being grown near water flowing channel.

It has been observed that local farmers could enjoy the releasing water from the factory by the plantation of crops such as ground nuts, onions, cotton, corn, and pigeon pea both in direct and indirect impact zones.

Farms at the sides of waste water drainage canal can enjoy the better growth of the plants in the fields. It can be the result of nitrogen fixation process by which nitrogen – fixing bacteria forms nitrogen compounds from gaseous nitrogen e.g. symbiotic bacteria, *Rhizobium* (lives in root nodules of leguminous plats), and free-living soil bacteria, so that plant can get rich nitrogen and denitrification is the process of converting nitrogenous compounds into gaseous nitrogen. Denitrifying bacteria are responsible for this process, particularly when they live in soil with low oxygen content.

Crop Plant List in indirect impact zone

No.	Common Name	Scientific Name	Family Name
1	Kalape	*Cicer orietinum* L.	Papilionaceae
2	Negya	*Helianthus annuus* L.	Compositae
3	Ngayok	*Capsicum annuum* L.	Cuscutaceae
4	Nyan	*Sesbania bispinosa (*Jacq.*)*	Papilionaceae
5	Pe-di-sein	*Phaseolus radiates* L.	Leguminosaceae
6	Pyaung-bu	*Zea mays* L.	Graminaceae
7	Saba	*Oxyza sativa* L.	Graminaceae
8	War-gyi	*Gossypium arboretum* L.	Malyaceae

Crop plantation in indirect impact zone

		
Allium cepa L. *(Kyetthun- ni)*	*Zea mays* L. *(Pyaung-bu)*	*Cicer orietinum* L. *(Ka-la-pe)*

Crop plantation besides waste desposal drain in direct impact zone

	
	
PhaseolusradiatusL.(Pe-di-sein)	

5.2.3.4 Analysis of the findings on Flora

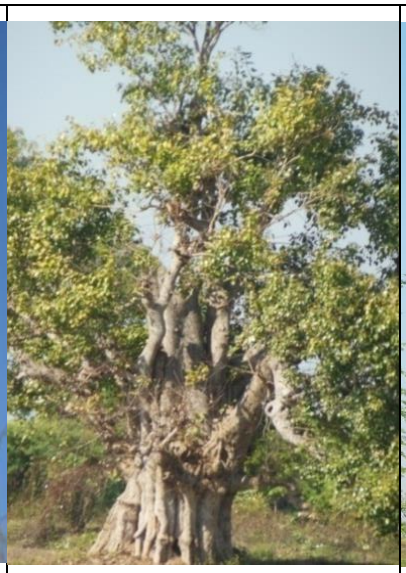
Soil type in the project site area is sandy and literite soil. The Dry Zone area is inhabited by the plants and trees which are capable of storing water and resistant to hot weather. Their distinguished general characteristics are small-size, thorn bearing, having small and thick leaves. Common species of trees in dry zone area are Than, Dahat, Shar, Hta Naung, Sue Phyu, Kyot Ko, Me Za Li, Lat pan, Bal Sa Khaine, Tamar, Shar Lyar. So that general forest

type of the Dry Zone is “Than Dahat Scrub forest”. This forest is open type and has less big trees and more small trees. The scarcity of big trees makes the forest open type. Climate change and increased population can cause this type of forest to have fewer trees.

The villagers from the villages located in the surrounding environment of the proposed oil refinery factory necessarily need the firewood for their daily life, and this fact is also a reason for the scarcity of hard wood and trees in the nearby forests. The main trees used as firewood are Hta Naung, Shar, Kyot Ko and the other hard-wood trees. Besides that, they are using the available trees for building their houses. The “Shar trees” are becoming very rare in these areas because this tree is extensively used for making the charcoal until recently.

However, the long life-span trees found in the environment, such as Lat Pan, Kyot Ko, Oatshit, Tamar and Hta Naung are resisting the climate change and maintain the regular environment. The scarcity of trees in the forest has strong impact on the presence of animals and birds the area, since they are living at and among the trees of the forest. Therefore recovery of the degraded forests is an urgent need too. Fortunately, existing long life-span trees provide a helping hand for some species of birds to have living space. Fundamentally, plants and animals are depending on each other’s in any forest ecosystem.

Long ago, the forest was full of any type of trees and also has the climate resistible ones, but nowadays the dominant trees are lacking in the forest. This point need to be aware of getting means to help the existing forests regenerate for future stability of the natural ecosystems and habitats for the animals. Therefore, we need to keep the rare trees species in the surrounding environment protected. Replantation of rare species and some natural species of local habitats including *Aurasia*, Tamar and Kyot Ko for the recovery of habitats should be carried out from now on.

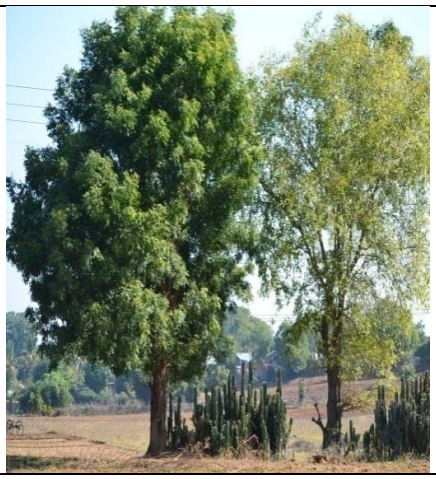
		
Acacia arabica *(Subyu)*	Ficusaffinis Wall. *(Nyaung)*	Salmaliaanceps *(Let-pan)*

Trees existing near the present Refinery

The Baydar (Water hyancynth) and other aquatic weeds such as Water Zalat, Yaynyit, and YayMaw should also be planted mainly in the water along the drainage channel of waste water. The advantages of bay dar are its leaves have a lot of air spaces in the tissue of leaf which is spongy. Therefore, they reduce the pollution in water and also recycle of these pollutants and can produce O_2 which decreases the dirty smell and purify the water again. Planting big tree at the both sides of polluted water drainage channel can also help prevent from air pollution, for tree’s leaves absorb CO_2 and use in making photosynthesis.

There are farmlands beside the waste water drainage channel. Villagers can plant only one crop in rainy season because of the scarcity of water in Dry Zone Area. Nowadays, they can plant two crops in rainy and winter seasons because of getting water sufficiently from the drainage of current running petrochemical refinery. The increase in yield of the farm is directly

proportional to the upgrading of the living standard and household expenditures of farmers. The villages have the some educated people who raise their knowledge base on their environment, forest, animals and plants. They are the primary source to raise awareness among the local people about sustainability. Valuable plants such as Nant thar phyu, San da kuu, and Thanakhar should be planted extensively since Nant thar phyu is really exotic and Thanakhar (*Hesperrethusa crenulata*) is currently high demanding in the market and valuable native species, and Sanda kuu is economically beneficial in future. Those plants grow well in Magwe Division.

	
Opuntia dillenii (Kyasha)	*Azadirachta indica* Wall. (Tama) *and* *Aegle marmelos* L.(Okshit)
	
Acacia catechu (Sha)	*Acacia catechu (Sha)*

5.2.3.5 Fauna Portion

5.2.3.5.1 Method of the Study

Direct visual observation method is applied for the presence and absence of animals in the field near and along the old pipeline, the off-take point area, and the villages located in surround area of current petrochemical complex and the new refinery project sites. The visual investigation was carried out by point out the survey method.

Avifauna was documented by photographs taken by a tele-lensed camera during the walkthrough exercise of some forest-cover areas.

A night-walk search was also made to be able to see some reptiles and small mammals.

The identification of fishes was made by direct sighting and taking photographs at the nearby bazaar.

Interviewing some local knowledgeable villagers were also made.

5.2.3.5.2 Background History

This area is geographically a dry zone area and geologically the Dry Belt where rocks are slightly soft and easily eroded and dry coarse sands are common. Dry Scrub and Semi-desert Scrub Forests are scattering in a patchy appearance with an under 40 inches of rainfall per year. However with connection to the deciduous forest of Rakhine Yoma and Tropical rainforest, the western Yoma landscape in the west fauna and flora distribution could reach to the Minbu and Thayet District area and project site surrounding was one of the most characteristic vegetation types of the Dry belt is a sparse scrub in which *Acacia catechu* ("sha"), occurring as low (1 to 2 meter) bushes.

5.2.3.6 Results

5.2.3.6.1 Aqatic Fauna

A total of 14 species belonging to eight families, six order was collected during study period. Among fish species caught order Cypriniformes contain highest number of four fish species. Follwed by order Perciformes and Siluriformes were only three species. Tetraodontiformes composed the least of only one species.

List of Aquatic Fauna (Vertebrate) from New oil refinery Area, Existing Pipeline and Off-Take Point

No.	Order	Family	Species	Common Name	Habitat
1	Cypriniformes	Cyprinidae	*Osteobrama cunma*	*Cunma osteobrama*	Does not include altitudinal distribution, which is covered under habitat 0.
2			*Puntius parrah*	Parrah	Not marine, freshwater.
3			*Puntius gonionotus*	Ptian fish	The species occurs at mid-water to bottom depths in rivers.
4			*Salmostoma sardinella*	Sardinella rozorbelly minnow	They were found in freshwater.
5	Osteoglossiformes	Notopteridae	*Notopterus notopterus*	Greay featherback	Fresh-water, brackishwater. Standing and sluggish waters of lakes
6	Perciformes	Ambassidae	*Pseudambasis ranga*	Glass fish	In fresh and brackish water in Burma, India.
7		Gobiidae	*Glossogobius giuris*	Tankgoby	It is a very widespread Indo-Pacific species and most likely. This species can also be found in the aquarium trade.
8		Mugilidae	*Rhinomugil corsula*	Corsula mullet	It is specially seen in the market in the rainy season.
9	Siluriformes	Bagridae	*Mystus cavasius*	Gangetic mystus	Standing and flowing water. Usually found marginal vegetation in lakes and swamps.
10			*Mystus vittatus*	Striped dwarf catfish	Found in freshwater bodies, in flooded canals, creeks.
11			*Aorichthys aor*	Long-whiskered catfish	Bottom living fish.
12	Tetraodontiformes	Tetraodontidae	*Macrognathus aculeatus*	Lesser spiny Eel	The habitat of this fish is the muddy stream.

13	Decapoda	Palaemonidae	*Macrobrachium rosenbergii*	Giant river prawn	Found in freshwater lakes and rivers in the native habitat. Lives in tropical freshwater environment that are influenced.
14			*Macrobrachium maribel*	Maribel Prawn	Loss in area occupied by dam sites, reservoirs.

Fish Species

1.*Osteobrama cunma*

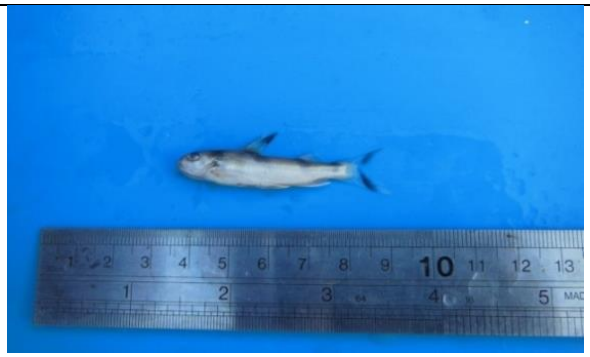
2.*Puntius gonionotus*

3.*Puntius parrah*

4.*Salmostoma sardinella*

5.*Notopterus notopterus*

6. *Pseudambasis ranga*

	
7. *Glossogobius giuris*	8. *Rhinomugil corsula*
	
9. *Mystus cavasius*	10. *Mystus vittatus*
	
11. *Aorichthys aor*	12. *Macrognathus aculeatus*
	
13. *Macrobrachium rosenbergin*	14. *Macrobrachium Maribel*

5.2.3.6.2 Amphibian fauna

Only one *Dutlaphrynus melanostictus* was recorded in study period.

5.2.3.6.3 Reptilian fauna

A total of five species belonging to five families and only one order Squmata was recorded

during study period. According to recorded photograph, only lizard, *Caltoes versicolor* species was found in off – take point.

List of Amphibian Fauna (Vertebrate) from New oil refinery Area, Existing Pipeline and Off-Take Point

Sr.	Order	Family	Species	Common Name	Habitat
1	Anura	Bufonidae	*Dutlaphrynus melanostictus*	True Toad/Phar Pyoke	Into the burrow and near the human house (Za Tha Pyin, Gyaing)

List of Reptilian Fauna (Vertebrate) from New oil refinery Area, Existing Pipeline and Off-Take Point

No	Order	Family	Scientic Name	Common Name	Local Name	Habitat
1	Squamata	Agamidae	*Caltoes versicolor*	Oriental Garden Lizard	Poke Thin Nyo	Surrounding the factor
2		Viperidae	*Ovophis monticula*	Montane plt viper	Mwe pway	
3		Elapidae	*Naja kaouthia*	Moncocnled cobra	Mwe houk	
4		Colubridae	*Oligondon Cyclurus*	Cantor's kukri snake	Myet shaw	
5		*Ptyas mucosa*	Indian rat snake	Linn mwe		

Dutlaphrynus melanostictus

Caltoes versicolour

5.2.3.6.4 Avian fauna

A total of 24 birds species were recorded. Among the recorded species, 22 species were recorded. According to the recorded data, Passeriformes contain highest number of 16 birds species. Followed by order Coraciiformes contain three species. Falconiformes composed the least of only one species.

List of Avian Fauna (Vertebrate) from New oil refinery Area, Existing Pipeline and Off-Take Point

No.	Order	Family	Species	Common Name	Habitat
1	Ciconiiformes	Ardeidae	*Egretta garzetta*	Little Egret	Inhabits fresh, brackish or saline.Wetlands and shows a preference for shallow water.

2			*Ixobrychus cinnamomeus*	Common Bittern	It is mainly resident, but some northern migrate short distance.
3	Columbiformes	Columbidae	*Sterptopelia orientalis*	Oriental Turtle- Drove	Are abundant in range of habitats in the tropics and two now have a much more extensive distribution.
4			*Treron phoenicoptera*	Yellow-Footed Green Pigeon	Forest, scrubland parks, and gardens in lowlands and foothills.
5	Coraciiformes	Coraciidae	*Coracias benghalensis*	Indian Roller	It is commonly seen in open grassland and scrub forest.
6		Halcyonidae	*Halcyon smyrnensis*	White-Throated Kingfisher	Dams, ponds, canals, creeks, swamps, mudflats, beaches.
7		Meropidae	*Merops orientalis*	Green Bee-Eater	Agricultural expansion and irrigation is creating new area of suitable habitats
8	Falconiformes	Accipitridae	*Pernis ptilorhyncus*	Oriental Honey-Buzzard	It habits woodland of various climatic types, preferring broad-leaved forest
9	Passeriformes	Corvidae	*Corvus macrorhynchos*	Large- billed Crow	Forests and woodland of all types across its wide range
10		Dicruridae	*Dicrurus macrocercus*	Black Drongo	Mostly open country and farmland with scattered trees, very common also in villages.
11		Muscicapidae	*Copsychus saularis*	Oriental Magpie Robin	In wild: Has adapted to urban areas and feeds in the open.
12			*Saxicoia caprata*	Pied Bushchat	It is found in open habitats including scrub, grassland and cultivation.
13		Sturnidae	*Sturnus burmannicus*	Vinous-Breasted Starling	Dry zone bird. Usually seen in large parties feeding on the ground in open grassland.
14			*Acridotheres tristis*	Common Myna	It is closely associated with human habitation.
15		Hirundinidae	*Hirundo striolata*	Striated Swallow	Agricultural cleaning in lowland deciduous forest.
16		Cisticolidae	*Prinia hodgsonii*	Grey-Breasted Prinia	Preference for second- dary growth and tolera- nce of man-made habit ats, such as garden…..
17		Phylloscopidae	*Phylloscopus inornatus*	Yellow-Browed Warlber	Dark habitats and bright birds illustrate the role of the environment in species divergence.
18		Dicaeiniidae	*Dicaeum concolor*	Plain Flowerpecker	Various forest types, including evergreen, moist deciduous, sub montane health and montane forest.
19		Nectariniidae	*Nectarinia asiatica*	Purple Sunbird	Habitat types created by urbanization, ranging.
20			*Nectarinia Jugularis*	Olive- Backed Sunbird	Such as secondary forest, orchards…….
21		Passeridae	*Motacilla alba*	White Wagtail	Habitats close to water, such as river banks and lake edges.
22		Pycnonotidae	*Pycnonotus cafer*	Red-Vented Bulbul	It is a bird of dry scrub, open forest, plain and cultivated lands.
23			*Pycnonotus blanfordi*	Streak-Eared Bulbul	It is subtropical or tropical moist lowlands forests.
24		Vangidae	*Tephrodomis pondicerianus*	Common Woodshrike	Agriculture land, lost of vegetation

There was no sighting of tracks, scats, droppings of carnivores and prey species, though observationwas carefully made in the field.

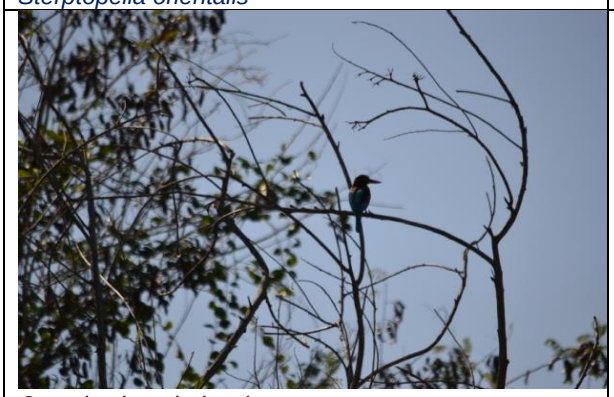
5.2.3.6.5 Avian fauna

Egretta garzetta

Ixobrychus cinnamomeus

Sterptopelia orientalis

Treron phoenicoptera



Coracias benghalensis

Halcyon smyrnensis

Merops orientalis

Pernis ptilorhyncus

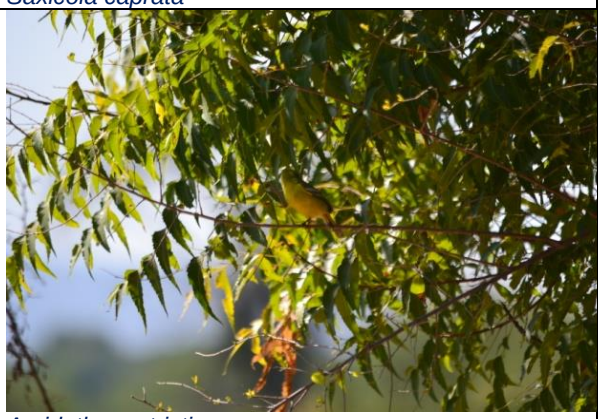
Corvus macrorhynchos

Dicrurus macrocercus

Copsychus saularis

Saxicoia caprata

Sturnus burmannicus



Acridotheres tristis

Phylloscopus inornatus

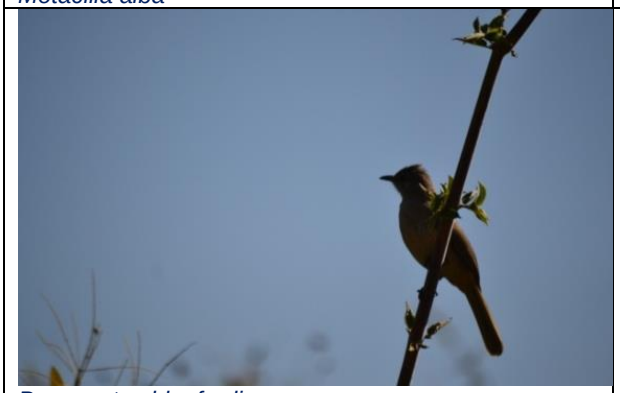
Dicaeum concolor

Nectarinia asiatica

Nectarinia Jugularis

Motacilla alba

Pycnonotus cafer



Pycnonotus blanfordi

Tephrodomis pondicerianus

5.2.3.6.6 Mammalian fauna

According to interview surveys from some workers and villagers around the service quarter and storage Tanks area, total of four species belong to four families and orders were recorded. Other species of goat, cow and sheep were recorded when observation were made along the existing oil pipeline. These species breed for livestock and use for milk and meat.

List of Mammalian Fauna (Vertebrate) from New oil refinery Area, Existing Pipeline and Off-Take Point

No	Order	Family	Species	Common Name	Habitat
1	Cetartiodactyla	Cervidae	*Muntiacus muntjak*	Red Muntjac	Temperate, tropical, terrestrial and forest
2	Rodentia	Sciuridae	*Callosciurus erythraeus*	Pallas's Squirrel	Temperate and terrestrial

3	Largomorpha	Leporidae	*Lepus peguensis*	Siamese Hare	Forest, subtropical and tropical dry
4	Carnivora	Felidae	*Felis chaus*	Jungle Cat	Temperate, tropical and terrestrial


Mammalia fauna

5.2.3.7 Analysis of Findings

There is no trees, plants and animals at the tip of the wastewater discharging channel of the current factory compound. Cattle can drink the water of the waste drainage channel at the point of 100m away from the factory compound. Toxic contaminants might have sunk down to the floor along the channel before this point. Aquatic plant, water arrow which can absorb the waste grows well in this area, but no fish is present there.

Birds are still quite abundant where tall and large trees stand near the places with water availability. It seems food for birds are still abundant, for agriculture fields are rich with insects. Some species of birds which are unbearable to the noise from the factory might have migrated away earlier.

Forest scattering in the surrounding area are composed of same types of plant species, so that forest around the area are likely to survive longer, though the area of habitats become narrow in terms of width. Villagers living along the pipeline are paddy growers. They use the flat land existing along the pipeline by transforming as pasture for cattle, goat and sheep.

Construction of a new pipeline may not have a serious impact on the movable animals. Excavation can kill the burrowing animals of lower vertebrates and small mammals. The existing tall trees located along the old pipeline should not be cut out, for these trees absorb CO_2 of the atmosphere and release the O_2. This has the positive impact of deterring climate change. Paddy fields next to the off-take point are not allowed to make burn the fields. Snake and frogs are commonly found in the fields located along the oil pipe line area in the rainy season while rats are abundant in summer. Various types of butterflies are still present in the agricultural fields.

Wastewater directly discharged at the jetty area is disturbing the presence of fishes by the pollution of spilled oil and petroleum products at the time of transferring the crude oil and factory products, while fishing in the one-mile diameter of Ayeyarwaddy river is prohibited by issuing administration Law's section 114.

Sucking of the huge amount of the river water has the impact of bank erosion and siltation which have the negative impacts on the natural ecological succession of the aquatic flora and fauna, while some crop plantation grows well on the newly formed land emerging at the bank of the river made up of siltation built up.

In terms of forest regeneration, there is evidence of well establishment forested area rich

with a variety of native trees and newly planted species in a defense heavy industry compound and a Buddhist monastery compound located near the river where some water supply is provided by river water or tube-well water.

5.3 Socio-Economic Environment Baseline Data Collection And Analysis

This section presents collection of the socio-economic data of communities living in the surrounding areas of the project site. These data will be served as baseline information for the environmental impact assessment and monitoring of the potential impacts in the future.

Myanmar-China crude oil pipeline from Saku off-take point to Thanbayakan Oil Refinery

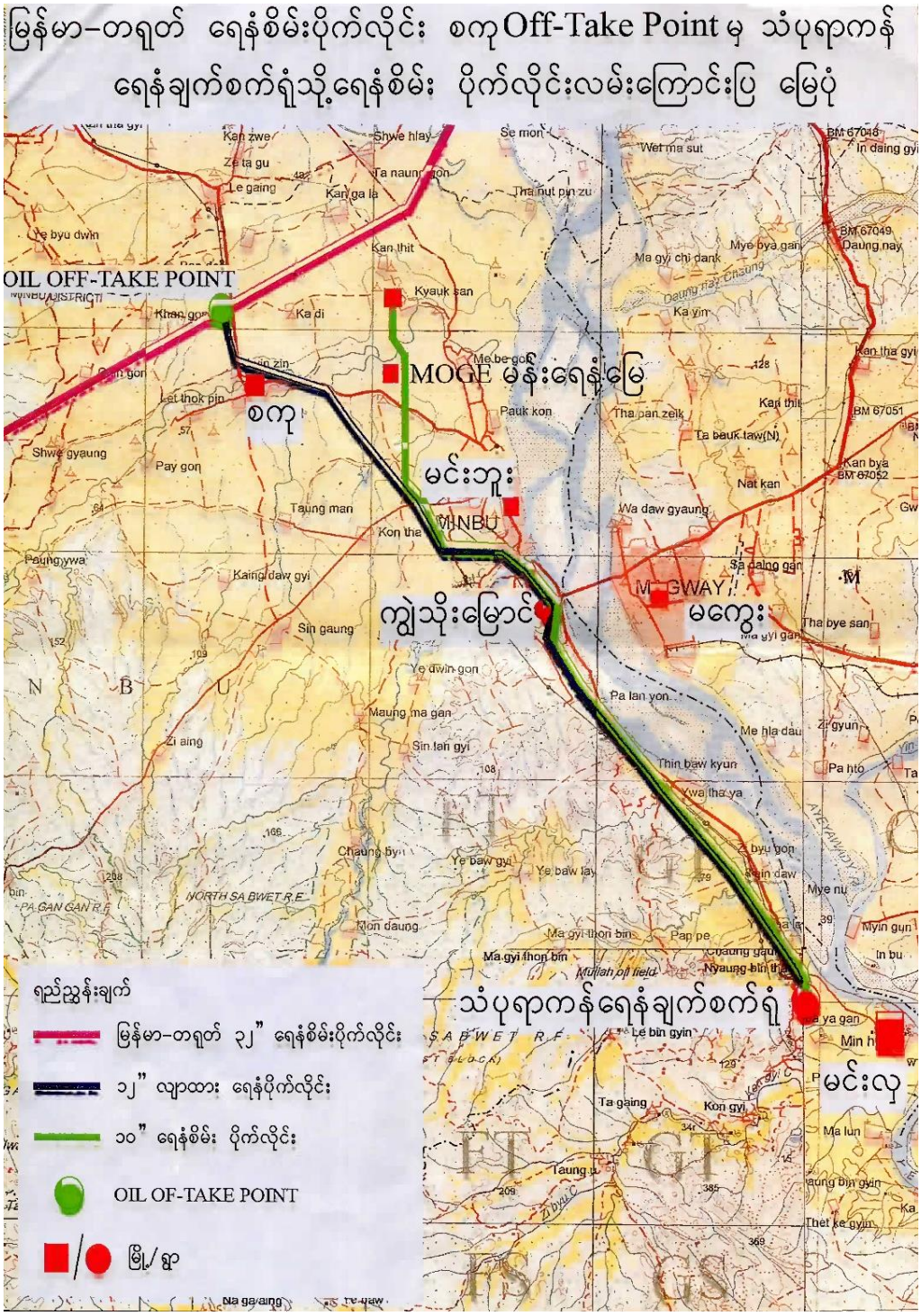


Figure 477: Map of project area

5.3.1 Observation

MSR's study team visited the proposed project surrounding area, (existing refinery, Than Payar Kan, Pan Taw Pyin, Mezi Taw, U Yin, Chaung Kauk and Nyaung Pin Tha villages) on 23 - 26 January 2015. Second time on 25 - 26 January 2015 and 20 - 25 February 2015 survey teams conducted field survey along the existing pipelines and villages.

The study teams conducted a study of the areas earmarked for the development. The study team covered the situations and conditions related to human settlements of the urban area, nature of residents, their households and livelihoods, cultural and social aspects, among others. They are mentioned in detail below:

- Demographic conditions (population and migration of population, households, languages spoken, races, religion)
- Local economy such as employment and livelihoods etc.
- Land use (housing, trade Centre/market, agriculture, etc.)
- Agricultural practices including the use of traditional knowledge and the application of modern technology
- Water use (drinking water, household water, agriculture, etc.)
- Use and availability of essential services - electricity, water supply, sewage system etc.
- Social services – educational, medical/health, public facilities, religious festivals/buildings etc.
- Historical and archaeological artefacts and sites
- Working environment/conditions, welfare of workers' safety and health

5.3.2 Survey methods

1. **Village profiles:** – Survey team collected village profile of Thanpuyarkan, Malzaletaw, Pantawpyin, Nyaungpinthar and Ywartaw village. Although, seven villages are located within the 3 KM radius of refinery, farmers from Chaungkauk and Uyin villages are not cultivating within the refinery compound. These two villages have no farm land taken by MPE.
2. **Household interviews:** - 37 farmers from five villages will lost their farm land if new refinery going to establish. Survey team conducted interviews with all 37 farmer households of nearby villages and collected socio-economic data.
3. **KIIs – Key Informant In-depth Interviews:** The survey team met key persons—community leaders, community elders, health-care officials, school heads or teachers—to obtain information about the economic and social welfare situations of the people living in the surrounding community.

Data Collection for Village Profiles, Household Interiews, KII Interviews and FGD



5.3.3 Community Profile

THE SURROUNDING TOWNS AND VILLAGES

Location of Surrounding Villages of New Refinery

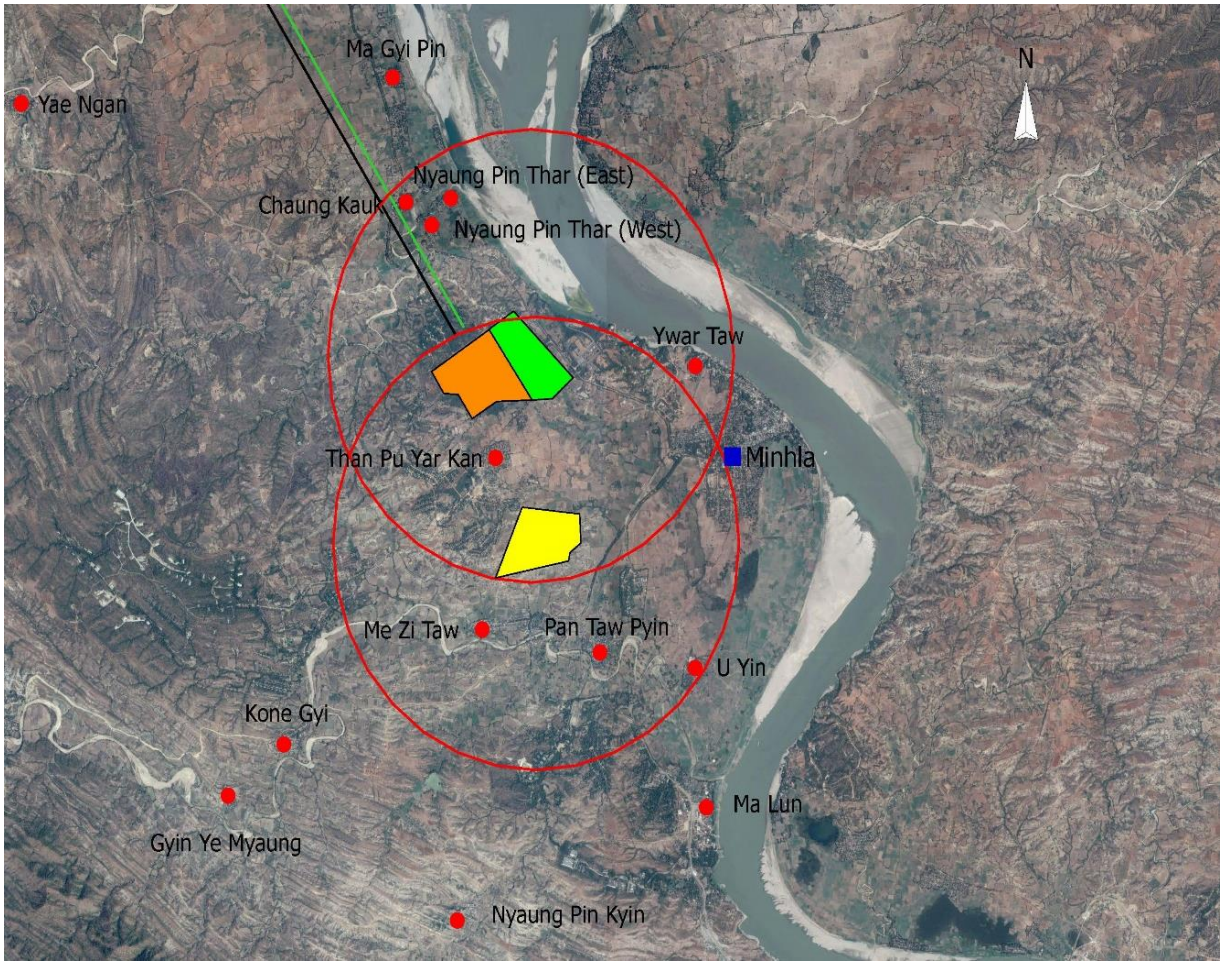


Figure 488: Location map of surrounding villages of New refinery project

5.3.3.1 Village profiles (Direct and Indirect Impact by New Oil Refinery)

MSR team visited the refinery project area in January, 2015. Discussions with responsible persons from MPE and Magway Regional authorities, enlightened team members the situations of the project. The project area is from Sagu off-take point to Thanpuyarkan petrolchemical complex. We define the impact areas as direct impact area and indirect impact area. Direct impact area is defined the villages located three-kilometer radius of planned refinery project site. Seven villages are located in this area. These villages are Thanpuyarkan village, Mezitaw village, Pantawpyin village, Uyin village, Nyaungpinthar village, Ywartaw village and Chaungkauk village. These villages are defined direct impact area, because the positive and negative impacts can be effect on them. Because of new refinery project villagers

can get job opportunities, health and education facility, transportation facility and socio-economic development. At the same time, villagers can face land deprivation, deforestation, air and water pollutions and industrial accidents.

This new refinery project is a plan to establish a new refinery in Thanpuyarkan refinery compound. Thanpuyarkan refinery was established since 1982. Before that this area is mostly the farming area.

Indirect impact area is defined the villages along the corridor as small strips of land on either side of the pipe line from off take point to refinery site. The SIA team got a map showing clearly demarcated area that will be affected by the project (both directly and indirectly). In this classification, many questions need to solve. Pipeline route is from Sagu off take point to Minbu through Thanpuyarkan refinery. Pipe line from Minbu to Thanpuyarkan refinery has already established. According to the rules and regulations 2 kilo meters of land on either side of the oil pipe line is curfew area. Nobody was allowed to live or cultivate in this area. The ownership of land is the government. After 30 years of implementation of oil pipe line, houses were built even on the oil pipeline area depend on area of village extensions. From Sagu take off point to Minbu, oil pipe line will pass seven villages along the distance of 40870 feets. These villages are Thanaungtaw village, Tawbokon village, Darmanaing village, Uyinzin village, Sakar village, Kyepin (East) village and Kanye (1) village. The land along the oil pipe line require to dug appropriate depth to lay down the pipe line will need compensations for the land owner farmers. The survey team collected relevant information and made suggestions in the next chapter.

In addition, visited to seven villages and discussed with villagers, stakeholders to have a better understanding of the geographic limits of the area and the people living there.

Survey team visited seven villages located in direct impact area. As mentioned above, villages are located three kilo meter radius of the refinery. Thanpuyarkan village is the closet to the refinery. Pantawpyin village is the biggest village with 297 houses and total 430 acres of farm land.

5.3.3.2 Basic Characteristics of the village located in the Impact Area

Village Name	No. of House	Village area (acre)	Farm area (acre)
Nyaungpinthar	290	20	301
Malzalitaw	227	20	360
Pantawpyin	297	25	430
Thanpayarkan	200	16	360
Uyin	190	15	250
Chaung kauk	140	35	300
Ywar Taw	170	13	108

Survey team questioned about the decision-making process of the villages and they replied that village administrative committees sometime discussed with the villagers for decision making process except Nyaungpinthar village.

Decision making process of village leader

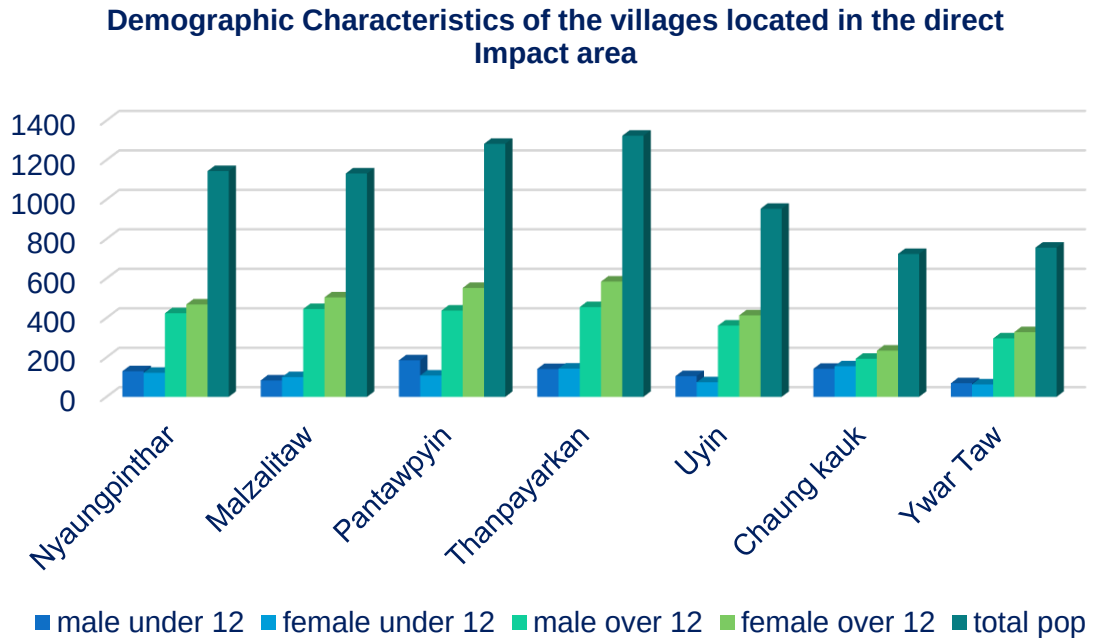
Village Name	Meeting with people
Nyaungpinthar	Regular
Malzalitaw	Some time
Pantawpyin	Some time
Thanpayarkan	Some time
Uyin	Some time
Chaung kauk	Some time
Ywar Taw	Some time

Among seven villages Thanpuyarkan village is the most populous village with total population of 1323. Pantawpyin village is the second populous village with total population of 1282. Demographic characteristics of the villages located in the direct impact area is mentioned in table (3).

Demographic Characteristics of the villages located in the direct Impact area

Village Name	Nyaungpinthar	Malzalitaw	Pantawpyin	Thanpayarkan	Uyin	Chaung kauk	Ywar Taw
Male under 12	130	83	185	141	105	142	69
Female under 12	122	100	108	143	74	155	63
Under 12 pop	252	183	293	284	179	297	132
Male over 12	424	445	437	455	361	193	296
Female over 12	468	504	552	584	413	234	328
Over 12 pop	892	949	989	1039	774	427	624
Male	554	528	622	596	466	334	365
Female	590	604	660	727	487	390	391
Total pop	1144	1132	1282	1323	953	724	756

5.3.3.3 Demographic characteristics of surrounding villages



Another demographic characteristics of the population is birth and death rates. Second populous village, Pantawpyin has the highest total number of birth with 35 people and highest total number of death with 25 people. Malzalitaw also has second highest total number of death with 17 people. Chaung Kauk village has the least total number of death. Interesting finding is that 3 villages very close to refinery, Thanpuyarka village, Pantawpyin village and Malzalitaw village have highest total number of death with 12, 25, 17peoples. Chaung Kauk village, the most far away from the refinery has the lowest total number of death with one person only in Table (4).

Birth and Death of the villages located in the Impact area

Village Name	Nyaung pinthar	Malzalitaw	Pantawpyin	Thanpayarkan	Uyin	Chaung kauk	Ywar Taw
Total pop	1144	1132	1282	1323	953	724	756
Birth (last year)	13	30	35	22	25	20	4
Mortality (last year)	10	17	25	12	10	1	6

Survey team checked with sample air polution results and the results of respiratory particular matter (PM10) from sample sites are 87.74 ugm/m3 in Nyaungpinthar primary school (AQ1), 66.9 ugm/m3 in near Gate 2 of Thanpuyarkan refinery industry (AQ2), 107.29 ugm/m3 in Basic Education State High School of Minhla Township (AQ3) and 96.57 ugm/m3 in Malon Zayut Kon respectively. (WHO guide line values -50 ugm/m3)

All the villages located in the direct impact area earned their main source of incomes are from farming. Because of deforestation and bad weather, socio-economic conditions of the villages are poorer than before. Within thirty years, the villages located in the direct impact area, except Chaung Kauk village deprive their farm lands because of refinery project and three other defence industry projects. Negative impacts to the villages are decrease in sown acre and increase in labour force. Positive impacts in these years are better transportations, better access to health facility, security and education. Malzalitaw village, Pantawpyin village and Uyin village have rural health centre and all the villages have primary school. For the middle school level and high school level students they have to attend state high school located at refinery or state high school located at Minhla. Students who attend the classes are shown with respective village in the following table:

Number of students by grade and by village

		KG	G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	Total
Nyaungpinthar	M	11	13	13	10	11	1	5	8	1	1	1	**75**
	F	16	9	9	8	12	8	1	5	3	1	5	**77**
Malzalitaw	M	10	14	8	7	9	10	8	10	8	10	9	**103**
	F	10	10	6	5	10	10	9	11	7	10	8	**96**
Pantawpyin	M	11	14	9	13	13	14	10	7	8	13	9	**121**
	F	8	10	13	8	6	14	14	11	10	6	13	**113**
Thanpayarkan	M	16	16	17	10	8	10	9	8	4	8	3	**109**
	F	25	13	8	14	9	11	12	10	5	12	9	**128**
Uyin	M	7	13	11	12	8	11	8	12	7	11	8	**108**
	F	4	8	6	8	10	10	10	8	9	8	7	**88**
Chaungkauk	M	14	10	8	12	6	6	5	7	4	1	2	**75**
	F	7	14	7	10	7	9	6	7	7	0	3	**77**
Ywar Taw	M	4	5	10	6	9	4	6	5	2	6	2	**59**
	F	12	10	4	6	5	7	7	4	7	5	3	**70**

Inventory of Losses to Households: This analysis contains full information on losses to both assets immovable as well immovable. These include land, houses, other structures, income and livelihood, and social networks.

5.3.4 Household survey

Survey team found out that out of seven villages Chaung Kauk and Uyin villagers have no farm land in the refinery compound. Farmers, the deprivable farmers from five villages were studied. Deprivable farmers by village is mentioned in below table.

No. of Households by village

Village	No of Farmer
Nyaungpinthar	5
Malzalitaw	5
Pantawpyin	7
Thanpuyarkan	13
Ywar Taw	7
Total	**37**

Name of the farmer and their information of 37 farmer by village is mentioned in below table.

Deprivable farmers by village

Village	Name	H-size	male	Farm	Deprivable acre
Thanpuyarkan	U Hla Thaung	9	4	1	1
Thanpuyarkan	Daw Hla Tin	5	3	10	8
Thanpuyarkan	U Tin Myint	4	3	22	22
Thanpuyarkan	U Thar Saung	5	3	15	15
Thanpuyarkan	U Ngwe Soe	4	4	30	25
Thanpuyarkan	U San Htay	7	4	20	20
Thanpuyarkan	U Thaung Hlaing	10	4	7	7
Thanpuyarkan	U Aye	4	4	8	8
Thanpuyarkan	U San Myint	5	4	17	10
Thanpuyarkan	U Khin Maung	4	4	8	4
Thanpuyarkan	Daw Tin Kyi	3	4	2	2
Thanpuyarkan	U Aung Kyaing	7	5	8	8
Thanpuyarkan	U Thar Noe	3	4	10	10
Malzalitaw	U Phoe Thaung	4	3	12	3.5
Malzalitaw	U Myint Thein	2	4	5	5
Malzalitaw	U Tin Myint	6	4	24.5	19.5
Malzalitaw	U Than Aung	4	4	16	10
Malzalitaw	U Mya Maung	3	4	5	5
Pantawpyin	U Hla Thein	4	3	7	7
Pantawpyin	U Kyaw Aye	4	4	7	7
Pantawpyin	U Myint Thein	6	3	12.5	3.6
Pantawpyin	U Aung Than	5	4	4	4
Pantawpyin	U Than Hlaing	3	4	3	3
Pantawpyin	U Phoe Thein+Daw San	4	3	6	6
Pantawpyin	U Maung Win	4	4	3	3
Ywartaw	Daw Khin San	6	3	4	4
Ywartaw	Daw Khin Myint	7	3	3.5	2.5
Ywartaw	Daw Than Myint	7	4	8	5
Ywartaw	U Win Shwe	7	5	7	4
Ywartaw	U Mya Thaung	5	4	10	4
Ywartaw	U Aye Hlaing	8	5	8	1.5
Ywartaw	U Than Aung	9	4	26	20
Nyaungpinthar	U Kyaw Hla	5	4	14	14

Nyaungpinthar	U Win Myint	5	4	11	11
Nyaungpinthar	U Moe	5	4	15	15
Nyaungpinthar	U Pauk Sa	3	5	11	11
Nyaungpinthar	U Tin Shein	5	5	19	15

According to the survey data, from five villages, 37 households, total of 191 household member will deprive total farm acre of 323.6 acres. Twenty-one households will become landless.

Housing condition for the deprivable farmers are mentioned in below table. More than 62% of farmers possess house made by wood and bamboo. One household from Thanpuyarkan village possess a truck.

Housing conditions of deprivable farmers by village

		House type			Total
		semiparker	wood and bamboo	bamboo	
Village	Nyaungpinthar	0	3	2	5
	Malzalitaw	1	4	0	5
	Pantawpyin	3	4	0	7
	Thanpuyarkan	3	9	1	13
	Ywar Taw	2	3	2	7
Total		**9**	**23**	**5**	**37**

According to socio-economic condition compare with last year is mentioned ta Table (9).

Socio-economic conditions of households compare to last year

		Economy			Total
		normal	bad	good	
Village	Nyaungpinthar	1	4	0	5
	Malzalitaw	2	2	1	5
	Pantawpyin	1	4	2	7
	Thanpuyarkan	4	9	0	13
	Ywar Taw	2	4	1	7
Total		**10**	**23**	**4**	**37**

According to the data, 62% (23 out of 37) of households said that their economy is bad compare to last year. Reasons for their socio-economic conditions compare to last year is mentioned in below table.

The changes for socio-economic conditions of household

		Reason					Total
		weather	poor yield	other	rich yield	low price	
Village	Nyaungpinthar	2	0	0	0	3	5
	Malzalitaw	2	0	0	1	2	5
	Pantawpyin	2	2	0	0	3	7
	Thanpuyarkan	8	2	1	2	0	13
	Ywar Taw	3	1	0	2	1	7
Total		**17**	**5**	**1**	**5**	**9**	**37**

Because of bad weather, farm outputs are poor and the prices for their outputs are lower than previous years. Socio-economic condition and reason by village is mentioned in below table.

Socio-economic condition and reason by village

Village			Reason					Total
			weather	poor yield	other	rich yield	low price	
Nyaungpinthar	Economy	normal	0				1	1
		bad	2				2	4
	Total		2				3	5
Malzalitaw	Economy	normal	1			1	0	2
		bad	1			0	1	2
		good	0			0	1	1
	Total		2			1	2	5
Pantawpyin	Economy	normal	0	1			0	1
		bad	2	1			1	4
		good	0	0			2	2
	Total		2	2			3	7
Thanpuyarkan	Economy	normal	0	1	1	2		4
		bad	8	1	0	0		9
	Total		8	2	1	2		13
Ywar Taw	Economy	normal	1	0		1	0	2
		bad	2	1		0	1	4
		good	0	0		1	0	1
	Total		3	1		2	1	7
Total	Economy	normal	2	2	1	4	1	10
		bad	15	3	0	0	5	23
		good	0	0	0	1	3	4
Total			**17**	**5**	**1**	**5**	**9**	**37**

In this area, small private oil fields were operating. Job opportunities at small private oil fields are income sources for the nearby villages. Below table shows their employment status at small private oil field.

Employment status at small private oil field by the farmers

Village			oil_drill		Total
			posses	non	
Nyaungpinthar	Economy	normal		1	1
		bad		4	4
	Total			5	5
Malzalitaw	Economy	normal	1	1	2
		bad	0	2	2
		good	0	1	1
	Total		1	4	5
Pantawpyin	Economy	normal		1	1
		bad		4	4
		good		2	2
	Total			7	7
Thanpuyarkan	Economy	normal		4	4
		bad		9	9
	Total			13	13
Ywar Taw	Economy	normal	0	2	2
		bad	1	3	4
		good	0	1	1
	Total		1	6	7
Total	Economy	normal	1	9	10
		bad	1	22	23
		good	0	4	4
	Total		**2**	**35**	**37**

Only two households worked at the small private oil field foe side income. Because of bad socio-economic condition, households were in debts. This condition is shown at following table.

Socio-economic conditions and condition of debts by village

Village			debts		Total
			debts	non	
Nyaungpinthar	Economy	normal	1		1
		bad	4		4
	Total		5		5
Malzalitaw	Economy	normal	2		2
		bad	2		2
		good	1		1
	Total		5		5
Pantawpyin	Economy	normal	0	1	1
		bad	3	1	4
		good	2	0	2
	Total		5	2	7
Thanpuyarkan	Economy	normal	4	0	4
		bad	8	1	9
	Total		12	1	13
Ywar Taw	Economy	normal	2		2
		bad	4		4
		good	1		1
	Total		7		7
Total	Economy	normal	9	1	10
		bad	21	2	23
		good	4	0	4
	Total		**34**	**3**	**37**

Out of 37 households, only 34 households are in debts. Sources of borrow money were shown at below table by villages.

Sources of borrow money and sources by village

Village			borrow source1			Total
			government	cooperative	private	
Nyaungpinthar	debts	debts		3	2	5
	Total			3	2	5
Malzalitaw	debts	debts	5			5
	Total		5			5
Pantawpyin	debts	debts	1	2	2	5
		non	0	0	2	2
	Total		1	2	4	7
Thanpuyarkan	debts	debts	2	2	8	12
		non	0	0	1	1
	Total		2	2	9	13
Ywar Taw	debts	debts	4		3	7
	Total		4		3	7
Total	debts	debts	12	7	15	34
		non	0	0	3	3
	Total		**12**	**7**	**18**	**37**

Nearly 50% of households borrowed from privates.

Village			Borrow source2			Total
			government	cooperative	private	
Nyaungpinthar	debts	debts		2	3	5
	Total			2	3	5
Malzalitaw	debts	debts		2	3	5
	Total			2	3	5
Pantawpyin	debts	debts		1	4	5
		non		0	2	2
	Total			1	6	7
Thanpuyarkan	debts	debts			12	12
		non			1	1
	Total				13	13
Ywar Taw	debts	debts	2	4	1	7
	Total		2	4	1	7
Total	debts	debts	2	9	23	34
		non	0	0	3	3
	Total		2	9	26	37

Survey team asked for their opinion for the new refinery project and their opinions were mentioned at below table.

Opinions of households by village

		Refinery_project			Total
		Accept	Reject	Don't know	
Village	Nyaungpinthar	4	0	1	5
	Malzalitaw	0	2	3	5
	Pantawpyin	5	2	0	7
	Thanpuyarkan	3	6	4	13
	Ywar Taw	5	2	0	7
Total		**17**	**12**	**8**	**37**

Nearly 50% accept new refinery project for the development of their region.

Their opinion and the reasons for their opinion are shown at below table.

Households opinions and reasons by village

Village			Refinery project			Total
			Accept	Reject	Don't know	
Nyaungpinthar	idea	dont know	1		1	2
		NA	3		0	3
	Total		4		1	5
Malzalitaw	idea	afraid to loose my land		0	1	1
		afraid to disaster		2	0	2
		dont know		0	1	1
		NA		0	1	1
	Total			2	3	5
Pantawpyin	idea	afraid to loose my land	0	1		1
		dont know	1	0		1
		NA	4	1		5
	Total		5	2		7
Thanpuyarkan	idea	afraid to loose my land	0	2	1	3
		afraid to disaster	0	2	0	2

		dont know	2	1	1	4
		NA	1	1	2	4
	Total		3	6	4	13
Ywar Taw	idea	afraid to loose my land	0	1		1
		afraid to disaster	0	1		1
		dont know	1	0		1
		NA	4	0		4
	Total		5	2		7
Total	idea	afraid to loose my land	0	4	2	6
		afraid to disaster	0	5	0	5
		dont know	5	1	3	9
		NA	12	2	3	17
	Total		**17**	**12**	**8**	**37**

Population

Seven villages located three-kilometer radius of planned refinery project site are Thanpuyarkan village, Malzalitaw village, Pantawpyin village, Uyin village, Nyaungpinthar village, Ywartaw village and Chaungkauk village. Number of people in each village are shown in the following table.

Name of the village	Total	Male	Female
Thanpuyarkan	1282	596	727
Malzalitaw	1132	526	604
Pantawpyin	1323	596	727
Uyin	953	466	487
Ywar Taw	756	365	391
Chaung Kauk	724	334	390
Nyaungpin Thar	1144	554	590

Livelihood

Agriculture is the major economic activity. People in those 7 villages located near refinery project are mostly farmers. The principle crops they grow are varieties of beans, groundnuts, pigeon peas, chickpeas, green gram, oilseed crops, corn maze plants, and cotton. Cultivating land (in acre) of each village are listed as follow.

Name of the village	Total cultivating acres
Thanpuyarkan	360
Malzalitaw	360
Pantawpyin	430
Uyin	250
Ywar Taw	108
Chaung Kauk	300
Nyaungpin Thar	301.8

Major livestock residents kept include cows, goats, pigs, and chickens. Other livelihood activities include trade, especially in agricultural product and oil finished products, small scale shops, grocery shops. Some residents work as peasants, seasonal workers and some are doing carpentry work, masonry work and odd jobs.

Social infrastructure

Access to Electricity

All the households of Pantawpyin, Chaung Kauk, Thanpayrkan villages are receiving electricity however some of the households of Malzalitaw, Uyin, Nyaungpinthar are not receiving and using candles.

Access to Health care

Access to health service is poor because there are no health care facilities in those villages. Residents go to Min Hla hospital if they have health problems to seek medical and surgical treatment.

Education facilities

There are only one primary school in each villages and have no middle schools (secondary school).

Transport

Residents use motorcycles, taxi motorcycle (carry motorbike) and three wheel cars for transport.

Community group

There are volunteer charity group in the villages to help sick and poor people to get medical treatment in hospital. They also support poor students to continue studying higher education in cities.

Women's affair organization, Mother and child welfare organization and library committee are there in the village for social activities.

Monastery and pagoda

Every village have at least one monastery and monks for worship of Buddhist believe. Two pagodas are there in Pandawpyin village.

Political parties

The most popular political parties are National League for Democracy (NLD), Union solidarity and Development Party (USDP).

5.3.4.1 Village profiles (Direct and Indirect Impact by Pipeline Alignment)

Survey team visited to Hta Naung village where its farmlands are being passed through by previous Myanmar-China Oil & Gas Pipeline. An Off-take point of proposed oil pipe line to Thanpuyarkan petrolchemical complex is near to this village.

Survey team met stakeholders from Hta Naung village and explained about the project. People from Hta Naung village have no objection to new refinery project.

Next, survey team visited the villages namely U Yin Zin village, Dar Ma Naing village, Kyaung village, Kywe Tae village, Yay Poat village, Kywe Thou Myaung village, Shwe Ta Pin Myo Thit, Kyauk Tan Village, Kan Yay Village, Ywa Ma Kan Village and Kyee Pin Kan Village which are on proposed pipeline ROW. Survey team met stakeholders and key informants from the respective villages and explained about the project. Their perception on the Project was documented. Information of those villages are summarized as below.

Population and household

Village	Total	Male	Female	Number of houses	Number of household
U Yin Zin	969	488	481	230	230
Dar Ma Naing	652	316	336	123	133
Kyaung Village	3242	1132	2110	450	500
Kywe Tae	1600	Data not available		380	406
Yay Poat	1731	720	1001	410	410
Kywe Thou Myaung	928	Data not available		210	225
Shwe Ta Pin Myo Thit	300	Data not available		150	180
Kan Yay	527	Data not available		447	500
Ywa Ma Kan	614	304	310	140	144
Kyee Pin Kan	2018	915	1103	512	512
Kyauk Tan	2507	1208	1229	480	500

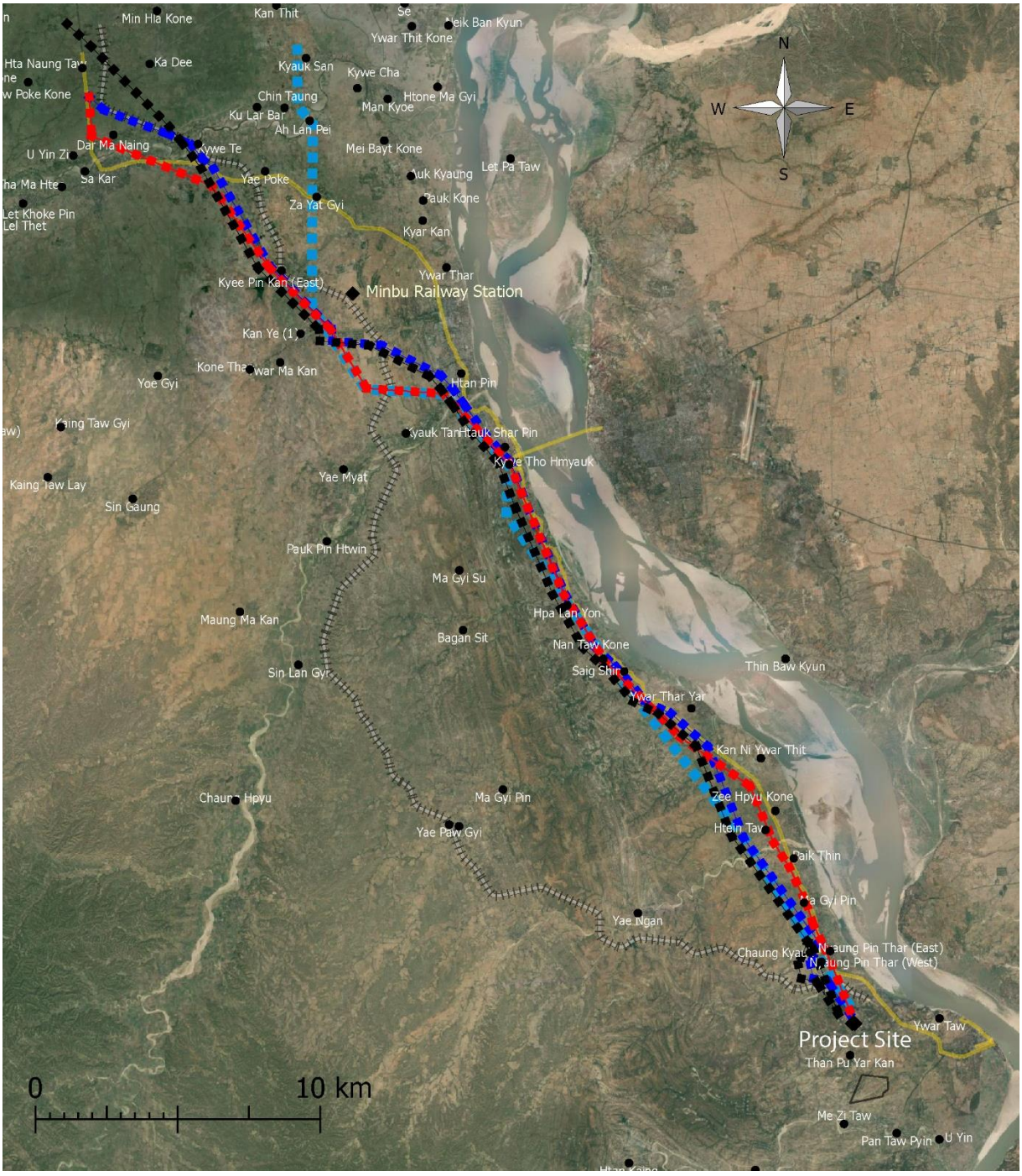


Figure 49: Location map of villages on proposed pipeline ROW

Livelihood

Most of the residents are farmers, fruits farmers, livestock farmers and seasonal workers. The most common crops are rice, varieties of beans such as black matpe, green mung, kidney beans, pulses, sesame plants, maize and vegetables. Farmers from U Yin Zin village mainly grow rice and their total cultivate acres is 2300. There are 900 cultivation acres in Yay Poat village and some fields in Yay Poat village and Dar Ma Naing village cultivate three crops a year. The land where access to water can be grown onion. Farmers in Kywe Thou Myaung village have orchards where mango trees, custard apple trees, and papaya are mainly grown.

Rearing animals including cattle, goats, sheep, poultry, and pigs is an important economic activity for many households. The largest number of livestock was noticed in Yay Poat village, Kan Yay village and Kyauk Tan village however, other villages are raising animal

for small-scale. As for residents in Shwe Ta Pin Myo Thit, most of them are retired government employees. There are three rice mills in U Yin Zin village.

Village	Total cultivating acre	Livestock
U Yin Zin	2300	200 cattle, 120 goats
Dar Ma Naing	70	
Kywe Tae	550	
Yay Poat	900	800 cattle, 300 sheep, 200 goats
Kan Yay		1000 cattle, 300 goats
Kyauk Tan		2000 sheep, 1000 goats

Social infrastructure

Access to electricity

All the villages are receiving electricity however, Dar Ma Naing village has not receiving electricity yet and residents are using solar power.

Education facilities

One primary school are present in U Yin Zin village, Dar Ma Naing village, Kyaung village, Kyauk Tan village, and Ywa Ma Kan village while Kyee Pin Kan village has 2 primary schools. Kywe Tae village, Yay Poat village, and Kan Yay village have middle schools. Kywe Thou Myaung village, and Shwe Ta Pin Myo Thit village have no schools open yet.

Health care facilities

There is one rural health care center each in Kywe Tae village and Yay Poat village however health care center is not available in other villages. Only midwife is taking care by home visit in U Yin Zin village and in Da Ma Naing village.

Water supply

All villages are getting water from tube wells.

Communication

All the villages have mobile telephone network however not everyone own mobile phone. About two third of the households have television in their houses.

Transportation

Villagers use bullock carts, tractor trailers, motor cycles, cars, three wheels cars, trucks and buses.

Data on possession of tube well, vehicles, mobile phone and television in villages (data is given by key informants)

Village	Water supply No. of tube well	Vehicles for transport	Number of household with TV and hand phone
U Yin Zin	200	Data not available	Every house
Dar Ma Naing	600	Data not available	
Kyaung Village	400	400 motor cycles, 30 tractor trailers, 10 cars, 50 carts	400 TVs, 600 mobile phones
Kywe Tae	200	200 motor cycles, 5 tractor trailers, 5 cars, 4 trucks, 60 carts	200 TVs, 300 mobile phones
Yay Poat	200	400 motor cycles,	

		1 bus 1 truck 3 – 3wheels cars	360 TVs, 400 mobile phones
Kywe Thou Myaung	100	150 motor cycles, 3 tractor trailers, 3 - 3wheel cars, 3 trucks, 60 carts	150 TVs, 200 mobile phones
Kan Yay	200	400 motor cycle, 400 cart 4 trucks, 35 – 3wheel cars	300 TVs, 500 mobile phones
Ywa Ma Kan	4	80 motor cycles, 1 car 1 - 3wheel car 1 light truck 80 motor cycle 140	40 TVs 150 mobile phone
Kyee Pin Kan	Every house	313 motor cycle 4 cars 3 -3wheel car, 1 tractor trailer, 170 carts	Every house
Kyauk Tan	Every house	350 motor cycles, 8 cars	Every house

Monastery Religion

Every village have at least one Buddhist monastery. There are two monasteries in Kywe Tae village, Yay Poat village, Kyee Pin Kan village and Kyauk Tan village.

Summary of villages along the pipeline from Minbu to Refinery Site

There are 11 villages between Minbu and Thanpu yarkan along the pipeline namely Ywa Thit, Ywa Tharyar, Phala Yone, Pite Thinn, Nyaung pin Thar, Nan Taw Kone, Ma Kyee Pin, Kann Ni, Htein Taw, Chaung Kouk . Socioeconomic information is derived from key informant interviews

Population

Basic information regarding population and household are summarized in the following table.

Village	Total	Male	Female	House	Household
Ywar Thit	435	192	243	93	97
Ywar Thar Yar	3147	1522	1625	684	690
Pha La Yone	1408	693	715	297	313
Pite Thinn	578	266	312	119	124
Nyaung Pin Thar	1158	Not available	290	290	
Nan Taw Kone	2313	1145	1168	450	502
Ma Kyee Pin	525	244	281	110	118
Kone tan	323	139	184	69	74
Kann Ni	765	365	400	175	160
Htein Taw	825	344	481	170	173
Chaung Kauk	732	338	394	168	168

Livelihood

Most of the villagers in 11 villages are farmers. Rice cultivation is only in Ywa Thar Yar village while farmers of other villages grow green beans, lab bean, pigeon pea, chick pea, ground nut, onion, and cotton and sesame plants widespread on the outskirts of the villages. Farmers owns livestock (chickens, goats, cows, and sheep) for production and consumption. Cultivated land holding size and cattle in each villages are listed in the table. People from Ywa Thar Yar village have business of making earth pots.

Village	Total cultivated land acre	livestock
Ywar Thit	900	129 cows, 84 goats, 334 sheep
Ywar Thar Yar	Paddy field 30 acre, other farms 2000, basin farm 14 acre	250 cows, 20 pigs, 450 goats
Pha La Yone	130	891 cows, 60 pigs, 300 goats
Pite Thinn	750	120 cows, 10 pigs, 360 goats
Nyaung Pin Thar	650	320 cows, 10 pigs, 250 goats
Nan Taw Kone	1979	300 cows, 50 pigs, 150 goats
Ma Kyee Pin	500	180 cows, 30 pigs, 105 goats, 150 sheep
Kone tan	250	94 cows, 25 pigs, 200 goats
Kann Ni	300	305 cows, 20 pigs, 270 goats
Htein Taw	1180	660 cows, 10 pigs, 260 goats, 15 sheep
Chaung Kauk	300	160 cows, 100 pigs, 500 goats

Social infrastructure

Access to Electricity

Most of the villages are having electricity. Nan Taw Kone village and Kone Tan village are using private grid and self-help. Kan Ni village is getting electricity only from 6:00 pm to 9:00 pm. Residents from Pite Thinn village reported that they receive electricity from village monastery. In Htein Taw village only 25 houses afforded to get electricity.

Education facilities

There are schools in the villages except Ywa Thit village Kone Tan village those are small villages with population less than 450. Children from those two villages go to Ma Kyee Pin village school. Number of schools, students and teachers are listed in the table.

Village	No. of schools; No. of teachers; No. of students
Ywa Thit	No education facilities
Ywa Thar Yar	1 high school, 25 teachers
Pha La Yone	1 Primary school, 11 teachers, 300> pupils
Pite Thin	1 Primary school, 5 teachers, 52 pupils
Nyaung pin Thar	1 primary school, 6 teachers, 111 students
Nan Taw Kone	1 primary school extension, 11 teachers, 300 students
Ma Kyee Pin	1 Middle School, 5 teachers, 185 students
Kone Dan	No education facilities
Kan Ni	1 primary school, 1 nursery , 6 teachers, 85 students
Htein taw	1 middle school, 5 teachers, 219 students
Chaung Kauk	1 primary school, 1 nursery, 3 teachers, 95 students

Health care facilities

Rural health care center are only in Ma Kyee Pin village, Pha La Kone village where medical assistants and midwife are taking health care of not only their respective villagers but also for the people from nearby villages. A hospital is in Ywa Thar Yar where one doctor is giving health care service for community.

Water supply

Water source is mostly from tube wells which is sufficient for residents, Number of tube wells in the villages are listed in the table. In Nyaung Pin Thar, Nan Taw Kone and Ma Kyee Pin village there are water supply from Municipal.

Communication

All the villages have mobile telephone network however not everyone own mobile phone. About two third of the households have television in their houses.

Transportation

Residents use moto cycles, bullock carts and tractor trailers for transport.

Data on possession of tube well, vehicles, mobile phone and television in villages (data is given by key informants)

Village	Water supply No. of tube wells	Vehicle for transport	Number of household with TV and hand phone
Ywa Thit	200 Tube well	62 motor cycles 1 car, 30 carts	30TVs 40 mobile phones
Ywa Thar Yar	60 tube well	102 motor cycles, 6 - 3wheel cars, 9 cars 2 tractor trailers	143 TVs 360 mobile phones
Pha La Yone	20 tube wells	290 Motor cycles, 1 tractor trailers, 4 cars, 50 carts	400 TVs 600 mobile phones
Pite Thin	200 tube wells	200 motor cycles 5 cars 4 trucks 5 tractor trailer 60 carts	88 TVs 150 phones
Nyaung Pin Thar	pipe water 80 tube wells	230 motor cycles, 2 cars, 5 – 3wheels cars 100 carts	120 TVs 300 mobile phones
Nan Taw Kone	37 tube well 1 municipal	150 motor cycles 2 cars, 2 - 3wheels, 78 carts	225 TVs 400 mobile phones
Ma Kyee Pin	pipe water 33 private	70 moto cycles, 1 tract trailer, 60 carts	75 TVs 75 mobile phone
Kone Dan	Tube well	50 motor cycles, 2 cars 15 carts	25 TVs 35 mobile phones
Kan Ni	Tube well	Data not available	100 TVs 100 mobile phones
Htein Taw	Tube well	52 motor cycles 1 car 4 - 3wheel cars 1 tractor trailers 120 carts	34 TVs 170 mobile phones
Chaung Kauk	Tube well	100 motor cycles, 1 - 3 wheel cars 4 cars, 30 carts	100 TVs 100mobile phones

Monastery

Every village have at least one Buddhist monastery. There are two monasteries in Kan Ni and Htein Taw village and 9 monasteries in the most populated village Ywa Thar Yar.

5.3.5 Stakeholder Analysis

5.3.5.1 Process

Stakeholder analysis is a process of systematically gathering and analyzing qualitative information to determine whose interests should be taken into account when developing and/or implementing a new refinery project. The follwings are the definitions of stakeholders consultations defined by the survey team.

Who is a stakeholder? Actors (persons or organizations) who have a vested interest in the new refinery project that is being promoted are considered stakeholders in the process. These stakeholders or "interested parties" in the new refinery project can usually be grouped into the following categories: public, political, commercial/private, nongovernmental organization (NGO)/civil society, labor, and users/ consumers.

Which stakeholder characteristics are analyzed? Characteristics such as knowledge of the new refinery project, interests related to the new refinery project, position for or against the new refinery project, potential alliances with other stakeholders, and ability to affect the new refinery project process (through their power and leadership) are analyzed.

Why is this analysis useful? Knowing who the key actors are, their knowledge, interests, positions, alliances, and importance related to the new refinery project allows policy makers and managers to interact more effectively with key stakeholders and increase support for the new refinery project. By carrying out this analysis *before* implementing a new refinery project, policy makers and managers can detect and act to prevent potential misunderstandings and/ or opposition to the implementation of the new refinery project. A new refinery project will more likely succeed if a stakeholder analysis, along with other key tools, is used to guide its implementation.
The following are the major steps in the process survey team have done:

- Planning the process
- Identifying key stakeholders
- Adapting the tools Collecting and recording the information
- Filling in the stakeholder table
- Analyzing the stakeholder table
- Using the information

The subsequent sections describe each of these steps in terms of suggested actions and tools to be used to conduct stakeholder analysis around a new refinery project. Stakeholder analysis yields useful and accurate information on new refinery project. This information can be used to provide input into other analyses; to develop action plans to increase support for new refinery project; or to guide a participatory, consensus-building process.

To increase support or build consensus for new refinery project, policy makers and managers must take additional steps following the stakeholder analysis. They should use the information generated by the stakeholder analysis to develop and implement strategic communication, advocacy, and negotiation plans or to hold consensus-building workshops.

The amount of resources used depends mainly on the number of stakeholders to be interviewed and how much travel is required to conduct these interviews. As a reference point, a village-level stakeholder analysis that interviews 5-10 stakeholders requires a four-person team working full-time for about two days, depending upon how quickly the interview appointments are made. The working group consists of at least two persons who are skilled interviewers, knowledgeable about the new refinery project, able to analyze qualitative information, and computer literate. For analyses involving a smaller number of stakeholders, fewer resources are required.

5.3.5.2 Planning the Process

Define the purpose of the analysis and identify uses for the results

The first step in conducting a stakeholder analysis is to define the purpose of the analysis, identify the users of the information, and devise a plan for using the information. Information generated from stakeholder analysis may serve several purposes: to provide input into other analyses; to inform the development of action plans to increase support for a new refinery project; or to guide a participatory, consensus-building process.

Other activities, such as strategic planning, institutional assessments,often require information on who the stakeholders are, what their positions are related to a new refinery project, how important they are, and so forth. Since stakeholder analysis generates this type of information, it would be useful if such an analysis were conducted in conjunction with the aforementioned activities.

Policy makers and managers may use the results obtained through the stakeholder analysis to inform the development of their action plans. These plans identify concrete, and possibly "behind the scenes," actions that the policy makers and managers will implement to increase stakeholder support.

Finally, policy makers and managers may use the results in open discussions with stakeholders in an effort to build consensus. Stakeholder analysis information can be used in this process to allow the stakeholders to see a reflection of where they are relative to others and to encourage discussion on how to address the opposition's concerns. This may be useful when the number of stakeholders is small and manageable and when consensus building was stated as the goal for developing the analysis.

Identify and train working group

The survey team formed a small "working group" (2 to 4 people). The members of this working group are the interviewers and analysts for the stakeholder analysis. Survey team leader may guide the process and serve as a reference, or he or she may be a member, and leader, of the working group.

Where possible, the working group members represent distinct interests and organizations. This helps prevent possible biases that could occur when a single person or institution conducts an analysis. Members' differing points of view can also assist in interpreting the qualitative and at times ambiguous data that emerge. Survey team also considered that the group should include a "neutral" person with no political or other interest in the policy, who is independent of the institution promoting the policy. At the same time, it is useful to include members who have knowledge of the sector, stakeholders, context, and politics related to the policy.

The stakeholder analysis process was participatory, involving all members of the group from beginning to end. All working group members are integrated into the entire process and learn how to carry out this type of analysis, thus giving them the experience needed for future efforts. Integrating all working group members into the process also will increase their understanding and support for the results, while ensuring the accurate translation of interview responses into analysis results.

In selecting the working group, it is important to choose persons with interviewing experience. The interviewer should be able to elicit answers for the questions listed without imposing his or her biases. In addition, all members of the group read the guidelines, trained in the content of stakeholder analysis, and understand the reason for undertaking the exercise.

Develop a plan and timeline

Finally, the working group identified the specific steps to be taken in conducting the analysis (following these guidelines) and establish timeframes for each step. The timeline include all major steps in the process, up to and including the final presentation of conclusions to policy makers. Sufficient time allocated for setting up interviews and rescheduling them in case of cancellation.

Select an appropriate policy

It is important to note that for a stakeholder analysis to be useful, it must be focused on a specific new refinery project. Policy, as used in this document, refers to new refinery. In most cases, the stakeholder analysis will have a policy in mind that he or she would like the analysis to focus on. But, before beginning the analysis, it is important to ensure that the policy in question is an appropriate topic for a stakeholder analysis.

The following are some basic criteria for evaluating the appropriateness of new refinery project as subjects of a stakeholder analysis:

- The policy should be specific and "definable." Policy makers and managers should avoid conducting an analysis on a policy that has not been thought through or that is too general to define in concrete terms. This is important to ensure that specific interview questions and responses can be developed around the policy.

Define the policy

Once a policy is chosen for the stakeholder analysis, the working group discussed with responsible persons to define the main ideas and concepts. Since basic ideas, not the details of the new refinery project, need to be explained to the stakeholders later in the process, simple, concise definitions was developed.

The identification of the key stakeholders is extremely important to the success of the analysis. Based on the resources available, the working group is decided on the maximum number of stakeholders to be interviewed. The working group then followed the steps below to define the list of stakeholders.

Compile and review existing information related to the policy

The working group gathered and analyzed any written documents related to the present refinery project. This helped to identify the direct impact area and potential stakeholders and, perhaps, their connection to the new refinery project.

Develop a list of all possible stakeholders related to the policy

Initially, the working group identified all actors who could have an interest in the new refinery project. Since new refinery project can affect or be affected by actors outside the refinery compound, the group was not limit potential stakeholders to the refinery compound. Specific stakeholders can be identified from the following sectors: national political (legislators, village administrator), labor (organizations, medical associations), public (MOH, Social Security, MPE), private for profit, and nonprofit (nongovernmental organizations, foundations). Civil society is also an important sector to consider if the community or consumers have a direct interest in the new refinery project.

Develop a list of priority stakeholders with input from experts

Since resources, time, and finances for the analysis is limited, the list of stakeholders to be interviewed with prioritized. Experts who know the sector, policy, and players helped in this process.

Survey team consults with 2 to 3 persons who have extensive knowledge of the refinery area, its actors, and the power of those actors to influence the policy. Team members meet with the experts to identify potential stakeholders from the various sectors mentioned. The discussion focused on persons or organizations that may be related to or affected by the particular policy and have the ability to affect the implementation of the policy. The working group also asked experts about the availability of written information, including specific stakeholder statements related to the policy.

Using the experts' information, survey team prioritized the list of potential stakeholders to include only those individuals who have a direct interest in the policy and could impact its

implementation. Actors who are not organized or do not have the ability to affect the new refinery project are not be included.

Once the stakeholders are chosen, survey team developed a contact list, with the stakeholders' names, addresses, and phone numbers. Generally, very little secondary information is available on stakeholders. As a result, the survey team planned to interview the priority stakeholders identified to gain accurate information on their positions, interests, and ability to affect the process.

The following tools are used for gathering and analyzing this information:

- Definitions of stakeholder characteristics
- Interview questionnaire and protocol
- Reference chart

The working group reviewed and adapt these tools to fit the specific policy being analyzed and the information needed about the stakeholders.

Adapt stakeholder characteristics

First, the working group defined the exact stakeholder information or characteristics to be considered. The following characteristics are usually included for each stakeholder: name, position and organization, internal/external to the organization promoting the policy, knowledge of the new refinery project, position on the new refinery project, interest, alliances, resources, power, and leadership.

Based on a review of the literature and experiences, these characteristics have been identified as the most important for the following reasons:

- Stakeholder *knowledge* level is important in identifying stakeholders who oppose the new refinery project due to misunderstandings or lack of communication.
- The stakeholder's *position* on the new refinery project is key to establishing whether or not he or she will block the new refinery project implementation.
- Determining the stakeholder's vested *interests* in the new refinery project will help policy makers and managers better understand the stakeholder's position and possible ways to address his or her concerns.
- Identifying possible stakeholder *alliances* is important because alliances can make a weak stakeholder stronger, or provide a way to influence several stakeholders by dealing with one key stakeholder.
- The amount of and ability to mobilize *resources* is an important characteristic that is summarized by a power index and will determine with what force the stakeholder might support or oppose the policy.
- Finally, establishing whether or not the stakeholder has *leadership* will help policy makers and managers target those stakeholders who will be more likely to actually demonstrate their position for or against the policy (and convince others to do so).

The working group review and adapt the characteristics and definitions provided to the new refinery project being analyzed and the particular culture of the region. It is crucial to ensure that each member of the working group understands the meaning of the final definition for each characteristic.

Once the terms have been defined, a stakeholder analysis table is created in a word processing application or in a spreadsheet. The table list stakeholder characteristics across the top row. This title row may vary depending on the exact characteristics and their definitions. *Develop interview questionnaire.*

Once the working group has chosen and defined key stakeholder characteristics, a standard questionnaire is developed for interviewing stakeholders. The interviewer should use the questionnaire to guide the conversation during the interview.

In developing the questionnaire, the working group is given the cultural context, the most appropriate way to obtain the necessary information. Asking direct questions may seem the most efficient method but could result in unreliable answers because the stakeholders are not accustomed to communicating in such a direct and candid manner. Questions is clearly stated, specific, and open-ended wherever possible, requiring the stakeholder to provide more than a simple “yes” or “no” answer. If necessary, several questions may be asked to obtain information on one characteristic, but doing this repeatedly runs the risk of extending the interview beyond the ideal two-hour time limit.

The questionnaire also included an introductory section that each interviewer can read to the stakeholder. This introduction states the objective of the interview, identify who is collecting the information, explain what will be done with the information, and assure the stakeholder that all of his or her responses will remain anonymous. The definition of the new refinery project under analysis and any terms that might be ambiguous or unknown to the stakeholder is explained during the interview. Such definitions and clarifications, however, is provided only after the interviewer has explored and established the stakeholder’s level of understanding and knowledge of the policy in question.

The following section on interview protocol suggests a few more tips for improving the interview process.

Develop interview protocol

The working group discussed and document the protocol to be followed in the interview process. To ensure consistency and objectivity, the following protocol is suggested:

- Two-person interview teams is used, with the interviewers representing different organizations whenever possible.
- Both interviewers is taken notes, but only one lead the interview.
- Questions are asked no more than twice, and if the stakeholder still does not provide an answer, the interviewer move on.
- The interview was terminated at the stakeholder’s request, even if questions remain.
- Immediately following the interview, the interviewers write their notes into one questionnaire per stakeholder.
- The information is entered in the same words the stakeholder used.

As part of the protocol, each questionnaire have a place for the interviewer to fill out the name and ID number for the stakeholder being interviewed and the date and village where the interview took place. This protocol, and any other “rules” that the working group sees as important to ensuring the collection of consistent and accurate data, is established. All interviewers were clear on how to adhere to the protocol before beginning the interviews.

Test the questionnaire

Before interviewing the stakeholders, the working group pretest the questionnaire by conducting interviews with a few of the stakeholders. A pretest should be conducted to determine the following:

- Interviewers are comfortable with the questionnaire;
- The interviewee understands the questions;
- Answers provide the information required for filling in the stakeholder table (the table should be filled in for the pre-test interviews);
- The interview does not take more than one hours; and
- Interviewers successfully adhere to the established protocol.

After analyzing the results of the pretest, the questionnaire and protocol is modified, if

necessary, before proceeding with the other stakeholder interviews.

Develop the reference chart

The final tool needed is the information transfer reference chart or “reference chart” . This chart serves two purposes: (1) to provide a means of checking that all the stakeholder characteristics are covered in the interview questionnaire and (2) to aid the working group in transferring the information from the questionnaire to the stakeholder table.

The chart, which utilizes the column titles from the stakeholder table, is developed after the questionnaire and the stakeholder table has been developed. The working group identified and listed the specific interview questions that provide the information for each column.

Review existing information

Before beginning the interviews, it is important to gather and review secondary information on the priority stakeholders. This information is more detailed than the initial secondary information that was reviewed in Step 3. It include any written or spoken statements regarding the stakeholders’ positions on the new refinery project, any goals or objectives of the organizations the stakeholders represent, the position of the stakeholder within the organization (with specific reference to his or her control over resources), and any data on the quantity or type of resources the stakeholders or his or her organization have.

Possible secondary information sources

- Newspaper
- Magway Division and Townships reports and publications
- Village household lists

The secondary information is filed and used later on, in conjunction with the interview information, to fill in the stakeholder table.

Make interview appointments

As stated in Step 4, since there is usually little secondary information available on stakeholders, the working group is likely have to interview all of the stakeholders from the final list. There is an abundance of secondary information, the working group choose to interview some stakeholders to gain more insight into their opinions on the policy and other stakeholders. Date of collecting households data.

To begin the process, interview appointments is made with each stakeholder. Ideally, appointments is made one week in advance by the working group member who has the influence to secure appointments with high-level and busy stakeholders.

The interviews scheduled at the time and place most convenient for the stakeholder. All attempts made to secure an interview with the person indicated and not his or her representative. This includes rescheduling cancelled appointments, if necessary.

Conduct interviews and record notes

The interviewers follow the protocol established by the group, with one person as the principle interviewer responsible for leading the conversation. If the stakeholder does not understand a question, the interviewer can rephrase the question slightly, but any deviations from the original questionnaire was to be noted. After two attempts to ask and/or rephrase a question, the interviewer has to move on.

Immediately following the interview, the two-person interview team is work together to enter the stakeholder’s answers for each question into the computer. The objective of this follow-up process is to record the information accurately, legibly, and by question number for use in the analysis process.

5.3.5.3 Stakeholders' Panel Discussion

- Invite a village elders, administrative committee member, NGOs, and member from village level of associations to be special guests at meeting.
- Hand out printed chapter announcements so that the entire meeting can be devoted to the panel discussion.
- Introduce the panelists.
- Ask each panelist to provide a two-minute description of his or her relationship to, and understanding of, internal auditing.
- Hold a question-and-answer period, with the following suggested questions for the panel:
- Send a letter of appreciation to each panelist after the meeting.

Summary results of consultations with village leaders and stakeholders

General List of Stakeholders

Sector	Sub-Sector	Internal/ External to MPE	To be interview	Reason chosen/Relation to project
Agencies and NGos	NAT NGO, Lighting Committee, Library Organization		3	External support, in both economic and political terms, has been very influential in determining the direction of New Refinery Project.
Politicians	UNSP NLD	External	4	The village representatives have significant impact on the implementation of new refinery project efforts in the regions and represent the villages' views to the Village administrators; those to be interviewed are involved in the issues related to this topic.
Public Entities: MPE		Internal	2	Since the process being analy- zed includes new refinery project, the local staff levels of the MPE will be responsible for implementing many of these changes.
Public Entities: Other than MPE	Administrative Sector SAT Teacher Maternity Nurse Election Commission	External	13	Since the process being analy- zed includes new refinery project, the local staff levels of the non-MPE will be responsible for implementing many of these changes.
private sector	Village Elders Farmer Monastery	External	7	The private sector in the region is very powerful, and through their protests, private groups are able to stop political efforts that they consider to be threatening their interests. In the oil and gas sector alone there are umerous labor, both within and external to the MPE. These groups, if not in support of this project, may be able to stop its implementation.

5.3.5.4 Stakeholder interview questionnaire

Date: ___/___/_____ ID #: _____ Village: _____

Introduction:

We are from (Myanmar Survey Research) and we are conducting a study on behalf of (MPE) to explore the opinions of several important actors who are interested in the New Refinery Project of the MPE. As an important actor in the energy sector, it is crucial for us to obtain your opinion and that of your organization.

We plan to conduct about 35 to 40 interviews to produce a general report on the opinions of the major actors. The information obtained through these interviews will be for the direct use of the consultants on the analysis team, and will be presented in a general report to (insert organization for whom report is done if appropriate) without identifying individual opinions.

We would now like to ask you a few specific questions about your opinion regarding the implementation of new refinery project of the MPE.

Your opinion:

1. Have you heard of the MPE's new refinery project?

2. If so, how did you hear of it?

3. What do you understand new refinery project?

The Ministry of Energy has defined "new refinery project" as "to build a new refinery may be the biggest one in Myanmar, by using the crude from Chinese crude oil pipe line. Take off point is near Saku. The new refinery will be establish within the Mann_Thanpuyarkan refinery compound.

4. What are the potential benefits to you and your organization of the new refinery project of the MPE?

5. What are the potential disadvantages to you and your organization of the new refinery project of the MPE?

6. Which of these categories best describes your opinion on the new refinery project of the MPE?

(*Read answer options and circle answer given.*)

a) I strongly support it

b) I somewhat support it

c) I do not support nor oppose it

d) I somewhat oppose it

e) I strongly oppose it

If stakeholder answers a, b, or c, continue below.

If stakeholder answers d or e, pass to question #10.

For those who answer "a,""b," or "c" to question #6:

7. Which of the three aspects of new refinery project do you support?

a) Regional development

b) Increase job opportunities

c) Oil/Diesel import substitution

8. For those aspects of establishment of new refinery project that you do support,

a) In what manner would you demonstrate this support?

b) Would you have many, some, or no resources to dedicate to supporting this policy?

c) Would this support be public?

d) Would you ally with any other persons or organizations in these actions?

e) What conditions would have to exist for you to express this support?

f) Would you take the initiative in supporting new refinery project, or would you wait for others to do so?

9. Under what conditions would you choose NOT to support new refinery project?

For those who answered "d" or "e" to question #6:

10. Which of the following aspects of new refinery project do you oppose:

a) Over the deprivable of farm land.

b) Over the environmental issues.

c) Over the use of labourers in the project.

11. For those aspects that you oppose:

a) In what manner would you demonstrate this opposition?

b) Would you have many, some, or no resources to dedicate to opposing this policy?

c) Would this opposition be public?

d) Would you ally with any other persons or organizations in these actions?

e) What conditions would have to exist for you to express this opposition?

f) Would you take the initiative in opposing new refinery project, or would you wait for others to do so?

g) How quickly would you be able to mobilize your opposition?

12. Under what conditions would you come to support new refinery project?

We would now like to ask you a few specific questions about your opinion regarding others' opinions of the implementation of new refinery project of the MPE.

Other supporters:

13. What other organizations, departments within an organization, or persons do you think would support new refinery project the MPE? (*Probe for MPE and non-MPE stakeholders*)

14. What do you think these supporters would gain from the new refinery project of the MPE?

15. Which of these supporters would take the initiative to actively support new refinery project?

16. Which of these supporters would work together to demonstrate their support for newrefinery project?

17. Under what conditions do you think these actors would come to oppose newrefinery project?

Other opposors:

18. What other organizations, departments within an organization, or persons do you think would oppose new refinery project of the MPE? (*Probe for MPE and non-MPE stakeholders*)

19. What do you think these opponents would gain from preventing the new refinery project of the MPE?

20. Which of these opponents would take the initiative to actively oppose new refinery project?

21. Which of these actors would work together to demonstrate their opposition to new refinery project?

22. Under what conditions do you think these actors would come to support the new refinery project of the MPE?

5.3.5.5 Definitions of Stakeholder Characteristics and Instructions for Filling in Stakeholder Table

A. I.D. #: Given the stakeholder on the questionnaire.

B. Position and organization: Position the stakeholder has and the organization that he/she works for.

C. Internal/External: Internal (I)—stakeholders that work within the organization that is promoting or implementing the policy; all other stakeholders are considered external (E).

D. Knowledge of policy: This column is divided into two parts. The first part, D1, is the level of accurate knowledge the stakeholder has regarding the policy under analysis. This knowledge should be rated from 3 to 1: 3 – a lot; 2 – some; 1 – none. Final rankings should be reviewed to ensure consistent scoring among all of the stakeholders.

The second part of the column, D2, is to record how each stakeholder defines the policy in question. The information gathered in question #3 of the questionnaire should be noted here in the stakeholder's own words.

E. Position: Supports/Opposes/Neutral: Position refers to the stakeholder's status as a supporter or opponent of the policy. The position of the stakeholder can be obtained by gathering information directly from the stakeholder; and through information gathered indirectly from other stakeholders or secondary information. Thus, the reporting in this column represents the self-reported classification (column E1), the classification by others (column E2), and a final classification considering both (column E3). The position of the stakeholder should be reported from this final classification (column E3).

Stakeholders who agree with the implementation of the policy are considered supporters (S); those who disagree with the policy are considered opponents (O); and those who do not have a clear opinion, or whose opinion could not be discerned, are considered neutral (N). Those who express some agreement, but not total agreement with the policy should be classified as moderate supporters (MS).

Finally those who express some, but not total, opposition to the policy should be classified as moderate opponents (MO). Thus, in column E1, the position of the stakeholder as they state it in the interview should be entered (S, MS, N, MO, or O).

In column E2, the position of the stakeholder as perceived by other stakeholders and/or from secondary information should be entered with a reference to the ID number of the person who stated that opinion. For example, S 32 would mean that stakeholder number 32 stated in his or her interview that the stakeholder under analysis would support the policy. In column E2, the position of the stakeholder as others perceive it should be entered (S, MS, N, MO, or O) with the ID number for each opinion.

Lastly, in column E3, the final determination for the position of the stakeholder should be entered (after entering data from all interviews). This position should take into account the self-reported position as well as other stakeholders' opinions. S, MS, N, MO, and O can be entered in this column.

F. Interest:

Interest refers to the interest the stakeholder has in the policy—or the advantages and disadvantages that the implementation of the policy may bring to him or her or his or her organization.

Advantages and disadvantages mentioned by each of the stakeholders should be entered into this column in as much detail as possible, since the information will be used primarily in developing conclusions and strategies for dealing with the stakeholders' concerns.

G. Alliances:

"a union or relationship" (Webster, 1984). Alliances are formed when two or more organizations collaborate to meet the same objective, in this case to support or oppose the policy in question. Any organizations that are mentioned by the stakeholder in the questions related to this item should be entered in this column.

H. Resources:

"a source of support or aid" (Webster, 1984). Resources can be of many types—human, financial, technological, political, and other. The analysts should consider the stakeholder's access to all of these resources.

The resource category is divided into two parts: the quantity of resources that a stakeholder has within his or her organization or area, and the ability to mobilize those resources. The quantity of resources should be classified by the analysts as 3 – many, 2 – some, 1 – few and inserted into column H1 of the stakeholder table. Since this score is relative, final rankings should be reviewed to ensure consistent scoring among all stakeholders.

The ability of the stakeholder to mobilize resources should be quantified in terms of 3 – the stakeholder can make decisions regarding the use of the resources in his or her organization or area; 2 – the stakeholder is one of several persons that makes decisions regarding the use of resources; 1 – the stakeholder cannot make decisions regarding the use of the resources. This score should be inserted into column H2. For example, if the stakeholder has personnel that work for him or her, it can be concluded that the stakeholder has the ability to mobilize these resources because he or she has direct influence over them.

I. Power:

"the capacity or ability to accomplish something…strength, force or might" (Webster, 1984). Here, power refers to the ability of the stakeholder to affect the implementation of the health reform policy due to the strength or force he or she possesses.

Since "power" is defined here as the combined measure of the amount of resources a stakeholder has and his or her capacity to mobilize them, the two resource scores

	implied should be averaged, resulting in a power index between 3 and 1: 3 – high power, 2 – medium power, and 1 – little power. The final rankings should be reviewed to ensure consistent scoring among all stakeholders.
J. Leadership:	"to direct the activity…to start, begin…front, foremost" (Webster, 1984). Leadership is specifically defined here as the willingness and ability to initiate, convoke, or lead an action for or against the health reform policy. The stakeholder either has or lacks this characteristic. This is represented with "yes" or "no."

5.3.6 Stakeholder Engagement for New Refinery

As part of ESIA process MSR Social Consultant Team visited to Malzalitaw, Nyaungpinthar, Pantawpyin, Thanpayarkan, Ywar Taw villages in February 2015 to consult with stakeholders, explaining the project and administering questionnaires to individuals.

Total 74 residents (56 males, 18 females) from Malzalitaw, Nyaungpinthar, Pantawpyin, Thanpayarkan, Ywar Taw were participated in interviews. Their age ranged from 23 to 85 year and the mean age is 53.2 year. Elderly respondents talked about their memories of natural environment before any of developments were implemented. Three of the respondents told what they recalled the experience of how they lost land during the development of Defense Industry. Thirty-eight of the respondents described about their lost farmland at the time of developing Thanbayakan Oil Refinery.

Key findings of consultation with stakeholder regarding the New Refinery Project are presented below.

- All most all of the respondents were aware of the Project.
- Since there are quite a number of graduated unemployment youths in the villages all of the respondents expect the new project will generate job opportunities for those educated youths. They also have expectation for hiring of local residents or members of vulnerable populations. Consequently, after development of the Project will enhance society's socio-economic development.
- About 75.5% of respondent considered the project as important for the community and the country and welcome the project. However, the rest 18 respondents disagree with the development of new refinery and 12 respondents did not give their opinion.
- Respondents acclaimed that residents of villages around the Project site would have no objection as long as the new development will

- not cause CO_2 pollution,
- never result plant explosion,
- not affected the farmland,
- create job opportunities and
- provide training course for villages who keen to work as skilled worker in new refinery plant

- Respondents who contradict the project, think they will never be better off by development of this project.
- One of the respondents said members of the village are concerned when they seeing the flare from the flare stack tower of refinery plant.

Myanmar-China crude oil pipeline from Saku off-take point to Thanbayakan Oil Refinery

37 farmers from five villages will lost their farm land if new refinery going to establish.

Village profiles (Direct and Indirect Impact by New Oil Refinery

The land along the oil pipe line require to dug appropriate depth to lay down the pipe line will need compensations for the land owner farmers.

seven villages located in direct impact area. As mentioned above, villages are located three kilo meter radius of the refinery. Thanpuyarkan village is the closet to the refinery. Pantawpyin village is the biggest village with 297 houses and total 430 acres of farm land.

CHAPTER 6:

POTENTIAL ENVIRONMENTAL IMPACTS, RISK ASSESSMENTS AND MITIGATION MEASURES

6. POTENTIAL ENVIRONMENTAL IMPACTS, RISK ASSESSMENTS AND MITIGATION MEASURES

6.1 Overview

This chapter presents assessments of potential environmental impacts of proposed New Refinery Plant Project at Minhla Township Magway Region, during pre-construction, construction, operation and decommission phases. These environmental impacts are related to physical, biological, and social aspects and including but not limited to pollution (air quality, surface and ground water quality, waste, soil contamination, sedimentation, hydrology, soil erosion, noise and vibration) social environment (living and livelihood, local conflict, misdistribution benefit and damage, existing infrastructures and services, water usage), natural environment (flora, fauna and biodiversity, ecosystem), health and safety (risks for infectious diseases such as AIDS/HIV, occupational health and safety, community health and safety), emergency (flood risk, risk of fire, earth quake, storms) and climate change and greenhouse gases effects. The risk assessment and mitigation measures for the potential environmental impacts are also described.

6.2 Impact Assessment

Assessment refers to the interpretation of the significance of anticipated changes relating to the proposed project. Impact interpretation is based upon the systematic application of definition of “significance”: E.g., waste-discharge standards (effluent limitation) from particular facilities. The application of professional judgment in the context of assessing impacts is a pivotal role in our work.

Another basis for impact assessment is public input; this input could be received through the conduct of public meetings and interviews with residents in surrounding area of the project site. As the general public can often delineate important environmental resources and values for the particular areas, and these are also considered essential in impact assessment. The assessment of short- and long-term potential impacts is made on the basis of information collected from existing sources supplemented by the field data. Impacts are also differentiated as direct or indirect – those that arise directly from the proposed project, and those that arise because of secondary activities induced by the project. Impacts are also categorized in relations with different implementation phases: Pre-construction phase, Construction phase, Operation phase and Decommissioning phases.

6.2.1 Project Background

The primary products of the Refinery industry fall into three major categories:

- Fuels (eg: motor gasoline, diesel and distillate fuel oil, liquefied petroleum gas, jet fuel, residual fuel oil, kerosene and petroleum coke);
- Finished nonfuel products (eg solvents, lubricating oils, greases, petroleum wax, petroleum jelly, bitumen and petroleum coke);
- Chemical industry feedstocks (eg naphtha, ethane, propane, butane, ethylene, propylene, butylenes, butadiene, benzene, toluene, and xylene).

The nature of the proposed Refinery Project

World Bank has classified Refinery Project as Category A and the EIA Directive (85/337/EEC) has listed it under projects subject to mandatory EIA since they are known or considered to have potentially significant adverse impacts on the environment.

In the meantime, the proposed project will also provide economic and social benefit to the local community and to the national economy. This report determine effective strategies to help mitigate the negative impacts, and maximise positive impacts, of the project prior to major decisions being taken and commitments made.

Refinery Process

The petroleum refining industry converts crude oil into more than 2500 refined products, including liquefied petroleum gas, gasoline, kerosene, aviation fuel, diesel fuel, fuel oils, lubricating oils, and feedstocks for the petrochemical industry.

Petroleum refinery activities start with receipt of crude for storage at the refinery, include all petroleum handling and refining operations, and they terminate with storage preparatory to shipping the refined products from the refinery.

Petroleum refining is the physical, thermal and chemical separation of crude oil into its major distillation fractions which are then further processed through a series of separation and conversion steps into finished petroleum products.

Refining can be separated into two stages and a number of supporting processes.

Stage 1: Desalting and subsequent distillation into its various components or "fractions";

Stage 2: Conversion of some of the distillation fractions into petroleum products through a range of cracking, coking, reforming, and alkylation processes;

Supporting operations may include wastewater treatment, heat and power generation, sulphur recovery, additive production, heat exchanger cleaning, blowdown systems, product blending and storage.

Crude oil refineries process large amounts of raw materials and consume substantial amounts of energy. They also use large quantities of water. Emissions to air and water are generated as well as various solid and liquid waste streams.

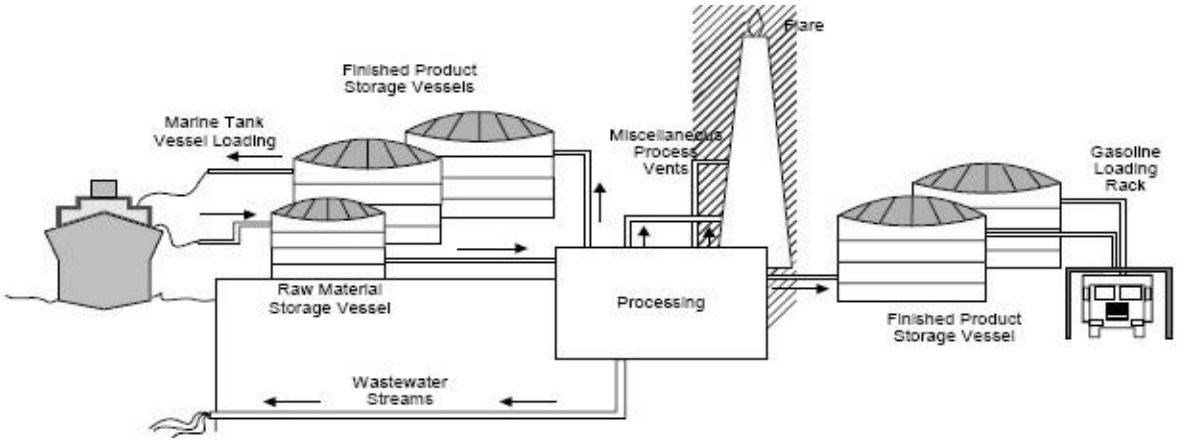


Figure 50: Refinery Inputs and Outputs, US EPA 1997 http://www.epa.gov/

Listed below are 5 categories of general refinery processes and associated operations.

1) Separation processes
2) Petroleum conversion processes
3) Petroleum treating processes
4) Feedstock and product handling (Storage, Blending, Loading, Unloading, etc)
5) Auxiliary facilities (Boilers, Waste water treatment, Hydrogen production, Sulfur recovery, Cooling towers, Compressor engines, etc)

Process Emission

The petroleum industry involves the refining of crude petroleum and the processing of natural gas into a multitude of products, as well as the distribution and marketing of petroleum-derived products. The primary pollutant emitted is volatile organic compounds arising from leakage, venting, and evaporation of the raw materials and finished products. Significant amounts of sulfur oxides, hydrogen sulfide, particulate matter, and a number of toxic species can also be generated from operations specific to this industry. In addition, a wide variety of fuel combustion devices emits all of the criteria pollutants and a number of toxic species.

The common pollutants

The common pollutants are;

- Particulate matter
- Sulfur Oxides SOx (as SO2)
- Carbon Monoxide
- Total Hydrocarbons
- Nitrogen Oxides NOx (as NO2)
- Aldehydes (an organic compound containing the group -CHO, formed by the oxidation of alcohols)
- Ammonia

Total Amount of Pollutants

Unit	Waste Gas			Wastewater			Solid Waste		
t/a	SO2	NOx	Soot	Discharge Flow	COD	Ammonia Nitrogen	Total	General Solid Waste	Hazardous Solid Waste
	527.4	751.4	254.77	663600	79.63	16.59	220147.9	213143.45	6929.42

Pollutants, Sources, and Effects

Pollutant	Source	Effect
Sulphur dioxide (SO2)	- Process furnaces, boilers, gas turbines - Fluidized catalytic cracking unit regenerators - Sulphur Recovery Unit (SRU) - Flare system	Aggravates asthma and make breathing difficult. (Health Effect)
Oxide of Nitrogen (NOx)	- Process furnaces, boilers, gas turbines - Fluidized catalytic cracking (FCC) Unit regenerators	Worsen lung disease leading to respiratory symptoms, increased susceptibility to respiratory infection.
Carbon monoxide (CO)	Fuel combustion from Engines and vehicles	Reduces the amount of oxygen reaching the body's organs and tissues, aggravates heart disease, resulting in chest pain and other symptoms.
Particulate Matter (PM)	- Process furnaces and boilers, particularly when firing fluid fuels - FCC Unit regenerators and CO boilers. - Improved roads or during road constructions	Short term exposures can worsen heart or lung diseases and cause respiratory problems. Long-term exposures can cause heart or lung disease and sometime premature death.
Ground-level Ozone (O3)	Secondary pollutant formed by chemical reaction of volatile organic compounds (VOCs) and NO_x in the present of sunlight.	Decrease lung function and causes respiratory symptoms, such as coughing and shortness of breath, and also makes asthma, and other lung decrease get worse.
Lead (Pb)	Process wastewater Tank drainage Residual oily sludges Catalytic process	Demages the developing nervous system, resulting in IQ loss and impacts on learning, memory, and behaviors in children. Cardiovascular and renal effects in adults and early effects related to aneamia.

Hydnogem suplhit (H_2S)	Process wastewater from cracking unit (FCU, Coker, Hydro-cracker, etc.) Hydro desulphurization and treating Units	Exposure to low concentrations of H_2S may cause irritation to the eyes, nose or throat. It may also cause difficulty in breathing for some asthmatius. Respiratory distress or arrest has been observed in people exposed to very high concentration of H_2S. Headaches, poor memory, tireness and balance problems. H.C - loss of consciousness - birth defect
Ammonia	Process waste water flaring	Exposure to very high concentrations gasesous ammonia can result in lung demage and death. Highly toxic to aquatic animals, and for this reason is classified as dangerous for the environment. Harmful to fish species and can result in poor growth and feed conversion rate, reduced

6.2.2 Nature and Characteristics of Impacts

There can be different nature of impacts with different characteristics which include:

- Positive and negative: Negative impacts harm, degrade or impair the ecosystem health and the health and quality of life of people who live and work in the affected ecosystems. Some impacts can be perceived to be neutral, whilst others are positive.
- Direct and Indirect: Direct impacts are created directly by a project action. Indirect impacts result from subsequent impacts caused by the direct impacts. Direct impacts are more easily identifiable and quantifiable than indirect impacts.
- Long term and short term: Some impacts occur only during the construction phase of the project (short term), others persist to the operational phase (medium term) and others linger on long after the project has been decommissioned (long term).
- Recurring and Non-Recurring: Some impacts occur repeatedly in space and time, while others occur only once.
- Regional and Local: Some impacts cover large areas whilst others are restricted to a small area.
- Cumulative and Non-cumulative: Cumulative impacts result when impacts from one activity combine with those from another activity to produce a greater impact or a different impact. Non-cumulative impacts do not accumulate in space and in time.
- Reversible and Irreversible: This refers to the permanence of an impact. Impacts maybe reversible by natural means at natural rates (e.g. sand deposition) or through human intervention (e.g. reforestation). However, some impacts are irreversible such as the elimination of particular wildlife habitats through urban development.

6.2.3 Identification of potential impacts

For applying a systematic approach, following framework is used for identifying the direct, indirect, and ultimate impacts of a proposed project.

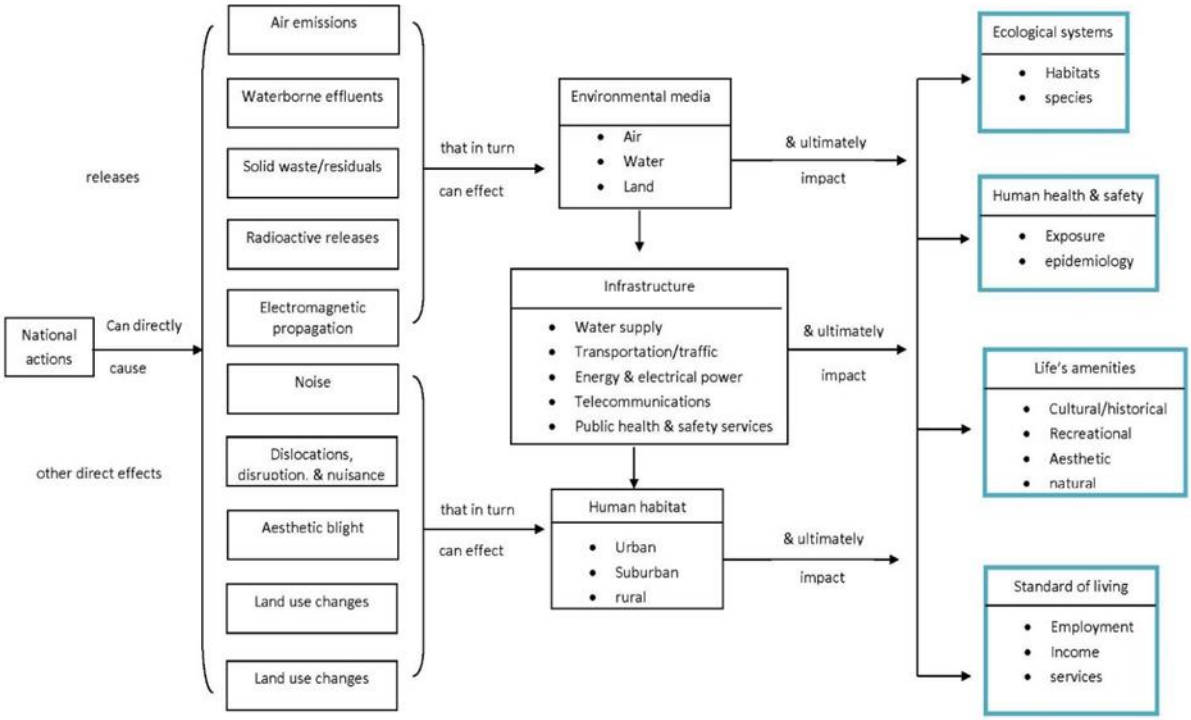


Figure 51: Applying a systematic approach for impact identification

There are several methods applied to assist in the identification. These include checklists, map overlays, public consultation and professional judgement based on information collected from existing sources supplemented by the field data.

The interaction-matrix method developed by Leopold et al (1971) is used as an example. The Leopold Matrix contains the list of actions and environmental items. Each action and its potential for creating an impact on each environmental item are considered.

In general, the project activities and the related negative environmental impacts are mentioned in the sample matrix table below. The specific details of project activities and the potential impacts caused by these activities for different project phases are described in the following respective sections.

Sample matrix for project activities and the related negative environmental impacts

Project Activities	Environmental Parameters																
	Topography and Geology	Air Quality	Noise and vibration	Surface Water Hydrology	Surface Water Quality	Ground Water Quality	Soil Quality / Contamination	Soil Erosion	Generation of solid waste	GHG emissions	Flora, fauna and ecosystem	Living and livelihood	Cultural heritage/traditional value	Landscape and scenery	Occupational health and safety	Emergency Risk	Community Health and Safety
Site clearing and levelling	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	X
Transportation and storage of		x	x		x		x		x	x	x	x			x	x	x

construction materials/equipment																	
Construction Activities	x	x	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x
Construction Equipment and Machine Use		x	x	X	x	x	x		x	x	x				x	x	x
Influx of labor and construction of temporary houses					x				x			x	x		x	x	x
Transportation and disposal of construction waste and debris (Vehicle movement)		x	x		x	x	x		x	x					x		x
Operation of project activities		x	x	X	x	x	x		x	x		x			x	x	x
Wastewater disposed from different industries and project facilities					x	x	x								x		x
Solid waste generation from operation of project activities					x	x	x		x						x		x
Emissions from different industries		x								x					x	x	x
Demolition work		x	x		x		x		x	x		x			x	x	x

Comprehensive literature reviews and published information helps for impact identification as well. Impact prediction is also accomplished by the use of look-alike (analogous) information on actual impacts from similar types of projects in the world and based on professional judgment.

6.2.3.1 Identification of Potential Impact Sources in Construction Phase

The source of impact during construction phase depends upon the type of construction activities, the construction methods, construction equipment used, plant equipment fabricated onsite, chemicals / materials used, source / amount of utilities and duration of work. The impacts in construction phase are generated from following areas:

- New Refinery and supported utilities;
- Harbor/ jetty facility;
- River water intake and outfall facilities including pipelines;
- Off-take point and crude oil pipeline to the Refinery from off take point location.

The quantities/composition of variou of popullations such as air emissions, wastewater and solid wastes will be mentioned in assessment. Therefore, *the following table* identifies the sources, waste types, and type of impact. In subsequent sections, the emissions with regards to air, wastewater, solid waste, hazardous wastes, noise and accidental releases have been qualified.

Impact source related to wastes in construction phase

No	Source of impact	Generated wastes			Other impacts
		Emission	Wastewater	Solid waste	
1	Activities of construction equipments and engines	Dust, CO, NOx, SOx, VOC, CH4, HC	-	Residue oil	Noise, vibration, light, public health
2	Operation of Constructional equipment and truck transportion	Dust, CO, NOx, SOx, VOC, CH4, HC		Residue oil	Noise, vibration, traffic safety, public health
3	Complex installation activities	Dust		Empty drums, papers, wood scraps, plastic containers, oily & chemical wipers	Noise, vibration, public health, occupational health and safety
4	Tank installation	Dust, VOC		Used materials	Occupational health and safety
5	Washing facilities surface before painting (depend on used methods)	Dust (metal dust)	Wastewater	Fe_2O_3, SiO_2, K_2O, CaO	Noise, public health, occupational health and safety
6	Painting activities	Dust, VOC		Used paints, brushes, wipers	Occupational health and safety
7	Welding and cutting activities	Dust, heat		Welding rods	Noise, heat, occupational health and safety
8	Pipeline trenching and installation	Dust		Spoil materials	Flora and fauna
9	Non-destructive testing (NDT)	Radioactive ray			Occupational health and safety
10	Onshore cleaning and hydrotesting (Pipeline & tank system)		Wastewater		Aqua culture environment, Fisheries
11	Workforce		Domestic wastewater	Domestic waste	Social disruption, employment, quality of life, HIV/AIDS, public health
12	Fuel spills	HC	Wastewater	Oily wastes	Occupational health

6.2.3.1.1 Exhaust gases

In construction phase, exhaust gases are generated from diesel generators, engine-driven machinery used for site work, welders/cutters and surface coating during equipment fabrication, transport vehicles, fuel oil storage tanks, transporting truck, excavation, trenching and earthworks.

6.2.3.1.2 Noise

The main sources of noise and vibration on site during the construction period will be construction machineries such as bull-dozers, excavators, compactors, which generate significantly high noise level. In addition, DGs used for power supply also produce high noise level. The vehicles used for the transport of materials and men to the site will also generate significant noise along the route. Table below presents the typical noise levels expected from various construction machinery and activities along with the duration of operations.

Typical Noise Level

No.	Source of Noise	Duration of Operation	Noise Level at 1m from Source dB(A)
1	Excavator, shovels, dumpers etc.	Day time only	70-80
2	Compactors	Day time only	80-90
3	Motors and compressors	Day time only	80-85
4	DG units	24 hours	75-85
5	Trucks	Day time only	75-80

It is difficult to quantify noise emissions during construction activities as the type and numbers of potential noise sources are not available at present. However, noise level will be maintained in compliance with NEQG standard. If the workers are likely to be exposed to continuous noise level exceeding 85dB(A), they will be provided with appropriate personal protective equipment (PPEs) such as ear plugs and ear muffs. Machineries will be provided with suitable noise dampening agents like mufflers, enclosures, etc. to minimise noise at source. High noise generating activities will be carried out in the day time to the extent possible.

6.2.3.1.3 Waste water

The effluents usually create from vehicle washing, hydrotest water and sewage. In the rainy season, a significant volume of storm water runoff also generates. In addition, used oil, paints, cleaning solvents, etc., also form hazardous effluent during construction phase.

The effluent from equipment/vehicle washings contains mainly TSS and oil. Typically, these will be discharged to the land with preliminary treatment for removing oil and grease. The effluents from equipment/vehicle washings contain mainly TSS and oil. Typically, these effluents generated during construction and commissioning phase will be treated and disposed in correct way by EPC Contractor to ensure that final discharge of effluents is in compliance with Project Discharge Standards.

The cleaning and hydrotesting effluent generated from pipeline and tank-farm cleaning and hydrotesting process is assumed the biggest volume in construction phase. Depending on cleaning and hydrotesting alternative (use chemicals or not), estimation of this effluent is assumed based on the volume of biggest tank and onshore pipeline system.

Daily crude oil pipeline transportstion, based on the proposed project capacity, is approximately 100,000 barrel per day. Based on above information, 20” diameter double pipeline or 48” single pipeline shoule be installed. Estimation of hydrotest water requirement is approximatrly 48,000 m3.

Estimation of domestic wastewater in the construction phase is based on average manpower of 3,800 (4,000 in round) persons and peak manpower requirements of 6,700 (7,000 in

round) persons. Anticipated construction period to mechanical completion is 36 months which equate to approximately 930 working days, based on a 6-day working week. Estimation of effluent in the construction phase is 2046,000 m^3.

The sewage generated from site offices and constructional sites and camps will contain both total suspended solids (TSS) and biochemical oxygen demand (BOD).

6.2.3.1.4 Hydrotest Water

Hydrotesting will be carried out for identifying and eliminating any leakages / opening in the process vessels, pipeline framework and the plumbing and chemical additives such as corrosion inhibitor, oxygen scavenger, etc. may be added to the hydrotest water to prevent internal corrosion. However, biodegradable additives with low toxicity will be used. Consequently, the spent hydrotest water may contain traces of oil, SS and chemicals. The used hydrotest water will be collected and reused for multiple tests, as far as practicable. Further, the hydrotesting procedure will be planned such that the test water is allowed to remain inside the vessel or pipeline for minimal time; thus reducing the requirement of using additives in the hydrotest water.

The spent hydrotest water from the final test will be collected in a tank or a lined evaporation pond and checked for compliance with NEQG discharge and runoff Standard. If the water complies with the standard, then it will be used for land discharge activities on obtaining requisite approvals from MONREC; else it will be let to dry out in a lined evaporation pond. After the water has evaporated, the lining will be folded and sent for disposal to existing Hazardous waste facility. The hydrotest water disposal plan will need to be submitted to MONREC well ahead of the activity to obtain the requisite approvals.

6.2.3.1.5 Solid Waste

Solid wastes usually generate from construction debris, excavated soil, packaging materials, scrap metals from construction and equipment fabrication, vehicle/equipment maintenance waste, etc. The excavated soil from onshore pipeline route can be used for pipeline backfilled; the others are often segregated and stored in roll-off containers at waste yards managed by the EPC contractor. Besides, there is a volume of domestic waste generated by 7,000 workers.

Domestic solid waste especially from the camps are collected and stored in waste skips and disposed to local landfill.

6.2.3.1.6 Hazardous waste

Solid and liquid hazardous wastes will be generated from equipment maintenance and lubrication, surface coating, on-site fabrication, empty containers of paints/solvents/oils and accidental spills. These wastes typically include used lube oil, batteries, empty drums of paint/solvent/additives, floor sweepings from material storage yard, oily sludge, contaminated soils from spills, off-specification materials, electrical and mechanical components, etc. Most of these cannot be recycled or disposed off -site. Type of hazardous wastes in construction phase is listed in following table.

Type of hazardous wastes in construction phase

No.	Waste type	Description
1	Oily waste	Engine, transformer oil, waste fuel, waste lube oil, cooking oil
2	Oily container/drum	Oil filters, empty chemical drums, maintenance waste-gease, oil, cotton waste, rags, etc
3	Used batteries/ cartridges	Dry batteries, Li, Cd, batteries, Lead acid batteries/acid, toner, used photocopy cartridges, used fluorescent tubes, aerosol containers/cans, used smoke ionic detectors, refrigerant Residues, Pigging residues,

4	Contaminated materials	Solvents/ paints/ thinners residue, sealants/mastic, spill absorbents, contaminated soil, contaminated insulation, mineral wool material, used PPE
5	Lab and medical wastes	Medical /clinical/first aid waste, laboratory waste e.g. expired chemicals
6	Radioactive waste	Radioactive waste

These wastes will be handled safely and stored in skips, drums and containers at the waste yard. They are then transferred to the authorized treatment contractor by EPC Contractor in accordance with hazardous waste management regulation.

6.2.3.1.7 Sources of accident

In construction phase, accidental impact sources at construction sites result mainly from oil spills during routine loading/unloading, transportation and use of hazardous materials. The cleanup of such spills generates oil-contaminated sands, floor sweepings and general debris. For instance, where compressed gas cylinders or welding gases are used, there is a likelihood of such impact sources during storage and transport activities.

6.2.3.2 Identification of Potential Impact Sources in operation phase

The sources of impact related to wastes in operation phase include air emissions, liquid effluents, solid wastes and hazardous wastes generated from the process units along with the utilities, tank farm system and mooring facilities.

6.2.3.2.1 Air Emissions

The significant sources of air emissions – stationary as well as area – during the New Refinery plant operation phase are various process units, heaters, incinerators, flare system, power plant, emergency DG, tanks, pipe fittings, storage tank farm etc., The emissions from the stationary point sources can be either continuous or intermittent. It may be noted that during the operation phase of the New Refinery, the stationary point sources will be the primary contributors to air emissions. The area sources will be less significant when compared to the stationary point sources, while the mobile sources will be insignificant.

Air emissions from the stacks attached to combustion systems, which include gas turbines, furnaces, boilers and flares, are the products of combustion of the fuels and off-gases. While the main products of combustion are carbon dioxide and water vapour, the emissions will also consist of a number of air pollutants including NO_X, SO_2, CO, un-burnt HC and PM_{10}. Among these, NO_X, CO and to a lesser extent HC are expected to be significant. SO_2 and PM_{10} are not expected to be significant since mainly gaseous fuels with negligible sulphur content are used.

Air emissions from stacks attached to incinerators will also consist of NO_X, SO_2, CO, un-burnt HC and PM_{10}. Pollutants such as HCl, HF and dioxins, which are normally associated with incinerators, will not be released since no halogenated substances are incinerated in any of the incinerators.

6.2.3.2.2 Fugitive emission from Storage Tanks

The storage tanks will have vents to facilitate release of the VOCs collected within the tank into the atmosphere. However, it is to be noted that the tanks will be connected either to the flare or the incinerator thus minimizing environmental impacts from tank emissions.

Transport vehicles for people and material will constitute mobile emission sources. However, emission contribution from these sources will be negligible in comparison to the other continuous and fugitive emission sources. Furthermore, the emissions from the mobile sources are difficult to be quantified or estimated at the present stage of the project.

6.2.3.2.3 Noise

The major noise generation sources during the operational phase will be gas turbines, steam generators, flares, incinerators, WWTU etc. The typical noise levels expected from these sources are presented in following table.

Noise Generation During Operational Phase

Noise Source	Duration of Operation	Noise Level (in dB(A)) at 1m from Source
Gas turbine-generators	Continuous	85 (maximum)
Steam Boilers	Continuous	85 (maximum)
Compressors	Continuous	90 (maximum)
Generator air coolers	Continuous	85 (maximum)
Pumps	Continuous	80 (maximum)
Flare – Normal Condition	Continuous	90 (maximum)
Flare – Upset Condition	Discontinuous and rare	115 (maximum)

Since the equipment and machineries will be of latest technology, it is expected that all the high noise producing equipment will have inherent noise controls. Moreover, for machineries like GTs, steam generators and compressors, mufflers, acoustic enclosure and other suitable acoustic treatments will be employed. All the high noise areas will be identified and workers engaged in those areas will be provided with either earplug or ear muff, depending on the requirement. Furthermore, MPE has planned Green Belt with appropriate mix of trees and shrubs along its site fence line to ensure additional noise attenuation. Detailed noise mitigation measures and controls including monitoring requirements have been included in the EMP presented separately.

6.2.3.2.4 Wastewater

In the operation phase, the process effluents comprise spent caustic, containment water, boiler blow down and backwash from process units, which is collected through the drain system. The continuous oil contaminated wastewater is collected from oily water equalization tank, equipment areas and tanker loading areas and is routed to the drain system. The cleaning wastewater comes from various process and utility areas. Accidentally oil-contaminated surface water (AOC) including surface run-offs (rain water, wash down) are collected from project areas with a risk of contamination. Therefore, Specific wastewater streams are collected in dedicated systems before passing to the effluent treatment plant (ETP). The sanitary effluent generated from administrative building and offices is collected separately, pretreated and routed into the biotreatment stage of the ETP. The ETP consists of a two stage oil/water separation unit along with third stage biological treatment.

Cooling water will be river water taken from Ayeyarwaddy River at Ywa Taw port. After cooling circulation, about 5-20% of cooling water will be routed to Flue Gases Desulphurization (FGD) for desulphurisation purpose. The neutralized effluent from the ETP which will also be potentially discharged to the river through the outfall facilities.

6.2.3.2.5 Solid waste

Non-hazardous solid waste

Solid wastes during the operational phase include hazardous and non-hazardous wastes. Non-hazardous solid wastes include packing materials, used electrical fittings, domestic

waste from residential camp, canteen waste, STP sludge, waste paper, printer cartridges, metal scrap, used spare parts and cans, drums and containers of non-hazardous materials. These wastes are stored at designated waste storage areas at the facility and finally disposed off at approved dumpsites or sold to potential authorized buyers for recycling (e.g. waste paper, packing materials, metal scrap and printer cartridges). A suitable waste management facility for storage of solid wastes will be located at the plant boundary.

Hazardous solid waste

When the project comes into operation phase, hazardous wastes from various process units are mainly spent catalysts, spent absorbents, spent de-sorbents, replacement of inert materials, oily sludge, waste chemicals, containers of hazardous materials, incineration ash, etc. Liquid hazardous wastes include spent caustic waste oil / paints / solvents and chemicals.

These wastes will be stored in designated and protected hazardous waste storage area of the Refinery. The hazardous waste storage area will be typically part of the waste management facility, which will be planned and located at the site for storage of non-hazardous and hazardous wastes.

6.2.3.2.6 Accidental impact sources

During the operation phase, the potential accidental releases include gaseous releases into atmosphere, and liquid spills and leaks on land. The potential for accidental release of hazardous gases into the atmosphere is significant due to the handling of NG, which will be used as fuel within the plant. The potential for accidental release of hazardous liquids on land exists for the storage drums and tanks of various feed stock, fuel and liquid chemicals.

The storage facilities will be designed to reduce the possibilities of any leakages or failure of the facilities. Suitable material of constructions will be selected for building the storage tanks and drums. Furthermore, the storage facilities will be provided with preventive measures such as secondary containment, firefighting systems, etc. to prevent accidents due to any leakages from the storage facilities.

Considering the above, the probability of failures / leakages of the storage tanks will be low. The risk management for accidental release on hazardous substances will be developed based on a quantitative risk assessment study that will be conducted as part of the project design.

6.3 Impact Assessment Methodology

This section describes the impact assessment process undertaken to evaluate the level of risk to environmental, socio-economic and health receptors from activities associated with the proposed project. This description provides an account of the identification of potential impacts and benefits and the evaluation of their significance.

The assessment of the level of impact significance requires consideration of the impact level in relation to the receptor sensitivity. The impact assessment is based on four categories of impact significance level as described in the following table. These address the level of mitigation that is considered appropriate to be applied for a given impact.

The degree of significance depends upon the level (i.e. Magnitude, extent and duration) of impacts and the sensitivity of the resource value that they may impact. The criteria used to define the significance ranking of impacts on a qualitative basis are mentioned in the table below.

Criteria used to determine Impact Significance

Criteria	Score	Detail
Extent	3	**High** – Area of impact is beyond 5 km and impact extends to regional and national level
	2	**Medium** – Area of impact is beyond the project area but is in a limited area of 1-5 km
	1	**Low** – Area of impacts is in the project area within a radius of 1 km
Duration	3	**Long Term** – Permanent impact and impact will remain after decommissioning of the project. Impact occurs in long term duration (> 5 years)
	2	**Medium Term** – Impact can be reversible over time (1-5 years), period of impact occurrence is within the project period, impact occurs over mid-term duration (1-5 years)
	1	**Short Term** – Impact can be quickly reversible (< 1 year), period of impact occurrence is less than the project period, impact occurs in short-term duration (< 1 year)
Magnitude	3	**High** – Exceeds regulatory standards, changes the original structure of the environmental or social system or ecosystem
	2	**Medium** – Within regulatory standards, but changes some factors in the environmental or social system or ecosystem but does not change the structure
	1	**Low** – within regulatory standards, with small changes in some factors for the environmental or social system or ecosystem but does not change the structure
		Negligible – no detectable impact on the environment or socio-economic conditions
Receptor Sensitivity	3	**High** – High value/sensitivity receptor or resource, rare or endangered species or habitat impacted on a national or international level, exceeding standards, large permanent change in human use and quality of life values at a regional level, long-term or no reversible.
	2	**Medium** - Medium value/sensitivity receptor or resource, impact disturbs an area that has a value for conservation or causes change in species diversity. Impact important on a local or regional level, within standards, moderate change in human use and quality of life values at moderate level over a long-term duration, reversible over medium-term.
	1	**Low** - Low value/sensitivity receptor or resource, impact disturbs degraded area or slightly disturbs area with value for conservation, causes small changes in species and diversity, within standards, small local change in human use and quality of life values over a short- term duration, reversible over short-term.
		Negligible – no detectable sensitivity

Source: Adapted from Nigel Rossouw (2003); Sippe (1999); and United Nations University (2007)

Impact level score

Where there is any uncertainty, a higher figure is assigned to an impact criterion, so as to reduce the chance of underestimating an impact (i.e., the precautionary principle is applied), thereby minimising risk (Crowfoot et al. 1990).

Each potential impact is then allocated a 'impact level score' obtained by averaging the numerical values assigned respectively for magnitude, spatial extent and duration of impact. The average is rounded up to a whole number where necessary; thus the basic impact index is a number between 1 and 3. Potential positive effects are noted as such but are not subject to further numerical interpretation.

IMPACT LEVEL = EXTENT + DURATION + MAGNITUDE

Impact Level Score

Impact Level Score	Impact Level	Score
7-9	High	3
4-6	Medium	2
1-3	Low	1

The above matrix method is used to consider the Impact Level and Receptor Sensitivity as follows:

Assessment of Impact Significance

The final impact significance is the result of the combination of the impact level Score and the Receptor Sensitivity, as shown in below table. Impact significance is described as negligible, low medium and high.

SIGNIFICANCE = IMPACT LEVEL SCORE X RECEPTOR SENSITIVITY

Impact Significance Evaluation

Significance Level of Environmental Impact			Impact Level Score		
			Low	Medium	High
			1	2	3
Receptor Sensitivity	Low	1	Negligible (1)	Low (2)	Low (3)
	Medium	2	Low (2)	Medium (4)	Medium (6)
	High	3	Low (3)	Medium (6)	High (9)

Categories of Impact Significance

Significance Level	Definition
High (7-9)	Impact is classified as high and can cause numerous effects. Major impacts affect an entire population or species in sufficient magnitude to cause a decline in abundance and/or change in distribution. Large permanent change in human use and quality of life values at a regional and national level. Fatality from an accident or occupational illness. Impacts cannot be managed or resolved by any mitigation measures.

Medium (4-6)	Impact may result in changes that affect the value of resources and environment. Moderate impacts affect a portion of a population and may bring about a change in abundance and/or distribution but does not threaten integrity of population. Impact may affect moderate change in human use and quality of life values at a local and regional level over a long-term duration. Major injury or health effects (including Permanent Partial Disability). Mitigation measures are required to manage or reduce the potential impacts and monitoring measures are required to determine effectiveness of mitigation measures.
Low (2-3)	Impact may result in changes in resources and environment, but this change does not decrease value of these resources and environment. Minor impacts affect individuals within a population over a short period of time. Local change in human use and quality of life values over a short-term duration. Minor injury or health effects (Lost Time Injury). Impact can be managed and resolved by implementation of general mitigation measures.
Negligible (1)	Impact has no effect.

The impact assessment is requires the level of impact significance consideration of the impact level in relation to receptor sensitivity.

The degree of significance depends upon the level (i.e. Magnitude, extent and duration) of impacts and the sensitivity of the resource value that they may impact. The criteria used to define the significance ranking of impacts on a qualitative basis are mentioned in Impact Assessment Methodology.

6.3.1 Pre-construction phase (Planning Phase)

For the planning stage (pre-construction phase), the impacts will be mainly on the social environment.

Potential Environmental Impacts during Pre – Construction Phase

Type of impact, impacted Environment and Environmental parameters	Score				Impact Significance = Impact score x Receptor sensitivity
	Receptor Sensitivit	Magnitude	Extent	Duration	
Land Acquisition	1	1	1	3	2 (Low)
Involuntary Resettlement	1	1	1	1	1 (Negligible)
Living and livelihood	2	2	1	2	4 (Medium)
Conflict of interest	2	1	1	1	2 (Low)

Land Acquisition

Due project activities and components, local people would be prevented from using their cultivate land although the land is not their own land. Since 1980 estimated, government was compensate for existing petrochemical plant (Thapayakan). But developer should negotiate for compensation of crop. The significance level of impact is **low**.

Involuntary Resettlement

The land acquisition will be partially required from the local people (their residential land and plantation) and some scale of involuntary resettlement would occur. The vulnerable people in the project area would also be affected. The significance level of impact is **negligible**.

Living and livelihood

The project affected people's livelihood will change and consequently whose income sources are from vegetable fields. The significance level of impact is medium.

Conflict of interest

If the job opportunity increased by the project is mis - disseminated to the community, there will be a conflict of interest between local community. Furthermore, the conflict of interest would

occur between the relocated households and the host community. The misdistribution of benefits and disadvantages would occur since there are project affected people who lose their income source, while there are people who would have job opportunity as construction workers. The children's education would also be temporarily affected due to relocation. The significance level of impact is **low**.

6.3.2 Construction Phases

6.3.2.1 *Summary of* Potential Environmental Impacts during *Construction Phases*

Table 16: Summary of poential environmental impacts during the construction phase

Aspect	Receptor	Impact	Score				Impact Significance = Impact score x Receptor sensitivity
			Receptor Sensitivity	Magnitude	Extent	Duration	
Site Preparation	Air	Reduced quality due to exhaust gas, dust and particulate emissions	3	3	1	1	6-Medium
	Noise and vibration	Increased noise	3	2	1	1	6-Medium
	Soil	Degradation due to release of contaminants	2	3	2	3	6-Medium
	Groundwater	Release of contaminant due to damage to underground services and existing (historical) sources of contaminants	3	2	2	3	9-High
	Surface Water	Reduced quality due to contaminant inflow	3	2	2	1	6-Medium
		Hydrotesting	1	3	1	1	2-Low
		Effect of sanitary wastewater discharge	3	2	2	1	6-Medium
		Effect of storm water discharge	3	1	1	1	3-Low
	Terrestrial Ecology	Loss of habitat, decrease of air quality, increase in noise and vibration.	1	2	1	3	2-Low
Traffic movement	Air	Reduced quality due to exhaust gas, dust and particulate emissions	3	3	2	2	9-High
	Terrestrial Ecology and Biodiversity	Decrease of air quality, increase in noise and vibration	1	1	1	1	1-Negligible

Equipment and on site machinery use	Air	Reduced quality due to exhaust gas, dust and particulate emissions	3	2	2	2	6-Medium
	Noise and vibration	Increased noise	3	1	1	1	3-Low
Construction of New Refinery Complex	Groundwater	Reduced groundwater quality due to influx of contaminants from inadequate management of wastewater, piling activities, etc	3	2	2	3	2-Low
	Terrestrial Ecology	Loss of habitat. Pollution to the Ayeyar Waddy River. Noise, light and vibration.	1	1	2	2	2-Low
Waste and Hazardous	Air	Reduced quality due to gaseous emissions	3	1	2	2	6-Medium
Material Management	Groundwater	Reduced groundwater quality due to influx of contaminants	3	2	2	1	6-Medium
	Surface Water	Reduced quality due to contaminant inflow	3	2	2	1	6-Medium
	Terrestrial Ecology	Toxic effects	1	1	1	1	1-Negligible
Plant Equipment Testing and Start- up Stage	Air	Reduced quality due to exhaust gas, dust and particulate emissions	3	2	2	1	6-Medium
	Surface Water	Reduced water quality due to effluent discharge	3	2	2	1	6-Medium
	Groundwater	Reduced water quality due to possible intrusion of inappropriately treated effluent	3	2	2	3	9-High
	Terrestrial Ecology	Increased noise, light and vibration.	1	1	1	1	1-Negligible

Impact Level Score is the combination of the ratings credited to magnitude, extent and duration.

6.3.2.2 Potential Impacts on Physical Environment

This phase is planned to commence during the first half of 2021 for a period of 50 months. Project completion is expected to be in Q4 of 2025 (see schedule in Chapter 2). The following paragraphs are consider the main impacts likely to be produced during the construction phase of the proposed project. The works assessed in this part include: the complex site; onshore

pipeline system including crude, product, cooling intake, outfall pipelines. Predicted impacts for the construction phase are summarised in *Table 17*.

6.3.2.2.1 Air Quality

Dust

During the construction phase, dust will be generated due to earthwork activities and exhaust gases from construction equipment and truck movement at the site .

People living along provincial Min Hla- Min Bu road will be also affected by dust. Dust is considered a major adverse impact. The movement of earthworks equipment steel welding and cutting activities, polishing tank surface, and spraying paint on tank and pipeline system will generate a great quantity of dust, VOC, and oxide metals (Fe_2O_3, SiO_2, K_2O). These substances will directly affect on the health of on-site workers and local effects on air quality at the working site.

The Project is located in remote but it is near the staff residential area. Therefore, in the construction phase, dusts do not only affect on the project area but also affect on residential area and nearby communes. Impact level is assessed as **medium** for 3 years of construction and installation.

Emission gas

The major exhaust gases consist of PM, NOx, SOx, CO and VOC. Fugitive emissions from earthmoving equipment, crane and heavy machines will release combustion gases like TSP, NOx, SO2, CO and VOC which will impact local ambient air quality. All these gases created from movement sources will be easily dispersed in an open and flat terrain. Therefore, the impact of exhaust gases is considered as **low** for three construction years.

The painting activity is a potential source of VOC released into the environment, especially under sunshine in the dry season. In practice, the painting activity is carried out in different locations of the Complex, so the VOC will easily disperse into the air with very low concentration and affect insignificantly on the environment. Moreover, MPE will suggest the EPC Contractor apply international painting standards to ensure that VOC concentration comply with National and International requirements. Hence, impact level of painting activity is assessed as **low**.

6.3.2.2.2 Noise and vibration

Noise generated from construction site will come from sources which vary in nature and intensity. The most significant noises are produced by heavy equipment operating on the site, such as compressors, pneumatic and hydraulic tools, excavators, loaders, graders, bulldozers, shovels, and hammers. Other noise sources can include trucks traveling to and from the site, the loading and unloading of materials, and sirens and backup warning signals. There is also noise produced by engines (i.e., valves, air cooling and exhaust systems), as well as vibrations generated by tools. Moreover, poor equipment maintenance (e.g., loose parts and poor lubrication) can create vibrations and, consequently, increase the noise level. If the use of dynamite, is also a significant noise source on construction sites. Noise is a concern for project workers and local communities, especially in the early morning and night time site work activities. The typical noise levels expected from the various construction machines are presented i*n the following table*.

Noise level in the construction phase

Noise of source	Expected noise level(dBA)
Heavy cranes	115
Mass transportation	75
Heavy equipment	125
Earthmoving equipment	115
Others	72-74

The construction activities on-site are likely to affect the ambient noise levels, especially near residential areas. For construction equipment with a typical level of 85 dBA at 15 m, the expected noise level is approximately 49 dBA at 1 km distance from the source and 43 dBA at 2 km distance. Simultaneous operation of multiple pieces of heavy equipment can increase noise level by up to 10 dBA. The noise from a construction work site may have a significant impact on residence located within 1 km of construction activity and could exceed IFC noise guidelines.

Noise levels for a typical haul truck are 85 dBA at 15 m with the average velocity of 80km/h, the forecasted equivalent noise level is LAeq 1h: 50 dBA at a distance of 400 m from the road, in compliance with IFC residential daytime noise guidelines but exceeding residential nighttime guidelines. Noise from transport vehicles will be only transient for a given location and can be considered as a nuisance during daytime and nighttime along the transportation access.

During the nighttime when the ambient noise levels are low, the level of perception to noise is more sensitive and impact more significant.

Moreover, the direct driving a great quantity of concrete piles for foundation consolidating will generate noise but also cause strong vibrating within the project area. It is noted that the noise and vibration caused by pilling drivers are most long lasting, stretching and make uncomfortable (reverberation effect) to local communities within first year of construction period, especially at nighttime.

Thus, noise generated from construction equipment will directly affect to health of construction workers and nearby communities. Impacts level is assessed as **medium** and uninterrupted during working process.

6.3.*2*.2.*3* Soil

The New refinery project will not require additional land acquisition. It will be constructed at the existing refinery plant complex area. Most of the land which is expected to build new refinery plant location is unfruitful and these activities are predicted no change on land use.

The impacts on the soil are due to the disposal of solid wastes such as construction rubble, campsite garbage, and discarded topsoil that may impact soil quality. However, the impact is likely to be insignificant as the project authorities will take adequate measures to ensure that all waste generated at the construction site and at the labour camps are collected and disposed of properly in a dump site or recycled or reused where feasible.

No quarry material will be required as the land is a gentle slope and mostly even and will not involve major cutting and filling. Deeply excavated and removing earth activities affected negatively impacted to the original position of the soil.

During site works, potentially contaminating materials including fuels, engine oil, paints, solvents, acids are expected to be stored on site. Accidental spills or inappropriate management of these may result in contamination of the soil.

However, in the context of an industrial site, soil quality in itself is not regarded as having the high sensitivity that it would in. Therefore adverse impact level is considered as **medium.**

6.3.2.2.4 Ground Water

Groundwater may be contaminated during construction activities including site preparation, the operation of temporary workplaces, and inappropriate handling of hazardous and material wastes. A large portion of the Project Site consists of former industrial facilities including petrochemical infrastructure and gas stations. Hazardous waste has been temporarily stored in several areas now allocated in the existing factory compound. Additionally, above-ground and underground pipes and services are present on the site.

Piling activities could drive contaminated soil material into the shallow and deeper aquifers

or the piling may recreate a preferential pathway for the migration of contaminated liquids. Given the high sensitivity of groundwater in the area, the potential impact significance level is considered to be **high**.

Dewatering may be required to enable foundation construction. In addition to the contaminated groundwater this might produce, this abstraction may also affect groundwater levels of nearby shallow wells.

Additional impacts on groundwater could arise from the inadequate treatment of wastewater that will be produced by the large number of staff working on the site (in the region of 7,000 during peak construction). At this stage, the options for sanitary treatment for the work area are to connect to the existing sewerage network or to use temporary wastewater treatment units. However, obvious leaks or spills could result in an impact of moderate significance.

Inappropriate discharge of hydro-testing water, which will be required for all pipes and tank testing. Due to potentially large quanity of water may be required uncertain source of water can cause contamination in loading of water where precautionary principle has been applied in assigning **high** impact significance level.

The discharge treated hydro-test water to the river is assessed as minor after controlling the content of contaminated substances. The significant potential impact to groundwater contamination in this phase is from sanitary wastewater due to having peak number of workers. As planned, the EPC contractor will provide toilets at the site and camps to collect and treat domestic wastewater on site. Therefore, the impact level to groundwater quality is assessed as small in a short period.

6.3.2.2.5 Surface Water

The surface water bodies that may be impacted by the construction activities. The Ayeyarwaddy river is assigned as a high sensitivity because it is a source of water supply for drinking (following treatment) and is used for irrigation.

Contamination to surface water may arise from various sources. The existing refinery complex and potential historical sources of contamination are likely to be present at the site. During the site preparation works, existing contaminants may be mobilized and travel to surface water, resulting in localized pollution. Dust generation will occur as a result of earth movement. Dust deposition in the creeks may result in degradation of the water quality due to increased total suspended solids (TSS). Besides, heavy metals and other chemical constituents trapped in the dust particles may potentially be dissolved and mobilized into the receiving water. The measured concentrations of TSS in the river were relatively low compared to the national criteria for surface water into which treated industrial fluid wastes are discharged.

The large number of construction workers will result in the production of sanitary waste, which will require wastewater treatment facilities. These wastes will either be treated at the existing refinery or nearby WWTP or using portable treatment units to the standards.

High volumes of wastewater will be produced from machine washing and hydro-testing of the pipes and process units which will be recycled or discharged to the MPE wastewater network to be disposed. Much of this wastewater is not expected to have high contaminant levels and potential impacts would be of short duration, limited to this construction and commissioning stage of the project. However, there is a risk that contaminant levels in wastewater may be higher during the initial set up and testing of the equipment and steps will be taken to ensure that this water is treated to the required standards at the WWTP.

Impact by construction/installation of intake water and outfall effluent system

The water intake from the river is installed at the riverbank and located on the north of existing jetty at Ywa Taw.

The intake channel will be dredged to designed depth to ensure supplying enough river water. The dredging activities will impact to the riverbed and generate a significant quantity of dredged

materials, and the above-mentioned earthwork will be discharged at the approved site disposal site by the authority in the construction phase.

Turbidity will be increased during intake installation near bank. However, construction activities are done in a short time, therefore adverse impact level is considered as short-term and **medium.**

Potential water pollution due to onshore cleaning and hydrotesting activities

Hydrotesting activities will be undertaken after completing the installation of tank system and pipeline system. It is planned to use freshwater and some chemicals as oxygen scavenger, corrosion inhibitor, biocide and dye. A preliminary estimate showed that hydrotest volume is about 48,000m^3 which will be retained in settling pond to remove particulates and recycle for one by one tank testing. At last, cleaned and hydrotested wastewater will be treated through on-site effluent treatment facilities before discharging into the environment.

The discharge of treated cleaning and hydrotest water into river water might cause oxygen depletion and high turbidity around the outfall area. In practice, the hydrotest water will be diluted quickly by the effects of waves and current. Therefore, the impact level is assessed as a minor within 1-2 weeks.

Effect of sanitary wastewater discharge

During the construction phase, a large number of employees are mobilized to the site. The avrage number is about 4,000 persons and at the peak period there will be 1.7 times higher (7,000 persons).

Approximately 2,000 m^3 of domestic wastewater per day will be generated during the peak period of construction activity.

The potential impacts which may be associated with the sanitary effluent discharge are to reduce water quality in receiving waters due to high BOD and COD and dissolved oxygen (DO) depletion around outfalls due to bacterial digestion. This might also cause eutrophication due to increased organic loading (algal blooms) and resultant localized anoxia.

MPE will ensure that effluent treatment design standards are set in the environmental design basis so that the treated effluent from the construction camps will not be discharged into a highly sensitive as Ayeyarwaddy watershed.

On this basis, the discharge of sanitary effluent from the camps will cause a **medium** adverse environmental impact. Impacts will last throughout the construction phase (3 years), but its magnitude will be most significant during peak construction.

Effect of stormwater discharge

Large volumes of turbid stormwater will be generated at the worksite, particularly following excavation work, pipeline trenching and backfilling.

At the end of site leveling course, Chaung Kauk canal will be backfilled. In order to drain water from refinery footprint to the Min Hla- MinBu road, existing refinery complex management board had constructed a drainage creek to Ayeyarwaddy river via Chaung Kauk creek.

To avoid flood to nearby community, the Project has designed a drainage channel in the North of the plant to drain off all volume of runoff storm water from the surface of the Plant. Runoff storm water in the South will be drained through a drainage system along Min Hla- Min Bu Road. Therefore, all of water runoff in the project site and rain water around refinery complex area will be totally drainaged out and do not cause effect to nearby populated area. Impact level of runoff storm water is assessed as **low**.

Oil Spill

Collection of materials at pre-construction and construction activities will use jetty at Irrawaddy River, rail way and road transports. A large quantities of materials will transport to proposed sites by barge carriers, locomotives and trucks. Fuels, grease, and power oils will be used at internal combustion engines of transport vehicles, locomotives, earth moving machineries,

transporting machineries. Loading, unloading, shifting and improvised storage of fuels and power hydraulic oil will be leaked and spilled at river and natural ground. It will be negatively impacted and damaged to soil and cause to water pollution.

Energy Consumption

During pre-construction and construction ,a large quantities of tons of fossil fuels such as diesel, Octane, Gasoline and Hydraulic oil will be consume to run earth moving machineries, construction machineries and generators at proposed site. Electricity Power will use for power generations and lighting purposes. Both electricity and Fossil energy is non- renewable and excessive usage may have serious environmental implications on its availability, price and sustainability.

6.3.2.2.6 Solid Waste generation

Large quantities of solid waste such as removing and cutting down trees, leaves, bushes and leveling to the soil will be generated at earlier pre- construction phase. At construction phase of the proposed project, disposed materials such as metal cuts, used hydraulic oil, grease, lubricants, construction materials, plastic bags, paper bags, empty drums, bundles and wastes will be consisted. Such large quantities of solid waste can be injurious to the environment through blockage of drainage system and sewage system. Some of waste materials contain hazardous substances such as asbestos, enamel paints, cement, adhesive, hardener, cleaning solvent, and chemicals are negative impacts to human and animal health. Alloyed metal cutting, reflective tapes, plastic containers, and plastic bags are not biodegradable and can have long term and cumulative effects on the environment.

6.3.2.2.7 Extraction and use of Building Materials

Building materials such as hard core, ballast, lime, stones, sand, river shingles, woods and required for proposed project construction and oil refinery will be obtained from extract of natural resource of river and land. Since substantial quantities of these materials will be required for construction activities and installation of oil refinery, the availability and sustainability of such resources at the extraction sites will be negatively affected. These are not renewable in the short term. Materials extracted sites will be significantly affected in several ways such as landscape changes, displacement of animals, poor visual quality, vegetation and opening of depressions on the surface leading to human and animal health.

*6.3.2.2.*8 Traffic Flow

During pre-construction and construction phase, roads from jetty to site, nearby towns and villages to site, railway and other traffic will be increased and may be congested . Trucks used to transport various building materials and refinery parts from their sources to the project site will contribute emission of dust, CO2, NOx, and PMs. Large quantities of required materials will be collected from outside of the project area and abroad. Water way transport is cheapest that jetty will be busy. Mostly, transporting from jetty to site will pass through the main road and railway. The impact of such congestion can be greater at main road and level crossing area when slow moving vehicles with heavy materials are working.

6.3.2.2.9 Risk of accident and Injuries of workers

Intensive engineering and construction works including installing towers and chimneys at oil refinery, metal grinding, cutting, welding, moving heavy materials and parts, lifting with cranes, loading and unloading of heavy materials and parts of plant will be exposed to risk of accidents and injuries. Such injuries can result from accidental falls from high elevation and scaffolding. Workers can result injuries from hand tools, cutting, negligence and careless usage of electricity power.

6.3.2.2.10 Visual Quality Disorganization

During pre-construction and construction activities, visual quality will be poor resulted by landscaping , site preparation , removing trees and vegetation plants for construction of new

oil refinery and supporting facilities like as offices, quarters, roads, warehouses, fencing, jetty and stacking materials. This activities and changes at the site and environ is significantly impacted to visual quality of original position.

6.3.2.3 Potential Impacts on Biological Environment in the Construction Phase

As the project will be developed mainly in barren land therefore there will be very less tree cutting and tree felling. But since the proposed project will acquire a large amount of land it can cause damage to soil micro fauna like earthworms and scavengers which helps in maintaining soil fertility.

There exist four industries around the proposed project site within 5 km radius of the study area. These are No.2 Heavy Industry, N0.2 Defense Industry, No.10 Defense Industry and existing refinery. Due to these industries and traffic in the region the air pollution and noise pollution causing damage to the environment, due to which the natural habitats of the wild animals (Barking-deer/muntjac, Wild Cat, Fox) are reducing day by day. Because of shortage of food it is learnt that these animals enter the villages and destroy agricultural land.

Minimal vegetation will be cleared for the construction activities. The necessary stockpiles will be maintained within the refinery complex. The construction labourers will be prohibited from using vegetation for fuel wood. Common kitchens at the camp site will be provided with cooking gas/fuel for this purpose.

The construction phase of the project will not have any impact on the biota freshwater bodies considering its location and operations philosophy.

6.3.2.3.1 *Flora*

During construction, the majority of vegetation on site will be removed. The site is characterized by a low abundance of low biodiversity habitats. The majority of habitats are easily re-creatable and of limited conservation value. Protected flora was not encountered during the environmental baseline survey in the direct impact zone. Existing vegetation on-site comprises mainly trees and shrubs planted for their ornamental (aesthetic) value. There is no associated understorey and their ability to act as wildlife corridors is considered to be limited. As such, the level of the impact to flora on-site during construction are considered to be **low.**

6.3.2.3.2 *Fauna*

The presence of walls restricting access for wildlife into the sites and a lack of semi-natural connecting land significantly reduces the likelihood of any protected species being present within the area before construction.

Linear features, such as the shrubs present in the proposed new refinery plot, may be used by fauna as a wildlife corridor. However, the potential is extremely compromised by gaps, lack of understorey and uniform structure. Additionally, there are no connections to more valuable habitat, such as the Ayeyarwaddy river or the agricultural zone to the East of the Project Area. Thus, a loss of these features is unlikely to significantly impact upon terrestrial fauna.

Edge habitats of cereal fields may be used as feeding stations by mammal species and as basking habitats by reptiles. Damage to the southern edge of the arable fields by the currently-in- construction sanitary pipeline severely compromises the potential for agricultural habitat to be used by terrestrial fauna. The sub-shrub habitat adjacent to the Chaung Kauk Creek represents potential reptile habitat. If, at a future date, the irrigation canal will be impacted, although none is envisaged at the moment, mitigation for reptile disturbance must be assessed by a suitably qualified ecologist. This is likely to involve ensuring habitats are not fragmented in the long-term.

Noise, vibration and dust may impact upon fauna. The lack of suitable habitat, plus the already existing sandy soil and dust from existing waste is likely to reduce the significance of such an impact. As the Project Area and the general area are largely used for residential and industrial purposes, the fauna present is already subject to high levels of noise and vibration.

Waste streams can represent a toxic environment to fauna. This can present both a direct impact through poisoning and also an indirect impact as this is likely to encourage nuisance species, leading to a reduction in prey diversity.

The lack of potential for significant fauna to be present on any of the project plots during construction suggests any impact level will be **low.**

6.3.2.3.3 *Avifauna*

Removal of vegetation used by nesting birds may impact upon the breeding population of the area. However, the lack of woodland structure in the sites means any such population is already compromised. Removal of trees and shrubs when not in use by breeding birds may adversely impact the bird life of the area. However, the lack of woodland and other semi-natural habitats within the sites already decreases the potential use by bird life.

Bats use linear structures as a guide and feeding source. The presence of a network of hedgerows combined with the nearby Ayeyarwaddy river increases the potential for use by bats, although no evidence was recorded on site. However, this is compromised by the lack of on-site semi-natural habitat reducing the potential for diverse, abundant invertebrate species. The linear network also does not connect to any semi-natural features, further reducing the potential.

Noise, vibration and dust may impact upon avifauna. The lack of suitable habitat, plus the already existing sandy soil and dust from existing waste is likely to reduce the significance of such an impact. As the sites and the general area are largely used for residential and industrial purposes, the avifauna present is already subject to high levels of noise and vibration

Waste streams can represent a toxic environment to fauna. This can present both a direct impact through poisoning and also an indirect impact, as this is likely to encourage nuisance species, leading to a reduction in prey diversity.

Due to the sites' low potential to be hosting significant fauna, which is generally a consequence of their industrial character, this VR is considered to be of low sensitivity. As a result, the significance of potential impacts level is regarded as either **low.**

6.3.2.3.4 Biological environment (Pipeline construction)

Flora

The site clearance, trenching and pipeline installation activities will occupy approximately 90% of agriculture land with fruit trees and 10% remained area is trees and shrubs. These area will be used for onshore pipelines system including: two 12" crude pipelines, 11 product pipelines, one intake cooling pipeline and one outfall pipeline and other supported pipelines connecting from off-take to tank for crude and tank area to Harbor for refined products

Accomondation camps, site gathering, assembling and temporary storage a large quantity of equipment, materials, etc will affect vegetation and flora.

However, there is not any rare species and vegetable cover is mainly fruit trees and crops, thus, the significance of this impact is assessed as **minor**.

Fauna and wildlife

Field survey found out that some distributed birds as white herons were observed in project area and pipeline route area. The presence of 4,000 – 7,000 workers may affect threatened fauna species through local market food supplies or restaurant. However, provision of full accommodation and meal for these workers and increase awareness of concervation of wildlife may reduce the potential impact on the threatened fauna species. The significance of this adverse impact is assessed as **minor** and short-term.

6.3.2.4 Potential Impacts on Socio-economic Environment in the Construction Phase

6.3.2.4.1 Social impact assessment (SIA) was carried out by following method

Social impact assessment is the process of assessing, in advance the social impacts likely to follow from a propose project. It will alert the proponents to understand the potential consequences of the project. It is a powerful tool allowing decision makers to initiate steps necessary to prevent harmful impacts.

6.3.2.4.2 Method

SIA uses both secondary and primary data. Secondary data were obtained from census and vital statistics. Primary sources were collected by socioeconomic surveys that produced quantitative data, further qualitative data in the impact area specifically Thanpuyarkan village, Malzalitaw village, Pantawpyin village, Uyin village, Nyaungpinthar village, Ywartaw village and Chaungkauk village, U Yin Zin village, Dar Ma Naing village, Kyaung village, Kywe Tae village,

Yay Poat village, Kywe Thou Myaung village, Shwe Ta Pin Myo Thit, Kyauk Tan Village, Kan Yay Village, Ywa Ma Kan Village and Kyee Pin Kan Village. Following qualitative methods were performed to assess social impacts.

- Key informant interviews
- Focus group meeting
- Public consultations

Since it is an entry point to SIA and participatory work, stakeholder analysis was performed firstly as described in chapter 5.3.5.

Secondary data review was carried out to familiar with the development context and to establish a relevant structure and key social variables in advance.

6.3.2.4.3 Key Informant In-depth interviews

During the survey procedures Key Informant In-depth Interviews were performed. The survey team met key person such as community leaders, community elders, health-care officials, school heads or teacher. Apart from obtaining information about the economic and social welfare situations of the surrounding community, MSR Team explained about the proposed project to the residents.

6.3.2.4.4 Focus Group Meetings

Stakeholders were met to address a particular concern and response and opinion on the effect of the project were recorded.

6.3.2.4.5 Public consultation

Public consultation events were launched in the High School compound in Min Hla and in Primary School in Nyaungpin Thar village. Public and stakeholders were informed about the propose project, and gather their views and concerns and values. Detail of the procedures are described in chapter 10.

6.3.2.4.6 Soco-economic Environment - Potential Impacts

Due to land clearance for the for the construction of the refinery and petrochemical complex and associated facilities the following potential impacts were anticipated.

1) Land deprivation

Thirty-seven households, 191 persons who were cultivating in the refinery compound will lose a significant part of their land [lost more than 81% of their total holdings (323.6 acres out of 339.5 acres)] and 56.75% of households (21households out of 37 households). Farmers who lost agricultural land declared that their land was no longer viable. It is envisaged that there

will be insignificant or no land use conflicts with local communities during construction or operation phase

2) Involuntary Resettlement

Involuntary resettlement is unavoidable that can arise economic, social, and environmental risks, and result in long-term hardship.

3) Living and Livelihood

The households who are doing agriculture in the project area will be affected in terms of livelihood.

4) Conflict of interest

Conflicts can be arising within the communities along the proposed pipeline farmers and residents over affected properties and crops while the activities of the surveyors.

5) Temporary Loss of agricultural lands to other uses

There are two groups of households those will temporally loss agricultural lands.

First group is the households who live from off take point (Saku) to Minbu along the oil pipe line will lost for cultivation while the oil pipe lay down

Second group is the households from Minbu to Thanpuyarkan refinery along the oil pipe line.

6) Job opportunity

New refinery project has the potential to create a major significant positive economic impacts on workers employed and their families. This impact will also benefit to the local communities nearby the project and also to other communities in Magway Region.

During the construction phase, the Project will create jobs for skilled workers and unskilled workers.

The construction period will also create a great demand for various services (food, accommodation, entertainment services, etc.) in order to serve the workers. Local people could also benefit from this demand by providing these types of services.

7) Indirect employment and local procurement opportunities

The project is expected to create jobs during the construction period. In addition, the project will contribute indirectly to create jobs in the project area through business development. These activities will require many unskilled workers. The creation of a large number of jobs during construction activities of the project should contribute greatly to the reduction of poverty not only in the affected township but also in Magway Region.

Local services such as food, entertainment, accommodation will also develop to supply for demand of these work force. This is an opportunity for local people to change job from agriculture to industry and other services.

8) Community Health and Safety

It is anticipated that there will be an impact on community health and safety because of influx of construction workers (who might bring the infectious diseases) and increase of vehicle traffic (vehicular exhaust emissions can cause the pollution – related diseases including respiratory problems, heart diseases, stroke, lung cancer, and chronic obstructive pulmonary disease). The increase of traffic and operation of construction machineries can also cause accidents to the local community and the injuries and even death is possible and hence the safety of the community is threatened

Noise and road congestion from vehicle movement is likely to create some nuisance along the road network. However, the construction activities will be restricted to new refinery project area and daytime thereby limiting the nuisance during night when the perception to noise is the highest.

Infrastructure such as access roads, water, electricity, chapels, healthcare services, recreation facilities, sanitation, and waste services may be shared with the local community.

9) Job opportunity

New refinery project has the potential to create a major significant positive economic impacts on workers employed during construction as well as their families. This impact will benefit to the local communities nearby the project but will also be extended to other communities in Magway Region. During the construction phase, the Project will create skilled workers and unskilled workers. The construction period will also create a great demand for various services (food, accommodation, entertainment services, etc.) in order to serve the workers. Local people could also benefit from this demand by providing these types of services.

10) Gender

In Myanmar, females are generally responsible for a variety of tasks related to household as children education, family health, water supply, agricultural activities and income generation. According to Survey no significant differences for the level of education, between men and women head of households, have been noticed. Most of men and women have a relatively fair level of education (mainly lower secondary). Few women have been identified as head of households in the Project area. Women in the Project area join in all economic activities (agriculture and forestry). Moreover, they are also responsible for housework and breed cattle and goat for home economics. *There are many job opportunities for local women in the construction phase which contributes to improve and keep stable income source.* Given their large responsibilities in regard to the family, women will be greatly affected specifically by the relocation of households.

11) Indirect employment and local procurement opportunities

The project is expected to create an thousand jobs during the construction period. In addition, the project will contribute indirectly to create thousand jobs in the project area through business development. These activities will require many unskilled workers. The creation of a large number of jobs during construction activities of the project should contribute greatly to the reduction of poverty not only in the affected township but also in Magway Region. Local services such as food, entertainment, accommodation will also develop to supply for demand of these work force. This is an opportunity for local people to change job from agriculture to industry and other services.

12) Community Health and Safety

It is anticipated that there will be an impact on community health and safety because of influx of construction workers (who might bring the infectious diseases) and increase of vehicle traffic (vehicular exhaust emissions can cause the pollution – related diseases including respiratory problems, heart diseases, stroke, lung cancer, and chronic obstructive pulmonary disease). The increase of traffic and operation of construction machineries can also cause accidents to the local community and the injuries and even death is possible and hence the safety of the community is threatened. **The significance level of impact is medium**.

13) Local Economy

As mentioned above, the project site is located within a designated industrial area and most of the infrastructure facility are already developed and will be provided by MPE. The construction activities will require significant number of local skilled and unskilled workers. The involvement of local community for employment will be carried through the Me Zi Taw, Pan Taw Pyin, U Yin or Ywar Taw and the respective village Than Pa Yar Kan. People from nearby settlements, are likely to be benefited through employment as part of the construction activities as the construction activities will require a number of skilled and unskilled workers. Although this could be only for a limited period of time during the construction phase positive impact on the local livelihood during the construction phase through creating new job opportunity is envisaged.

In addition, local suppliers will also be benefited as they will be contracted for the supply of water, foodstuff etc. Considering the above, beneficial impacts are envisaged from the project on the local employment and economy. Therefore, it can be concluded that the project will set positive impact on local livelihood option.

Infrastructure such as access roads, water, electricity, chapels, healthcare services, recreation facilities, sanitation, and waste services may be shared with the local community.

14) Land use and Local Communities

As mentioned in Chapter 5 (Environmental Baseline), the project site is a vacant land within the dedicated MPE. It is envisaged that there will be insignificant or no land use conflicts with local communities during construction or operation phase. However, the community may be impacted by movement of heavy machinery and traffic during the construction phase.

Impacts to local communities during the construction phase are also likely from health and safety risk from waste management activities, transportation / movement of heavy equipment and vehicles, earthwork such as excavation, dust and gaseous emissions, noise and influx of large number construction workers to the area. Further, nuisance from increased activities and traffic, stress on road traffic, groundwater use, etc., are likely to have impacts on local communities in the area.

15) Archaeology and Heritage

No sites or objects of archaeological importance are expected to occur within the project site, being a dedicated industrial area. However, if any such objects are encountered during the construction, such area will be immediately cordoned off and MPE or its contractors will inform department of archaeology accordingly to obtain further advice from the Ministry.

16) Community Impacts: Traffic

Impacts on local communities are also considered in the social impact assessment, predominantly from a community perspective basis. During the construction phase there will be three separate transportation requirements of the scheme: The heavy goods vehicles needed during the course of the construction of the site, visiting over the course of three years; five deliveries of large plant equipment (up to 1200 T in weight); and access to site by approximately 7 000 workers at the peak of construction.

The major impacts of the construction phase will be the increased numbers of buses and HGVs that will be required to move workers and materials. It is estimated that the number of HGVs required can be considered as a daily number and it is reasonable to assume that the HGVs will arrive at a steady rate throughout the day. However the bus traffic is likely to occur as an hourly peak, as it is expected that the majority of the employees will begin work at the same time. Therefore the impacts of the different types of traffic will follow a different daily profile.

It is reasonable and robust to assume that the workers' peak and HGVs' peak will occur at the same point during the construction period. If the start of the work is delayed, it is anticipated that the peak will remain at the same level, but will occur at a later time.

This is considered robust as it specifies variations in flows in the local road network and allows each length of road to be considered at a micro-scale. The main concern is buses impacting on the local road network on Min Hla - Min Bu road. Min Hla- Min Bu road is predicted to undergo moderate adverse impacts from both bus and HGV traffic. The Ring Road will experience an increase in bus and HGV traffic, but the impact is considered to be minor as there is spare capacity to accommodate such movement.

The predicted concentrations of new refinery project resulting from construction phase traffic movement are all lower than the air quality standards. However, baseline sampling has suggested that existing levels of TSPM and PM10 exceed NEQG and WBG standards in

places (see Chapter 5). Given that the emissions associated with the project construction phase will add to this situation, the significance of impact must be considered **major.**

Emissions from the increased traffic due to facility construction will increase during this phase. The assessment of this as major significance is primarily associated with the increased use of fuel and the emissions of sulphur dioxide caused by its combustion. This is because the fuel currently available to the construction team is rich in sulphur. It should be noted the construction of this facility will improve this situation for any future construction works in the area as it will increase the availability of lower sulphur fuels.

6.3.3 Operation Phase

6.3.3.1Potential Impacts on Physical Environment in the Operation Phase

Every industry during the operational phase has certain emissions, which create an impact to the environment. The operational phase activities due to the proposed new refinery have the potential to cause long-term environmental impacts. A pre-requisite to estimating the potential environmental impacts for the proposed New refinery plant was the identification and recording of the total project inputs including process technology, raw materials, water and energy. These impacts during the operation phase have been minimized by considering the use of the Best Available Technology, adopting cleaner options, physical and chemical nature of raw materials, precautionary measures, requirements of processing, transportation and handling of any hazardous/toxic/ flammable/explosive material(s), usage of any recycled/salvaged material from industrial waste in the process, optimum usage of water, wastewater recycle and reuse etc.

It is projected that the facility will operate for approximately 25 years, although this may be extended. The following section discusses potential impacts that may arise during the operational phase of the proposed Project. Predicted impacts are summarised in following table.

Predicted Impacts during Operation Phase

Aspect	Receptor	Impact	Score				Impact Significance = Impact score x Receptor sensitivity
			Receptor Sensitivity	Magnitude	Extent	Duration	
Operation of New Refinery complex	Air	Air quality due to pollutant emission	2	3	2	3	6- Medium
		Increased noise	3	1	1	1	3- low
	Soil	Degradation due to contaminant release	2	2	2	3	6- Medium
		Effect of leakage from storage tanks	2	2	1	1	4- Medium
		Effect of hazardous wastes storage and handling	2	2	2	3	6- Medium
		Onshore pipeline system and loading activities	1	2	1	1	2- low
	Surface Water	Impact by effluent discharge	1	2	2	2	2- low

		Maintenance dredging at jetty site	3	2	2	3	9- High
		product loading at jetties	3	1	2	3	6- Medium
		effluent discharges at harbor	1	2	1	1	2- low
		wastewater and solid wastes from vessels	1	1	1	1	1- Negligble
	Groundwater	Reduced quality due to contaminant influx	1	2	1	1	2- low
	Terrestrial Ecology	Decrease of air quality, increased noise and vibration	1	2	1	1	2- low
Traffic Movement	Air	Reduced quality due to emissions	3	1	2	3	6- Medium
	Terrestrial Ecology	Decreased air quality, increased noise and vibration	1	1	1	2	2- low
Waste Management	Surface Water	Reduced quality due to inappropriate waste disposal and release of contaminants	3	2	2	3	9- High
	Groundwater	Reduced water quality due to inappropriate waste disposal	3	2	2	3	9- High
	Terrestrial Ecology	On-site pollution	1	2	1	1	2- low

6.3.3.1.1 Air Quality

The impacts on air quality from any project depend on various factors such as design capacity, configuration, process technology, raw material/fuel used, envisaged emission control measures, operation and maintenance practices. Apart from the above, other activities, viz. transportation of raw materials and products, storage facilities and material handling within the plant may also contribute to air pollution. Air quality is affected by various sources of emission such as stacks, incinerator, flare, tanks, etc.

Air Pollutant Emissions

The New refinery plant complex consists of 9 major units as given in the below Table 18. The major air pollutants from the proposed New refinery plant and existing refinery which will contain refinery units are SO_2 and NOx due to the fuels burnt in the various process units. The fuel gas/liquid fuels in the complex are generated from the various process units and it is hydrotreated so that the fuel has low sulphur content which in turn reduces the emissions from the stacks. The fuel gas and fuel oil are fed to the furnace in a controlled manner so as to have minimum emissions. Natural gas / Synthesis Gas will also be used as a supplementary fuel. The efficient burner management system controls the NOx emissions.

Emission from stacks and flares

During the operation phase, air emissions (NOx, SO_2, CO, PM, etc.) of the New Refinery and existing refinery Complex are emitted through point source stacks of process units and utilities. There are estimated total 19 stacks from various process units and utilities.

In the case of general power failure, discharges from all relief valves (except acid gas service) are routed to the HC flare system. Flaring gas will be routed to the HC purge flare / HC flare by maintaining the different head in the HC purge flare seal drum and HC flare seal drum. In normal operation, there is no emission of SOx and PM_{10} at HC purge flare.

Impacts of VOC from storage tank system

The fugitive emissions from New Refinery and existing refinery complex are mainly from the storage tanks. The storage tanks include the crude oil, intermediate, final product fuel oil and plant inventory storage tanks.

Fugitive emissions of volatile organic compounds (VOC) from the Complex have been estimated from hydrocarbon loss. The estimated quantities of fugitive emissions are based on storage volumes from tank system. VOC emissions from tank farms are controlled due to inherent design features, e.g., installing floating roof tanks, vapor recovery systems, nitrogen blanketing, etc. Considering all the above measures, the facility wide VOC emissions are very small. Total VOC loss is approximately 52 tons/year, compared with 3.5 million tons of crude oil/year. The ratio of VOC tons and crude oil million tons is 14.69 compared with the Benchmark of IFC Guideline on Petroleum refinery from 120 to 300. The VOC emission will be well within acceptable limits. And therefore, the impacts level is considered as **medium.**

Impacts of greenhouse gas (GHG)

The Complex is designed to use energy efficiently by using energy saving technology such as energy optimum method in CDU, energy recovery in preliminary heaters to reuse heat from emission gas, saving energy between units and using energy saving devices.

A heat exchange network is designed to optimize recovered heat, reduce operation cost and increase operational ability of process units. Input temperature of the CDU heater is at maximum value due to taking advantage of heat from stacks and it achieves target of heat sources efficient using.

The operation of process units will generate a significant amount of CO_2 into the environment that will contribute green house effects.

Total volume of CO_2 generated from the Complex operation is about 3.5 million tons/year.

However, in comparison with statistical data of green house gas in the United States (1990-2007), total CO_2 generated from burning of fossil fuels in 2007 was about 5.7x1012 tons, so CO_2 emission level of the Project is **insignificant** in comparison of the ones of the global.

Table 17: Major Units of proposed New Refinery Plant

Sr.	Proposed Units	Facilities
1	CDU+ VDU	Crude complex includes primary crude atmospheric and vacuum distillation units (CDU and VDU)
2	Delay Coker Unit	Vacuum residue from the crude complex undergoes secondary conversion in a Delayed Coker in the Coking Complex
3	Fluid Catalytic Cracker	Fluid Catalytic Cracker (FCC) is the principal conversion unit for fuel and petrochemical (Olefin) products
4	Olefins complex	Olefins present in the cracked products from the FCC are recovered in the Olefins complex
5	Hydrotreating complex	Hydrotreating complex includes hydroprocessing of various streams for superior product yields and qualities with low sulphur. Hydrogen plant produces required hydrogen for hydroprocessing

6	Aromatics Complex	Aromatics Complex includes Continuous Catalytic Regeneration (CCR) Reformer and downstream extraction to make paraxylene, benzene and orthoxylene.
7	Amine Treatment Unit	Amine Treatment Unit (ATU) complex includes individual amine absorber units in CDU, FCC, Coker, Vacuum Gas Oil Hydro Treater (VGOHT), Diesel Hydro Treater (DHT), Heavy Naphtha Hydro Treater (HNHT), Light Naphtha Heavy Treater (LNHT) and Amine Regeneration Unit (ARU).
8	Hydrogen Manufacturing Unit	Hydrogen Manufacturing Unit (HMU) is to produce high purity hydrogen for the hydrodesulphurisation units; and for use in the Indirect Alkylation, Selective Hydrotreater, Tail Gas Treatment Units etc;.
9	Sulphur Recovery Unit	Sulphur Recovery Complex produces elemental sulphur from H_2S produced in hydroprocessing units.

Operational Odour Impacts

Project activities

During the operation phase, the emission of odorous compounds (Hydrogen Sulphide, Ammonia, Dimethyl Disulphide, Benzene, Toluene, Ethylbenzene, Xylenes, Haxane, etc.) of the New Refinery and existing refinery Complex are emitted through point source stacks of process units and utilities.

Potential impacts

Odour emissions from oil refineries are one of the important air pollution issues, which can limit the establishment or expansion of new or existing plants due to the complaints of nearby residents. Odour emissions accompanied by complaints can affect property values and, more importantly, the health of people living in adjacent areas. However, a lack of knowledge surrounding the odour emissions and odour properties of oil refineries has made developing source-specific odour impact criteria and setback distance difficult. Oil refineries' odour properties and the relationship between them and the extent of oil refineries odour impacts on surrounding environment have not been studied in details.

6.3.3.1.2 Noise and vibration

Project activities

Process equipment such as compressors, pumps, heaters, blowers, flare, boilers, turbines, etc. will be major noise sources during the operation phase. The truck loading will also be a generation of noise at plant site as well as along their route to the Complex.

Potential impacts

Project noise level standards are based on the most stringent limits from NEQG and IFC guidelines. The noise generated by the equipment shall not exceed the noise limits for any of the conditions of operation, including turndown, start-up, shut-down and commissioning of the equipment. The equipment must comply with the most restrictive of the specified work area or sound power level criteria. Sound pressure level limits apply at 1m from the process equipment surface and at 3m from vent or on nearest platform.

Noise Level in the Operation Phase

Noise Sources	Noise Limit dB(A)
Centrifugal compressors	85
Centrifugal and axial	95
Fired heaters and boilers	85
Gas turbines	85

Air cooled exchangers	85
Cooling tower	85
Pumps, gears	82
Blowers, agitators/mixers	85
Equipment fitted with acoustic enclosure	110
Operating vents	85
Emergency vents	110
Valves and piping components	82
Other noise sources located outdoors	82
Noise sources located inside process	79
Flare	85

The major stationary noise generating sources expected at proposed New refinery plant during operation phase are given in above table. The noise generation from major equipment will be restricted through manufacture specifications like Gas turbines, boilers, exchangers, etc.: 85 dB(A). Equipment fitted with Acoustic Enclosure and Emergency Vents will be at 110 dB(A). The flare will be at 85 dB(A) during emergency operations, but start up noise will be less than 85 dB(A). Therefore, the noise generating from machines, equipment and process units will be limited inside the plant boundary and cause directly to project workers only. These sources have been considered for prediction of impact on ambient noise levels at nearby human settlements as well as the occupational exposure to workers within the project premises. Accordingly, the net cumulative noise generation due to multiple sources at one location have been derived following standard logarithmic sum (log. Sum) formula. The resultant maximum noise level from site is calculated as 85 dB (A). Assuming no environmental attenuation factors, noise modelling has been done which shows that noise level at different distance from the site has been shown in following table.

Noise Level at various Distances

Noise Levels (dB (A))	Distance from Source (m)
85	2.51
80	4.47
75	7.9
70	14.1
65	25.1
60	44.7
55	79.4
50	141.25
45	251.19
40	446.68
35	794.33
30	1412.5444
25	2511.89
20	4466.84
15	7943.28
10	14125.38

The predicted noise contours around proposed sources are shown the above table. These prediction results are applicable to only present layout plan. In case of any change in layout the distribution/pattern of predicted noise contours are also expected to change accordingly. It is also to be noted these noise contours derived without considering any attenuation factors due to structural interferences or green belt, i.e. the prediction results are conservative. As per the prediction results, the impact of noise outside the proposed project premises would be less than 22 dB(A).

Figure 52: Predicted Noise Contours due to Proposed New refinery plant

The impact of noise levels from the stationary sources within New refinery plant is predicted to be below 20 dBA as given in below table The predicted noise level after superimposing the predicted noise levels with the baseline data are well within the stipulated norms of NEQG.

Predicted Noise level at nearby human settlements

Sr.	Village Name	Distance from project site (meter)	Predicted Noise Level From proposed project dB(A)
1	Than Pa Yar Kan	1400	30
2	Ywar Taw	2500	25
3	Nyaung Pin Tha	2400	25
4	Chaung Kauk	2500	25
5	Me Zi Taw	4000	20
6	Pan Taw Pyin	4000	20
7	U Yin	5000	< 20

Based on Noise Level in the Operation Phase the noise generated equipments at the Refinery will be kept at value of 85 dB(A). Equipment fitted with Acoustic Enclosure and Emergency Vents will be at 110 dB(A). The flare will be at 85 dB(A) during emergency operations, but start up noise will be less than 85 dB(A). Therefore, the noise generating from machines, equipment and process units will be limited inside the plant boundary and cause directly to project workers only. The impact level is considered as **low** and long term.

MPE is defined the design Noise level standard for construction to meet relevant standards during operation. Detail assessment will be carried out during detail design phase. However, during detail engineering, EPC Contractor will carry out the assessment to make sure that noise levels meet Project Standard.

6.3.3.1.3 *Soil*

The normal operation of NRP complex will not cause any additional impact to soil environment due to modern technology and cemented plant surface. However, potential impacts may be created from hazardous materials, hazardous wastes storage and handling and accidental releases only.

Effect of leakage from storage tanks

Project activities

The handling and storage of hazardous wastes inside boundary might be a potential risk of soil contamination. The estimated type and amount of the waste are show in Appendix 19.

Potential impacts

The potential leakage might occur at pipe joints, valves, loading arms, etc. Those leakages are usually small and only limited at working area. In practice, crude oil and products are stored and handled in closed systems and involve the use of insulated storage tanks and lagged and trace-heated transfer lines. Exposure to fuel oil is therefore limited, except on tank filling and during maintenance operations. In addition, each tank is surrounded by bund system; any crude/product release will be kept inside the bunds.

Commercial caustic flakes/ beads are received in 25 kg bags by road trucks in the refinery complex. The bags are unloaded and stored in the Refinery warehouse or in dry enclosed space. Solid caustic feeding package is provided for automatic handling, opening and unloading the caustic bags into the concentrated caustic preparation tank. Caustic flakes are safely unloaded into the tank using a solid caustic feeding package. Therefore, the potential risk of caustic leakage is small and impact level is assessed as **medium** to soil environment.

Effect of hazardous wastes storage and handling

Project activities

The handling and storage a significant hazardous wastes inside plant boundary might be a potential risk of soil contamination.

Regular hazardous wastes are oily wastes, sludge from ETP, ash generated from incinerator, spent replacement materials, spent catalysts, spent absorbents, spent desorbent, catalyst grading materials, spent caustic, etc. from different process units.

Potential Impacts

The release/fall out hazardous wastes may pollute not only soil environment, but also ground water. However, MPE will establish waste management plan in which hazardous material/waste disposal may be introduced for easy identification, ensuring responsibilities, right disposal destination and tracking. So, the significance of these impacts is considered as **medium** during the operation phase.

Onshore pipeline system and loading activities

Product loading at harbor will not cause significant impact to soil environment due to loading activities are operated on the harbor structure.

Normal operation of crude and product pipelines connecting from Refinery and Petrochemical Complex to harbor will not cause soil pollution. In the case of occurring onshore pipeline failure/rupture, spilled oil/product will cause soil contamination along the pipeline right of way. In practice, pipeline tracks are buried at minimum of -1m in depth and isolated with the vicinity by fence and will be supervised by NRP. On the other hand, onshore

oil spill/leakages are usually minor and easy to handle. Therefore, the impact level is considered as **minor**.

During the periodic pipeline pigging, any deposit or fluids inside the pipeline will be discharged to the tank ahead at the pig receiving station in the plant. Therefore, the level impact of maintenance pigging on soil contamination is considered as **negligible**.

6.3.3.1.4 Waste Water Disposal

Crude oil refinery process required large volume of water. New oil refinery will pump Irrawaddy river water and will be purified and supplied for distillation process and cooling process. Out of these volume, a large portion of water is continuously recycled but some of water is highly contaminated and evaporated. Most water usage in petroleum refining process is steam generation and heat transfer. Large volume are lost at cooling tower by evaporation. Along these process, leaks and spills at valve and pipes are major pollution to water. Leakage and spill of petroleum products flows to the refinery drainage system. Storm run-off from contaminated process area is another significant negative impact of waste water. Waste water disposal pollution exists BOD, COD, Hydrocarbons, oil, Phenolic, sulfides, suspended solids, NH3, H2S, and Heavy Metals.

6.3.3.1.5 Ground Water contamination

Project activities

During the operation phase, water supplied for the Complex will routed from (river water) water treatment supply plant, therefore the groundwater will not be affected.

A significant amount of hazardous waste managed, stored and disposed or leaked will cause a potential risk of groundwater contamination.

Potential impact

All hazardous materials, chemicals and waste materials will be contained in proper vessels /storage facilities with adequately designed containments to prevent any impact sources or spills on the land and subsequently to groundwater. Appropriate methods of handling and transportation will be established for hazardous materials and wastes. There will be no underground storage tanks at the facility and the material loading and unloading areas will be designed with proper enclosures on paved surfaces. In addition, the process effluents and sewage will be treated onsite at adequately designed ETP facilities to meet the regulatory requirements for recycling and disposal standards. Therefore, the potential for groundwater contamination is **low.**

The potential causes for groundwater contamination are the disposal of solid and hazardous wastes on land and accidental spillages of hazardous materials (oils, chemicals, paints, cleaning solvents, etc.). All solid and hazardous wastes will be properly collected, segregated and stored in appropriate storage areas. Recyclable wastes such as metal and wood scrap will be sold to scrap buyers, as feasible. Other non-hazardous wastes will be disposed off to approve landfill sites. Therefore, potential impacts due to discharge of handling of solid / hazardous wastes will be minimized by implementation of measures as above.

6.3.3.1.6 Surface Water

The processing facility will produce a wastewater stream that will be treated prior to disposal into the Ayeyarwaddy River. The wastewater will consist of cooling water, process water and surface water runoff. The wastewater will go through treatment processes as described in Chapter 2 that will ensure that the end-of-pipe legislative requirements for discharges to potable water are achieved. The water will then be transferred to existing refinery**,** to join its treated wastewater from the new wastewater treatment units financed by MPE and will be discharged into the Ayeyarwaddy river via the existing outfall.

Following treatment, contaminant levels will be reduced such that the maximum concentrations in the final effluent comply with the permissible limits. There are no standards in the National legislation for ammonia or cyanide but typical international discharge limits are between 1 mg/l and 5 mg/l for ammonia and 0.1 mg/l to 1 mg/l for cyanide. The permissible limit for phenolic compounds is understood to be so low it is unlikely to be achieved. It should be noted that the World Bank Guideline value is 0.2 mg/l.

Most of the cooling water is used to reduce the concentration of contaminants in the effluent from the WWTP through dilution. The cooling water is sourced from the river and therefore will already have high levels of some contaminants. This states that if such water is taken from the same source into which it discharges, and provided that the system is closed, only the standards for temperature and oil and grease will apply.

The legislation also provides standards for the watercourse into which the industrial effluent will discharge. The baseline assessment regarding the contaminants that were found to have concentrations close to or exceeding these legislative requirements in the Ayeyarwaddy river are described as below.

Summary of River Water Results

Analyte	Reference	Unit	Results			
			WR-1	WR-2	WR-3	WR-4
pH	: 5.5-9	-	7.2	7.9	7.9	7.8
BOD	: 20-60	Mg O_2/L	38	39	35	40
COD	: 200	ppm	28	30	34	25
Total Dissolved Solid	: 2000	ppm	120	110	110	110
Nitrate	: 10	ppm	8	7	5	23
Arsenic	: 50	ppb	0.758	3.093	5.777	3.411
Oil and Grease	: 10	ppm	2.71	9.03	3.24	15.35
Phenol	: 1	ppm	0.14	0.03	0.01	0
Sulphate	: 1000	ppm	22	10	7	6
Chloride	: 1000	ppm	10	20	20	20
Electro Conductivity	: 1500	µmhos/c	210	180	170	160
Lead	: 10	ppb	0.088	4.452	0	0
Turbidity	: 5-15	NTU	1	5	5	1
Alkalinity	: 200	ppm	55	60	55	45
Iron	: 3	ppm	0.28	0.17	0.19	0.27
Dissolved Oxygen	: 11	ppm	10.1	11.0	9.8	11.2
Copper	: 3	ppm	0.24	0.24	0.14	0.16
Phosphate	0.0-70	ppm	0	0	0	0
Color	15	TCU	10	10	10	5
Hardness	500	ppm as $CaCo_3$	73	116	75	64
Fluride	1.5	ppm	0.31	0	0.31	0.10
Magnesium	150	ppm	32	35	37	33
Zinc	3	ppm	0.04	0.03	0.11	0.12

The implications of this for the licensing of the discharge for the proposed facility will require further discussion. There is an evidence that the existing refinery outfall could be contributing elevated concentrations of oil and grease to the Ayeyarwaddy river at proposed jetty and landing area (existing refine product terminal and down-stream of Ayeyarwaddy River).

Due to the proposed provision of new tertiary wastewater treatment units in MPE, the future impact of the combined discharge from the MPE WWTP is regarded as positive at this stage.

6.3.3.1.6.1 Impact by effluent discharge

Project activities

The Refinery and Petrochemical Complex will discharge of a large volume of effluents in which are cooling water, from treated FGD effluent, from treated effluent from ETP and from RO unit.

The discharge has some unfavourable effects because it attracts fish and thus causes indirectly food shortage, deterioration of the condition.

Potential impacts

The primary effects of thermal pollution are direct thermal shock, changes in dissolved oxygen and the redistribution of organisms in the outfall. Because water can absorb thermal energy with only small changes in temperature, most aquatic organisms have developed enzyme systems that operate in only narrow ranges of temperature. These stenothermic organisms can be killed by sudden temperature changes that are beyond the tolerance limits of their metabolic systems.

At the site of the discharge the excess temperatures rise as a result of the much lower currents and weaker advection and dispersion. That means thermal plume will cause significant effect to aquatic habitat in the range of 300m surrounding the outfall. But the thermal plume in the river bank and the current varies in range of 0.6 – 0.8^{o}C and is well within the environmental requirements (≤3°C). Therefore, the impact level is considered as small at the outfall and **low** to aquatic habitat.

6.3.3.1.6.2 Impact by maintenance dredging at Product loading jetties

Project activities

Main activities caused potential impact to water habitat at this phase is product loading at jetties and maintenance dredging and material dumping.

There can be impact to water habitat while products are loading at jetties. Risk of oil spill is high at jetties. In case of oil spill occurs, the main threat posed to living resources by the persistent residues of spilled oils and water-in-oil emulsions is one of physical smothering leading in cases of severe contamination, to death through the prevention of normal functions such as feeding, respiration and movement. As damage is caused by physical contact, the animals and plants at most risk are those that could come into contact with contaminated water.

Maintenance dredging and material dumping activities will cause similar impacts as ones in the construction phase. However, the presence of contaminated sediments may be higher due to effluent discharges from industrial activities. The potential effects of these changes on aquatic life are:

- Cause the removal of benthic animals at the dredge site.
- Temporary increases in the level of suspended sediments in the water column which can give rise to increased turbidity, and the possible release of oxygen depleting substances (organic or anaerobic sediments), nutrients and contaminants.
- Temporary reduction of algal/plant growth due to increased turbidity.
- Disturbance to sensitive benthic animals and fish due suspended sediments, which may cause temporary disruption of migration of fish.
- Temporary disturbance of marine animals from the depletion of oxygen due to release of organic-rich material.
- Nutrient enrichment possibly causing increased food supplies/algal blooms.
- Uptake of contaminants by marine life possibly causing direct toxic effects or effects further up the food chain.

- Smothering of benthic animals and plants due to resettlement of suspended sediments.

The overall effect of maintenance dredging on the hydrodynamics and geomorphology of a site has all the complexity of a capital scheme but the impacts are less magnitude. For maintenance dredging, the extent of these environmental affects is near-field and temporary generally only lasting as long as dredging operations are taking place.

However, the presence of contaminated sediment may increase the impact of the maintenance dredging at the disposal site. The impact level is considered as **high.**

6.3.3.1.6.3 Impact of product loading at jetties

Project activities

The refinery products (LPG, RON 92, RON 95, Jet, Kerosene, Premium Diesel, Regular Diesel, Fuel Oil, Benzene, Poly-propylene and Sulphur) will be routed by pipeline from product tank farm and loaded directly into vessels/tankers through loading arms at the berths.

Potential impact

The product loading activities at the harbor will impact to water quality by tankers/vessels propellers and mooring. Other potential impacts include the effects of anti-fouling paints, the types used for vessels to undergo cleaning in the harbor. The estimated area affected by activities at the area of harbor, access channel, breakwater and cooling river water intake channel is about 77 acres.

During routine loading operations, small leakages of oil products may occur at the harbor due to human error. These include the tightening of equipment performance and compliance requirements for tank structural components, valves, and plugs, supporting and anchoring devices and other fittings. The impact level is considered as small and be limited in the harbor area.

Since the Project harbor is constructed nearby the specific port of inland water transport (in the South), so the vessel density at this area will increase significantly and also cause high risk of collision between ships. Although NRP has given effective mitigation and prevention measures to minimize potential risks, impact level of this activity is assessed as **medium** during operation phase of the Project.

It is important to note that the density shipping activities at harbor and access channel might cause high risk of ship collision and oil spill. The density of petroleum products is generally lower than that of water, so in the case of product spillage into the sea; the product itself is extremely volatile at ambient temperature and always floats on the surface. Since it is quickly dispersed into the air, the risk of long term environmental impact to river water quality will be significant. Oil spreading and assessment will be analyzed in detail in the separately report named “Oil Spill Response Plan” for NRP.

6.3.3.1.6.4 Impact by harbor effluent discharges

Project activities

Sources of effluent within harbor will consist of clean water, oily water and sanitary effluent.

Potential impact

Typically storm water run-off from non-process or unused areas where there is no potential to pollute water-run-off is classified as clean effluent. Clean effluents are collected to gravity drainage systems and in open ditches at the harbor. Clean effluents normally have low or negligible content of pollutants and meet the discharge limits. Therefore, this effluent can be discharged, untreated, direct to river. The discharge of clean effluents directly to the river at the harbor will not pollute river water.

Sanitary effluent generated is based on an estimated flow of 300 liters/person/day. It is anticipated that the number of employees will be 42 persons and an allowance of 12 additional persons. The estimation sanitary volume is about 16.2m3/day.

This sanitary effluent will be treated by sewage treatment package at the harbor and then routed to project outfall. The treated wastewater will meet discharge standards of the project. The sludge will be transferred to the secondary treatment stage (biological) of the refinery effluent treatment plant (ETP). So sanitary effluent generated from harbor's topsides will not cause direct impact to river water. Project activities will be updated during EPC phase.

6.3.3.1.6.5 Impacts of wastewater and solid wastes from vessels

Oily wastewater

At product export berths, there will be many ships going in and out. As planned, the NRP harbor will only receive double hull ships or having 2 containing holds, not for ships having ballast water. The operation process of these tankers at the harbor will generate a small volume of oily runoff water since oil stains are swept away from the floor of the ship by rain water. This oily wastewater will be preliminarily extracted the lower layer because oil is lighter than water and will float on the surface. The above oily water layer will be collected and routed to a separate tank and treated periodically (when the tank is nearly full) by the onboard oil/water separator or a licensed company outside the harbor.

Therefore, the NRP harbor will not receive oily wastewater from product vessels and impact level on river water environment is assessed as **low**.

Domestic wastewater

Domestic wastewater generated onboard of product ships will be collected and preliminary treated before discharging into the river. However, number of screws working on these specific ships is not much. Therefore, discharging treated domestic wastewater from ships will cause **low** impact level on the water environment.

Solid waste

Domestic rubbish from canteen area as waste food generated from each ship is not significant. Normal operation of product ships will generate frequently amount of solid waste. These solid wastes are mainly non-hazardous waste as domestic rubbish and a small amount of hazardous waste as oily rag, batteries.

As planned, all solid wastes generated onboard will be classified at source into separate bins before transporting to temporary storage area at NRP harbor. At the harbor area, hazardous waste will be transported to specific storage area of the Complex and treated together with hazardous wastes of the Complex. Non-hazardous wastes will be transported and treated properly by a licensed treater company; and NRP will be responsible for hiring this company in accordance with current regulations. Therefore, impact level of solid wastes generated from ships on water quality at Ayeyarwaddy River is assessed as **low.**

Amount of solid wastes generated from these tankers will be defined by the EPC Contractor in the detailed design phase of the Project.

6.3.3.1.7 Oil Spill at Terminal

Final Products of New oil refinery will be collected at storage tanks and discharged to terminals. To distribute the products along the country, New oil refinery will use water ways, railway and road transport. Product spills will be result at terminal compound. Pipes, Valves, and flexible joints are cause of spill. As well as the Irrawaddy River water is 40 Feet (13.3 Meters) different to Highest water level (Rainy Season) and Lowest water level (Summer) at Minhla, termination process will be used by flexible accessories and joints which will lead to leakage and spill. Lack of supervision and negligence of handling lead to leakage and spill at river water is a significantly negative impact to aquatic flora and fish population and at ground is unregradeable to the soil which is a significantly negative impact.

6.3.3.1.8 Solid Waste

The largest amount of solid waste will originate Cracking, Coke production, Sludge production, sludge treatment, water and oil spreader and effluent treatment systems. Regeneration, recycling and decontamination process can mitigate solid waste at refinery complex. Domestic waste such as plastic bags, paper bags, containers and other small waste will be disposed by land filling or Municipal Authority.

6.3.3.1.9 Risk of Fire

Petroleum oil refinerys exists crude storage tanks, product storage tanks, gasoline, octane, diesel and other flammable product. It is very easy to be explored and burnt because large volume of explosive and flammable are stored. Lack of supervision and negligence of working leads to dangerous fire exploration. The accidental release of syngas(a mixture of carbon monoxide and hydrogen used as a feed stock in making synthetic chemicals),oxygen, and methanol and refinery gases during process operations generates fire and explosion hazards. Explosive hazards may also be associated with the accumulation of vapours in storage tanks.

6.3.3.1.10 Energy *consumption*

Pumps, motors, compressors, boosters, lighting facilities, power facilities, and other electricity power will be installed and operate at new refinery project. Such electricity power is used from national grid which is product of hydro power and gas turbines. Both electricity and fossil energy is non- renewable and excessive usage may be serious environmental implications on its availability price and sustainability.

6.3.3.1.11 Risk of accidents, harmful and injuries of workers

Oil refinery operation workers are working at high temperatures that can lead to heat stress

and contact burning can result handling to hot equipment. During maintenance activities, metal grinding, cutting, welding, moving heavy materials and parts, lifting with cranes, loading and unloading of heavy materials and parts of plant will be exposed to risk of accidents and injuries. Such injuries can result from accidental falls from high elevation and scaffolding. Workers can result injuries from hand tools, cutting, negligence and careless usage of electricity power. Workers may be subject to potential inhalation hazards (e.g. hydrogen sulphide, carbon monoxide, VOCs, polycyclic aromatic hydrocarbons) during routine plant operations. The use of certain chemical substances in the refining process may lead to chemical burns. Polychlorinated Biphenyls (PCBs) fluids are used at electrical appliances and asbestos powders are used at heat coverage bundles, fire proofing and insulation appliances. Both PCBs and Asbestos are harmful and hazardous to health that workers should handle systematically to those materials at maintenance activities.

6.3.3.1.12 Security

New oil oil refinery could be target for criminal or terrorist attack. Well managed security measures must be implemented to hazard.

6.3.3.1.13 Public Anxiety

Particularly from surrounding residents, towns and villages can be caused by a lack of knowledge regarding the nature of the chemicals and products being stored on the site, odours from the site. The potential from fries, explosions and the action that will be taken in the case of an accidental release. The public anxiety can result in significant planning constraints being imposed on this type of facility.

6.3.3.1.14 Financial Implications

Many countries are signatories to the KYOTO PROTOCOL and have adopted targets for the reduction of carbon dioxide emissions. Where governments have set up carbon emission reduction programs and industrial process have been required to reduce their carbon dioxide emissions through the setting of the targets. This can result in a need for substantial investment

in new/clean technologies to achieve the emission targets.

In many countries, new standards for fuels are being set, for example, the amount of sulfur permitted in fuel. This regulation is being set to reduce the amount of air pollution from vehicles. New standards for fuels may be set in permits and/or contracts with customers and many required investment in new technology or lead to increases in the cost of operating plant.

6.3.3.2 Potential Impacts on Biological Environment in the Operation Phase

6.3.3.2.1 Disappearance of wildlife habitat

In next few years, the currently remaining natural forest patches would disappear in the surrounding area of the project sites as long term impact. There can be happening of sever soil erosion due to removal of forest and natural regeneration will not occur, for soil has no nutrient as a result of erosion. Currently existing endangered and key species of plant and animals in various habitats of the terrestrial ecosystem will disappear as a long term impact. Climate change effect will be compounded by absence of forests.

Furthermore, loss of fish species in the Ayeyawaddy River will happen due to oil spill

Interruption of fish migration, as a consequence of the transportation of oil and refinery products from the barge established at the bank of Ayeyawady River bank near Minhla, as well

as due to pollution from spilling oil. Increased fishing pressure can follow and wild stock of fishes in the nearby aquatic environment.

6.3.3.2.2 Visual Impacts

Assessment of the visual or scenic qualities of landscape is sometimes termed “landscape evaluation”. Valued landscape elements (mountains, forested areas, a beautiful view of the countryside, etc.)Though economic aspect of the effects of development is positive, removal

of vegetation will reduce the aesthetic value of the landscape. However, local people have been familiar with prominent structures of currently existing oil refinery factory and associated facilities, emergence of new factory within 200-acre of land is a small minor element of a panoramic view; that will not be a big change in visual amenity.

6.3.3.2.3 Assessment of impact significance

Along with professional judgment and public input, the following impacts both in construction and operation phases are identified as significant and they are assed as follow.

Bio 1. Loss of land cover vegetation and habitats

Bio 2. Changes to terrestrial biota

Bio 3. Changes to aquatic biota

Construction of new refinery, staff quarter, infrastructure facilities such as building, oil storage tanks, waste water pond, etc. and the magnitude of the amount of pollutants emitted. It is necessary to balance the pollutant emissions and construction of new facilities.

Following the establishment of the baseline, an environmental impact assessment was conducted. The main potential issues associated with project development are prioritized as an example of significant level in the evaluation process by assigning score from 1 to 3 parameters based on a grading which is illustrated in the table below:

Bio 1. Loss of Land cover vegetation and Natural Habitats

(Original land cover will be totally changed. Even small areas of remaining natural habitat can be removed.)

Ref.	Extent	Duration	Magnitude/ Intensity	Receptor Sensitivity	Significance =Impact Level score x Receptor sensitivity
Bio.1	2	3	1	1	2 (Low)

Bio 2. Changes to terrestrial biota

(Due to construction for new refinery and staff quarter as well as necessary infrastructure and refinery additional facilities, terrestrial ecosystem may be changed.)

Ref.	Extent	Duration	Magnitude/ Intensity	Receptor Sensitivity	Significance =Impact Level score x Receptor sensitivity
Bio.2	2	3	1	1	2 (Low)

Bio 3. Changes to aquatic biota

(Due to the presence of jetty for transporting necessary materials for currently running oil refinery at Thanphayakan and sending refinery product to needed placers under MPE's management, aquatic organisms including fishes in the nearby area of Ayayarwaddy River suffers pollution of oil spill and oil products. As a result decline of fish abundance in that portion of the river). Fishing is prohibited within I mile radius from jatty since 1982.

Ref.	Extent	Duration	Magnitude/ Intensity	Receptor Sensitivity	Significance =Impact Level score x Receptor sensitivity
Bio.3	2	1	2	2	4 (Medium)

Flora and fauna on site are limited due to the industrial context of the area. A lack of semi-natural habitat and the presence of high walls and fencing limits the potential for terrestrial species to migrate to and from the area. Flora will be strictly controlled by on-site staff, thereby reducing the potential for any new habitat to arise. Operational impacts, such as noise, light, dust and habitat loss from traffic and refinery activities are thus likely to be **Low.**

Unmitigated disposal of waste may lead to pollution of the Ayeyarwaddy river . This may also reduce the potential for the river to provide foraging habitat for birds and bats. The operation of off-site facilities may impact the river banks, limiting its potential to act as a wildlife corridor and fragmenting faunal habitat. Again, given the limited biodiversity of the site and its location within an industrial site, it is likely that any impacts will be **Medium.**

6.3.3.3 Potential Impacts on Socio-economic Environment in the Operation Phase

6.3.3.3.1 Job opportunity

During the operation phase, about thousands skilled and unskilled employees will be employed. In the beginning, the project will start to recruit and train its staff. Priority will be given to local people if the recruitment requirements are met. Workers will be hired only if they meet the project requirements, such as work experience, Language ability, academic background, etc. In operation phase, new refinery project will create direct jobs for skilled and unskilled workers. Besides, there will be indirect jobs through contracts.

6.3.3.3.2 Economic development

When the Project comes into operation phase, it will meet the total fuel demand of the country contributing to ensure national energy security and make a foundation for development of petrochemical industry and other services. The Project will contribute to national budget hundreds of million US dollars every year through taxes.

6.3.3.3.3 Secondary economic activity

New refinery project will rely on numerous vendors and service providers to meet the daily operating needs of the Project and also the domestic needs of its employees. In addition, the Project will induce secondary/tertiary economic activity due the immigration of people from outside the Project area who will require housing, food, and other supplies.

Construction of the new refinery project will create a range of sustained indirect economic opportunities at local and national levels. Local sourcing of goods and services will result in revenues for local businesses and entrepreneurs, provided they can offer sufficient quality and reliability and can meet project standards, particularly on health, safety and environment.

6.3.3.3.4 Access restrictions and diversions

The project will require acquisition of land and access roads used by local communities for daily activities and access to services. Directly affected people will be compensated for the loss of lands, assets and income related to land acquired for the project. However there will be restrictions to access within the project area during the construction activities. Project construction activities will loss access route connecting some villages, causing difficulties for local economic development. The Project construction activities will result in changes in access routes. At least, one of these routes is important for the local population.

6.3.3.3.5 Impact on health

The displacement of those currently living on the site could lead to health impacts associated with disruption to their communities and the loss of agricultural land and the loss of income. The inward migration of large numbers of workers and their family into the area are likely to increase the risks of infectious disease, gastro-intestinal illnesses, injuries, traffic accidents and psychological disorders including stress. There will also be health impacts associated with the greater demands on the area's infrastructure and the general increase in affluence. The physical processes of construction and operation of the Complex will create impacts on traffic, air quality, waste management and water quality that will in turn result in potential human health impacts.

The non-infectious illnesses arising from the Project are likely to include stress, substance abuse, violence and possible occupational illness. These effects will arise during the construction phase and continue into the operational phase of the Project, at lesser extend although the exact effects will evolve as the workforce and nature of operations change. Stress, substance abuse and violence are likely to be of greatest importance during the construction phase. These effects will be largely controlled by planned mitigation measures. Some individuals are particularly prone to these types of ill health and although the risks of significant effects are minor for most of the population, they will be moderate for a small proportion of both workers and local residents. The immigration of thousands of workers for the construction period and construction activities is the main source of health impacts.

6.3.3.3.4 Economic activities

The Refinery and Petrochemical Complex will enhance the development of a series other industries such as production of construction materials, light industry, production of home appliances, transportation, services, etc., and will create many kind of jobs during the operation period. New refinery project will rely on numerous vendors and service providers to meet the daily operating needs of the Project and also the domestic needs of its employees. Project employees will likely enjoy a high income level which will contribute to the demand for local products and services.

The implementation of Refinery and Petrochemical Complex will create a range of sustained indirect economic opportunities at local, regional and national levels. Local sourcing of goods

and services will result in revenues for local businesses and entrepreneurs, provided they can offer sufficient quality and reliability and can meet project standards, particularly on health, safety and environment.

In operation phase, will create thousand direct jobs for skilled and unskilled workers. Besides, there will be indirect jobs through contracts and service suppliers.

6.3.3.3.5 Impact on poverty

When the project comes into operation phase, it will meet the fuel demand of the country contributing to ensure national energy security and make a foundation for development of petrochemical industry and other services. The project will contribute to national budget hundreds of million US dollars every year through taxes.

6.3.3.3.6 Community Impacts: Traffic

During the operational phase it is estimated that 700 workers will be employed on site. The site will be operational 24 hours a day and the workers will be employed in three, eight hour shifts or two twelve-hour shifts.

The majority of raw materials and products will be piped into and out of the site, and thus not require any additional vehicular traffic. The exception to this will be sulphur and coke. The total amount of sulphur and coke produced is likely to be slightly less than 1 600 tonnes per day, which will require 25 trucks to transport it away.

HGV and bus traffic generated during the operational period will be significantly lower than at the peak of the construction phase. The greatest level of impact the operational phase will have on any Link is classified as **minor** adverse.

6.3.4 Demolition and Closure Phase

6.3.4.1 Decommissioning, Demolition and Closure Phase

When assessing alternative to the construction and operation stages of a new oil refinery project, it was assumed the service life of planned facility will be >20 years. This assumption is standard, although actual facility will be operated for much longer period with subsequent gradual upgrades. Thus, the real life cycle of the planned facility has not been specified definitely. But, it exceeds the framework of reasonable assumption. As a consequence, the decommission sequence has not be considered. However, it is expected that procedures implemented during decommission of the complex facility will comply with national and international standards in force at the time of closure of the facility.

6.3.4.2 *Demolition* solid waste

Demolition of the project supporting buildings and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including broken concrete, roofing sheets, dry wall, woods, glass, paints, adhesives, sealants, PVC pipes pieces, Asbestos sheets, steels, aluminum and alloyed metals. Although construction demolition waste is generally considered as less harmful to the environment since they are composed of inert materials but large quantities of such waste may lead to release harzadous chemicals into the environment. Non-toxic chemicals such as chloride, sodium sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of ground water quality.

Demolition of the plant facilities and mechanism will result in large quantities of solid waste.

The waste will contain asbestos, metals, dregs oil, pipes and pipe connections, storage tanks, electricity switch yard and related infrastructure. Chemical plant waste are generally known as significantly harmful to public health and the environment, the plant owner is responsible to remove and dispose hazardous materials such as asbestos abatement, numerous toxic, explosive, reactive waste, petroleum hydrocarbon, dregs and polychlorinated biphenyls.

Petroleum hydrocarbon is already impacted to the soil and ground water since operation period that ground water monitoring works will need to do annually after complete demolition. Systematically removal and characterization of disposal to the public, the plant owner should contract to internationally recognized, expertized hazardous waste demolition and removal company.

6.3.4.3 Air Quality

Emissions generated by activities during the decommissioning/reclamation phase include vehicle emissions and dust from many sources such as land clearing, structure removal, cement mixing, backfilling, dumping, reclamation of disturbed areas (grading, seeding, planting), and truck and equipment traffic.

6.3.4.4 Noise and vibration

During demolition and dismantling works are under process, acoustic environment within the project site and the surrounding area will be impacted noise and vibration.

6.3.4.5 Worker/Public Health and Safety

Potential impacts to worker and public health and safety during decommissioning and reclamation are anticipated from to earthmoving, use of large equipment, dismantling of industrial components, and transportation of overweight and oversized materials

6.3.4.6 Impacts to Soils

The removal of plant, pipelines and other ancillary structures could result in impacts to soils. Surface disturbance, heavy equipment traffic, and changes to surface runoff patterns could cause soil erosion. Soil erosion impacts include soil nutrient loss and reduced water quality in nearby surface water bodies.

6.3.4.7 Retrenchment of employment

Thousands of refinery workers, officers, technicians, engineers and managers will be retrenched at decommissioning, demolishing and closure of oil refinery.

6.3.4.8 Inarable land

As the project site area is largely concrete-filled and surrounding land area has lost its top soil due to severe soil erosion as a result of disappearance of forest patches, the soil cannot be arable, though resurgence of agricultural activities occur elsewhere along with economic development of the region and the country.

6.4 Risk Assessment

In general terms, risk assessment comprises the scientific methods of confronting and expressing uncertainty in predicting the future. This is a procedure in which the risks posed by inherent hazards involved in processes or situations are estimated either quantitatively or qualitatively.

6.4.1 Risk Assessment Methodology

6.4.1.1 Use of Risk Assessment

Risk Assessment method is used to determine the significance considering the following factors

– probability of an adverse event
– consequences of an adverse event
– probability of detection of the effect or the degradation which results from loss of control

Risk is calculated as the product of all three factors. The effects which are having highest risk factor are considered to be most significant. Those effects which are governed by regulations are to be regarded as most significant.

6.4.1.2 Risk Calculation

Probability of occurrence		Probability of detection		Severity of degradation	
Criteria	**Scale**	**Criteria**	**Scale**	**Criteria**	**Scale**
Very low	1	Low	1	Negligible	1
Low	2	Moderate	2	Low	2
Moderate	3	High	3	Moderate	3
High	4	Very high	4	High	4
Very high	5	Certain	5	Very high	5

Categories of Probability of occurrence

level	Definition
Very low	An unlikely probability of occurrence
Low	A remote probability of occurrence
Moderate	A moderate probability of occurrence
High	A high probability of occurrence
Very high	A very high probability of occurrence

Categories of Probability of detection

level	Definition
Low	Low or no detectability
Moderate	Moderate degree of detectability (Fair detectability)
High	Good/high degree of detectability
Very high	Very high degree of detectability
Certain	Definite detectability

Categories of Severity of degradation

level	Definition
Negligible	The severity of degradation is no impact and can be neglected
Low	The severity of degradation is low and the impact is almost negligible
Moderate	The severity of degradation is sensible enough to be taken into account
High	The severity of degradation is high enough for causing any damages
Very high	The severity of degradation is very high and the damages will be enormous

RISK = PROBABILITY OF OCCURRENCE X PROBABILITY OF DETECTION X SEVERITY OF DEGRADATION

6.4.1.3 Evaluation of Risks

Risk		
Scale	**Scale if 'Probability of Detection' is NA**	**Evaluation**
1 – 25	1 – 5	Very low
26 – 50	6 – 10	Low
51 – 75	11 – 15	Moderate
76 – 100	16 – 20	High
101 – 125	21 – 25	Very high

Categories of Risk Evaluation level

Risk Evaluation level	Definition
Very low	A risk at this level – if it occurs – will have little or no impact on achieving outcome objectives.
Low	A risk at this level – if it occurs – will have a minor impact on achieving desired results, to the extent that one or more stated outcome objectives will fall below goals but well above minimum acceptable levels.
Moderate	A risk at this level – if it occurs – will have a moderate impact on achieving desired results, to the extent that one or more stated outcome objectives will fall well below goals but above minimum acceptable levels.
High	A risk at this level – if it occurs – will have a significant impact on achieving desired results, to the extent that one or more stated outcome objectives will fall below acceptable levels.
Very high	A risk at this level – if it occurs – will have a severe impact on achieving desired results, to the extent that one or more of its critical outcome objectives will not be achieved.

6.4.1.4 Risk Evaluation for Pre - Construction Phase

No.	Impact	Probability of occurrence	Probability of detection	Severity of degradation	Scale	Level
Social Environment						
1	Land Acquisition	1	5	4	20	Very Low
2	Involuntary Resettlement	1	5	4	20	Very Low
3	Living and livelihood	4	4	3	48	Low
4	Conflict of interest	3	4	3	36	Low

Note:

1. Since the affected group do not own the project land where they are using for their livelihood land acquisition is not necessary to take action and evaluated as very low risk.
2. Consequently, involuntary resettlement will not occurrence due to the land is owned by Government since 1980 estimated. Therefore, risk evaluation level is very low.
3. There can be impact on living and livelihood and conflict of interest however the risk evaluation level is low.

6.4.1.5 Risk Evaluation for Construction Phase

No.	Impact	Probability of occurrence	Probability of detection	Severity of degradation	Scale	Level
Physical Environment						
1	Soil Quality	4	4	4	64	Moderate
2	Soil Erosion	1	4	1	4	Very Low
3	Topography	3	5	4	60	Moderate
4	Dust Emission	4	4	4	64	Moderate
5	Air Pollution	4	4	4	64	Moderate
6	Greenhouse gas emissions	3	5	3	45	Low
7	Surface water contamination	4	5	3	60	Moderate
8	Ground water contamination	3	3	3	27	Low
9	Surface water Hydrology	3	5	3	45	Low
10	Noise and vibration	4	5	3	60	Moderate
11	Solid waste generation	5	5	3	75	Moderate
12	Changes to Natural Resources	4	3	4	48	Low
13	Traffic flow	4	5	4	80	High
Biological Environment						
1	Protected Areas	1	5	1	5	Very low
2	Changes to land cover or vegetation loss	3	5	3	45	Low
3	Changes to areas of natural habitat or habitat loss/destruction	4	5	4	80	High
4	Loss of wildlife (Endangered species – IUCN listed)	1	5	1	5	Very low
5	Changes to terrestrial flora and fauna	3	5	3	45	Low
6	Changes to aquatic flora and fauna	4	4	4	64	Moderate
Social Environment						
1	Living and livelihood	4	4	3	48	Low
2	Conflict of interests	3	4	3	36	Low

3	Existing social infrastructures and services	4	3	3	36	Low
4	Cultural heritage/traditional value	2	4	3	24	Low
5	Landscape and scenery	5	5	2	50	Low
6	Risks for infectious diseases such as AIDS/HIV	3	4	4	48	Low
7	Occupational health and safety (Risk of injuries and accidents to workers)	4	5	3	60	Moderate
8	Emergency risk (flood risk, risk of fire, earthquake)	4	5	3	60	Moderate
9	Community Health and Safety	3	4	3	36	Low

Note:

1. The impact of traffic flow is evaluated as highest risk on physical environment due to large vehicles for deliveries, hiab cranes, and existing traffic.
2. Changes to areas of natural habitat or habitat loss/destruction leads to highest risk on biological environment.
3. Other impacts are range from very low to moderate.

6.4.1.6 Risk Evaluation for Operation Phase

No.	Impact	Probability of occurrence	Probability of detection	Severity of degradation	Scale	Level
Physical Environment						
1	Soil Quality	3	5	4	60	Moderate
2	Dust Emission	3	5	3	45	Low
3	Air Pollution	4	5	3	60	Moderate
4	Greenhouse gas emissions	3	5	3	45	Low
5	Surface water contamination	4	5	3	60	Moderate
6	Ground water contamination	3	2	3	18	Very low
7	Increased water demand	5	5	3	75	Moderate
8	Noise and vibration	3	5	3	45	Low
9	Increased Solid waste generation	4	5	3	60	Moderate
10	Increased waste water generation	4	5	3	60	Moderate
11	Hazardous waste generation	4	5	3	60	Moderate

12	Changes to Natural Resources	3	3	3	27	Low
13	Increased Traffic flow	4	5	3	60	Moderate
14	Foul Odour and Vectors	3	3	3	27	Low
Biological Environment						
1	Protected Areas	1	5	1	5	Very low
2	Changes to land cover or vegetation loss	3	5	3	45	Low
3	Changes to areas of natural habitat or habitat loss/destruction	4	5	4	80	High
4	Loss of wildlife (endangered species – IUCN listed)	1	5	1	5	Very low
5	Changes to terrestrial flora and fauna	3	5	3	45	Low
6	Changes to aquatic flora and fauna	4	4	4	64	Moderate
Social Environment						
1	Inconveniency with socio-economic change	2	2	2	8	Very low
2	Community Health and Safety	4	4	2	32	Low
3	Occupational health and safety (Risk of injuries and accidents to workers)	4	5	3	60	Moderate
4	Light intrusion	3	5	3	45	Low
5	Increased Emergency risk (risk of fire)	4	5	4	80	High

6.4.1.7 Risk Evaluation for Decommission/Closure Phase

No.	Impact	Probability of occurrence	Probability of detection	Severity of degradation	Scale	Level
Physical Environment						
1	Dust Emission and Air Pollution	5	5	3	75	Moderate
2	Greenhouse gas emissions	2	3	3	18	Very low
3	Surface water contamination	3	3	3	27	Low
4	Noise and vibration	4	5	3	60	Moderate

5	Waste generation (Solid, Wastewater, Hazardous)	4	5	3	60	Moderate
Social Environment						
1	Living and Livelihood	5	5	4	100	High
2	Risks for Infectious disease such as AIDS/HIV	3	3	3	27	Low
3	Occupational Health and Safety	4	3	3	36	Low
4	Community Health and Safety	3	3	3	27	Low

6.5 Mitigation Measures

This section outlines the necessary mitigation measures that will be adopted to prevent or minimize significant negative environmental impacts associated with the activities of the project during Construction Phase, Operation Phase and Decommissioning Phase.

This chapter outlines the necessary mitigation measure that will be adopted to prevent or minimize significant negative environmental impacts associated with the activities of the project during Pre-construction, Construction, Operation, Decommissioning, Demolishing and Closure phases.

6.5.1 Pre-Construction Phase (Planning phase)

6.5.1.1 Mitigation Measures on Social Environment

6.5.1.1.1 Land Acquisition

The discussion and negotiation will be made between developer and the land owners to get the agreement of using the land for the benefit of both parties. If the land owners would like to sell the land to the developer, the developer would buy these lands.

6.5.1.1.2 Involuntary Resettlement

The initial discussion will be made to avoid the involuntary resettlement for the affected people. As necessary, the compensation and assistance for them will be provided.

6.5.1.1.3 Living and livelihood

The compensation for the loss of income will be made and the affected people will be employed by the project for construction and operation phases according to their education, work experience, and interest. If needed, the skills training will also be provided to them.

6.5.1.1.4 Conflict of interest

Primarily, the job opportunity will be disseminated to the community on the basis of the severity of the impact experienced by the affected people. The adequate infrastructure and services will be arranged according to the actual need of the people.

6.5.2 Construction Phase

6.5.2.1 Mitigation measure on Physical Environment

NRP has prepared project HSE policy and conducted all mitigation measures during construction phase to minimize adverse impacts in construction phase on environment and

social economic activities of local people. Mitigation measures for separated objects are shown in following sections.

6.5.2.1.1 *Air Quality*

Air & dust emissions during the construction phase will be minimized by implementing the following measures:

Mitigation Measures

- Daily water spray road and site of the Complex to reduce dust;
- Usually sweep rock/soil litered in material transport road;
- Introduce a site speed limit (20 km/h) to trucks and other vehicles for reducing dust;
- Well ventilation for working areas created dust and exhausted gas such as welding, paint spraying, warehouse and supply safety individual equipment suitable for workers as hamlets, masks, protective clothes…
- At paint spraying area, workers must be equipped with specific protective clothes, anti-toxic mask and oxygen cylinder in special case;
- Do not use chemicals containing forbidden substances, such as asbestos;
- Choose worldwide used paint to ensure that VOC content meet national and international requirements;
- Low sulphur fuels to be used for vehicle;
- On-site roads to be paved with dust free material to reduce dust generation;
- Paving roads between washing facilities and site exits;
- Cover materials of all free dusts during off-site road haulage;
- Road maintenance; grading and compacting road surfaces to prevent uneven running surfaces, which create both noise and dust;
- Install wheel washing facilities at appropriate positions from the site entrance within site boundary;
- Limit vehicle age and/or condition and vehicle maintenance to reduce fuel use and poor air quality due to vehicle emissions;
- Routing haul routes away from sensitive areas (schools, protective forest, etc.) wherever possible;
- Ensure that dust generation from construction roads is managed; control conformity of covering canvas over material transport vehicles, speed limit and water spraying on transport road;
- No open burning of wastes to be undertaken;
- Take proper measures for polishing tank surface to reduce dust problem. Limit use sand spraying method.

6.5.2.1.2 Noise and vibration

Noise generated from construction equipments will directly affect to health of construction workers and nearby communities. Impact level is assessed as moderate but uninterrupted during working process. The following mitigation measures will be applied:

Mitigation Measures

- Ensure that all Contractors on site have effectively controlled noise levels from equipment. Effective noise controls include:
  - Regular inspection and maintenance all vehicles and construction equipment working on-site;
  - Installation of sound suppressive devices (such as mufflers) on all mechanical plant as necessary;

  - Where practicable, vehicles and machinery that are used intermittently should not be left idling for long periods of time
- Excessively noisy activities will be conducted between 6:00am – 18:00pm if they are likely to cause any nuisance to local residents;
- Equipment used on-site will be the quietest reasonably available;
- Equip ear-protection devices for workers at working site.
- Haul routes for construction traffics entering and leaving the site will be selected to ensure noise levels at noise sensitive receptors are kept at a minimum;
- Enforce speed limits in relation to road conditions and location of sensitive receptors (such as schools, population areas, etc.);
- The adjacent residents will be notified prior to any noise events or noisy operation outside 6:00am – 18:00pm from Monday to Sunday

6.5.2.1.3 Soil quality

Solid wastes generate from construction activities might cause impact to soil quality. Following mitigation measures are proposed including:

Mitigation Measures

- Construction wastes will be handled and disposed of in accordance with hazardous wastes management regulations.
- Waste storage area should not be located near sewer or outfall system to avoid cause air pollution and generate odour;
- Temporary storage of wastes at site designated areas. Hazardous wastes to be fully contained and stored undercover within retention bunds in order to avoid any leakage into the area;
- Hazardous solid wastes must be collected to labeled drums named “Hazardous wastes” and stored in temporary roofing storage house inside the complex boundary before transfer to treater who has given license of treating hazardous wastes.
- Provide documentation in detail with dates of delivery and quantities of consignments, as well as instructions on the safe storage, use, collection and disposal of materials and waste products prior to transfer to the disposal places;
- Put waste baskets at each constructional section with at least 3 different colored and labelled baskets to collect hazardous waste, non-hazardous construction wastes (Iron, steel, wooden ends, etc) and domestic waste at construction site;
- Restrict access to hazardous waste storage area.
- Minimize generated wastewater and reuse as much as possible. Minimize using Hazardous chemicals; segregated and stored in secondary containment.
- Conduct refueling in designated area with secondary containment as far as practicable.
- Where in-situ refueling required, follow procedures to reduce spillage.
- Environmental awareness training compulsory for site construction workers.
- Access to hazardous materials will be restricted and notification of volumes and routine inspections of storage facilities will be made.

6.5.2.1.3 Surface water

The following mitigation measures will be applied to reduce the impact on river water quality from construction of intake water and outfall effluent system, Cleaning and Hydrotesting after completing installation tankage system and in plant pipeline system, stormwater and domestic wastewater:

Mitigation measures for surface water

1. During constructing intake water and outfall system

- Notify the process, working sites, implementation duration of the harbour/jetty to the local Authorities and fishermen. Set up a restricted area for the working site by using buoy system and signal-lamp (at night) to restrain the collision incident/accidents.
- Select suitable trenching method in order to reduce riverbed disturbance at the Ayeyarwaddy River;
- Install concreted barrier to protect the head of outfall system;
- Collect solid waste onboard, absolutely avoid discharging solid waste to river water.

2. **Cleaning and Hydrotesting**

- No discharge of contaminated effluents.
- Reuse hydrotest water to limit generated wastewater.
- Treat cleaning and hydrotesting water before discharge:
  - Separate solid residue and oil generated in construction and tanks and pipeline installation phase;
  - Treat chemicals in temporary neutralization tanks at tankage area.
- Do not discharge treated hydrotest water onsite. it should be discharged into the river as far the shore as possible;
- All other contaminated effluents from commissioning will be treated through on-site effluent treatment plant.
- If wastewater is treated at other area, it should be removed oily residues and reduced turbidity prior to transport.

3. **Storm water Discharge**

- A storm water collection system will be installed throughout the worksite to minimise soil erosion and reduce turbid water discharge to the nearshore area.
- A storm water drainage system in trapezium shape will be installed in the Northern site to outlet safely total amount of runoff water to avoid flood for surrounding community;
- Runoff water in the Southern site will be routed to drainage system along provincial Min Hla- Malon road built by MPE;
- Dyke around the site to control storm water to reduce over flow to the environment directly

4. **Sanitary Wastewater Discharge**

- Treat sanitary wastewater to be met NEQG guidelines;
- Build temporary water closets at the site to collect and treat preliminary domestic wastewater generated in this phase;
- Contract with township municipal department to periodically suck septic tanks at construction and camping site and treat properly in accordance with in force regulation;
- Do not discharge sanitary effluent to Ayeyarwaddy river. Treated sanitary wastewater shall then be routed to the river via an outfall pipe at the location of adequate dilution and dispersion of effluent.
- Regular monitoring of effluent from the construction site will be undertaken to ensure treatment efficiency.

6.5.2.1.4 *Groundwater*

Sources causing effects to groundwater resources are from sanitary and cleaning and hydrotesting discharge, the following mitigation measures are proposed:

Mitigation Measures

- Control cleaning and hydrotesting process and quantity of chemicals used.
- Monitor discharging process;
- Control and monitor sanitary discharge process;
- Monitoring groundwater quality after construction phase.

6.5.2.1.5 *Ecosystem*

Some following mitigation measures are proposed to reduce the impact on terrestrial ecosystem.

Mitigation Measures

- Vegetation clearance in construction period of pipeline and harbour site should be reduced as much as possible;
- Prevention of trespass and hunting by staff and contracted personnel.
- Plant green trees around the complex area and along onshore pipeline and some areas in the Complex (not less than 10% of total project area).

6.5.2.1.6 Safety for the workers

Working accidents in construction phase mainly concern with traffic, machine operation and faults caused by human. In order to keep safety for the workers in this phase, MPE will ask EPC Contractor apply following mitigation measures:

Mitigation Measures

- Instruct employees to utilize equipments in construction activities (materials, lifting technique and limit weight);
- Limit load/unload, transport heavy goods by hand;
- Choose tools and arrange working area to reduce effort and time;
- Clean usually wastes and overflow effluents in construction site;
- Use anti-slipped boots;
- Put barriers around deep area to avoid to fall down;
- Train workers to use protective equipments properly as well as fall prevention system;
- Set up procedures for working in height, fall prevention plan and fall down first aid;
- Manage and use radioactive substance in accordance with regulations of xxxx Law
- Use control and monitoring system to protect workers in dangerous cases;
- Safely manage wastes with slide gutter system and assigned disposal area;
- Avoid to generate splinters when operate/control heavy devices by clear the traffic road;
- Evacuate workers out of construction site when carrying out explosion activity (mines, bombs…);
- Equip appropriate protective clothes (safety glass with blanket, hard helmet and protective boots);
- Develop traffic management system to minimize potential risks, such as isolate transport road area, limit speed, set up one way route…;
- Ensure vision for workers when working or passing areas having heavy machines in operation; instruct workers how to test and protect eyes;

- All mobile equipments have sirens with suitable volume;
- Check and maintain carefully lifting equipments (cranes…)
- All workers should be trained about industrial safety before working in limited spaces;
- Apply work permit for all workers, supervisors in construction area;
- Implement preventive measures such as breathe support devices, lifeline, monitoring station to observe safety for workers with first aid and rescue tools;
- Personnel protective equipments must be available and enough;
- Provide clothes used in humid weather for all workers;
- Workers should be check for health before entering working site, especially those doing heavy work or in dangerous area;
- Keep roads from construction area to camp site safe and clean in bad weather condition;
- Prepare high capacity pump system enough to pump rain water out of flooded area.

6.5.2.1.7 Water way and road traffic

Mitigation Measures

1) **Water way traffic**
   - Arrange reasonably berthing schedule for materials and construction equipments transport ships to avoid to slow down the Project progress and water way traffic in local area;
   - Inform local authority and community about pipeline and terminal installation schedule to avoid high density traffic;
2) **Road traffic**
   - Arrange reasonably operation schedule and number of transportation vehicles for materials and construction equipments to avoid local traffic jam. Limit to transport in rush hours.
   - Choose reasonable transport route and avoid away from heavy traffic roads;
   - Loading/unloading materials activities must be acted as quick as possible to avoid traffic jam;
   - Project emergency response plan should include case of traffic accident occurring outside of the Project area;
   - Implement strictly safe driving for whole company, all contractors and local community;
   - Implement propagandize safe traffic for workers;

6.5.2.1.8 Mitigation measures for natural calamity

To ensure safe for all persons taking part in the Project, the Project owner has prepared health, safety and environment (HSE) plan to manage project activities and asked contractors comply with:

- HSE standards for Contractors;
- HSE plan at construction site;
- Requirements on escape in emergency cases;
- Requirements in construction activity in storm and heavy rain weather;
- Requirements in construction phase;
- Requirements on temporary works;
- HSE and security guidelines for Contractors.

Before implementing activities in construction site, EPC Contractor must submit MPE all safe procedures in detail for approval. EPC Contractor should be aware of incidents caused by earthquake, storm and rising river water level to prepare mitigation and repair measures.

Calamities cause damages not only for materials but human lives. Therefore, MPE will require EPC Contractor apply some following measures to mitigate negative impacts of calamity and storm/flood.

Mitigation Measures

- Actively protect working sites and implement safe measures for under construction site in case of being forecasted of storm;
- Prepare plan, alternatives and measures to ensure construction schedule progress, safe for dyke, intake channel and not causing effects on residential area, production units (inside/outside of project area), minimize damage in case of flood, storm, heavy storm or other calamities;
- Check drainage system of construction site to sure that rain water is not stagnant causing flood in construction area and it vicinity;
- Check electricity supply system served for construction; Shutdown electricity system during storm/flood to ensure safe.
- Co-operate with local authority and people to prevent calamity and response incidents if necessary;
- Get necessary response force ready (communication, person, response tools…) in case of incident;
- Prevent rascals in unusual weather condition.

6.5.2.1.9 Off-Take Point

The impact of the Off-Take Point on the environment in the pre-construction and construction phases is negligible as the facility already exists with full functions for the operational phase. Land for the facility is already acquired, eliminating the issue of compensation for the land and avoiding conflicts with farmers and residents over properties and crops. There could only be some structural and logistical additions. It is located in an isolated area, with no nearby villages. In fact, all impacts associated with the pre-construction and construction phases of a project have been eliminated by the simple fact that the facility already exists.

6.5.2.1.10 Oil Pipeline (Construction Phase)

6.5.2.1.10.1 Land acquisition and compensation issues

This impact is regarded as major in magnitude. The crude oil pipeline that MPE proposes to use has a width of 12” in diameter and a swathe of land 35 meters wide is needed all along its ROW in accordance with international practice.

Then, access tracks across cultivation fields to the pipeline’s ROW must be laid for haulage trucks carrying line pipes and construction and installation equipment and workers to sites all along the ROW.

A compensation action plan should be prepared and implemented following appropriate compensation procedures**.**

Monetary compensations will be paid to people whose farms or crops will be destroyed due to the construction and installation of the oil pipeline.

MPE will engage staffs who are community relations officers. These community relations officers will be tasked to undertake community sensitization programs which should be ongoing.

The program will help avoid unnecessary tension between misinformed communities (members) and the MPE and establish a better rapport between the two interest groups.

6.5.2.1.10.2 Conflict with farmers and residents over affected properties and crops

Communities along the proposed oil transmission pipeline will be informed well in advance by MPE on the project through local authorities (ward, village tract and township authorities) and by the distribution of pamphlets. The activities of the surveyors within the communities and through farms will therefore not be excessively intrusive to residents and farmers in the affected areas.

6.5.2.1.10.3 Livelihood issues

Appropriate compensation to be paid to the affected people.
Education on alternative livelihoods to be provided by MPE.

6.5.2.2 Mitigation Measure on Biological Environment

Measures for Preventing and Mitigation of Negative Impacts on Vegetation and Wildlife

There are four general categories of biological impacts which mitigation measures must address:

(1) Loss of wildlife and wildlife habitat,
(2) Disturbance of aquatic organisms and aquatic habitat;
(3) Erosion and sedimentation, and
(4) destruction of vegetation

The region does not have dense vegetation and land use suggests agricultural activities in certain areas, which crops for only one season i.e. during the monsoon season. The following measures are recommended to mitigate adverse impacts on biological activities during construction phase:

Mitigation Measures

- There should be minimal removal of vegetation and felling of trees.
- Revegetation should commence at the time when site clearing is being undertaken.
- Reliance should continue with its afforestation programme to replace any vegetation removed during construction.
- A greenbelt of appropriate width should be developed in and around the proposed New Refinery plant.
- To ensure that vegetation clearance is limited to the required land area as much as possible

6.5.2.3 Mitigation measure on Social Environment

Socio-economic Environment

The related developments like construction camps should not be dependent on local resources (power, water), during both construction and operations phase, the only likely impact on infrastructure would be on the roads, especially Mandalay-Min Bu- Min Hla road during the construction phase. However, considering the low traffic emanating during construction phase, effective traffic management should not pose any problem. A traffic management scheme should be developed to avoid congestion on the nearby and local roads.

- It is estimated that about 7,000 construction workers on average will be involved for a period of 3-4 years. The total employment during the construction phase will be about 2 lakh man months (both skilled and non-skilled employment). The manpower required for these activities should preferably be employed from nearby villages so that avenues of employment will be open to local people.
- When necessary, it is recommended that the local communities should be

engaged in an on-going dialogue during construction period, with an objective to build and maintain a good relationship with the project proponent and contracting companies.

- As an efficient tool for maintaining these good relationships, it is recommended that a grievance mechanism should be operational during the construction period. The mechanism aims at receiving and facilitating resolution of the affected communities concerns and grievances related to the risks and nuisances created by the project. The efforts should be commensurate to the potential impacts of the project, ranging from designating a community liaison officer for maintaining a formal grievance register.

Living and livelihood

The discussion and negotiation will be carried out between the developer and the project affected people in order to get the agreement. The land would be bought by the developer if the local people (land owners) would like to sell or the local land owner can be a shareholder of the project by incorporating their land into the project. The training and education programs on alternative livelihoods related to construction work will be provided to the affected people.

Conflict of interests

Primarily, the job opportunity will be disseminated to the community on the basis of the severity of the impact experienced by the affected people. The adequate infrastructure and services will be arranged according to the actual need of the people.

Cultural heritage/traditional value

There will be a comprehensive discussion to get the agreement of the local people to remove their spirits' houses or other religious structures to an appropriate according to the wishes of the local people.

Risks for infectious diseases such as AIDS/HIV

The project will follow the general EHS guidelines set by International Finance Corporation, World Bank Group. The interventions for communicable diseases will be as follows: providing surveillance and active screening and treatment of workers, preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services), providing treatment through standard case management in on-site or community health care facilities, promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization. For the vector-borne diseases, the mitigation measures are prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements, elimination of unusable impounded water, increase in water velocity in natural and artificial channels, implementation of integrated vector control programs, promoting use of repellents, clothing, netting and other barriers to prevent insect bites, use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs, monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread, collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects, educating project personnel and local residents on risks, prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases, distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure.

Existing social infrastructures and services

The existing social infrastructures and services will be upgraded by the project to meet the needs of the local people and the additional construction workers. If needed, new social infrastructures and services will be created.

Occupational health and safety (Risk of injuries and accidents to workers)

The project's Health, Safety & Environment (HSE) Officers will ensure that the contractor and other sub-contractors educate their workers on the project's health and safety policy to prevent/minimize the possibility of accidents and reduce health risks. Workers will also be provided with the necessary protective equipment like safety boots, helmets, reflectors, etc., and its use enforced.

The contractor and MPE will consult with the township health authorities based in Minbu and Minhla for all major cases. All minor ailments will be referred to the nearest health facility for treatment.

MPE will also contact other appropriate health facilities for the provision of health services to its employees.

Community Health and Safety

The project will follow the general EHS guidelines set by International Finance Corporation (IFC), World Bank Group.

Parameter	Control Measures
Water Quality	Drinking water sources – at all times be protected.
	Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines)
Water Availability	Potential effect of surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area.
Structural Safety of Project Infrastructure	Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions. The siting and safety engineering criteria will be incorporated to prevent failures due to natural disasters. Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release.
Traffic Safety	Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents

	Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied: • Minimizing pedestrian interaction with construction vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic • Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions
Transport of Hazardous Materials	Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be: • Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information • Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. • Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved • Ensuring adequate transport vehicle specifications • Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures • Using labeling and placarding (external signs on transport vehicles) as required • Providing the necessary means for emergency response
Disease Prevention	Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.
Emergency Preparedness and Response	If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers.

	There are also proposed land for fire fighting departments in the project will be closely working with them for the emergency preparedness and response matters.

6.5.3 Operation Phase

6.5.3.1 Mitigation measure on Physical Environment

6.5.3.1.1 *Air Quality*

In operation phase, environmental target of NRP is to comply with project standard which complies with national standards and WB/IFC requirements including:

- Treating generated flue gas (FG) to meet allowable of project standard at discharge points;
- Ensure the dispersion ability of FG to meet as ambient environment standard;
- Using technical solutions.

Mitigation Measures

Air emission from point source

- Apply Flue Gases Desulphurization FGD system by water scrubbing for the flue gas from boilers
- Provide De-NOx and De-SOx system for RFCC;
- The stack heights have been defined based on emission of SOx, NOx, CO and PM10 and will be verified by air emission model to confirm that ambient ground concentration of pollutants always meet standards and guidelines of ambient air quality;
- Provide Low-NOx burners for SRU, Gas turbines, CDU, ETP incinerator, RHDSs, NACs, KHDSs, GOHDS and Ultra-low-NOx burner for HMU;
- Establish and maintain continuous emission monitoring system (CEMS) at following discharge source:
    - FGD / Boiler stacks – For SO2, NOx and PM
    - RFCC Co Boiler stacks– For SO2, NOx and PM
    - Gas turbine stacks – For NOx
- Monitor (every 6 months) of ambient air quality for NOx, SOx and PM in the upwind and downwind directions
    - Provide vapor recovery system in the tankage farm and balancing system for Jetty area;
    - Provide flow balancing system for dedicated collection of spent caustic effluent to prevent atmospheric emission of H_2S;
- Closely controlling liquid product loading/unloading processing to minimize product leaking and spillage incidents.
- Install leakage detector, spillage control equipments and emergency shut-off valves at closing magnetic type to prevent leakage/spillage at fuel storage tank area.
- Provide fire and gas preventing and fighting system;
- Maintain portable stack testing equipment for NOx, CO, SOx and HC emissions from combustion sources;
- Consider deploying a mobile ambient air quality monitoring station capable of measuring ground level concentrations of NOx, SOx and total hydrocarbons at a minimum, along with limited meteorological parameters such as wind speed, direction, temperature, humidity and rainfall.

For VOC from tanks and offloading system

Product of the Refinery will be stored and managed in compliance with strict storage and handling procedures, and regular inspection, maintenance and testing of valves, seals and volatile fuel storage units. Following specific measures will be proposed during the operation phase as follows:

Mitigation Measures

- Provide vapor recovery systems in the tankage farm (Isomerate, light Naphtha FCC, Benzene, Paraxylene and leaking steam in loading process of RON 92 and RON 95 gasolines to tanker)
- Closely control liquid product export/import process to minimize leaking and spillage incidents.
- Install leakage detector, spillage control equipments and emergency shut-off valves at closing magnetic type to prevent leakage/spillage at fuel storage tank area.
- Install the automatic fire detector and automatic firefighting equipment system at fuel tank areas and fuel pump station.
- Install safety vents on fixed roof tanks of diesel, jet kerosene and refinery fuel oil tank;
- Consider covering open works (i.e., aeration tanks) at wastewater treatment plant and routing vapors to a recovery unit;
- For components related to benzene, select equipment to minimize benzene emissions, e.g., pumps with double seals, specialized valves, etc.; and
- A periodic leak detection and repair (LDAR) program for leakage components such as valves, flanges, pump seals, etc. and timely repairs on components leaking > 1,000 ppm of VOC.

6.5.3.1.2 Noise control

During the operation phase, to ensure comply with the Project and National Standards. The Project Owner will implement mitigation measures as follows:

Mitigation Measure

- Follow routine Operation & Management (O&M) procedures specified by equipment vendor such as regular oil changes, tuning, lubrication, alignment and balancing of rotating parts, etc., which ensures operation at the rated capacity and consequently reduces source noise levels.
- Select and locate equipment within the process areas such that noise level of 85 dB(A) is maintained along the battery limits; provide attenuation measures for noisy equipment such as pressure/steam relief valves, vents and flare.
- Conduct noise measuring for the final configuration of equipment and their locations generate revised noise contours to identify work areas requiring hearing conservation program and demonstrate fence line noise levels within acceptable standards.
- Equip ear-protection devices for workers at working site.

6.5.3.1.3 Water quality

In the operation phase, the NRP will take a large volume of river water (Max 520 m^3/h) for cooling purpose, continuous effluent discharge to the river, loading refined products will impact on water quality around the outfall area. The following mitigation measures will be applied:

Mitigation Measure

1. **Cooling Water Intake**

- Online control velocity and temperature of inlet river water.
- Use small dredger to carry out maintenance dredging in intake channel to avoid intensive high content of TSS and accidents with nearby facilities;
- Dredged material will be disposed at location permitted by local authority.

2. **Effluent discharge (Industrial, sanitary, cooling water, RO and FGD effluents)**

- Reuse cooling water for De-SOx purpose at FGD unit.
- FGD effluent will be aerated to reduce COD before mixing with cooling water to the outfall: After used for cooling purpose, a part of river water will be routed to absorption tower. At here, SO_2 will be oxidized to $SO_4$2- by oxygen in river water. As a result of this, COD will increase but DO will decrease. Therefore, effluents from FGD meet industrial discharge standard.
- All effluents are pre-treated at source (first stage) then routed to the effluent treatment plant (ETP) for further treating. The treatment process of wastewater in the refinery plant is summarized as follows:

First stage treatment process

- For sanitary wastewater
- Sanitary wastewater will be collected in the septic tank in the plant then routed to the ETP plant by dedicated drainage for further biological treatment. The sanitary system septic tanks will require a vacuum truck service for sludge removal.
- De-oiled wastewaters
- Oily Wastewater (via COC sewer and header) flows are collected in a flow balancing tank (Oily Water Equalization Tank), where gross oil contamination can be skimmed.
- A Corrugated Plate Interceptor (CPI) oil separator further separates solids and entrained oil from the wastewater, and additional oil removal is effected in a Flocculation Flotation Unit (FFU, also known as DAF – dissolved air flotation). Collected oil is sent to the refinery slop oil system and oily sludge is collected for treatment.
- The characteristic of CPI and outfall effluent are as follows:
    - Discharge oil concentration to be less than 60 mg/l
    - CPI to be designed with head space purge (swipe air) to the vent extraction fan for air emission control
      After that, these will be routed to the FFU, the effluent will be more further treating, in this unit
    - Coagulant and polymer dosing system to be provided
    - The coagulant and polyelectrolyte dosing rates will be optimized based on regular Jar Test and the initial design rates are 50 and 5 mg/L of $Fe_2(SO_4)3$ and active polymer respectively

  The characteristics of first stage treated effluent are presented bellows:
    - Output oil concentration must be less than 10 mg/l;
    - Output suspended solids concentration must be less than 25 mg/l.

  The sludge from CPI and FFU units will be collected and treated at sludge incinerator. The outfall effluent from FFU unit will be continually routed to the ETP for further treating.

Second stage treatment process (ETP)

The de-oiled wastewater is mixed with the sanitary effluent before passing to biological treatment. The plant utilizes conventional activated sludge process with a contact chamber, a pre-de-nitrification reactor and aeration basins for COD and TKN oxidation, clarifiers and sludge and mixed liquor recycle. Waste sludge is sent to aerobic storage which is operated as a batch thickener to reduce sludge volumes.

Tertiary stage treatment process

Two-staged tertiary treatment is required in order to meet strict effluent treatment project standards. Initial physio-chemical treatment utilizing a coagulant and PAC (powdered activated carbon) will remove a significant part of the remaining COD. Sludge generated will be separated in a downstream clarifier before being routed to sludge treatment. Ozonation of the settled effluent is necessary to oxidize sufficient part of the remaining COD to meet the discharge standard.

Treated effluent flows to treated wastewater tank that provides retention sufficient for analyses to be performed and the results confirmed before final discharge to the river water return header. Effluent not complying with the discharge standards can be diverted to the guard basin. This basin also acts as a check basin for AOC flows in excess of FFB capacity and effluent can be stored by closing off the outlet and allowing the basin level to rise. Firefighting runoff from either the accidentally oil contaminated AOC or diverted from the clean storm water CSW systems can also be retained in the same manner.

The guard basin can also store partially treated effluent from the ETP by the use of a bypass header that allows diversion of partially treated wastewater from any process stage of the ETP for subsequent treatment.
Oily sludge is sent to the oily sludge storage tank where they are steam heated to enhance oily water and solid separation in the downstream phase separator (such as a two phase hydro-cyclone). Separated oily water returns to the oily water storage tank for oil/water separation in the corrugated plate Interceptor CPI. Sludge is combined with the thickened biological and tertiary sludge for dewatering before being incinerated.
In order to meet the Project air emission standards, especially for benzene and H_2S, all equipment upstream of Bio-treatment, including oily water storage tank, CPI, FFU/DAF, as well as the oily sludge storage tank are covered with the vent directed to a Bio-tower for benzene and H_2S treatment and air emission control.
Quality of treated effluent at the outfall of ETP will meet as project standard and NEQG.

- Treated effluents from ETP, FGD and RO will be mixed with cooling water before discharging to the river in order to ensure that concentration of all pollutants at the mixing zone are similar to the concentration in river water.
- The outfall structure should be divided into different diffusers and risers pipes for maximum dilution capacity and reducing outlet velocities
- Online monitor flow rate at input and temperature and Chloride at output of cooling system. Temperature at the outfall shall be lower or equal 40^{o}C and temperature of mixing zone shall not exceed 3^{o}C above the temperature of the river ambient water.
- Online monitor effluent quality at input and output of ETP.
- Period dredging drainage system of the Complex annually
- Regular carry out monitoring program (every 6 months) of coastal water quality at intake water, outfall location and their upstream and downstream.

6.5.3.1.4 *Groundwater*

To control the impact on groundwater quality, NRP will apply mitigation measures as follows:

Mitigation Measures

- Closely monitor the final disposal of hazardous and non-hazardous wastes to ensure that conformity of the Project Owner to International and NEQG Standards.

6.5.3.1.5 Soil quality

Loading/unloading feedstock and product and handling and storage significant hazardous wastes inside plant boundary during the operation phase are potential sources of impact on soil condition. These measures of collecting, storage and treating of chemicals and hazardous wastes will be strictly monitored during the operation phase and ensure that all processes are

stipulated the National regulations and related laws on hazardous waste storage and treatment which were mentioned in the introduction section of this report.

Mitigation Measure

Hazardous Materials Handling

- MSDS provided for all hazardous materials; handling procedures in place.
- Storage tanks should be surrounded by oil tight bund walls to prevent escape of chemicals and petrochemical products into the environment in the event of a major spillage or tank failure.
- Hazardous liquids are segregated and securely stored in appropriate secondary containment.
- Identify areas prone to leaks/spills and provide adequate secondary containment
- Spill prevention and clean-up plan in place.
- In case of spillage incident, prevent absorb or contain liquid with sand, earth, sawdust or other spill control materials from entering drains, ditches or waterways.
- Containment and covered storage of aggregates designed to reduce surface water runoff.

Hazardous Wastes Storage and Handling

- Waste separation at source
    - Spent catalyst waste from RFCC unit will be collected and transported to a cement factory where spent catalyst wastes can be treated by Co-processing method as raw material for the cement processing.
    - Spent catalyst from CCR and PENEX-DIH units containing Pt and RHDS unit containing Ni, V and Mo will be recovered metals by catalyst suppliers or licensed recovery companies.
    - ETP wastes and spent oil from PP unit will be burned in incinerator.
- The others hazardous will be treated by licensed treatment companies.
- Oily wastes will be collected in to HDPE bags/tanks and transported to the plant's incinerator.
- The waste sludge will be collected and treated by incinerator of the Plant
- Incineration ash will be collected into HDPE bags, labeled and transferred to designated hazardous waste storage area before transfer to licensed treatment companies.
- Used lube oil will be collected in to drums and transferred to domestic waste storage area prior to licensed lube oil and cooking oil recycling agencies.
- Build waste storage area in the Plant to make convenient condition for transfer and storage of hazardous and non-hazardous wastes before transporting to approved waste management area. Waste storage area is designed based on waste generation rate and maximum storage duration of 90 days. Additional area will be built to keep hazardous waste untreated properly.

Waste storage area should meet following requirements of design and safety:

1. **Design requirement**

- The waste storage shall be located in the downwind direction and at safe distance from the process Units/ utilities and other building areas.
- The storage facilities shall be designed and constructed in such a manner that risk of loss is minimized.
- The hazardous waste storage area shall be roofed with adequate ventilation and lighting arrangements and shall meet building and fire code requirements

- Flooring in waste storage area shall be impervious and sloped to facilitate proper drainage and collection of spilled liquid. A liquid waste collection system comprising of drainage channel, wastewater sump and pumping system shall be provided for collection of liquid waste spilled from the storage area.
- Area around the storage area shall be properly kerbed to prevent any leakage of the spilled material from the storage area and to control the runoff water flowing in to storage area.
- The storage area shall be divided into different categories according to the chemical characteristics of the hazardous wastes and provision shall be made for isolated storage of reactive, flammable and toxic wastes.
- Materials of construction of storage facilities shall be consistent with the safe long term storage of the chemicals or wastes under consideration.
- Changes in the chemicals or wastes to be stored in a given facility shall not be permitted until a competent assessment has been made of the suitability of the facility for such a change in service.
- The degree to which measures are taken to ensure the integrity of a storage facility shall be dictated by the severity of the potential environmental, health and safety effects of the loss of the product to be stored.
- Where possible, storage facilities shall not be located where, in the event of a spill, waste product may enter a natural watercourse or a sewage or drainage system, or contaminate potable surface or groundwater supplies, or contribute to air contamination and bad odor.
- Emergency measures such as eye wash fountains, deluge showers, etc. must be provided and maintained in good repair, commensurate with the identified level of risk.
- Adequate fire protection system shall be provided to handle Fire emergency arising from flammable and reactive wastes.

2. Safe requirement

Following are some of the key safety requirements for a Waste storage facility

- Access to and exit from the storage facility will be restricted either through locked gates, door, or both. A sign visible from 8 meters (25 feet) distance away shall be placed on all access roads and entrances to the storage facility. The sign shall have the legend: "Danger - Unauthorized Personnel Keep Out,"
- Personal Protective Equipment (PPE) should include the use of impervious gloves (type and material), coveralls, boots (rubber or safety), eye protection (safety glasses/chemical goggles), details of respiratory equipment (particulate respirator, half face piece respirator, full face piece respirator, self contained breathing apparatus or supply air respirator if required.
- Eyewash/deluge showers will be provided within 10 seconds and within 100 feet of travel distance for both long- and short-term storage facilities (in conformance with Emergency Eyewash and Shower Equipment).
- Only non-leaking containers that are safe to handle and correctly labeled shall be stored in this facility. The containers shall be stored according to type and in such a manner as to facilitate inspection and removal with a minimum of handling.
- Worker training in the proper use, care and maintenance of any required personal protective equipment, including fit testing of respiratory equipment, if used, must be provided.
- Management & treatment measures of hazardous and non-hazardous wastes for each discharge source during operation phase of the Complex are presented *in Appendix 19.*

6.5.3.1.6 Mitigation Measures for Accidents and Abnormal Events

6.5.3.1.6.1 Fire and Explosions

Mitigation Measure

Technical Solution

- Ensure that the design specifications for all plant include performance standards such that plant failure, and thus hydrocarbon release scenarios, will be minimised through design;
- Reduce the hazard magnitude through the installation of gas (toxic and flammable) detectors with emergency shutdown (ESD) systems within the critical hazard locations. Emergency shutdown valves to be located outside fire impact zone. If the valve is located inside a fire/explosion zone then fire proofing is necessary to provide protection for a specified period of time in line with API 2001;
- Minimize the presence of ignition sources around the process units;
- Where possible, consider leak point minimization for all equipment (e.g. welded, rather than flanged pipe connections, fail safe valves, spring loaded manual valves, flange covers);
- Stop traffic in provincial Min Hla-Min Bu road in case of fire & explosion incidents to prevent local people and vehicles from damage;
- Install fire warning system and alarm procedure board when occurring accidents;
- Put fire banned board at high sensitive areas;
- Deploy hand-held firefighting tools at assigned areas for ease to approach in case of small fire accidents.

Local Communities

- Propose to Local authorities to extend resettlement to area C to ensure security in case of explosion at the Refinery and Petrochemical Complex;
- Implement the detailed QRA during the detail engineering phase and take proper counter measure to mitigate the risk of fire and explosion;
- Reduce risk to road users by early warning on leak and closure of access;

Toxic Gas Release

Mitigation Measure

- Inform local population and authority in case of incident at Plant area;
- Establish Site Emergency Response Plan during the Detailed Design. Emergency procedures should be put in place and followed if a leak is detected. Good procedures and training for emergency response are essential;

Oil spills

Oil Spill Response organization and equipment specification of New Refinery Project will be presented separately in oil spill response plan. The proposed mitigation measures for oil spill incidents are as follows:

Mitigation Measure

- Available Project Oil Spill Contingency Plan and Environmental Sensitivity Map for decision maker to decide response strategy and define priority area in the case of oil spill occur at project facilities;
- Equip special tools, pumps, hoses, sorbents (coconut husk mats or rice straw bales), containers, etc. to response efficient riverbank clean-up;
- Prepare some small flat-bottomed multipurpose boats with very shallow draught and high speed for towing to allow fast containment (reduction of initial spreading) or deflection of drifting oil;
- Adopt appropriate clean-up techniques for restoring the range of habitats;

- Establish an emergency response team and undertake regular training and provide and test suitable equipment;
- Develop agreements with “local authorities” where local people can be notified and some protection works can be done, focusing on protection of riverbank.

6.5.3.1.6.2 Risk of Accident, Harmful and Injuries of Workers

- Daily briefing by safety officer and safety department staffs at shifting
- 24 hours Checking and monitoring of safety personnel
- Installation of “**SAFETY FIRST**””**DANGER**” “**RESTRICTED AREA**” signboards at suitable places
- Regular training to workers about occupational health and maintenance procedure
- Provide full protective gear such as boots, overall aprons, gloves, helmets, earmuffs, dust masks and workmen’s compensation cover in addition to the right tools and operational instruction and manual
- Provision of first aid training and first aid box in ready and display telephone numbers of key places to contact at emergency
- Posting clear warning sign eg “**NO AUTHORIZED USE OF MACHINES**” and ensuring
- there are guards on dangerous where
- Strictly check at the entrance of the refinery not to carry prohibits
- Workers should always be free from drugs, alcohol and narcotic drugs
- Must have insurance coverage
- To get hygienic foods nearby food stalls

Security

- Cooperate with Home Ministry for special force
- Street lighting and security fence lighting
- Inner circle and outer circle security
- Provide bill boards and notice boards at factory compound “ **AUTHORIZED PERSONONLY” “NO ENTRY”**
- Educate people who are living at surrounding towns and villages

Public Anxiety

- Educate and explain to people who are living nearby, about oil refinery and national and local advantage
- Absorb their worry about risk of fire and explosive.

Off-Take Point (Operation Phase)

Facility maintenance

- A comprehensive maintenance program will be put in place to avert any serious breakdowns or transmission failures.

Major installations will be handled using laid down safety procedures.

Water and sanitation issues

- MPE will collaborate with the relevant township authorities in the provision of additional toilet facilities and potable water for workers in the facility to help prevent health threat.

- Waste bins will be provided at appropriate and convenient places to minimize littering of the site.

Solid waste disposal

All scraps and other solid wastes from facility maintenance will be disposed of at designated dumpsites or landfill sites or sold out to scrap dealers. Contaminated soil will be considered as waste material and disposed of accordingly at approved dumpsites.

Operational management and institutional problems

- Regular maintenance of the machinery and equipment in the facility will be undertaken.
- MPE will institute measures to take action against people who illegally tamper or vandalize machinery and equipment in the facility.

Public health and safety issues

To reduce incidental and structural or operational failures of the transmission facility, the following measures will be put in place:

- Ensure correct operation and maintenance of the installed machinery and equipment, including regular inspections and maintenance.
- Minimize emergency response time through the provision of adequate equipment, development of emergency response procedures and training of workers.
- Ensure timely repair and replacement works on pipelines, pumps and valves and other related areas of the crude oil transmission system.
- Ensure that maintenance works are carried out by only certified engineers. The work of these engineers will be closely monitored by very competent personnel as much as possible.
- Ensure regular check for illegal connections and take corrective actions.
- Ensure regular checks of the facility's machinery and equipment to prevent direct public access.

Occupational health and safety issues

- MPE will ensure that workers handling machinery and equipment are well trained.
- Management will ensure that workers are supplied with adequate personal protective equipment (PPE) including overalls, earplugs and hand gloves and enforce its use.

Emergency situations

MPE will ensure that an emergency response plan is in place and is in line with International Best Practice of transmission of crude oil using pipelines to minimize any hazards to humans and the environment. Management will ensure regular review of the plan.

The operators will ensure that Emergency Fire Response Team is in place to combat any fires, and will liaise with the concerned township fire departments for support when needed.

MPE will ensure that the likelihood of the loss of crude oil from the system occurring is minimized to the barest minimum through regular maintenance and monitoring. Procedures will be specified to detect and contain a leak if it does occur and define methods for clean up and disposal.

6.5.3.1.7 Oil pipeline (Operation Phase)

Pipeline maintenance

- A comprehensive maintenance program will be put in place to avert any serious breakdowns or pipeline failures.

- Major installations such as line pipe and valve replacement among others will be handled using laid down safety procedures.

Operational management and institutional problems

The crude oil transmission system will be managed through regular maintenance of the pipeline and discharge systems.

MPE will institute measures to take action against people who illegally tamper or vandalize the pipelines.

Public health and safety issues

To ensure that incidental and structural or operational failures of the transmission network is reduced, the following measures will be put in place:

- Ensure correct operation and maintenance of the installed machinery and equipment, including regular inspections and maintenance.
- Minimize emergency response time through the provision of adequate equipment, development of emergency response procedures and training of workers.
- Ensure timely repair and replacement works on pipelines, pumps and valves and other related areas of the crude oil transmission system.
- Ensure that maintenance works are carried out by only certified engineers. The work of these engineers will be closely monitored by very competent personnel as much as possible.
- Ensure regular check for illegal connections and take corrective actions.
- Ensure regular checks of the facility's machinery and equipment to prevent direct public access.

Occupational health and safety issues

MPE will ensure that workers handling machinery and equipment are well trained. Management will ensure that workers are supplied with adequate personal protective equipment including overalls, earplugs and hand gloves and enforce its use.

Emergency Situations

MPE will ensure that an emergency response plan is in place and is in line with International Best Practice of transmission of crude oil using pipelines to minimize any hazards to humans and the environment. Management will ensure regular review of the plan.

It will be ensured that Emergency Fire Response Team is in place to combat any fires, and will liaise with the concerned township fire departments for support when needed.

MPE will ensure that the likelihood of the loss of crude oil from the system occurring is minimized to the barest minimum through regular maintenance and monitoring. Procedures will be specified to detect and contain a leak if it did occur and define methods for cleanup and disposal.

A spill prevention plan and energy preparedness plan will be drawn up to tackle all eventualities from natural disasters.

Regular surveillance of the pipeline route, e.g. monthly inspection of the whole pipeline or overall pipeline integrity could be conducted. Routine surveillance will form an integral element of the integrity monitoring system.

6.5.3.2 Mitigation measure on Biological Environment

Following measures are recommended to mitigate adverse impacts on biological

activities during **operation phase**:

- Vegetation burning should have been banned continually. Some native wildlife can be back to some secure habitats which can grow normally under regional protection plan and the project developer. Animal rehabilitation plan should be developed and implementation should be undertaken by project developer.
- Development of the green belt to reduce niose and air pollution impacts by attenuation and for providing food and habitat for local macro and micro fauna.
- The transport movements will be limited to approved routes in the operation area to lessen the impact to wildlife and vegetation.
- The storage and use of chemical agents, fuels, lubricants and other materials, products and production waste hazardous to wildlife and habitats should be performed with observance of the measures guaranteeing prevention of the spread of disease and death and habitat deterioration.
- Ensure control of engine noise insulation integrity with regard to building machines and motor vehicles, timely maintenance to reduce noise levels produced by machinery in operation.
- Limit animal access to the process sites by installing fencing around the designed sites.
- Apply environmentally sound and socially responsible practice of development and provide CSR (corporate social responsibility) by developer.
- Operations at the jetty area should be restrained during the period of fish spawning (usually May to July). Ban should be imposed on pollutant discharge to water bodies of Ayeyarwaddy River. The intake pipeline of the pump supplying water for production purposes should be equipped with a fish protection mesh filter.

6.5.3.2.1 Terrestrial Habitat Restoration Plan

- Development of green belt with carefully selected plant species is of prime importance due to their capacity to reduce noise and air pollution impacts by attenuation/assimilation and for providing food and habitat for local macro and micro fauna. This not only overcomes the problem but also enhances the beauty of area that will attract bird and insect species and by this way ecology of the area will maintain to great extent.
- For developing the greenbelt in and around proposed project site care need to be taken to plant the evergreen species. The planting of evergreen species may have certain advantages that may reduce the environmental pollution.
- Survival rate of the planted trees should be closely monitored and the trees which could not survive should be counted. Equal number of trees should be replaced and their survival should be closely monitored.
- The rainwater harvesting should be done. Treated sewage and effluent in the best combination should be used for greenbelt development. Water scarcity should not be the reason for not expanding and strengthening greenbelt. Provision for irrigation water should be made as part of proposed project

6.5.3.2.2 Preparation of greenbelt plan keeping in view the selected plant species

The proposed greenbelt development in the New Refinery should be of a suitable width along the periphery of the New Refinery area including residential complex, space between the units located within the the New Refinery, along the roads, railway sidings, the hazardous waste disposal facility, storage areas, loading / unloading areas of products etc.

Criteria for selection of species for greenbelt

The plant species suitable for green belt development should be selected based on the following characteristics.

- It should have thick canopy cover
- They should be perennial and evergreen
- They should have high sink potential for pollutants
- They should be efficient in absorbing pollutants without significantly affecting their growth.

Guidelines for plantation

The plant species identified for greenbelt development should be planted using pitting technique. The pit size should be either 45 cm x 45 cm x 45 cm or 60 cm x 60 cm x 60 cm. Bigger pit size is prepared on marginal and poor quality soil. Soil used for filling the pit should be mixed with well decomposed farm yard manure or sewage sludge at the rate of 2.5 kg (on dry weight basis) and 3.6 kg (on dry weight basis) for 45cm x 45 cm x 45 cm and 60 cm x 60 cm x 60 cm size pits respectively. The filling of soil should be completed at least 5-10 days before actual plantation. Healthy sappling of identified species should be planted in each pit.

Roadside Plantation

Roadside plantation plays a very important role for greening the area, increasing the shady area, increasing aesthetic value and for eco-development of the area. The approach roads to project site, colony, hospitals, etc. should be planted with flowering trees. Reliance refinery complex should encourage plantation outside the plant boundary. Adequate care should be taken to encourage greenbelt development on the road side, however to uplift the regional ecosystem of the area by greenbelt development, all the voluntary organizations should take initiative to encourage massive plantation along the roadside Trees should be planted to increase aesthetic value as well as shady area along the roads.

6.5.3.3 Mitigation measure on Social Environment

In order to mitigate the impacts likely to arise out of the proposed project and also to maintain good will of local people for the proposed project, it is necessary to take steps for improving the social environment. Necessary social welfare measures by the industry shall be useful in gaining public confidence depending on local requirement.

The EMP measures are suggested for smooth functioning of the activities are given below:

- The New Refinery should continue to undertake social welfare programes for the improvement of the Quality of Life of villages around in collaboration with the local bodies.
- Some basic amenities, viz. education, safe drinking water supply to the nearby villages may be taken up
- Regular medical checkup should be continued on routine basis in the villages around the New Refinery and also by providing mobile hospital services
- The New Refinery shall in collaboration with local government improve the road infrastructure in the vicinity
- Formal and informal training to provide direct and indirect employment to the affected villagers due to the project shall be taken up on priority

- Entrepreneurship Development programme (EMP) should be undertaken for both male and female group irrespective of their age and education, qualification
- Job oriented skill training, courses may be organized. Through industrial/technical training institutions for educational youth (both for male and female), like home need appliances, tailoring, plumbing, light & heavy vehicles driving

6.5.3.3.1 Inconveniency with socio-economic change

Some people will meet with difficulty, especially at the initial stage, if they have to give away their agricultural land and lose their livelihoods. Retrenchment of workers can happen especially during the switch from construction phase to operation phase of the project and it would lead to job loss and consequent income loss. The contractors would be encouraged to have an appropriate severance and packages and redundancy program for workers. Trainings would be provided to the local people to be fit with skills requirement with project activities and needs.

6.5.3.3.2 Community Health and Safety

The project will follow the general EHS guidelines set by International Finance Corporation (IFC), World Bank Group.

Parameter	**Control Measures**
Water Quality	Drinking water sources – at all times be protected.
	Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines)
Water Availability	Potential effect of surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area.
Hazardous materials Management	Buffer strips or other methods of physical separation around project sites will be included to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odor or other emissions. Hazardous materials storage, handling and use will be managed to reduce or eliminate consequences of the potential off-site release.
Traffic Safety	Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

	Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied: • Minimizing pedestrian interaction with vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic • Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions
Transport of Hazardous Materials	Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be: • Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information • Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. • Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved • Ensuring adequate transport vehicle specifications • Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures • Using labeling and placarding (external signs on transport vehicles) as required • Providing the necessary means for emergency response
Disease Prevention	Communicable Diseases and Vector-Borne Diseases – Please see in the “Risks for infectious diseases such as AIDS/HIV” section above.
Emergency Preparedness and Response	If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers. There are also proposed for fire fighting departments in the project will be closely working with them for the emergency preparedness and response matters.

6.5.4 Decommission, Demolition and Closure Phase

6.5.4.1 Living and Livelihood

The Employment Contract between workers and the concerned company (employer) will be prepared according to the existing Myanmar Labor Law. In this way, the worker's labor right will be protected by confirming termination service. In case the termination service will be preceded unfairly, workers can request authorities from labor office to settle and resolve the situation.

6.5.4.2 Risks for Infectious disease such as AIDS/HIV

The project will follow the general EHS guidelines set by International Finance Corporation, World Bank Group. The interventions for communicable diseases will be as follows: providing surveillance and active screening and treatment of workers, preventing illness among workers in local communities (undertaking health awareness and education initiatives, training health workers in disease treatment, conducting immunization programs for workers in local community to improve health and guard against infection, providing health services), providing treatment through standard case management in on-site or community health care facilities, promoting collaboration with local authorities to enhance access of workers families and the community to public health services and promote immunization. For the vector-borne diseases, the mitigation measures are prevention of larval and adult propagation through sanitary improvements and elimination of breeding grounds close to human settlements, elimination of unusable impounded water, increase in water velocity in natural and artificial channels, implementation of integrated vector control programs, promoting use of repellents, clothing, netting and other barriers to prevent insect bites, use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs, monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread, collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects, educating project personnel and local residents on risks, prevention and available treatment, monitoring communities during high-risk seasons to detect and treat cases, distributing appropriate education materials and following safety guidelines for the storage, transport and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure.

Occupational Health and Safety

The company will follow its Occupational Health and Safety Plan and Procedures.

Community Health and Safety

The project will follow the general EHS guidelines for Community Health and Safety set by International Finance Corporation, World Bank Group.

Parameter	Control Measures
Water Quality	Drinking water sources – at all times be protected.
	Delivery of water to the community or to users of facility infrastructure – water quality needs to comply with National Acceptability Standards (or in their absence the current edition of with WHO Drinking Water Guidelines)
Water Availability	Potential effect of surface water abstraction for project activities would be properly assessed accounting for seasonal variability and projected changes in demand in the project area.

Traffic Safety	Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. • Emphasizing safety aspects among drivers • Improving driving skills and requiring licensing of drivers • Adopting limits for trip duration and arranging driver rosters to avoid overtiredness • Avoiding dangerous routes and times of day to reduce the risk of accidents Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, the following measures will be applied: • Minimizing pedestrian interaction with construction vehicles • Collaboration with local authorities (traffic police unit) and local communities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations (hospital). Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaign) • Coordination with emergency responders (Government hospital or local social and health associations) to ensure that appropriate first aid is provided in the event of accidents • Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker camps close to project sites and arranging worker transport system to minimizing external traffic • Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions
Transport of Hazardous Materials	Project will have procedures ensuring the compliance with local laws and requirements applicable to the transport of hazardous materials. The procedures will be: • Proper labeling of containers, including the identity and quantity of the contents, hazards, and shipper contact information • Providing a shipping document (e.g. shipping manifest) describing the contents of the load and its associated hazards in addition to the labeling of the containers. • Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved • Ensuring adequate transport vehicle specifications • Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures • Using labeling and placarding (external signs on transport vehicles) as required • Providing the necessary means for emergency response

Disease Prevention	Communicable Diseases and Vector-Borne Diseases – Please see in the "Risks for infectious diseases such as AIDS/HIV" section above.
Emergency Preparedness and Response	If there is a risk to the local community from a potential emergency arising at the project site, the company will inform the community through the communication measures, namely, informing the local authorities, communicating details of the nature of emergency, communicating protection options (evacuation, quarantine), providing advices on selecting an appropriate option and vehicle mounted speakers. There are also proposed land for firefighting departments in the project will be closely working with them for the emergency preparedness and response matters.

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6.6 Characterization and Assessment of Residual Impacts

The project will apply careful design and planning in combination with the mitigation measures and hence there are no significant adverse impacts to the physical, biological and socio-economic environments. For several valued Environmental and Social Components, no adverse environmental effects were identified that could result from routine activities during any of the project phases. However, there will be some residual impacts predicted.

The residual impacts are the impacts which remain after the implementation of the mitigation measures described. The predicted residual adverse impacts are considered for each project phase (Construction, Operation and Decommissioning/Closure). The residual impacts and their significance are determined by the professional judgement and expertise based on the nature of impacts, namely, magnitude, duration, and reversibility.

Level of Magnitude	Description
High	Impact is high enough to cause numerous effects.
Medium	Impact may result in changes that affect the value of resources, social-cultural, economic and environment.
Low	Impact may result in changes in resources and environment, but this change does not decrease value of these resources, social-cultural, economic and environment.
Nil	Impact has no effect.

Duration	Description
Long term	Beyond the construction phase for years or the operational life of project or permanent
Medium term	1-2 years
Short term	(0-12 months) and intermittent

Reversibility	Description
Reversible	Capable of re-establishing the original condition after a change or being impacted
Irreversible	Incapable of re-establishing the original condition after a change or being impacted

Level of Significance	Description
Major	Potential impact could threaten the long-term sustainability of the resource. Additional research, monitoring, and/or recovery initiatives should be considered.
Medium	Potential impact could result in a decline of a resource in terms of quality/quantity, such that the impact is considered moderate in its combination of magnitude, aerial extent, duration, and frequency, but does not affect the long-term sustainability. Additional research, monitoring, and/or recovery initiatives may be considered.
Minor	Potential impact may result in a localized or short-term decline in a resource during the life of the Project. Typically, no additional research, monitoring, and/or recovery initiatives are considered.

Minimal	Potential impact may result in a small, localized decline in a resource during the construction phase of the Project and should be negligible to the overall baseline status of the resource.

6.6.1 Residual Impact Assessment for Construction Phase

No.	Impact	Magnitude	Duration	Reversibility	Level of Significance
Physical Environment					
1	Effects on watercourses (erosion, sediment loading, stormwater discharges, oil and fuel spills and leaks)	Low	Intermittent and Short term	Reversible	Minor
2	Groundwater Contamination (due to uncontrolled site and road runoff, accidental release of fuel chemicals and hazardous materials)	Low	Intermittent and Short term	Reversible	Minimal
3	Air Pollution (Emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries)	Low	Intermittent and Short term	Reversible	Minimal
4	Dust Emission (from excavating and moving earth, construction equipment and machinery, vehicles)	Medium	Intermittent and Short term	Reversible	Minor
Social Environment					
1	Community Health and Safety	Low	Long term	Reversible	Minimal

6.6.2 Residual Impact Assessment for Operation Phase

No.	Impact	Magnitude	Duration	Reversibility	Level of Significance
Physical Environment					
1	Degradation of groundwater quality due to accidental and chronic spills and release of chemical and hazardous materials	Low	Intermittent and Short term	Reversible	Minimal
Social Environment					
1	Community Health and Safety	Low	Intermittent and Short term	Reversible	Minimal
2	Risk of injuries and accidents to workers	Low	Intermittent and Short term	Reversible	Minimal
3	Light intrusion	Low	Intermittent and Short term	Reversible	Minor

6.6.3 Residual Impact Assessment for Decommissioning/Closure Phase

No.	Impact	Magnitude	Duration	Reversibility	Level of Significance
Physical Environment					
1	Effects on watercourses (erosion, sediment loading, storm water discharges, oil and fuel spills and leaks)	Low	Intermittent and Short term	Reversible	Minimal
2	Air Pollution (Emissions of gaseous pollutants from diesel powered construction equipment, vehicles and machineries)	Low	Intermittent and Short term	Reversible	Minimal
3	Dust Emission (from excavating and moving earth, construction equipment and machinery, vehicles)	Low	Intermittent and Short term	Reversible	Minimal

Social Environment					
1	Community Health and Safety	Low	Intermittent and Short term	Reversible	Minimal

Although the residual impacts are expected for construction, operation and decommissioning/closure pahses as described in the tables above. The level of significance of these residual impacts are minor and minimal. Therefore, no additional research, monitoring, and/or recovery initiatives are considered and these impacts are negligible to the overall baseline status of the resource.

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CHAPTER 7:
CUMULATIVE IMPACT ASSESSMENT

7. CUMULATIVE IMPACT ASSESSMENT

Cumulative Impact is usually considered as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time

Cumulative effects are caused by the aggregate of past, present and reasonably foreseeable future actions. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem and human community of all action taken, no matter who has taken the action (CEQ, 1997).

The relevant VECs affected by the project

In the environment of proposed new refinery project, Valued Environmental and Social Components (VECs) such as Air shed, Surface Water (Fisheries resource), Land and soil pollution by discharging waste and pollutants in the air, and Ecosystem (Forest resource) and Resident wildlife are dealt as cumulative impact assessment.

Air shed

Sources of pollutants in this case is crude oil. This may be accentuated by the fact that oil refineries cause smog and air pollution. Many of gases emitted by refineries are harmful to humans, and cause permanent damage and even death. They can cause respiratory problems (such as asthma, coughing, chest pain, choking, and bronchitis), skin irritations, nausea, eye problems, headaches, birth defects, leukemia, and cancer. Young children and elderly are the worst affected. Very often the amount of pollution coming from fugitive emissions of a refinery is higher than the amount coming out of the stacks. Fugitive gases themselves have cumulative effects. Additional new refinery plant will have cumulative effect to biophysical environment and human. To reduce the dangerous pollutants, it requires the refinery to install some equipment in best technology.

Impact on Fisheries resources

The jetty currently established has been busy for decades with ships which carries needed things for the refinery plant and products of the plant to other places by Ayeyawaddy waterways. There is a proposed jetty site and landing stage area which will be busy by temporary jetty for construction period and permanent new jetty at operation phase. A large quantity of River water will be pumped out for a new Refinery Plant at that location. Huge barge carrier will be anchored at jetty and filling the products of New Refinery Plant and oil spills can occur there. Even at the current situation, fish catching has been decline in this section of Ayawaddy River at Minhla Township. Future cumulative effects in this area would be severe to the fish movement and reproduction and aquatic ecosystem's function including stability of food chain and food web and food pyramid. Spilling of oil and movement of numerous transportation vessels will expel the fish population in the area.

Moreover, waste water directly discharged at the jetty area is disturbing the presence of fishes by the pollution of spilled oil and petroleum products at the time of transferring the crude oil and factory products, while fishing in the one mile diameter of Ayeyarwaddy river is prohibited by issuing administration Law's section 114.

Sucking of the huge amount of the river water has the impact of bank erosion and siltation which have the negative impacts on the natural ecological succession of the aquatic flora and fauna, while some crop plantation grow well on the newly formed land emerging at the bank of the river made up of siltation built up.

Disruption to Dry Forest and Dry Deciduous Forest System

According to the result of interviewing the elderly of nearby villages, the surrounding area of the Thanphyakan oil refinery complex was covered by many of the thick scattering subtypes of

the Dry Deciduous Hardwood Forests and Scrub Forests, and Scrub Forests. Some Dry Upland Forests and Scrub Forests are still growing on upland areas, particularly over the northern part of the Pegu Yomas. Dry Deciduous Forests grow on hill slopes. It was difficult to go to nearby villages due to presence of forest which had been infested by Elds deer, hog deer, barking deer, monitor lizard, cobra and vipers. Even tiger visited village area of Mazalidaw and Thanbayakan. After establishing current refinery complex and three heavy industry complexes of army engineer corps which have positive impact of economic development and employment opportunity for local people, villages has become populous with local immigration with labour and staffing of industries as negative cumulative impact (Immigration for example, before current refinery was built house number of Thanbayakan was about 100, now it is more than 300.) Labourers and household numbers have been increased in villages ever since. Then bamboo and hardwood disappeared due to use for house-posts and house building. Shrubs and scrubs have been removing due to fuel wood use and transforming of land to agricultural fields. Forest scattering in the surrounding area cannot reach to mature fare composed of same types though secondary growth occurs whenever rains come back regularly or irregularly. However, wildlife cannot return to original level of presence. Now no jackal is found here around, though it was abundant in the last 50 years in this area according to the result of interviews with old aged villagers.

Villagers living along the pipeline are paddy growers. They use the flat land existing along the pipeline by transforming as pasture for cattle, goat and sheep. This type of negative impact that cause degrading natural dry forests and habitats can commonly occurs with new project.

However, in terms of forest regeneration as a best means of mitigation, there is an evidence of well establishment forested area rich with variety of native trees and newly planted species in a defense heavy industry compound and a Buddhist monastery compound located near the river where some water supply is provided by river water or tube-well water.

Another mitigation measure is to grow native species of trees such as In (*Dipterocarpus tubberculatus)*, Ingyin (*Pentacme siamensis*), Nipasae (*Moranda tinctoria*), Thitpoke (*Tetrameles nudiflora*), Shawphu (*Sterculia versicolor*), Thanakar (*Limonia acidissma*), and Nabe (*Lannea coromanelica*) including Sha, Tanaung, Than, Dahat, Tamarin and neam in any available land and feasible opportunity.

Therefore let the forest ecosystem and its constituents, wildlife, survive longer, though the area of natural habitats become narrow in terms of width. The existing tall trees located along the old pipeline should not be cut out, for these trees absorb CO_2 of the atmosphere and release the O_2. This has the positive impact of deterring climate change.

Cumulative effects of emissions from two refineries

Refineries dump a large amount of harmful wastes. Some of the waste materials contain hazardous substances such as paints, solvent, cement, adhesives, and chemicals. Some of waste materials including plastic containers and plastic bags are not biodegradable and can have long term effect on soil and ground water. Water quality degradation can occur from multiple point-source discharges.

There can be accumulation of pollutants both in atmosphere and aquatic environment as well as in soil for the surrounding area of project site, rather than pollution in the project site itself as a result of cumulative impact in the surrounding of Industrial Complex.

Mitigation is to use best available technology and build a secure dumping site.

CHAPTER 8:

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 Overview

This chapter provides recommendations for Environmental Management Plan (EMP) including mitigation measure for minimizing the negative environmental impacts of the project. Environmental monitoring requirements for effective implementation of mitigation measures during construction as well as operation of the project have also been delineated along with required institutional arrangements for implementation.

Environmental Management Plan (EMP) is drawn after identifying, predicting and evaluating the significant impacts on each component of the environment with a view to maximising the benefits from the project.

8.2 Management and Monitoring Plans by Project phase Construction, Operation and Decommissioning, Closure and Post-closure

8.2.1 Environmental Management Plan (EMP)

An EMP is defined as "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".*

The EMP is therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life-cycle.

It is to be implemented during the pre-construction / construction phase and, thereafter, throughout the project life-cycle. This is to ensure that environmental management objectives are integrated into the project planning and design.

However, there is generally not enough available information to assess or forecast resulting environmental problems and their impact on the economy or society. Therefore, strategic decisions have to be made with high levels of uncertainty

The challenges for the construction phase often only develop once the detailed design has been completed. Since the EMP is included in this EIA Report, there should always be a provision for updating the EMP once the detailed design is complete.

Therefore, at this time of completing the EIA, it is only possible to prepare an EMP framework that provides the over-arching requirements for environmental management. This framework specifies the management actions (eg. mitigation) required and performance targets to be achieved. The specific requirements to implement these mitigation requirements will need to be developed during the detailed design and planning phase.

8.2.2 Linking EMP with Environmental Management Systems

To manage environmental performance at the project implementation stage is the Environmental Management System (EMS). An EMS provides a systematic framework and approach to minimize risks and manage environmental aspects (i.e. activities that cause impacts) and impacts (i.e. effect or change to the environment resulting from an activity). An EMS is an iterative process that requires ongoing commitment from an organisation, in order to achieve continuous improvement and enhanced environmental performance.

As stated in Section 7.2.2 of this report, the oil refinery should in due time aim to be certified for ISO 14001 EMS. The ISO14001 standard provides a logical framework within which to prepare an EMP, even in cases where an organisation is not intending to obtain certification. The Top Management should be responsible for implementing and maintaining EMS. The EMS shall be audited internally by qualified internal auditors and externally by the certifying body as per the stipulated frequency.

The purpose of ISO 14001 EMS is primarily prevention of pollution by use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control

(separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts.

8.2.3 Mitigation and impact management

The purpose of mitigation is to identify measures that safeguard the environment and the community affected by the proposal. Mitigation is both a creative and practical phase of the EIA process. It seeks to find the best ways and means of avoiding, minimising and remedying impacts.

Mitigation is a critical component of the EIA process. It aims to prevent adverse impacts from happening and to keep those that do occur within an acceptable level. Opportunities for impact mitigation will occur throughout the project cycle.

Mitigation measures are translated into action in the correct way and at the right time and a written plan, EMP is prepared for this purpose. 3R principles (Reduce, Reuse and Recycle) are to be applied where appropriate. The action plan starts from materials procurement through series of action steps like process optimization, preventive maintenance, good housekeeping, waste minimization, energy conservation, environmental awareness and training, and adequate pollution control measures

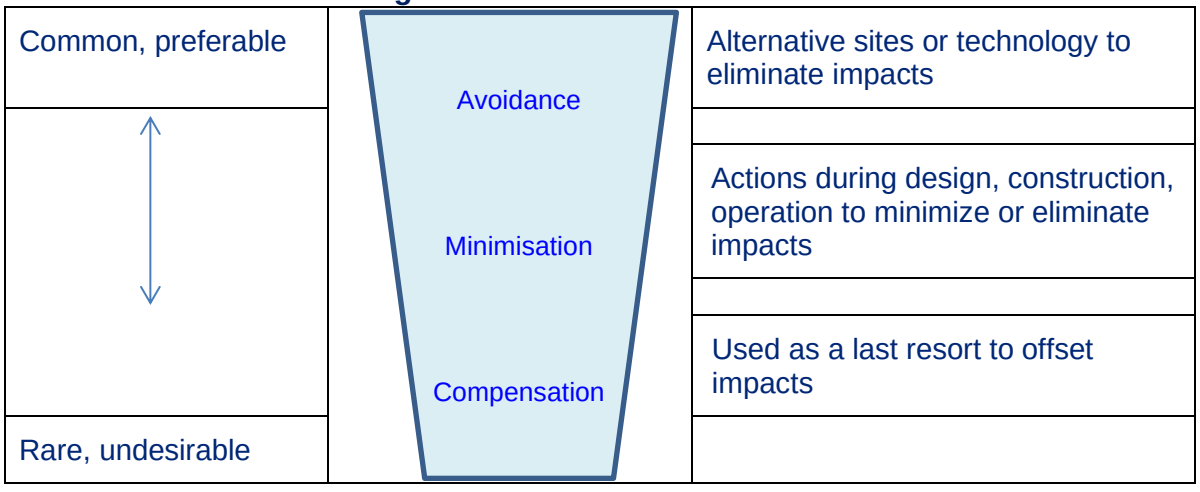
The objectives of mitigation are to:

- find better alternatives and ways of doing things;
- enhance the environmental and social benefits of a proposal;
- avoid, minimise or remedy adverse impacts; and
- ensure that residual adverse impacts are kept within acceptable levels.

The elements of mitigation are organised into a hierarchy of actions:

- first, avoid adverse impacts as far as possible by use of preventative measures;
- second, minimise or reduce adverse impacts to ‘as low as practicable’ levels; and
- third, remedy or compensate for adverse residual impacts, which are unavoidable and cannot be reduced further.

8.2.3.1 The elements of mitigation



Source: adapted from the UNEP Environmental Impact Assessment Training Resource Manual, Second Edition

Step One: Impact avoidance. This step is most effective when applied at an early stage of project planning. It can be achieved by:

- not undertaking certain projects or elements that could result in adverse impacts;
- avoiding areas that are environmentally sensitive; and

- putting in place preventative measures to stop adverse impacts from occurring, for example, release of water from a reservoir to maintain a fisheries regime.

Step Two: Impact minimisation. This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- scaling down or relocating the proposal;
- redesigning elements of the project; and
- taking supplementary measures to manage the impacts.

Step Three: Impact compensation. This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- rehabilitation of the affected site or environment, for example, by habitat enhancement and restocking fish;
- restoration of the affected site or environment to its previous state or better, as typically required for mine sites, forestry roads and seismic lines; and
- replacement of the same resource values at another location, for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

Key principles for the application of mitigation consistent with the above framework include the following:

- give preference to avoid and prevent measures;
- consider feasible alternatives to the proposal and identify the best practicable environmental option;
- identify customised measures to minimise each of the main impacts predicted;
- ensure they are appropriate, environmentally sound and cost-effective; and
- use compensation or remedial measures as a last resort.

8.3 Environmental monitoring

Environmental monitoring refers to the systematic collection of environmental data through a series of repetitive measurements. The different types of monitoring are baseline monitoring, effects or impact monitoring, compliance monitoring, and impact auditing.

The major aim of a monitoring program is to detect trends and changes so that remedial measures may be taken to achieve good environmental performance. The monitored parameters usually cover the environmental values to be protected, potential hazards, potential impacts and the level of risk posed by the implementation of projects.

Data compiled can be used to:

- Assess performance and monitor compliance with agreed conditions specified in construction permits and operating licenses, and modify activities or mitigation measures to comply with the regulations stipulated;
- Review predicted environmental impacts for the effective management of risks and uncertainties;
- Identify trends in impacts;
- Periodically review and later impact management plans or activities;
- Verify the accuracy and effectiveness of mitigation measures, in order to transfer the experience to future activities of the same type; and
- Review the effectiveness of the environmental management. Monitoring should be linked to impact prediction. As a result monitoring programs should focus on: The magnitude of the impact:
    - The nature of the impact;
    - The geographical extent of the impact;
    - The timescale of the impact;

- The probability of the impact occurring;
- The significance of the impact; and
- The confidence in the prediction of the impact

8.4 Objectives and structure of EMP

The core objective of EMP is to

- ensure that mitigation measures are implemented;
- establish systems and procedures for this purpose;
- monitor the effectiveness of mitigation measures; and
- take any necessary action when unforeseen impacts occur.

The EMP includes Objectives, Legal Requirements, Management Actions, Monitoring Plans, Implementation Schedule and Responsibilities.

Evaluating the impacts that might occur throughout the 4- phase life cycle of a typical industrial or hazardous facility, include: (1) planning/policy development, (2) construction implementation, (3) operation/maintenance, and (4) decommissioning/abandonment

The plans and sub-plans for Mitigation and Monitoring required for the pre- construction, construction and operation phases of the project are identified and Separate EMPs are prepared for each of these phases.

8.5 Management and Monitoring Plans / Sub-Plans

8.5.1 Pre-Construction Phase (planning/policy development)

Socio-economic and other miscellaneous issues Pre-Construction Phase (planning/policy development)

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	- To define the overall commitment to the environment and a common set of values include level of environmental responsibility and performance required of the organization - To establish guiding principles	ISO 14001: 2004 Environmental management systems	- Establish Environmental Policy (overall intentions and direction of the organization related to its environmental performance as formally expressed by top management) - Ensure that the Environmental Policy is communicated, understood and implemented throughout the organization	Top Management	Upon making decision to implement the project	Display Environmental Policy at strategic location within the organisation - Compliance monitoring	State commitment(s) to the protection of the environment, prevention of pollution, including commitment to conform to compliance obligations
2	To ensure the decision making process is equitable and fair and leads to more informed choice and better environmental / social outcomes	Land Law (2012), Law of Culturable Land, Follow Land, and Waste Land(2012)	Resolve any issue related to acquisition or conversion of the land	Top Management	At least 5 months before construction commence	Land Title Approval from relevant authority - Compliance monitoring	
3	- To obtain local and traditional knowledge - To facilitate consideration of alternatives, mitigation measures and trade-offs - To reduce conflict through the early identification of contentious issues - To provide an opportunity for the	UNECE Convention on Access to Information, Public Participation in Decision Making and Access to Justice in International Environmental	Identify the range of stakeholders involved and carry out 'Public Involvement' activities - the people – individuals, groups and communities – who are affected by the proposed project - government agencies; - NGOs and interest groups; and - others, such as donors, the private sector, academics etc Explain in details; - what is proposed	Top Management	At least 4 months before construction commence	Retain meeting minutes and relevant records - Compliance monitoring	

	public to influence project design in a positive manner (thereby creating a sense of ownership of the proposal) - To improve transparency and accountability of decision-making; and - To increase public confidence in the proposed project - To enable any member of the public reach a person who can arrange appropriate response / corrective action to their complaint within a defined time	Matters (Aarhus)	- what the likely impacts are - how their concerns will be understood and taken into account - assure that their views will be carefully listened to and considered on their merits Ensure effective participation by; - informing – one way flow of information to the public - consulting – two way flow of information with the public - participating – interactive exchange with the public - negotiating – face to face discussion with the public Complaints Management - Nominate an appropriate person(s) to implement and manage the Complaints Management System - Ensure the name and contact details of this person(s) is known to all - Establish and publicise a 24 hour toll-free complaints contact telephone number - Establish a system to receive, record, track and respond to complaints ensure that a verbal response is provided to the complainant defined time (unless the complainant agrees otherwise) and provide a written response later if the complaint cannot be resolved verbally - Ensure information on all complaints received and response times is available to the Management daily				
4	To inform the public about the environmental impact of the Project	Environmental Conservation Law (2012)	Publicise in the media, the nature of the work proposed for the next 3 months, the areas in which these works are proposed to occur, the hours of operation and contact details	Top Management	Before commencing construction, and subsequently at 3 months interval	Media reports and newspaper cuttings - Compliance monitoring	

5	To ensure the EMP is effectively implemented and maintained (to ensure the EMP is a "living" document)	ILO Convention 142 "Occupational orientation and occupational training for development of human resources"	- Nominate a person or persons to serve as the Environmental Management Representative (EMR) - Identify the organisational structure for the project specifically for the personnel responsible for Environmental Management - Define the description of the roles, responsibility and authority of each identified person	Top Management	At least 3 months before construction ommence	- Internal memo / minutes of assignment of EMR - Organisation chart - Roles, responsibility and authority of each identified person	EMR reports status of EMP implementation and environmental performance to top management
6	To ensure that any person(s) performing tasks that have the potential to cause a significant environmental impact(s) is (are) competent	ILO Convention 142 "Occupational orientation and occupational training for development of human resources"	- Prepare site induction training for all personnel to familiarise with • Requirements of EMP • Individual obligation to exercise due diligence for environmental matters • Site environmental controls • Emergency contacts • Alert the sensitive work areas • Emergency Response procedures - Targeted environmental training for specific responsible personnel	EMR	- At least 3 months before construction commence - Retrain regularly	- Check and ensure Trainings conducted as per Plan - Retain associated records - Compliance monitoring	
7	To ensure ecosystems in the zone are not affected by the planned Complex	Convention on Biological Diversity, Rio de Janeiro	- Prepare Site Layout Plan (Map) to identify Environmental Control Plan • Environmentally sensitive areas on and adjacent to the site • Waterways including drains • Erosion and sediment control measures • Works areas, machinery or vehicle parking, waste storage, fuel and chemical stores • Vegetation that requires protection • Restriction on traffic movement • Office location • Accommodation location - Topography and Drainage lines	EMR	At least 6 months before construction commence	Check and approve the Site Layout Plan (Map) - Compliance monitoring	

			• The natural drainage lines passing through the project area should be clearly indicated and should not be blocked. The natural flow should remain unobstructed				
8	Flora and Fauna - To prevent altering aquatic flora and fauna populations and hence population dynamics of dependent organisms	Wildlife and Protected Areas Law (1994)	- Fence the boundary of the construction zone to prevent construction plant and equipment entering adjacent vegetated areas	EMR	Before commencing Work	Records of fencing including cost - Compliance monitoring	
9	Health and Safety - To ensure better and safe planning of the project activities - To reduce the likelihood of accidents and work-related illnesses on the job - To prevent as accidents occurring between construction related equipment and local vehicles	Public Health Law	- All staff involved are required to undergo training on health & safety, pollution control, sanitation measures and emergency rescue procedures before development begins - Identify hazards, assess risk and develop controls Prepare - Separate ways / gates for entry and exit in project premises - Sufficient parking area with unidirectional vehicular movement with separate entry and exit - Two or more staircases on each floor in all high rise buildings (more than four floors). Approach distance to any staircase should not be more than 30' on each floor. - Sufficient lighting, ventilation, drinking water facility, sanitary blocks, firefighting and first aid arrangements - Safe and ergonomic design and layout of plant, machinery, tools and control equipment keeping in view the safety and pollution prevention in mind	- MR - Project In Charge (PIC)	- Train before commencing Work - Plan before commencing Work and ongoing during Construction	- Roving inspection, record and highlight any discrepancy - Monitor compliance with agreed conditions specified in construction permits	

8.5.2 Pre-construction Phase (Pipeline ROW)

No	Objectives	Legal Requirement/ Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To avoid the Land acquisition and compensation issues	National Constitution (2008) Land Acquisition Act (1894) Special Economic Zone Law (2014) Farmland Act (2012) Vacant, Fallow and Virgin Land Act (2012)	• A Land acquisition and compensation action plan will be prepared and implemented and payments made to Project Affected Persons (PAPs). • Monetary compensations will be paid to people whose farms or crops will be destroyed due to the construction and installation of the gas pipeline. • Compensation payment will be made directly to affected farmers and individuals to avoid future problems from other people purporting to be family members or actual land owners. • Community relations officers should be appointed. They should be tasked to undertake community sensitization programs which should be an ongoing exercise. The terms of reference for the work include among other things - holding of durbars at the community level to further explain the project and its socio-economic benefits to the people; - facilitate the formation of a consultative group with selected representatives from the communities to meet periodically with MPE and plan for peaceful co-existence; and - build capacity for community relations work to ensure	Top Management	At least 6 months before construction commence	- Retain associated records	The program will help avoid unnecessary tension between misinformed communities (members) and the MPE and establish a better rapport between the two interest groups. Individuals who will receive monetary compensation will be counselled on suitable investments to ensure long-term financial security.

			successful implementation of project. • Finally, a very close liaison with all communities along the route will be maintained throughout project life. This will include initial land rights negotiation that will be done in a fair and transparent manner with in-built grievance mechanism to address any conflicts.				
2	To avoid conflict with farmers and villagers over affected properties and crops		Communities along the proposed oil transmission pipeline will be informed well in advance by MPE on the project via emissaries, local authorities (ward, village tract and township authorities), and community leaders and through elected representatives.	Top Management	At least 6 months before construction commence	- Retain associated records	The activities of the surveyors within the communities' and through farms will therefore not be excessively intrusive to residents and farmers in the affected areas.
3	To mitigation the loss of vegetation		Vegetation clearance to be limited to the required land area. The area should be allowed to re-vegetate naturally after the pipeline is laid. Access tracks and sites to be returned to cultivation after the pipeline is laid.	Project In Charge (PIC)	During construction	Compliance monitoring	

8.5.3 Construction Phase (construction implementation)

8.5.3.1 Air Quality Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks Reporting
1	To minimize the release of fugitive emissions (dust, smoke, fumes and odor) to air causing or likely to cause nuisance on or beyond the boundaries of the site and outside the ROW of the access roads	Standards issued in NEQ (E) guideline, WB, ADB and WHO	• Introduce a site speed limit (20 km/h) for trucks and other vehicles; • Low sulphur fuels to be used for vehicle and mobile plant; • On-site roads to be paved as early as possible with dust free material to reduce dust generation; • Paving roads as early as possible between washing facilities and site exists; • Usually sweep rock/soil litered in material transport road; • Cover materials of all free dusts during off-site road haulage; • Daily road spraying for material transportation road and site area; • Road maintenance; grading and compacting road surfaces to prevent uneven running surfaces, which create both noise and dust; • Install wheel washing facilities at an appropriate distance from the site entrance within site boundary; At paint spraying area, workers must be equipped with specific protective clothes, anti-toxic mask and oxygen cylinder in special case; • Do not use chemicals containing forbidden substances, such as asbestos; • Take proper measures for polishing tank surface to reduce dust problem. Limit use sand spraying method. • No open burning of wastes to be undertaken	EPC Contractor In Charge (PIC)	Ongoing during Construction	Visual inspections will be undertaken by EPC Contractor to check for evidence of excessive dust generation, dust monitoring will be undertaken in areas likely to generate dust	All complaints will be documented, acted on and monthly reported to the refinery complex environmental management committee (RCEMC). RCEMC will make reports twice times per year to relevant authorities and lenders.

8.5.3.2 Noise Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks Reporting
	To minimize the generation of noise emissions during the construction phase and to mitigate potential noise impacts	Standards issued in NEQ (E) guideline, WB, ADB and WHO	• Ensure that all Contractors on site have effectively controlled noise levels from equipment. Effective noise controls include: - Regular inspection and maintenance of all vehicles and construction equipment working on-site; - Installation of sound suppressive devices (such as mufflers) on all mechanical plant as necessary; - Where practicable, vehicles and machinery that are used intermittently should not be left idling for long periods of time • Excessively noisy activities will be conducted between 6h00 - 18h00 if they are likely to cause any nuisance to local residents; • Avoid piling and dredging works as well as breakwater placement at night to reduce noise and vibration impacts and avoid any environmental incidents. • Provide earplug/earmuff to workers at high noise level area • The adjacent residents will be notified prior to any noise events or noisy operation outside 6h00 - 18h00 Monday to Sunday	EPC Contractor	Ongoing during construction	Noise Monitoring will be conducted according to ECD requirement	All complaints will be documented, acted on and monthly reported to refinery complex environment management committee (RCEMC). RCEMC will make reports twice per year to relevant authorities and lenders.

8.5.3.3 Surface Water Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize the discharge of contaminated surface water to the surrounding environment Intake water and outfall effluent system:	• Standards issued in NEQ (E) guideline, WB, ADB and WHO • Municipal By Law	• Notify the timing, working sites, implementation duration of the harbour to the local Authorities and fishermen. Set up a restricted area for the working site by using buoy system and signal-lamp (at night) to restrain the collision incident/accidents. • Keep safety in waterway material transportation. • Collect solid waste completely onboard; absolutely avoid discharging solid waste to river water.	EPC Contractor	Ongoing during construction	The EPC Contractor will conduct regular inspections of construction areas and site drain system and erosion mitigation measures Inspections will be conducted on a weekly basis during the wet season as well as after each heavy rain occurred.	The EPC Contractor will report monthly to RCEMC on the following: • Compliance with approved erosion and sediment control plan • Incidents of erosion or water contamination • Results of weekly inspections • Results of any corrective actions The EPC Contractor will report to RCEMC any incident and surface water quality results twice a year. RCEMC will make reports twice per year to relevant authorities and lenders.
2	Cleaning & Hydrotesting		• Limit amount of chemical using. In the case of have to use, select less toxic chemicals; • No discharge of contaminated effluents into the river. • Recycle cleaning & hydro-testing water from commissioning plant, where possible to reduce amount of water discharging to the river; • Treat cleaning and hydrotesting water before discharge by separating solid residue and oil generated in construction and tanks and pipeline installation phase; After that treat by chemicals in temporary neutralization tanks at tankage area. • Do not discharge cleaned and hydro-tested water at site. In the case of discharging to the river, discharged cleaning and hydro-testing water as far the shoreline.	EPC Contractor			
3	Sanitary Wastewater Discharge		• Build temporary water closets at the site to collect and treat preliminary domestic wastewater generated in this phase; • Contract with township municipal department to periodically suck septic tanks at construction and camping site and treat properly in accordance with in force regulation; • Do not discharge sanitary effluent to Ayeyarwaddy river. Treated sanitary wastewater shall then be routed to the river via an outfall system at the location of adequate dilution and dispersion of effluent.				

			• Regular monitoring of effluent from the construction site will be undertaken to ensure treatment efficiency.	EPC Contractor			
4	Storm water Discharge		• A storm water collection system will be installed throughout the worksite to minimise soil erosion and reduce turbid water discharge to the nearshore area. • A storm water drainage system in trapezium shape will be installed in the Northern site to outlet safely total amount of runoff water to avoid flood for surrounding community; • Runoff water in the Southern site will be routed to drainage system along provincial Min Hla- Malon road built by MPE; • Dyke around the site to control storm water to reduce over flow to the environment directly				

8.5.3.4 Groundwater Management Plan

NO	Objectives	Legal Requirements / Reference Standard,	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize groundwater contamination Prevent impact on the receiving environment from contaminated groundwater	Standards issued in NEQ (E) guideline, WB, ADB and WHO	• Install sanitary waste system to collect and treat sewage and grey water from the various operations of the worksite and construction labour camp. • Control cleaning & hydro-testing process and quantity of chemicals used. • Monitor discharging process; • Monitoring groundwater quality after completion construction phase.	EPC Contractor	Ongoing during construction	Groundwater sampling to collect information that can be used to determine: • The characteristics and trends of contaminated groundwater migrating offsite • Whether any contaminant plumes may be forming • Routine performance checks and monitoring of the operation of the recovery system	The EPC Contractor will report to RCEMC any incident and ground water quality twice a year. RCEMC will make reports twice per year to relevant authorities and lenders.

8.5.3.5 Terrestrial Flora Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize the impact on the surrounding environment, the entire operation of site clearing, trenching, pipe lying and rehabilitation will occur in the shortest practicable time.	Municipal By Law	• Vegetation clearance should be reduced as much as possible at onshore area of harbour and pipeline route. • Plant green trees around the complex area and along onshore pipeline and some areas in the Complex in order to ensure that green area is not less than 10% of total project area. • Prevention of hunting by staff and contracted personnel.	EPC constructor	Ongoing during construction	Rehabilitated areas will be monitored to ensure the success of the rehabilitation program by EPC Contractor and EMC.	The EPC Contractor will report to RCEMC any incident and ground water quality twice a year. RCEMC will make reports twice per year to relevant authorities and lenders.

8.5.3.6 Waste Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Manage all wastes generated on site Waste Management	Standards issued in NEQ (E) guideline, WB, ADB and WHO Municipal By Law	• The scope and objectives of the waste management plan; • Capacities and actions to be taken to implement the waste management hierarchy; • Quantitative estimates of the expected wastes and emissions; • Have agreement with suppliers to take back the unused materials; • Training in waste minimization skill / habit; • Monitoring / supervising; • Emergency response procedures; • Reporting	EPC Contractor is responsible to implement.	Ongoing during construction	EPC Contractor will implement waste consignment notes indicating source/dates/ quantities of generation along with periodic analyses of constituents. The following waste streams will be measured and	The EPC Contractor will report monthly to RCEMC amount of wastes and other relevant waste management issues. RCEMC will make reports twice per year to relevant

						reported: • Waste generation • Waste re-use • Waste recycling Waste treatment and disposal	authorities and lenders.
	Non-hazardous waste		• The topsoil will be collected and disposed at assigned area; • Concrete, grit and sand/soil waste will be used for grading/land leveling. • Packaging waste will be collected and stored in non-hazardous waste area. Explore possibility to reuse waste as for other packaging purposes. • Compostable food and canteen wastes will be collected in dustbins and transported to the landfill of the province. • Scrap iron, cable drums, electric wires, containers… will be transferred to the designated Non-hazardous waste storage area prior to scrap dealers. • Domestic sludge from the construction camps will be ollected for treatment and disposal.				
	Hazardous waste		• All hazardous wastes will be managed in compliance with Notification No.615/2015 issued by MONREC on Guidedance of practice condition and procedures of documenting, registering, licensing work permit, code of hazardous management. • Hazardous waste generated during construction and installation such as oil waste, used batteries, contaminated mineral and laboratory wastes will be separately collected in plastic bag, labeled and stored at Hazardous waste storage area. • Medical waste generated from health centre will be collected in plastic bag, labeled and sealed. The sharp things will be stored in specific containers under control of medical staff.				

8.5.3.7 Health and Safety Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To ensure that the project does not adversely affect the health of the employees, contractors or the public.	FC Performance Standards, EIA procedure	• Instruct employees to utilize equipments in construction activities (materials, lifting technique and limit weight); • Limit load/unload, transport heavy goods by hand; • Clean usually wastes and overflow effluents in construction site; • Use anti-slipped boots; • Put barriers around deep area to avoid to fall down; • Train workers to use protective equipments properly as well as fall prevention system; • Use control and monitoring system to protect workers in dangerous cases; • Evacuate workers out of construction site when carrying out explosion activity (mines, bombs…); • Equip appropriate protective clothes (safety glass with blanket, hard helmet and protective boots); • Develop traffic management system to minimize potential risks, such as insolate transport road area, limit speed, set up one way route…; • Ensure vision for workers when working or passing areas having heavy machines in operation; instruct workers how to test and protect eyes; • All mobile equipments have sirens with suitable volume; • Check and maintain carefully lifting equipments such as cranes; • All workers should be trained about industrial safety before working in confined space; • Apply work permit for all workers, supervisors in construction area; • Implement preventive measures such as breathe support devices, safety belt, monitoring station to observe safety for workers with first aid and rescue tools);	RCEMC and EPC Contractor	Ongoing during construction	The health and safety performance, including HIV/AIDS and other communicable diseases, will be monitored in accordance with the defined responsibilities of the EPC Contractor. Regular audits will be undertaken by RCEMC.	All health and safety initiatives and incidents will be reported monthly to RCEMC by EPC Contractor. RCEMC will make reports twice per year to relevant authorities and lenders.

			• Personnel protective equipments (PPE) must be available and enough; • Keep roads from construction area to camp site safe and clean in bad weather condition; • Prepare high capacity pump system enough to pump rain water out of flooded area.				

8.5.3.8 Social Impact Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize detrimental social and/or community impacts from the construction workforce; Maximize opportunities for local businesses during the construction period.	IFC Performance Standards, EIA procedure	**Accommodation for workers** An accommodation camp will be provided for the construction workers to minimize conflicts between the Project worker and local people: • Accommodation camps will be located far from existing villages or settlements as much as possible to avoid disturbance to local communities; • Basic health and medical services will be provided reducing the demand on existing public facilities; • Buses will be provided to transport workers to the work sites each day. **Respect of local communities** The EPC Contractor will specify the behavior standards expected from all construction workers. This will be formalized in a code of conduct that will be agreed to and signed by every employee and sub-contractor. Complaints about unacceptable behavior from the Project workers will be investigated and solved. **Communication** Refinery complex environmental management committee will use a wide range of communication tools to ensure that any contacts in the Complex must be kept.	RCEMC, EPC Contractor, MPE, Min Hla- Min Bu township and Training Organisation	Ongoing during construction	Monitoring will be carried out by stakeholders feedback, review of complaints and statistics related to local resident employment and business development.	The EPC Contractor will report to RCEMC any incident and ground water quality twice a year. RCEMC will make reports twice per year to relevant authorities and lenders.

			Employment and business opportunities Refinery complex environmental management committee will maximize opportunities for the involvement of local businesses in the project construction and operation and for the employment of local residents. Refinery complex environmental management committee and EPC will communicate the requirements of the project's employment policy to the local community, relevant organizations and businesses. This will include information on positions available, skill requirements and recruitment procedures. To support local businesses, refinery complex environmental management committee and the EPC Contractor will commit to: • Ensuring potential local businesses are provided with relevant information in an equitable and timely manner; • Ensuring local businesses are provided with the opportunity to supply under the same terms and conditions as external businesses; • Ensuring that contracts are awarded competitively which will include due consideration of non-cost factors such as reliability, maintainability, servicing etc. **Infrastructure** EPC Contractor will be responsible for effecting repairs of any accidental disruption or damage caused by its activities under its responsibility and/or will provide appropriate compensation in agreement with MPE, local authorities and affected parties All planned diversions will be communicated to MPE and local authorities prior to the actual works being undertaken.				

8.5.3.9 Water way and road traffic Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementaton Schedule	Monitoring Plans	Remarks
1	To avoid the impacts on traffic during the construction phase and to ensure traffic safety	Standards issued in NEQ (E) guideline, WB, ADB and WHO	**Water way traffic** • Arrange reasonably berthing schedule for materials and construction equipments transport ships to avoid to slow down the Project progress and water way traffic in local area; • Inform local authority and community about pipeline and terminal installation schedule to avoid high density traffic; **Road traffic** • Arrange reasonably operation schedule and number of transportation vehicles for materials and construction equipments to avoid local traffic jam. Limit to transport in rush hours. • Choose reasonable transport route and avoid away from heavy traffic roads; • Loading/unloading materials activities must be acted as quick as possible to avoid traffic jam; • Project emergency response plan should include case of traffic accident occurring outside of the Project area; • Implement strictly safe driving for whole company, all contractors and local community; • Implement propagandize safe traffic for workers;	EPC Contractor is responsible to take action	Ongoing during construction	EPC Contractor will monitoring traffic entering the site during morning & evening peaks to ensure the implementation of good site management practices by all contractors during construction.	Refinery complex environmental management committee will make reports quarterly reporting of summary results (or more if requested) to relevant authorities and lenders.

8.5.3.10 Construction Phase (Pipeline ROW)

NO	Objectives	Legal Requirement/ Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To mitigate loss of vegetation and fauna habitat	Wildlife and Protected Areas Law (1994)	The contractor will ensure that vegetation clearance is limited to the required land area as much as possible. All disturbed habitats will be restored to its pre-construction status using a remedial plan that includes monitoring till all vegetation re-grow or are replanted. Phasing of development activities will allow some time for mobile fauna to seek refuge in adjacent and similar habitats or establish new ones nearby.	- Project In Charge (PIC)	Ongoing during construction	Compliance monitoring	
2	To minimise the amount of solid wastes produced	Municipal law	The contractor will provide adequate litter bins and place them at vantage points to minimize littering of the sites by workers. Salvaging of useable biomass by local people can significantly reduce the volume of waste that has to be disposed of.	- Project In Charge (PIC)	Ongoing during construction	Compliance monitoring	
3	Public safety - To enable to control the OH&S risks and improve OH&S performance	Public health law	The mitigation measures to ensure public and worker safety will include: • All haulage trucks plying the routes within the project areas will be given a mandatory speed limit of 50km/hr when moving through the communities; • Any accidents on the road involving trucks and humans or domestic animals would be investigated immediately and corrective actions taken to avert re-occurrence. • A code of conduct for drivers on the road would be developed and implemented; and • Community complaints handling arrangements would be instituted. Where there are open trenches,	- Project In Charge (PIC)	Ongoing during construction	- Verify relevant records - Compliance monitoring	

			security/ warning signs to ward off farmers in the affected areas. Additionally, alternative haulage routes will be considered where possible.				
4	To reduce the likelihood of accidents and work-related illnesses on the job To prevent as accidents occurring between construction related equipment and local vehicles	Labour law	The project's Health, Safety & Environment (HSE) Officers will ensure that the contractor and other sub-contractors educate their workers on the project's health and safety policy to prevent/minimize the possibility of accidents and reduce health risks. Workers will also be provided with the necessary protective gadgets like safety boots, helmets, reflectors, etc., and their use enforced. The contractor and MPE will be in consultation with the township health authorities based in Minbu and Minhla for all major cases. All minor ailments will be referred to the nearest health facility for treatment. MPE shall also contact other appropriate health facilities for the provision of health services to its employees.	- Project In Charge (PIC)	- Train before commencing Work - Ongoing during Construction	- Compliance monitoring	
5	Impact on soil and sediment transport		The project engineers will ensure that sensitive sites with high erosion risk are identified. Such areas shall not be included in the ROW as much as possible and will include hilltops and very steep slopes having gradient of 25% or more. Vegetation of such areas shall be maintained to help control erosion as well as ensuring soil stability.				

6	Impact to water bodies	Environmental Conservation Law (2012)	Man-hole construction at the start and end of pipeline beaches should be done quickly and to disturb only a minimum amount of space in order to reduce impacts on benthic fauna and flora. Water crossings to be carried out with little disturbance as much as possible to shallow-water habitats.				
7	Dust and noise	Standards issued in WB, ADB and WHO	Burning of biomass, if any, from the site cleared to make way for the line pipe and its ancillaries will not be allowed but it will be made available to the local people as fire wood. Speed ramps will be constructed on the affected roads where possible in consultation with the relevant stakeholders to reduce the rise of dust from the road. Earthworks and other constru-ction activities will be phased out or controlled to reduce noise generation during construction. All construction and earthworks will be done during daytime to avoid disturbing the serene nights of the local communities. Ear muffs will be provided for workers where necessary and its use enforced.				

8.5.4 Operation Phase (operation/maintenance)

8.5.4.1 Air Quality Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks Reporting
1	To minimize the release of air emissions at discharge sources and effect to the vicinity	ISO 14001: 2004 Environmental management systems WHO Air Quality Guidelines (As a general rule, it is suggested that 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same air shed)	**Associated Facilities** • Apply FGD system by sea water scrubbing for the flue gas from boilers; • Provide De-NOx and De-SOx systems for RFCC unit; • Provide Low-NOx burners for stacks of SRU, Gas turbines, CDU, ETP incinerator, RHDSs, NACs, KHDSs, GOHDS and Ultra-low-NOx burner for HMU; • The stack heights have been established to get adequate dispersion of SOx, NOx, CO and PM10 and verified the dispersion results basing on air dispersion model to confirm that ambient air qualities meet related standards and guidelines; • Establish and maintain Continuous Emission Monitoring System (CEMS) at following discharge source: o FGD / Boiler stacks – For SO2, NOx and PM o RFCC Co Boiler stacks– For SO2, NOx and PM o Gas Turbine stacks – For NOx • Monitor (every 6 months) of ambient air quality for NOx, SOx and PM in the upwind and downwind directions. • Provide vapor recovery systems in the Isomer products tank, light Naphtha FCC, Benzene, Paraxylene and vapor from export process of RON 92 and RON 95 gasoline; • Closely controlling liquid product export/import process to minimize leaking and spillage incidents.	Refinery complex environmental management committee is responsible for implement In Charge (PIC)	During Operation	Continuous monitoring of NOx, SOx and PM for stacks with huge emission. Quarterly monitoring of emission and ambient air quality.	Refinery complex environmental management committee will make reports twice per year to relevant authorities and lenders.

			• Install leakage detector, spillage control equipments and emergency shutdown valves at closing magnetic type to prevent leakage/spillage at fuel storage tank area • Install the automatic fire detector and automatic firefighting equipment system at fuel tank areas and fuel pump station.				

8.5.4.2 Noise Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks Reporting
	To minimize noise generated from the Refinery and Harbor operation	Standards issued in NEQ (E) guideline, WB, ADB and WHO	• Install soundproofed wall around the equipment such as gas turbine, steam turbine, air compressor… to reduce noise; • Install the noise and vibration sensor at highly noise and highly vibration zone such as air compressor, turbines…; • Provide hearing protection for employees working in noisy area. The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A); • Making period maintenance plan for equipment to minimize noise and vibration; • Perform medical hearing checks for workers exposed to high noise levels; • Implement noise control measures to ensure compliance with IFC and Vietnam Noise Standards • Establish a green-tree buffer zone between the project area and resident area.	Refinery complex environmental management committee is responsible for implement	During Operation	Noise Monitoring will be conducted upon commissioning and then at twice a year in accordance with the MONREC Notification No.615/2015.	All complaints will be documented, acted on and reported in accordance with current site procedures; Refinery complex environmental management committee will make reports twice per year to relevant authorities and lenders.

8.5.4.3 Soil Contamination Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Prevent soil contamination Manage contaminated soil	Environmental Conservation Law (2012) Standards issued in NEQ (E) guideline, WB, ADB and WHO	**Onshore Facilities Hazardous Materials Handling:** • Material safety data sheet (MSDS) provided for all hazardous materials; handling procedures in place; • Storage tanks should be surrounded by oil tight bund walls to prevent escape of chemicals, petrochemical products into the environment in the event of a major spillage or tank failure; • Hazardous liquids are segregated and securely stored in appropriate secondary containments; • Identify areas prone to leaks/spills and provide adequate secondary containment • Spill prevention and clean-up plan in place; • In the event of a spillage, absorb or contain liquid with sand, earth, sawdust or other spill control materials. Prevent from entering drains, ditches or waterways. • Containment and covered storage of aggregates designed to reduce surface water runoff. **Hazardous waste storage and handling:** • Waste separation at source; • Spent catalyst waste from RFCC unit will be collected and transported to a cement factory where spent catalyst wastes can be treated by Co-processing method as raw material for the cement processing. At the preparation time of this EIA report, Cement Plant in Thatet Province is the only one having enough ability and license to treat this spent catalyst waste;	Refinery complex environmental management committee is responsible for implement	During Operation	Identification and reporting of any leaks or spills in accordance with the EMS Procedures. Audit soil contamination twice times/year.	Refinery complex environmental management committee will make reports twice per year to relevant authorities and lenders.

			• Spent catalyst from CCR and PENEX-DIH units containing Pt and RHDS unit containing Ni, V and Mo will be recovered metals by catalyst suppliers or licensed recovery companies; • Oily wastes will be collected in to HDPE bags and transported to the incinerator of the Plant; • The waste sludge will be collected and treated by the incinerator of the Plant; • Incineration ash will be collected into HDPE bags, labeled and transferred to designated hazardous waste storage area prior to offsite transportation to hazardous waste management facility; • Used lube oil will be recycled in refinery as much as possibly, if not lube oil will be collected in to drums and transferred to hazardous waste storage area prior to licensed lube oil recycling agencies.				

8.5.4.4 Surface Water Management Plan

No	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Prevent surface water pollution by not discharging contaminated water to the ambient environment	Environmental Conservation Law (2012) Standards issued in NEQ (E) guideline, WB, ADB and WHO	**Continuous water intake** • Control velocity of river water inlet and temperature; • Do not discharge backwash water directly to river water, but through outfall sump; Backwash water shall be routed to settle sump to reduce TSS content before discharging to the river through outfall; • Use small dredger to carry out maintenance dredging in intake channel to avoid intensive high content of TSS and accident with nearby facilities (main breakwater and low crest breakwater); **Wastewater discharge and thermal effect** • Cooling water temperature shall be controlled and maintained below 40oC before mixing with other treated effluents. • Regular monitor water temperature at intake water location and mixing zone area. Temperature of mixing zone shall not exceed 3oC above the temperature of the coastal ambient water.	Refinery complex environmental management committee is responsible for implement. Vessel Master for safe and efficient procedures during import/export activities at the	During Operation	Surface water monitoring if any incident Quarterly effluents monitoring Surface water monitoring twice a year to collect information on: Water quality of receiving environment; Performance checks of operational controls.	Refinery complex environmental management committee will make reports about surface water quality twice per year to relevant authorities and lenders.

			• Reuse cooling water for De-SOx purpose at FGD unit. • FGD effluent will be aerated to reduce COD before mixing with cooling water to the outfall; • All effluents are pre-treated at source (first stage) then routed to the effluent treatment plant (ETP) for further treating; • Oily sludge will be treated by the incinerator; • Wastewater from ETP and FGD will be treated to meet effluent standard and combined with cooling water before discharging to the river; • Install concreted barrier to protect the head of outfall system. **Product loading at jetties** • Strictly control product loading/offloading procedure and pipeline. Check obstacles at harbor basin for reducing oil leakage and oil spills. • No other vessel will be permitted to come alongside or remain alongside a vessel in berth while transferring cargo without the approval of the vessel's Master and the harbor manager; • Approaching adverse weather conditions may require that the moored vessel depart the berth, they only leave when harbor manager approves; • Monitor system pressure in order to immediately discover leakage accident; • Limit risk of the pipeline leakage or broken by clearly mark and regularly monitor the pipeline trenching area; • Regular check shutdown and collection system and equipment in order to response on time; • Regular practice/train firefighting procedure sand emergency response plan;	harbor				

- Coordinate with local authority and related agency (Min Hla Port) in setting up emergency response network;
- Do not carry out product loading at night time;
- Monitor sanitary and oily effluent discharge at harbor area.
- Provide for spill containment measures at the jetty to remove spills and contain impacts on marine environment;
- Provide Prevention measures during Loading Activities at the Harbor;
- Do not permit any ships containing ballast water needed to be treated arrive the harbor;

Maintenance dredging

- Characteristics of sediments (appearance of potential pollutant) will be surveyed / identified before dredging;
- Plan dredging schedule to avoid peak shipping activities;
- Dredging activity shall be carried out in daytime to avoid ship collision in the harbor and access channel;

Wastewater

- Oily effluent generating from harbour shall be collected to a sump and then transferred to plant ETP for treatment;
- Sanitary effluent is treated at Jetty by sewage treatment package (STP) and the routed to plant outfall;
- Sludge from STP will be transferred to the Refinery effluent treatment plant (ETP) for further treatment.

8.5.4.5 Groundwater Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize groundwater contamination Prevent impact on the receiving environment from contaminated groundwater	Environmental Conservation Law (2012) Housing Board Ground Water Act	• Set up groundwater quality monitoring during operation phase. • Follow-up the final disposal of solid wastes and hazardous wastes to make sure that they comply with International and Vietnamese standards.	Refinery complex environmental management committee is responsible to take action	During Operation	Groundwater sampling and analyzing twice a year to collect information that can be used to determine: • The characteristics and trends of contaminated groundwater migrating offsite • Whether any contaminant plumes may be forming or not • Routine performance checks and monitoring of the operation of the recovery system	Refinery complex environmental management committee will make reports about groundwater quality twice per year to relevant authorities and lenders.

8.5.4.6 Waste Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To minimize the quantity of generated waste and the environmental impacts caused by these wastes.	Municipal Law	**Non-hazardous waste** • All waste generated in the complex shall be classified in accordance with World Bank Guidelines for Refining. TCVN 6705:2000 covers the classification of non-hazardous solid wastes. • Non-hazardous waste shall be controlled and separated at source into those that can be recycled or re-used, and those which must be sent to disposal. They shall then be stored in bags or tanks of given colors as specified by the law, Solid Waste Management. • The specific actions for non-hazardous waste generated in the operation phase include: o Office paper waste from shredding will be collected in plastic bags to be stored to licensed paper recycling agencies; o Scrap metals such as iron, aluminum and cable drums will be transferred to the designated nonhazardous waste storage area prior to offsite transportation to scrap dealers; o Domestic wastes will collected and treated at landfill of MPE by the local waste treatment company. o Used tyres, plastic bottle and glass will be collected in puncher resistant bags stored at area designated for its storage or at nonhazardous waste storage area. o Used PPE will be collected in separate bags, labeled, and stored at nonhazardous waste storage area.	Refinery complex environmental management committee is responsible to take action	During Operation	Implement waste consignment notes indicating source/ dates/quantities of generation along with periodic analyses of constituents; •Control waste treatment agencies on the process of waste collection, transportation, treatment and disposal; •Copy relevant valid licenses of the employed waste transporters and waste collectors; •Records of quantities of reused and recycled waste.	Recorded data as well as mitigation and disposal measures will be reported twice per year to relevant authorities and lenders.

			Hazardous Waste • All hazardous waste will be managed in compliance with Notification No.615/2015 issued by MONREC – Guidance of practice condition and procedure of documentation, registration, practice license and hazardous waste management code. • Minimize and classify hazardous wastes generated from the Refinery; o Package hazardous wastes according to their categories in proper packing or containers, which satisfy the technical safety requirements, and the signs and marks there on must be clear as prescribed by the regulatory of MONREC; o Store hazardous wastes safety within the facility before transfer to the companies having license of collecting, transporting, keeping, treating and disposal. • The specific actions for hazardous waste generated in the operation phase include: o Spent catalysts will be collected into HDPE bags, labeled and transferred to hazardous waste storage area prior to offsite transportation to catalyst Vendor; o Used lube and oil from will collected in to drums, labeled and transferred to designated Hazardous waste storage area prior to offsite transportation to licensed lube oil recycling agencies; o Spent adsorbents, sulpholane solvent, clay treated waste, used cartridge filter, tank residue waste and solid waste from maintenance activities of storage tanks will be collected in to HDPE bags, labeled and transferred to Hazardous waste storage area prior to offsite transportation to approved.				
3			**Radioactive Waste** • Storage and use of radioactive substances and waste shall be detailing the implementation of the ordinance on radiation safety and control and other recognized standards.				

8.5.4.7 Social and Community Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize social and/or community effects from the Project operation Maximize opportunities for local businesses	IFC Performance Standards, EIA procedure	To support local businesses, refinery complex environmental management committee will commit to: • Ensuring potential local businesses are provided with relevant information in an equitable and timely manner; • Ensuring local businesses are provided with the opportunity to supply under the same terms and conditions as external businesses; • Ensuring that contracts are awarded competitively which will include due consideration of non-cost factors such as reliability, maintainability, servicing…; • Provide support for local community organizations.	Refinery complex environmental management committee	During Operation	Monitoring will be by stakeholders feedback, review of complaints and statistic related to local resident employment and business development	Communal issues will be reported annually to relevant authorities and lenders.

8.5.4.8 Employment and Training Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To ensure that the affected people, the poor and the local communities may get benefit from the Project	IFC Performance Standards, EIA procedure	• MPE, Min Hla- Min Bu township and Training Organizations will organize a training program in order to maximize the number of employees coming from the Project area. • Refinery complex environmental management committee (RCEMC) will maximize local participation and give a priority to the people affected by this project, where it is justified in respect of considerations of cost and quality. • RCEMC will emphasize selection and recruitment of high-performing local construction employees who will transition across to operation roles. • RCEMC will inform its local suppliers, contractors of this plan and the requirement to comply with the procedures. • RCEMC will develop the local supply chain to be able to support the operation activities, and to maximize the economic benefits that flow from the Project to the MPE, Min Hla Province and the country.	Refinery complex environmental management committee, MPE, Min Hla-Minbu township Vocational Schools	During Operation	Refinery complex environmental management committee will monitor direct and indirect employment numbers disaggregated by gender, by skill level, and by area of origin.	Statistic regarding training activities, employment data will be reported annually to relevant authorities and lenders.

8.5.4.9 Health and Safety Management Plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	To ensure that the operation does not adversely affect the health of the employees, contractors or the general public	BS OHSAS 18001:2007 Occupational health and safety management systems –	Prepare the Health and Safety Management Plan in accordance with the requirements of refinery complex HSE Management System	Refinery complex environmental management committee	During Operation	The health and safety performance will be monitored in accordance with the refinery complex HSE Management System	Health and safety performance will be reported annually to relevant authorities and lenders.

8.5.4.10 Emergency response plan

NO	Objectives	Legal Requirements / Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Minimize risk of incidents	BS OHSAS 18001:2007 Occupational health and safety management systems –	**Fire & explosion incident** • Equip toxic / flammable gas detectors with emergency block valve (EBV). EBV must be installed outside of flammable area. If not, it must be covered with fire resistance layer in compliance with API 2001 Standards; • Check all equipments to minimize leaking risk (such as pipeline connection welds, safe valve in case of incident, manual liquid loading valve, flange covers); • Minimize risk for passers by early warning in case of leaking incident and blockading quickly entrance; • Monitor traffic roads in case of fire & explosion accident in the Plant. **Toxic gas leaking** • Evacuate labor out of dangerous area; • Inform local community and authority about the accident; • Prepare an Emergency Response Plan in the Plant; put it in working area and apply at once in case of accident; • Emergency response training and drilling. **Oil spill incident** • Prepare Oil Spill Response Plan (OSRP) for quick and more efficient response in case of incident;	Refinery complex environmental management committee	During Operation	Appropriate monitoring in accordance with HSE system of refinery complex environmental management committee	Report yearly to relevant authorities and lenders

			• Equip and maintain oil spill response equipment at SPM and harbor area, including: skimmer, containment boom (used for offshore area and tidal shore), oil containment bags, additive tank; temporarily store recovered oil in response ship at harbor; • Equip specific devices: pump, risers, oil absorbent, container… to clean the shoreline; • Apply suitable clear technology to restore diversity of environment; • Set up an emergency response team with suitable equipments and well training and drilling; • Organize training and drilling yearly with onshore and offshore response options for whole company including decision makers. • Sign agreements with local authority about seashore protection activities.				

8.5.4.11 Operation Phase (Off-Take Point) / Operation Phase (Pipeline ROW)

No	Objectives	Legal Requirement/ Reference Standard, Guideline	Management Actions	Responsibilities	Implementation Schedule	Monitoring Plans	Remarks
1	Facility maintenance to avert any serious breakdowns or transmission failures	MPE/MOGE regulations	Comprehensive Maintenance Program should be put in place. The required maintenance for the systems will include among others: • Routine equipment maintenance/inspection schedule and record; • Annual equipment inspection and maintenance record; • Procedure for pre-arranged repair service; • Procedure for preventive maintenance; • Regular calibration; and • Emergency procedure for failures. Major installations will be handled using laid down safety procedures.	- Top Management - EMR - HSE Team	- Ongoing Duration Operation	- Preventive maintenance - schedule - Compliance monitoring - Impact auditing	

2	- To help prevent health threat - To minimize littering of the site	Environmental Conservation Law (2012)	- Provide additional toilet facilities and potable water in the affected communities - Provide Waste bins at appropriate and convenient places	- Top Management - EMR - HSE Team	- Ongoing during Operation	- Compliance monitoring - Impact auditing	
3	- To minimise the amounts of solid wastes produced - To recycle or salvage non-hazardous construction waste	Municipal law	- All scraps and other solid wastes from pipeline maintenance will be disposed of at designated dumpsites or landfill sites or sold out to scrap dealers - Excavated soils will be reused for filling purposes as much as possible - Contaminated soil will be considered as waste material and disposed of accordingly at designated dumpsites	- Top Management - EMR - HSE Team	- Ongoing during Operation	- Compliance monitoring - Impact auditing	
4	To ensure safe operation of the transmission systems	MPE regulations	The crude oil transmission system will be managed through regular maintenance of the pipeline and discharge systems Institute measures to sanction people who illegally tamper or vandalize the pipelines	- Top Management - EMR - HSE Team	- Ongoing during Operation	- Preventive Maintenance Schedule - Compliance monitoring - Impact auditing	
5	- To ensure that incidental and structural or operational failures of the transmission network is reduced - To prevent as accidents occurring between construction related equipment and local vehicles - To monitor health and	Public health law	- Ensure correct operation and maintenance of the installed machinery and equipment, including regular inspections and maintenance. - Minimize emergency response time through the provision of adequate equipment, development of emergency response procedures and training of workers. - Ensure timely repair and replacement works on pipelines, pumps and valves and other related areas of the crude oil transmission sys-tem. - Ensure that maintenance works are carried out by only certified engineers. The work of these engineers will be closely	- Top Management - EMR - HSE Team	-Train before commencing Work -Ongoing during Construction	- Preventive Maintance Schedule - Compliance monitoring - Impact auditing	

	safety of all workers		monitored by very competent personnel - Ensure regular check for illegal connections and take corrective actions. - Ensure regular checks of the facility's machinery and equipment to prevent direct public access. - Ensure that workers handling machinery and equipment are well trained - Ensure that workers are supplied with adequate personal protective equipment including overalls, earplugs and hand gloves and enforce their use				

6	- To minimize any hazards to humans and the environment during emergency situations - To combat any fire - For safety and to protect the pipeline	MPE regulations	- Emergency response plan is in place and regular review of the plan. - Set up Emergency Fire Response Team - Liaise with the concerned township fire departments for support when needed - Ensure that the likelihood of the loss of natural gas from the system occurring is minimized to the barest minimum through regular maintenance and monitoring - Specify procedures to detect and contain a leak if it did occur and define methods for cleanup and disposal - Set up spill prevention plan to tackle all eventualities from natural disasters - Regular surveillance of the pipeline and overall pipeline integrity will be conducted - Written permission is required prior to planting any shrubs within the pipeline right-of-way - Structures and trees are prohibited within the right-of-way	- Top Management - EMR - HSE Team	Routine surveillance / integrity monitoring system	- Monthly inspection of the whole pipeline - Compliance monitoring - Impact auditing	

Environmental Management and Monitoring Plan (Construction Phase)

Environmental impact	Proposed mitigation and aspects for monitoring	Responsibility for Mitigation monitoring and maintenance during construction	Monitoring means at Phase	Recommended frequency of monitoring
Soil degradation	• Control earthworks	Contractor/ Developer	Inspection	Daily
	• Install drainage structures properly	Contractor/ Developer	Inspection	Daily
	• Landscaping	Contractor/ Developer	Inspection	Daily
	• Ensure management of excavation activities/ cutting and filling	Contractor/ Developer	Routine maintenance	Daily
	• Control activities especially during the rainy season	Contractor/ Developer	Routine maintenance	Daily
	• Provide soil erosion control and conservation structures where necessary	Contractor/ Developer	Routine maintenance	Daily
	• Top soil restoration	Contractor/ Developer	Routine maintenance	Daily
• **Air pollution** • **Dust Emission** • **Hazardous emission**	• Control speed and operation of construction vehicles	Contractor/ Developer	Inspection	Daily
	• Proper cover of trucks carrying construction materials	Contractor/ Developer	Inspection	Daily
	• Prohibition of idling of vehicles	Contractor/ Developer	Inspection	Daily
	• Prohibition of solid waste burning	Contractor/ Developer	Inspection	Daily
	• Water should be sprayed during the construction phase of excavated areas during the dry season	Contractor/ Developer	Inspection and observation	Daily
	• Regular maintenance of construction plants and equipment	Contractor/ Developer	Inspection and observation	Weekly
	• Engage sensitive workers • Provide masks and PPE • Worker to understand about hazardous gas emission	Contractor/ Developer	Inspection and observation	Daily
Noise pollution	• Sensitization of drivers of construction machinery	Contractor/ Developer	Inspection and observation	Daily
	• Restriction of construction activities to day time	Contractor/ Developer	Inspection and observation	Daily
	• Workers in the vicinity involved in high-level noise to wear safety and protective gear	Contractor/ Developer	Inspection and observation	Daily
Oil pollution	• Proper storage, handling and disposal of new oil and used oil wastes	Contractor/ Developer	Inspection and observation	Daily

	• Maintenance of equipment to avoid leaks	Contractor/ Developer	Inspection and observation	Randomly
	• Maintenance of construction vehicles should be carried out in the contractor yard (off the site)	Contractor/ Developer	Inspection and observation	Randomly
Hydrology	• Proper construction and installation of drainage structure.	Contractor/ Developer	Inspection	During construction and on completion
	• Installation of cascades and drops to break the impact of water flowing in the drains	Contractor / Developer	Inspection	During construction and on completion
	• Provision of gradients to the drainage	Contractor / Developer	Inspection	During construction and on completion
	• Ensuring efficiency of drainage structures through proper design and maintenance	Contractor / Developer	Inspection	During construction and on completion
Water resources	• Rain water collection tank	Contractor/ Developer	Inspection	Weekly
	• To use river water as much as possible	Contractor/ Developer	Inspection	Weekly
	• Rain water storage at construction and operation phase	Contractor/ Developer	Inspection	Weekly
	• Capacity of purification plant	Contractor/ Developer	Inspection	Weekly
	• Capacity of treatment plant	Contractor/ Developer	Inspection	Weekly
Water usage	• Record water volume requirement at purification Plant	Contractor/ Developer	Inspection	Randomly
	• Management of unnecessary wastage and leakage	Contractor/ Developer	Inspection	Randomly
Vegetation	• Landscaping and planting at rest area	Contractor/ Developer	Inspection and observation	Daily
Sewage	• Regular maintenance of sewage septic tanks • Observation of smell • Check Groundwater at rainy season • Observation of ground tanks near septic tank	Contractor/ Developer	Inspection	Randomly
Solid waste and construction waste	• Ensure purchase of materials	Contractor/ Developer	Construction	Weekly
	• Waste bins/skips	Contractor/ Developer	Construction	Weekly
	• Sorting type of waste (Reduce, Reuse, Recycle)	Contractor/ Developer	Inspection and observation	Daily
	• Recycling	Contractor/ Developer	Inspection and observation	Daily

	• Garbage should be disposed of periodically and at approved dump sites	Contractor/ Developer	Inspection and observation	Daily
Security	• Provision of security guards and facilities during the project construction	Contractor/ Developer	Construction/ Operation	Daily
	• Checking and inspection to parameter fencing of the plant	Contractor/ Developer	Operation	Daily
	• Checking and inspection to sub-station yard	Contractor/ Developer	Operation	Daily
Road Safety	• Enforce speed limits for all vehicles accessing at site and off-site.	Contractor/ Developer	Inspection and observation	Daily
	• Provision of billboard and traffic signs around the site to notify or stakeholders of the development	Contractor/ Developer	Inspection and observation	Daily
Public health and Occupational safety	• Training of worker on occupational health and safety.	Contractor/ Developer/ Safety officer	Inspection and observation	Weekly
	• Provision of full protective gear and workmen's compensation cover in addition to the right tools and operational instructions and manuals (body protection, protective cloths, safety helmet)	Contractor/ Developer/ Safety officer	Inspection and observation	Weekly
	• Adoption of waste management system to ensure proper solid waste disposal and collection facilities (masks, gloves)	Contractor/ Developer	Inspection and observation	Daily
	• Ensure effective waste water management	Contractor/ Developer	Inspection and observation	Monthly
	• Design of sewerage system to be as provided in the plan	Contractor/ Developer	Inspection and observation	Randomly
	• Engaging the services of qualified personnel and/or ensuring training	Contractor/ Developer	Inspection and observation	Weekly
	• Ensuring water is available for drinking (Purified drinking water during construction phase)	Contractor/ Developer	Inspection and observation	Daily
	• Making health and safety awareness a priority	Contractor/ Developer	Inspection and observation	Weekly
	• Posting clear warning signs eg "No authorized use of machines" and ensuring there are guards on moving parts	Contractor/ Developer	Inspection and observation	Weekly

	• Provision of fully equipped first aid kits and training staff on its use (Emergency response)	Contractor/ Developer	Inspection and observation	Weekly
	• Sensitization of residents on environmental management • Prohibition signs, heavy equipment safety, scaffold safety, ladders safety, electricity safety, confined spaces	Contractor/ Developer	Inspection and observation	Weekly
Fire safety	• Installation of fire-fighting equipment /regular testing	Contractor/ Developer	Inspection and observation	On completion
	• Conducting training on fire-fighting, evacuation and emergency response	Contractor/ Developer	Inspection and observation	On completion
	• Sensitization of the workers on fire risks ie conducting regular fire drills.	Contractor/ Developer	Inspection and observation	On completion
	• Provision of emergency Phone numbers at strategic points scaffold safety, ladders safety, electricity safety, confined spaces	Contractor/ Developer	Inspection and observation	On completion
Internal audits	• Monitoring will involve measurements, observations, evaluation assessment of changes in waste management, noise levels, workers safety etc.	Contractor/ Developer	Inspection	Monthly
Contractors laydown area	• Special attention should be paid to the sanitary facilities on site.	Contractor/ Developer	Inspection	Daily
	• Garbage should be disposed of periodically at approved dump sites.	Contractor/ Developer	Inspection	Daily

Environmental Management and Monitoring Plan (Operation Phase)

Environmental impact	Proposed mitigation and aspects for monitoring	Responsibility for Mitigation monitoring and maintenance during Operation	Monitoring means at Phase	Recommended frequency of monitoring
Soil degradation	• Control activities especially during the rainy season	Developer	Routine maintenance	Monthly
	• Provide soil erosion control and conservation structures where necessary	Developer	Routine maintenance	Monthly
	• Top soil restoration	Developer	Routine maintenance	Monthly
• **Air pollution**	• Regular maintenance of construction plants and equipment	Developer	Inspection and observation	Monthly
• **Dust Emission** • **Hazardous emission**	• Engage sensitive workers • Provide masks and PPE • Worker to understand about hazardous gas emission	Developer	Inspection and observation	Monthly
Oil pollution	• Proper storage, handling and disposal of new oil and used oil wastes	Developer	Inspection and observation	Monthly
	• Maintenance of equipment to avoid leaks	Developer	Inspection and observation	Randomly
Hydrology	• Provision of gradients to the drainage	Developer	Inspection and routine maintenance	Monthly
	• Ensuring efficiency of drainage structures through proper design and maintenance	Developer	Inspection and routine maintenance	Monthly
Water resources	• Rain water collection tank	Developer	Inspection and routine maintenance	Weekly
	• Inspection of pipelines from reservoir	Developer	Inspection and routine maintenance	Weekly
	• To use river water as much as possible	Developer	Inspection and routine maintenance	Weekly
	• Rain water storage at construction and operation phase	Developer	Inspection and routine maintenance	Weekly
	• Capacity of purification plant	Developer	Inspection and routine maintenance	Weekly
	• Capacity of treatment plant	Developer	Inspection and routine maintenance	Weekly
Water usage	• Record water volume requirement at purification Plant	Developer	Inspection	Randomly

	• Management of unnecessary wastage and leakage	Developer	Inspection	Randomly
Vegetation	• Landscaping	Developer	Observation	Weekly
Sewage	• Regular maintenance of sewage septic tanks • Observation of smell • Check Groundwater at rainy season • Observation of ground tanks near septic tank	Developer	Inspection	Randomly
Solid waste	• Ensure purchase of materials	DeveloperI	Construction	Weekly
	• Waste bins/skips	Developer	Construction	Weekly
	• Sorting type of waste (Reduce, Reuse, Recycle)	Developer	Inspection and observation	Weekly
	• Recycling	Developer	Inspection and observation	Weekly
	• Garbage should be disposed of periodically and at approved dump sites	Developer	Inspection and observation	Weekly
	• Hazardous waste disposal	Developer	Inspection	Weekly
Security	• Provision of security guards and facilities during the project operation	Developer	Inspection and observation	Weekly
	• Checking and inspection to parameter fencing of the plant	Developer	Inspection and observation	Daily
	• Checking and inspection to sub-station yard	Developer	Inspection and observation	Daily
Road Safety	• Enforce speed limits for all vehicles accessing at site and off-site.	Developer	Inspection and observation	Daily
	• Provision of billboard and traffic signs around the site to notify or stakeholders of the development	Developer	Inspection and observation	Daily
Public health and Occupational safety	• Training of worker on occupational health and safety.	Developer/ Safety officer	Inspection and observation	Weekly
	• Adoption of waste management system to ensure proper solid waste disposal and collection facilities (masks, gloves)	Developer	Inspection and observation	Daily
	• Ensure effective waste water management	Developer	Inspection and observation	Monthly
	• Engaging the services of qualified personnel and/or ensuring training	Developer	Inspection and observation	Monthly
	• Making health and safety awareness a priority	Developer	Inspection and observation	Weekly

	• Provision of fully equipped first aid kits and training staff on its use (Emergency response)	Developer	Inspection and observation	Monthly
	• Sensitization of residents on environmental management • Prohibition signs, heavy equipment safety, scaffold safety, ladders safety, electricity safety, confined spaces	Developer	Inspection and observation	Weekly
Fire safety	• Installation of fire-fighting equipment /regular testing	Developer	Inspection and observation	Monthly
	• Conducting training on fire-fighting, evacuation and emergency response	Developer	Inspection and observation	Monthly
	• Sensitization of the workers on fire risks ie conducting regular fire drills.	Developer	Inspection and observation	Monthly
	• Provision of emergency Phone numbers at strategic points scaffold safety, ladders safety, electricity safety, confined spaces	Developer	Inspection and observation	Monthly
Internal audits	• Monitoring will involve measurements, observations, evaluation assessment of changes in waste management, noise levels, workers safety etc.	Developer	Inspection	Randomly

8.6 ENVIRONMENTAL MANAGEMENT PLAN AND ESTIMATED BUDGET

Environment Management Plan and Estimated budget

Impact	Mitigation	Monitoring To	Responsible Body	Content of work	Estimated amount of cost (MMK per year)
Soil					
Soil degradation	• Improvement and maintenance of rainwater drainage • Provision of conservation structure, Landscaping • Systematic excavation	• Drains, Water ways, • Vegetation covered plants, • Concrete Aprons, concrete drains, • Deformation by erosion • Top soil removal	Developer	Task work	30,000,000 *Included in Construction Budget*
Air					
Air pollution/ Dust emission	• Pouring water wetting of dusty places/area • Construction of diaphragm insulation wall at parameter fencing and maintenance regularly • Planting at rest area • Prohibited at dried leaves and solid waste	• Amount of dust, visit surrounding as wind direction • Road side tree leaves • PM_{10}, $PM_{2.5}$	Developer	Task work	30,000,000 *Included in Construction Budget*
Noise					
Noise pollution	• Sound-proof walls • Diaphragm wall at fencing • Sound-proof machinery • Proper maintenance to construction machines • Prohibit night time working • Limit working hours	• Observation at surrounding areas and premises	Developer	Task work	10,000,000 *Included in Construction Budget*
Water					
Surface water runoff	• Landscaping • Velocity of runoff by concrete drain and drops • Rain water storage	• To measure amount of rain water • Systematic surface drains	O&M Contractor who is hired by Developer	Task work	25,000,000 *Included in Construction Budget*

Water usage	• Rainwater storage • Capacity of purified water • Tube wells • Treated recycle sewage water • River water usage	• Gardening water • Water amount used at winter and summer	Developer	Task work	*Included in Operation and maintenance Budget*
Groundwater pollution	• Proper disposal of solid waste, educate workers and visitors • Handling of oils and chemicals • Solid waste management • Proper maintenance to sewage treatment plants	• Improperly disposing and dumping solid waste • Efficient collection and off-site disposal • Incidences of spills • Observation smell • Test BOD, COD, SS	Developer	Task work	20,000,000 *Included in Operation and maintenance Budget*
Sewage					
Sewage	• Regular maintenance of septic tanks	• Observation smell from sewage	Developer	Task work	15,000,000 *Included in Operation and maintenance Budget*
Solid waste					
	• Dust bins/skips • Educate workers and office staffs • Efficient solid waste management handling • Sorting type of waste • 3R (Reduce, Reuse, Recycle)	• Checking • Mosquitoes and flies • Moving to off-site Final disposal • Record daily work done of garbage trucks and volume of solid waste	Developer	Task work	20,000,000 *Included in Operation and maintenance Budget*
Climate					
Natural Hazards	• Planting more greens at rest area	• Record number of trees and greens area • Record paved area	Developer	Task work	20,000,000 *Included in Operation Budget*

8.6.1 Overall budget for implementation of the EMP

8.6.1.1 Capital expenditure for constructing main treatment and monitoring works

MPE will invest to construct treatment plants and monitoring facilities as follows:

1. Control air pollution
    a. Desulphurization system in fuel gas from boilers
    b. Sulphur recovery system (SRU and TGU)
    c. Flare system
2. Reduce noise
    a. Muffler
3. Waste water treatment
    a. Effluent Treatment Plant (ETP)
    b. Domestic waste water treatment system at the Plant
    c. Domestic waste water treatment system at the harbor
    d. Rain water drainage system
    e. Sludge incinerator of ETP
4. Environmental monitoring
    a. Continuously air emission monitoring (online)
    b. Ambient air quality monitoring station
    c. Gas detectors (approximatively 15 units and Process Unit 30 Units) (online)
    d. Wastewater quality monitoring (online)
    e. Wastewater quality monitoring (Laboratory)

Proposed budget for environmental monitoring program

Above described control measure units are installed in the new refinery plant construction phase to reduce the emission.

Following are the estimated proposed budget for environmental monitoring program of the Project:

- Construction phase: 50,000 USD/year

- Operation phase: 50,000 USD/year

The above-estimated budget for implementation of the monitoring program is a reference to similar refinery types and scope of project. Detailed budget allocation will be provided in after completing of detailed technical design for proposed refinery plant.

CHAPTER 9:
PUBLIC CONSULTATION AND DISCLOSURE

9. PUBLIC CONSULTATION AND DISCLOSURE

Several key guidelines recommend the use of public and targeted consultation is to inform the development of the project. They concur that there is value in exposing a wider audience, including all groups that have an interest in the implementation or outcomes of the project. There are also strong grounds for consulting public stakeholders from the beginning of the development process; for example, to ensure that issues important to villagers are taken into account in the scoping of topics and questions to address and in subsequent steps moving forward. In addition, targeted consultation with the public can add value when important gaps are identified in the evidence related to their views and experiences.

Consultation is a two way process through which the government seeks and receives the view of stakeholders such as business and general public on proposed changes in policy or regulations that affect them directly or in which they may have a significant interest. It is a process which provides on opportunity for groups and individuals to gives comments and inputs and to encourage and promote stakeholders' involvement in the policy or regulatory development process. This allows the government to obtain feedback from the work directly with affected members of the society through the regulatory development process to ensure that their issues and concerns are understood and considered. As such, consultation starts at the earliest time when proposed regulations/ projects are being formulated.

Public consultation generates inputs to supplements the procedures and analysis of the authorities especially at the identification and conceptualising stage of regulation development. It helps to improve the quality of regulation and helps regulators in developing regulations that are technically viable, informed and implementable.

Helping to ensure that issues important to the public are appropriately taken into account from the beginning of the project and reflected in the final product, thereby complementing the contribution of public members on a development group:

- Supplementing gaps in the evidence or obtaining a wider source of public experiences and views than can be provided by public members on a guideline development group
- Securing an understanding of public perception of the acceptability and relevance of the 'local' context.
- Helping to ensure the project is relevant and acceptable to the public, and to specific groups within the population, including those who are unrepresented or 'seldom heard'
- Paving the way for public support for dissemination, and
- Enhancing the legitimacy of the development process and the end product from a public perspective.

9.1 Ways of conducting consultation

Consultations may be open to the public and/or targeted to relevant public groups and other stakeholders. They may be conducted remotely (e.g. online), in meetings or in workshops, or a combination of these. Whichever approach is taken, consultation adds significantly to the time and resource requirements of development and should be factored in at the outset. In most consultation processes—such as feedback on draft scoping documents and draft guidelines public consultation can occur simultaneously with professional consultation.
Both open and targeted consultation methods have their advantages as outlined in the

following table.

9.2 Open or targeted consultation

OPEN	TARGETED	OPEN AND TARGETED
Public posting of draft documents and questions, which would need to be well publicised. Guideline developers could have an interactive online feature to notify interested parties of the topics, anticipated comment periods, and actual postings	By invitation to all relevant stakeholder organisations, or to groups and individuals with interest, expertise and responsibility	Public posting of draft documents and questions combined with targeted invitations to all relevant stakeholder organisations or groups and individuals with interest, expertise and responsibility
Potential advantages This option has the merit of transparency and in theory opens up the process to all interested parties and viewpoints	**Potential advantages** Targeting invitations may be more effective in generating responses Where public stakeholders are not known to developers (or key organisations have not registered their interest), a focus on targeted consultation can help developers plan ahead to find individuals or groups and invite them to contribute to the development process The volume of feedback should be manageable	**Potential advantages** Combines openness and transparency with reaching all relevant stakeholder organisations or targeted groups/individuals
Potential disadvantages Developers may be overwhelmed with the volume of feedback Developers may receive inadequate feedback if publicity is limited and no one feels responsible	**Potential disadvantages** Important viewpoints may be overlooked or avoided if targeted consultation is not combined with an open invitation to contribute Invited individuals/ organisations may not be interested or able to respond in a timely manner	**Potential disadvantages** Developers may be overwhelmed with the volume of feedback

The public sector needs to be more facilitative by fostering increase collaboration to find innovative approaches to resolving national issues. Collaboration within government and with the wider society will allow the nation as a whole to combine competencies, resources and capabilities in tackling our many development challenges.

Public consultation will enable the government to;

i. develop better and more practical regulations;
ii. identify the full range of affected parties;
iii. minimise the risk of unexpected consequences; and

iv. identify better implementation methods.

By involving interested parties in regulation development it is also effective inincreasing trust and engagement with stakeholders. This is because consultation:

i. promote transparency and accountability;
ii. improve awareness and understanding of the policy area and addresses assumptions made; and
iii. encourages public ownership of the policy, thereby increasing public commitment to its implementation.

Good consultation is characterised by systematic and active participation as well as effective gathering of relevant inputs of stakeholders, such as business community, employees, interest groups, professional organisations and individuals into the design and/or review of regulation. For business regulation the stakeholders are those that are affected directly or indirectly by intent and implementation of the regulation.

Formal consultation takes place at a stage when there is scope to influence the policy outcome. At first stage of impact assessment, a sample of key stakeholders and individuals who are knowledgeable on the issue of interest is consulted to gather their inputs and to identify regulatory and non-regulatory options.

The six principles provide a comprehensive guidance on critical aspects of public consultation. The six principles set out in this research is a synthesis of the rich experiences found elsewhere.

9.3 Principles for Public Consultation

The stakeholders and public members can help the group consider the inclusion of any material or amendment arising from feedback that will strengthen and improve the project. Some recommendations will not be feasible for various reasons. Some public members may be well-placed to present the proposed modifications and rationale to the development group. (This is a model that has been effective with systematic review development and has worked well with public members who choose to take on this role.)

For all types of comments received, final uptake decisions should be in accord with the development group's ongoing decision-making processes.

9.4 Min Hla and Nyaungpinthar village Public Consultation

Public consultation is one of the key regulatory tools employed to improve transparency, efficiency and effectiveness of impact analysis of new refinery project and improved accountability arrangements. There are three related forms of interaction with interested members of the public.

- Notification. It involves the communication of information on new refinery project to the public, and it is a key building block of the rule of law. It is a one-way process of communication in which the public plays a passive consumer role of government information. Notification does not, itself, constitute consultation, but can be a first step. In this view, prior notification allows stakeholders the time to prepare themselves for upcoming consultations.

- Consultation. It involves actively seeking the opinions of interested and affected groups. It is a two-way flow of information, which may occur at any stage of project development, from impacts identification to evaluation of existing project. It may be a one-stage process or, as it is increasingly the case, a continuing dialogue. Consultation is increasingly concerned with the objective of gathering information to facilitate the drafting of higher quality assessment.

- Participation. It is the active involvement of interest groups in the formulation of regulatory objectives, policies and approaches, or in the drafting of impacts and mitigation plan. Participation is usually meant to facilitate implementation and improve compliance, consensus, and political support. Responsible persons are likely to offer stakeholders a role in project development, implementation and/or enforcement in circumstances in which they wish to increase the sense of "ownership" of, or commitment to, the assessment beyond what is likely to be achieved via a purely consultative approach.

At Min Hla and Nyaungpinthar village hearing is a public meeting on a particular new refinery impact assessment proposal at which interested parties and groups can comment in person. A hearing is an independent procedure; rather, it usually supplements other consultation procedures. This hearing is usually discretionary and ad hoc unless connected to other consultation processes. This is, in principle, open to the general public, but effective access depends on how widely invitations are circulated, the location and timing of the hearing, and the size of the room. Public meetings provide face-to-face contact in which dialogue can take place between consultants and wide range of affected parties and between interest groups themselves.

A key disadvantage is that they are likely to be a single event, which might be inaccessible to some interest groups, and thus require more co-ordination and planning to ensure sufficient access. In addition, the simultaneous presence of many groups and individuals with widely differing views can render a discussion of particularly complex or emotional issues impossible, limiting the ability of this strategy to generate empirical information.

Summary of reason of chosen stakeholder/ stakeholders relation to project for public consultation in Nyaungpinthar Village

Sector	Sub-Sector	Internal/ External to MPE	To be interview	Reason chosen/ Relation to project
Agencies and NGOs				External support, in both economic and political terms, has been very influential in determining the direction of New Refinery Project.
Politicians				The village representatives have significant impact on the implementation of new refinery project efforts in the regions and represent the villages' views to the Village administrators; those to be interviewed are involved in the issues related to this topic.
Public Entities				Since the process being analyzed includes new refinery project, the local staff levels of the MPE will be responsible for implementing many of these changes.
Public Entities: Other than MPE	Administrative Sector SAT Teacher	External	3	Since the process being analyzed includes new refinery project, the local staff levels of the non-MPE will be responsible for implementing many of these changes
Private sector	Village Elders Farmer	External	10	The private sector in the region is very powerful, and through their protests, private groups are able to stop political efforts that they consider to be threatening their interests. In the oil and gas sector alone there are numerous labor, both within and external to the MPE. These groups, if not in support of this project, may be able to stop its implementation.

Summary of reason of chosen stakeholder/ stakeholders relation to project for public consultation in Minhla Township

Sector	Sub-Sector	Internal/ External to MPE	To be interview	Reason chosen/ Relation to project
Agencies and NGOs	Fire Station		**2**	External support, in both economic and political terms, has been very influential in determining the direction of New Refinery Project.
Politicians				The village representatives have significant impact on the implementation of new refinery project efforts in the regions and represent the villages' views to the Village administrators; those to be interviewed are involved in the issues related to this topic.
Public Entities: MPE				Since the process being analyzed includes new refinery project, the local staff levels of the MPE will be responsible for implementing many of these changes.
Public Entities: Other than MPE	Military Defence (Ka Pa Sa),Township Police Officer, Township Administration Officer, Township Supporting Organization, City Development Council, Green/Warm Forestry Dept; Agriculture Department, Cooperative, Information and communication, Headmaster, Legal, Lecturer Team, Education, MEB Bank, and other organizations	External	31	Since the process being analyzed includes new refinery project, the local staff levels of the non-MPE will be responsible for implementing many of these changes

Private sector	Village Elders Farmer	External	19	The private sector in the region is very powerful, and through their protests, private groups are able to stop political efforts that they consider to be threatening their interests. In the oil and gas sector alone there are numerous labor, both within and external to the MPE. These groups, if not in support of this project, may be able to stop its implementation.

9.4.1 PUBLIC CONSULTATION: NYAUNGPINTHAR VILLAGE

Location: Compound of Nyaungpinthar Village Primary School

Date: 20-02-2015

Public Consultation event was held in the compound of Nyaungpinthar Village primary school at the 11: 00 am February 2015, attended by village tract elders, administrator, departmental employees and some 60 interested students.

Head of the EIA/SIA Department of MSR Co explained the purpose of EIA/SIA. He said at the meeting that the Union Hluttaw enacted the Environmental Conservation Law 2012 on 20th March 2012 and the by-law (draft) requires that EIA/SAIA be carried out of all larger-scale development projects; the research company is to put forward the report on EIA/SIA of the new oil refinery construction project; the assessment will improve impacts of the project on the biological and physical environment, on the society, economy, health and culture during the pre-construction period; and the issues of use of land occupied, natural resources, issues of land ownership and rights of local people, including the pros and cons of the project were discussed.

Consultant Engineer U Myint Swe, leader of the Physical Environment Data Collection Team of MSR Co, explained the measuring of the physical features and the possible resultant changes and the measuring of the air -pollution level, and asked the attenders for their suggestions on the project.

Participants of Public Consultation Meetings

Sr. No	Name	Occupation	Contact number
1	U Kyaw Aung	Chairman, Administrator	09 401522566
2	U Hla Kyaw	Village Elder	
3	U San Mya	Village Elder	
4	U Han Myint	Farmer	09 401537255
5	U Win Myint	Farmer	09 33256344
6	U Aung Min	Farmer	09 794620118
7	U Win Hlaing	Farmer	09 401556367
8	Daw Khin Swe Win	Head of Primary School, Nyaungpinthar Village	09 33256931
9	Daw Khin Thandar Maw	Primary School Teacher Nyaungpinthar	09 401618821
10	U Win Hlaing	Farmer	09 401556367

11	U Aung Myint Thein	Farmer	09 253400598
12	U Tike Hlaing	Farmer	09 33256373
13	U Ye Win Hlaing	Farmer	
14	U Myint Thein Htay	Farmer	09 33462921
15	U Tin Aye	Farmer	09 33256371
16	Daw Mya Kyi	Farmer	
17	Daw Nyunt Sein	Farmer	
18	U Myint Soe	Farmer	09 401538041
19	U Htay Win	Farmer	09 30255997
20	U Win Zaw	Farmer	
21	U Kyaw Myint	Farmer	09 256459112
22	U Mya Aung	Farmer	09 258009786
23	Daw Yin Shwe	Farmer	

Five participants who attending the public meeting discussed and gave their opinion. They were -

1. U Kyaw Aung - Administrator, Nyaungpinthar Village

2. U Hla Kyaw - Village Elder, Nyaungpinthar Village

3. U Htay Win - Farmer, Nyaungpinthar Village

4. Daw Yin Shwe - Farmer, Nyaungpinthar Village

5. Daw Khin Swe Win - Head of Primary School, Nyaungpinthar Village

Their views and opinions were described as follows.

U Kyaw Aung - Administrator, Nyaungpinthar Village

Nyaungpinthar Village tract administrator U Kyaw Aung said, “At the time the old factory was developed I don’t think the developer explain about the construction plan of the project. When I saw all the procedures of investigating air pollution, soil test, noise I feel safe for the development of new refinery factory. I am thankful for public disclosure regarding the project. It will be the best it the project not affected the environment.”

U Hla Kyaw - Village Elder, Nyaungpinthar Village

Nyaungpinthar Village tract administrator U Kyaw Aung said, “At the time the old factory was developed I don’t think the developer explain about the construction plan of the project. When I saw all the procedures of investigating air pollution, soil test, noise I feel safe for the development of new refinery factory. I am thankful for public disclosure regarding the project. It will be the best it the project not affected the environment.”

Daw Yin Shwe (80), farmer, Nyaungpinthar

Elder farmer Daw Yin Shwe said, “We have never heard of such survey before. The work of survey being done have must be reported. The previous factory project didn’t employ the local people; it brought in workers from distant places, which it shouldn’t give done. We would like to suggest local people be employed, and compensations be paid for the land that will be lost to the project”

U Htay Win - Farmer, Nyaungpinthar Village

U Htay Win said, “villagers were worried when they saw the burning flame (flare stack) at the top of the tower. It is a good thing that this factory work of international standards and EIA/SIA being carried out. before developing international standard factory. We wish the project would start very soon. It deserves respect that the project is explained the to the villagers.

Daw Khin Swe Win - Head of Primary School, Nyaungpinthar Village

The school principal thanked to EIA Team of MSR for its explanation of environmental impacts of the project. She also said “We don’t know enough about EIA /SIA yet. But it is satisfactory that the work to be done before the project starts is explained. The project will help all surrounding villagers have security. School children are learnt about the new refinery development consequently they will disseminate the information to their parents. Work of the new government should be helped by all. The project will be a service if the factory observes the obligations will be a success. It should also pay attention in the health of the local people”.

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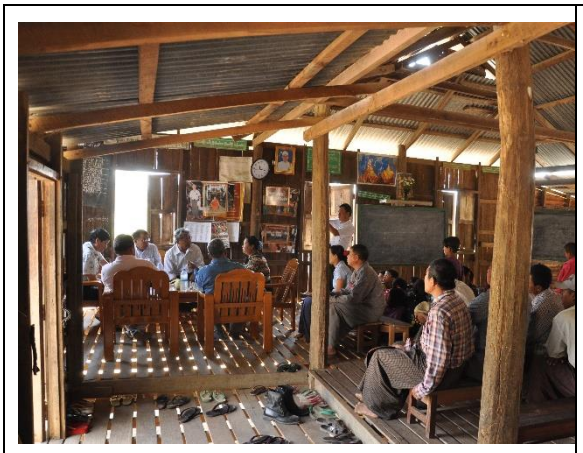



9.4.2 PUBLIC CONSULTATION: MINHLA

Location: Compound of Minhla High School

Date: 22-02-2015

Part of public consultation event was held in the compound of Minhla High School. Air pollution measuring procedure was also explained and demonstrated by EIA/SIA Department to attendants. The public consultation meeting was attended by some 40 interested people.

At the meeting, EIA Department Head, U Tin Than, Consultant Dr U Lay Kyi, Consultant Engineer U Myint Swe explained the EIA /SIA programs, socio-economic survey, and the environmental Study of Thanpayarkan Oil Factory respectively.

Participants of Public Consultation Meetings

Sr. No.	Name	Organization	Contact number
1	Col. Aung Thu Chan	Commander, Ma Lun Cantonment	09 5360490
2	U Zaw Lin	Commander of the Township Police Force	
3	U Pauk Kyaw	Township Administrator	09 444023190
4	Dr. U Aung Myint	Chairman, Development Support Group	
5	U Than Shwe	Township Development Affairs Committee	09 401618836
6	U Hla Myint	Development Support Group	09 259165988

7	U Aung Kyaw Htun	Communication	09 440226952
8	U Ohn Kyaw	Township Fire Service Department	
9	U Myoe Zaw Htun	Township Fire Service Department	09 256453559
10	U Aye Nyein	Dry Zone Greening Department	09 418131950
11	U Kyaw Myoe Thu	Township Forest Department	09 253524645
12	U Than Win	Township Agriculture Department	09 401536174
13	U Ye Lwin	Township Development Support Committee	09 5342762
14	Daw Tin Aye	The organization of Cooperative Department	09 256582668
15	Daw Wah Wah Lwin	Department of Information and Public Relations	09 401523776
16	Daw Wah Wah Aung	Livestock Breeding and Veterinary Department	09 259567674
17	Daw Sandar Oo	Myanmar Agricultural Development Bank	09 421090623
18	Daw Htay Htay Yee	Principal, Minhla High School	09 401631135
19	Daw Tin Tin Htay	Myanma Commercial Bank	09 796919397
20	U Nay Win	Development and construction Committee	09 401637925
21	U Kyaw Si Thu	Lawyer	
22	U Maung Maung	Education	065 45520
23	U Thaung Hlaing	Township Author Group	
24	U Kyi Khin	Education	09 401584684
25	U Aung Thein Oo		065 45398
26	U Nyi Nyi Aung		09 401561419
27	U Thet Naing	Myoma Ward Administrator	09 43042477
28	U Hla Win	Member, Ward Administrative Office	09 796885440
29	U Than Aung		
30	U Myint Swe	Member, Ward Administrative Office	09 796919651
31	U Khin Maung Zaw	Member, Ward Administrative Office	09 33256622
32	U Zaw Min Oo	Ward Administrator	09 333788744
33	U Shwe Man	Member, Ward Administrative Office	09 33378546
34	U Htun Myint	Member, Ward Administrative Office	09 33256504

Dr Aung Myint and U Hla Myint, among the attenders, made some suggestive discussions.

Dr Aung Myint, Chairman of Township Development Supportive Organization, Min Hla

Dr Aung Myint, a Chairman of Minhla Township Development Assistance Board said that he is now working for public health joining the social welfare activities. Before that, he worked as Township Medical Officer in our native town. He is glad that Minhla is giving to have an oil refinery. He has known that the old factory is over 30 years old; the department concerned has been working with Ta Ta Co. to start it running but it is not successful. The new oil refinery will be near the old factory and is nearly 4 times as big as the old one. So, EIA/SIA should be carried us to make it have good outcome. When he was in his native town, he could see dust in the roofs of houses in Thayet, that came from the cement factory. So even they didn't dare to live there. This shows that it is important to stop the bad effects caused by a business.

Oil refinery gives off SO_2 gas, which is harmful to health. They also give off NO_2 gas. NO_2 and CO gases are used to make anesthetic. These gases can cause trouble to the nervous system. NO_2 and CO gases from the oil refineries are poisonous gases. About 10 years ago, he worked in Thayet cement factory as a volunteer doctor for two years. He found in the factory area many people with asthma. His friend with asthma said the symptoms disappeared when he went back to the distance side of the Ayeyarwady. This oil refinery will surely cause air pollution.

SO_2, NO_2 and CO_2 gases mainly give trouble to the lungs. Despite many large oil tanks, the old refinery had only three firetrucks, so fire extinguishing system should be improved to deal with fire outbreaks competently.

U Hla Myint, Chairman, Minhla Township Traders Association: presented as follow.

I am working with 45acres of farmlands. I have no proper education. I am a native of Pwetaw Village. I lost about 800 acres to the old factory. Children of many farmers who lost their farmlands to the factory project are now university graduates. I was working as secretary of the Township Council when my farmland was confiscated. I haven't paid much attention to the development to the nearby villages since the completion of the factory.

Villagers of Ywataw often donated water to Thanpayarkan when it didn't have enough water. Elderly people who can't carry water have to buy it. Factory workers when they are not in good terms with the villagers stop releasing water into the village or release the water on limited times.

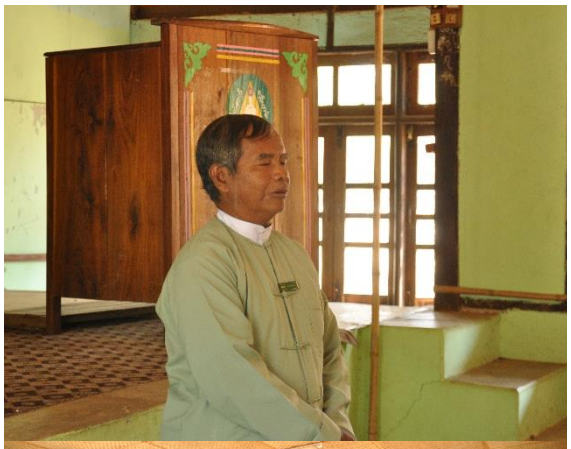
During the construction period of the old factory, construction workers deliberately destroyed the sesame plantations of the villagers using bulldozers, despite their requests to wait until the sesame crop had been harvested that was to the dismay of the sesame farmers, a point from the new refinery project to pay attention to. Farmers with plantations should be given compensations. After that, there was a plan to carry the river water into the plantations of farmers who suffered losses, but that plan fell through afterwards.

Then, the villagers faced losses of land again to the railroad construction. Now, children of the villagers now have become university graduates; if the new oil refinery project would employ them, it would be to the happiness of the villagers. As the chairman of the traders' association, I promised that I will help pull out all stops that comes its way. We villagers are losing farmlands to seeing a new environmentally friendly oil refinery.

The port for landing and unloading oil tanks will certainly cause water pollution. Fishermen said they can fish upstream of the port only, but not downstream, which is a point EIA should consider.

If the project has to cut down trees, it will have to grow new trees to prevent depletion of forest. Manthapayarkan Village, near our village, is a poor village with shortage of water. The villagers should have enough supply of water. They have electric lights on self-help basis.
Tankers along the Ayeyarwady take in water which the waterway maintenance department should know. Treated water from the factory, if sent to the plantations will be helpful to the villagers.

Officials from the MSR Co. thanked the attenders for their suggestions, which will be included in the report. Then, U Myint Swe let the attenders to the device that measures the air pollution level, and explained its functions to them, and answered the questions.






CHAPTER 10:
CONCLUSION AND RECOMMENDATION

10. CONCLUSION AND RECOMMENDATION

This project could enable import substitute for petroleum products in line with the national development plan.

The workforce could gain advance technical know-how from introduction of new technologies for the new proposed plant.

Inevitably, new job opportunities will be created locally and enhance the development of provincial economy.

The selection of the site for the proposed project is suitable due to the proximity of existing plant, water resource and availability of other facilities which could be shared. At the same time, the existing aging facilities could be upgraded with the installation of new facilities for common utilization.

In summary, it is to be concluded that the benefits outweigh the negative impacts.However, it is to be noted that the negative impacts could be disaterous if necessary measures are not taken seriously. Total commitment of stakeholders is crucial for the achievement of substainable development goals, where environmental, social and economical needs are to be met effectively.

Therefore, it is strongly recommended to proceed with proposed refinery project.

Local people participation in environmental protection is a key part to keep the surrounding green.

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12. APPENDICES

APPENDIX 1: SOIL ANALYSIS

Summary of External Feature of Soil Samples

Sr No	Profile No	Soil depth (inch)	Location	Soil type	Colour	Texture	Hardness
1.	SQ-1	0 - 15”	N. 19° 59’ 07.6” E. 94° 59’ 19.1”	Yaung alluvit (Sandy Soil) Fluvisol	Dull Yellow	Coarse Sand	Slightly Hard
2.	SQ-2	0 - 15”	N. 19° 59’ 14.9” E. 94° 59’ 31.5”	Yaung alluvit (Sandy Soil) Fluvisol	Bright Yellow wish Brown	Coarse Sand	Slightly Hard
3.	SQ-3A	0 - 20”	N. 19° 59’ 24.3” E. 94° 59’ 32.3”	Old Alluvial Soil (Fluvisol)	Dull Yellow	Crumby	Weakly hard
4.	SQ-3B	20”- 30”	N. 19° 59’ 24.3” E. 94° 59’ 32.3”	Old Alluvial Soil (Fluvisol)	Bright Yellow wish Brown	Crumby	Weakly hard
5	SQ-3C	30”- 34”	N. 19° 59’ 24.3” E. 94° 59’ 32.3”	Old Alluvial Soil (Fluvisol)	Bright Yellow wish Brown	Crumby	Weakly hard
6.	SQ-4	0 - 15”	N. 19° 58’ 48.4” E. 95° 00’ 21.9”	Gravelly Red Brown Savanna Soil (Luvisois)	Dull Yellow Orange	Clay	Hard
7.	SQ-5A	0 - 12”	N. 19° 58’ 51.2” E. 95° 00’ 09.5”	Gravelly Red Brown Savanna Soil (Luvisois)	Yellowwish Brown	Clay Loam	hard
8.	SQ-5B	12 - 20”	N. 19° 58’ 51.2” E. 95° 00’ 09.5”	Gravelly Red Brown Savanna Soil (Luvisois)	Yellowwish Brown	Clay Loam	hard
9.	SQ-5C	20 - 35”	N. 19° 58’ 51.2” E. 95° 00’ 09.5”	Gravelly Red Brown Savanna Soil (Luvisois)	Yellowwish Brown	Clay Loam	hard
10.	SQ-6	0 - 15”	N. 19° 58’ 46.8” E. 95° 00’17.8”	Gravelly Red Brown Savanna (Luvisol)	Reddish Brown	Sandy Loam	Hard

11.	SQ-7	0 - 12”	N. 19° 58’ 46.8” E. 95° 00’ 26.4”	Red Brown Savanna Soil (Luvisois)	Dark Reddish Brown	Sandy Loam	Weakly hard
12.	SQ-8	0 - 12”	N. 19° 58’ 37.3” E. 95° 00’ 32.1”	Red Brown Compact Savanna (Luvisois)	Dark Brown	Clay Loam	Weakly hard
13.	SQ-9	0 - 12”	N. 19° 58’ 22.0” E. 95° 00’ 40.8”	Red Brown	Reddish	Clay Loam	Weakly hard
14.	SQ-10	0 - 12”	N. 19° 58’ 26.9” E. 95° 00’ 36.7”	Red Brown Savanna Soil (Luvisol)	Reddish Brown	Sitty Clay	Weakly hard
15.	SQ-11	0 - 19”	N. 19° 57’ 29.0” E. 95° 00’ 25.7”	Yellow Brown Savanna (Luvisol)	Brown	Sitty Clay	Slightly hard
16.	SQ-12	0 - 20”	N. 19° 57” 23.6” E 95°00’ 27.1”	Red Brown Savana (Luvisol)	Reddish Brown	Clay Loam	Slightly hard
17.	SQ-13A	0 - 10”	N. 19° 57” 17.9” E 95°00’ 28.6”	Yellow Brown Savana (Luvisol)	Duck Yellowish Brown	Sitty Clay	Slightly hard
18.	SQ-13B	10” - 18”	N. 19° 57” 17.9” E 95°00’ 28.6”	Yellow Brown Savana (Luvisol)	Duck Yellowish Brown	Sitty Clay	Slightly hard
19.	SQ-13C	18” - 31”	N. 19° 57” 17.9” E 95°00’ 28.6”	Yellow Brown Savana (Luvisol)	Duck Yellowish Brown	Sitty Clay	Slightly hard
20.	SQ-14	0 - 10”	N. 19° 57” 14.4” E 95°00’ 33.4”	Red Brown Savanna (Luvisol)	Brown	Sandy Loam	Hard
21.	SQ-15	0 - 12”	N. 19° 37” 26.7” E 95°00’ 47.0”	Yellow Brown Savanna (Luvisol)	Dully Yellow Orange	Sandy Loam	Slightly hard
22.	SQ-12	0 - 20”	N. 19° 57” 23.6” E 95°00’ 27.1”	Red Brown Savana (Luvisol)	Reddish Brown	Clay Loam	Slightly hard
23	SQ-17	0 - 19”	N. 19° 57” 29.3” E 95°00’ 31.2”	Yellow Brown Savanna (Luvisols)	Brown	Sitty Sand	Slightly hard

24	SQ-18	0 - 12”	N. 19° 58” 40.0” E 95°01’ 42.2”	Grarelly Red Brown Savanna (Luvisols	Dull Yellowsih Orange	Sitty Clay	Slightly hard
25	SQ-19	0 - 20”	N. 19° 58” 18.5” E 95°00’ 28.4”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Dull Yellowsih	Sitty Clay	Slightly hard
26	SQ-20A	0 - 12”	N. 19° 58” 12.0” E 95°01” 29.9”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Brown	Clay Loam	Slightly Hard
27	SQ-20B	12” - 38”	N. 19° 58” 12.0” E 95°01” 29.9”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Brown	Clay Loam	Slightly hard
28	SQ-20C	35” - 42”	N. 19° 58” 12.0” E 95°01” 29.9”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Brown	Clay Loam	Slightly hard
29	SQ-21	0 - 12”	N. 19° 37” 42.1” E 95°01’ 42.1”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Browish Black	Clay Loam	Slightly hard
30	SQ-22	0 - 20”	N. 19° 37” 04.1” E 95°01’ 50.7”	Meadowish Slightly Compact 88il (Gleyic Luvisol)	Dull Ywllowsih Orange	Clay Loam	Slightly hard

Soil interpretation of results

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPREATATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 1
Lab No. S 1-10 / 14-15

Sr No.	Sample	Depth in inches		pH Soil:Water 1:2.5	EC Soil:Water 1:5	Texture	Organic Carbon	Total N	CEC	Available Nutrients	
										P	K_2O
1	SQ 1	0-15		Moderately alkaline	Very low	Sand	Very low	Low	Low	Low	Low
2	SQ 2	0-15		Moderately alkaline	Very low	Sand	Very low	Low	Low	Low	Low
3	SQ 3	0-20	I Layer	Moderately alkaline	Very low	Sandy loam	Low	Medium	Low	Low	Low
4	SQ 3	20-30	II Layer	Moderately alkaline	Very low	Clay loam	Medium	Low	High	Low	High
5	SQ 3	30-39	III Layer	Extremely alkaline	Very low	Clay loam	Medium	Low	High	High	High
6	SQ 4	0-15		Strongly alkaline	Low	Clay	Medium	Low	Very high	Low	Medium
7	SQ 5	0-12	I Layer	Extremely alkaline	Low	Sandy clay loam	Low	Low	Medium	Low	Medium
8	SQ 5	12-20	II Layer	Extremely alkaline	Low	Sandy clay loam	Low	Low	Medium	Low	Low
9	SQ 5	20-35	III Layer	Extremely alkaline	Medium	Sandy loam	Low	Low	High	Low	Low
10	SQ 6	0-15		Moderately alkaline	Very low	Sandy clay loam	Low	Low	Low	Low	Low

ခင်ဝင်းမာ
လက်ထောက်ညွှန်ကြားရေးမှူး
မိတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာန၌

Soil analysis data - 1

DEPARTMENT OF AGRICULTURE(LAND USE)
SOIL ANALYTICAL DATA SHEET

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 1
Lab No. S 1-10/14-15

Sr No.	Sample plot	Depth in inches		Moisture %	pH Soil:Water 1:2.5	EC ms/cm	Texture				Organic Carbon %	Humus %	Total N %	Fe ppm	CEC meq/100gm	Exchangeable Cations meq/100gm						Available Nutrients	
							Sand %	Silt %	Clay %	Total %						Ca^{++}	Mg^{++}	K^{+}	Na^{+}	H^{+}	Al^{+++}	P ppm Oslen	K_2O mg/100gm
1	SQ 1	0-15		0.37	8.13	0.05	91.00	1.45	6.00	98.45	0.43	0.74	0.14	7.00	11.51	10.04	1.34	0.12	Not detected	Not detected	0.01	0.80	5.42
2	SQ 2	0-15		0.78	8.20	0.03	92.00	1.00	5.60	98.60	0.44	0.76	0.12	9.00	9.55	8.74	0.67	0.13	Not detected	Not detected	0.01	3.60	6.04
3	SQ 3	0-20	I Layer	0.59	8.22	0.04	77.55	12.00	9.20	98.75	1.57	2.71	0.21	8.00	12.89	11.40	1.34	0.14	Not detected	Not detected	0.01	0.80	6.63
4	SQ 3	20-30	II Layer	3.10	8.28	0.07	30.50	31.45	36.55	98.50	3.09	5.33	0.14	9.00	35.72	32.33	1.38	0.53	1.48	Not detected	0.01	7.43	24.76
5	SQ 3	30-39	III Layer	3.08	9.03	0.03	27.30	33.30	37.60	98.20	2.81	4.84	0.13	8.00	36.79	30.96	2.06	0.50	3.25	Not detected	0.01	12.80	23.52
6	SQ 4	0-15		3.45	8.83	0.23	20.00	35.00	43.85	98.85	3.13	5.39	0.16	11.00	69.33	62.17	4.14	0.38	2.61	0.03	Not detected	1.24	18.03
7	SQ 5	0-12	I Layer	1.35	9.81	0.36	60.15	15.80	22.85	98.80	1.07	1.85	0.14	12.00	23.82	17.58	0.68	0.25	5.29	0.03	Not detected	0.41	11.57
8	SQ 5	12-20	II Layer	2.00	9.92	0.30	62.00	13.00	23.60	98.60	1.14	1.97	0.11	12.00	23.97	16.32	2.04	0.13	5.46	0.03	Not detected	0.41	6.73
9	SQ 5	20-35	III Layer	2.32	11.39	0.43	60.90	20.50	17.55	98.95	1.29	2.14	0.11	13.00	31.26	21.15	0.68	0.20	9.21	0.03	Not detected	0.41	9.21
10	SQ 6	0-15		1.00	8.07	0.05	72.60	1.25	25.00	98.85	1.59	2.73	0.12	16.00	9.61	7.41	2.02	0.15	Not Detected	0.03	Not detected	0.40	7.27

B= Bray & Kurtz Method
O= Olsen Method

ခင်ဝင်းမာ
လက်ထောက်ညွှန်ကြားရေးမှူး
မါတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

Soil analytical data - 2

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPREATATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 2
Lab No. S 11-20 / 14-15

Sr No.	Sample	Depth in inches		pH Soil:Water 1:2.5	EC Soil:Water 1:5	Texture	Organic Carbon	Total N	CEC	Available Nutrients	
										P	K_2O
11	SQ 7	0-12		Slightly alkaline	Very low	Sandy clay loam	Low	Low	Medium	Low	Low
12	SQ 8	0-12		Slightly alkaline	Very low	Loam	Medium	Low	Medium	Low	Medium
13	SQ 9	0-12		Slightly alkaline	Very low	Silty clay	High	Medium	High	High	High
14	SQ 10	0-12		Moderately alkaline	Very low	Sandy loam	Low	Low	Medium	Low	Low
15	SQ 11	0-19		Moderately alkaline	Very low	Loam	Low	Low	Medium	Low	Low
16	SQ 12	0-12		Moderately alkaline	Very low	Clay loam	Medium	Low	Medium	Low	Low
17	SQ 13	0-10	I Layer	Moderately alkaline	Very low	Loam	Low	Low	High	Low	Low
18	SQ 13	10-18	II Layer	Moderately alkaline	Low	Clay loam	Medium	Low	Very high	Low	Low
19	SQ 13	18-32	III Layer	Strongly alkaline	Very low	Loam	Low	Low	Very high	Low	Low
20	SQ 14	0-10		Moderately alkaline	Very low	Loam	Medium	Low	Very high	Low	Low

ခင်ဝင်းမာ
လက်ထောက်ညွှန်ကြားရေးမှူး
ဓါတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

Soil analytical data - 3

DEPARTMENT OF AGRICULTURE(LAND USE)
SOIL ANALYTICAL DATA SHEET

Division - မဂွေး
Township -မင်းလှ

EIA

Sheet No. 3
Lab No. S 21-30/14-15

Sr No.	Sample plot	Depth in inches		Moisture %	pH Soil:Water 1:2.5	EC ms/cm	Texture				Organic Carbon %	Humus %	Total N %	Fe ppm	CEC meq/100gm	Exchangeable Cations meq/100gm						Available Nutrients	
							Sand %	Silt %	Clay %	Total %						Ca^{++}	Mg^{++}	K^{+}	Na^{+}	H^{+}	Al^{+++}	P ppm	K_2O mg/100gm
21	SQ 15	0-12		1.21	8.40	0.07	66.05	13.95	18.80	98.80	1.32	2.28	0.16	10.00	62.37	39.81	22.27	0.23	0.04	0.03	Not detected	2.02(O)	10.93
22	SQ 16	0-15		1.73	8.24	0.14	40.75	37.00	21.00	98.75	1.31	2.26	0.12	8.00	43.62	37.30	6.10	0.18	0.02	0.03	Not detected	0.81(O)	8.54
23	SQ 17	0-19		1.38	8.18	0.11	52.15	22.30	24.00	98.45	1.17	2.02	0.12	11.00	17.85	9.47	8.11	0.26	Not Detected	0.01	Not detected	1.22(O)	12.17
24	SQ 18	0-12		1.39	8.41	0.13	48.00	28.50	22.00	98.50	1.20	2.08	0.12	11.00	25.32	20.96	4.06	0.30	Not Detected	0.01	Not detected	10.95(O)	13.99
25	SQ 19	0-20		3.05	7.13	0.13	14.55	48.60	35.35	98.50	3.95	6.80	0.20	20.00	22.71	18.57	3.44	0.40	0.29	0.01	Not detected	4.54(O)	18.57
26	SQ 20	0-12	I Layer	2.69	6.17	0.21	20.80	43.00	34.65	98.45	5.57	9.60	0.27	48.00	27.93	21.92	4.80	0.46	0.74	0.01	Not detected	5.34(B)	21.58
27	SQ 20	12 - 35	II Layer	2.25	6.06	0.12	30.70	41.00	27.05	98.75	2.52	4.34	0.21	111.00	17.55	14.33	2.73	0.33	0.16	0.01	Not detected	9.83(O)	15.35
28	SQ 20	35-42	III Layer	1.73	6.15	0.09	32.95	36.00	30.00	98.95	1.96	3.38	0.14	77.00	17.84	13.56	3.39	0.40	0.46	0.03	Not detected	6.51(O)	18.92
29	SQ 21	0-20		2.48	7.49	0.11	14.65	42.50	41.05	98.20	2.50	4.31	0.16	14.00	24.13	22.56	0.68	0.43	0.42	0.03	Not detected	3.28(O)	20.30
30	SQ 22	0-20		3.90	7.67	0.15	8.90	42.00	47.90	98.80	3.18	5.49	0.20	17.00	27.18	21.50	2.77	0.36	2.52	0.03	Not detected	24.56(O)	16.85

B = Bray & Kurtz Method
O = Olsen Method

ခင်ဝင်းမာ
လက်ထောက်ညွှန်ကြားရေးမှူး
မိတ်ခွဲခန်းတာဝန်ခံ
မြေအသုံးချရေးဌာနခွဲ

Soil interpretation of results

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPREATATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 3
Lab No. S 21-30 /14-15

Sr No.	Sample	Depth in inches		pH Soil:Water 1:2.5	EC Soil:Water 1:5	Texture	Organic Carbon	Total N	CEC	Available Nutrients	
										P	K_2O
21	SQ 15	0-12		Strongly alkaline	Very low	Sandy loam	Low	Low	Very high	Low	Medium
22	SQ 16	0-15		Moderately alkaline	Very low	Loam	Low	Low	Very high	Low	Low
23	SQ 17	0-19		Moderately alkaline	Very low	Sandy clay loam	Low	Low	Medium	Low	Medium
24	SQ 18	0-12		Strongly alkaline	Very low	Loam	Low	Low	Medium	Medium	Medium
25	SQ 19	0-20		Slightly alkaline	Very low	Silty clay loam	Medium	Low	Medium	Low	Medium
26	SQ 20	0-12	I Layer	Slightly acid	Low	Clay loam	High	Medium	High	Low	High
27	SQ 20	12 - 35	II Layer	Slightly acid	Very low	Clay loam	Medium	Medium	Medium	Medium	Medium
28	SQ 20	35-42	III Layer	Slightly acid	Very low	Clay loam	Low	low	Medium	Low	Medium
29	SQ 21	0-20		Slightly alkaline	Very low	Silty clay	Medium	low	Medium	Low	High
30	SQ 22	0-20		Moderately alkaline	Low	Silty clay	Medium	low	High	Very High	Medium

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Soil analytical data - 4

DEPARTMENT OF AGRICULTURE(LAND USE)
SOIL ANALYTICAL DATA SHEET

Division - မဂွေး
Township -မင်းလှ

EIA

Sheet No. 3
Lab No. S 21-30/14-15

Sr No.	Sample plot	Depth in inches		Moisture %	pH Soil:Water 1:2.5	EC ms/cm	Texture				Organic Carbon %	Humus %	Total N %	Fe ppm	CEC meq/100gm	Exchangeable Cations meq/100gm						Available Nutrients	
							Sand %	Silt %	Clay %	Total %						Ca^{++}	Mg^{++}	K^{+}	Na^{+}	H^{+}	Al^{+++}	P ppm	K_2O mg/100gm
21	SQ 15	0-12		1.21	8.40	0.07	66.05	13.95	18.80	98.80	1.32	2.28	0.16	10.00	62.37	39.81	22.27	0.23	0.04	0.03	Not detected	2.02(O)	10.93
22	SQ 16	0-15		1.73	8.24	0.14	40.75	37.00	21.00	98.75	1.31	2.26	0.12	8.00	43.62	37.30	6.10	0.18	0.02	0.03	Not detected	0.81(O)	8.54
23	SQ 17	0-19		1.38	8.18	0.11	52.15	22.30	24.00	98.45	1.17	2.02	0.12	11.00	17.85	9.47	8.11	0.26	Not Detected	0.01	Not detected	1.22(O)	12.17
24	SQ 18	0-12		1.39	8.41	0.13	48.00	28.50	22.00	98.50	1.20	2.08	0.12	11.00	25.32	20.96	4.06	0.30	Not Detected	0.01	Not detected	10.95(O)	13.99
25	SQ 19	0-20		3.05	7.13	0.13	14.55	48.60	35.35	98.50	3.95	6.80	0.20	20.00	22.71	18.57	3.44	0.40	0.29	0.01	Not detected	4.54(O)	18.57
26	SQ 20	0-12	I Layer	2.69	6.17	0.21	20.80	43.00	34.65	98.45	5.57	9.60	0.27	48.00	27.93	21.92	4.80	0.46	0.74	0.01	Not detected	5.34(B)	21.58
27	SQ 20	12 - 35	II Layer	2.25	6.06	0.12	30.70	41.00	27.05	98.75	2.52	4.34	0.21	111.00	17.55	14.33	2.73	0.33	0.16	0.01	Not detected	9.83(O)	15.35
28	SQ 20	35-42	III Layer	1.73	6.15	0.09	32.95	36.00	30.00	98.95	1.96	3.38	0.14	77.00	17.84	13.56	3.39	0.40	0.46	0.03	Not detected	6.51(O)	18.92
29	SQ 21	0-20		2.48	7.49	0.11	14.65	42.50	41.05	98.20	2.50	4.31	0.16	14.00	24.13	22.56	0.68	0.43	0.42	0.03	Not detected	3.28(O)	20.30
30	SQ 22	0-20		3.90	7.67	0.15	8.90	42.00	47.90	98.80	3.18	5.49	0.20	17.00	27.18	21.50	2.77	0.36	2.52	0.03	Not detected	24.56(O)	16.85

B = Bray & Kurtz Method
O = Olsen Method

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Soil, water extraction interpretation of results

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION INTERPRETATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 1
Lab No.S 1-10 / 14-15

Sr .no	Sample Plot	Depth in inches		pH	EC	TDS	SAR	RSC	Dorminant Salts
1	SQ 1	0-15		Moderately alkaline	Very low	Low	Not detected	Not detected	$Ca(HCO_3)_2$
2	SQ 2	0-15		Moderately alkaline	Very low	Low	Not detected	Low	$Ca(HCO_3)_2$
3	SQ 3	0-20	I Layer	Moderately alkaline	Very low	Low	Low	Low	$Ca(HCO_3)_2$
4	SQ 3	20-30	II Layer	Moderately alkaline	Very low	Low	Low	Low	$Na(HCO_3)_2$
5	SQ 3	30-39	III Layer	Extremely alkaline	Very low	Low	Low	Low	$Na(HCO_3)_2$
6	SQ 4	0-15		Strongly alkaline	Low	Medium	Low	Low	$Na(HCO_3)_2$
7	SQ 5	0-12	I Layer	Extremely alkaline	Low	Medium	Low	Low	$Na(HCO_3)_2$
8	SQ 5	12-20	II Layer	Extremely alkaline	Low	Medium	Low	Low	$Na(HCO_3)_2$
9	SQ 5	20-35	III Layer	Extremely alkaline	Medium	Medium	Low	Medium	$Na(HCO_3)_2$
10	SQ 6	0-15		Moderately alkaline	Very low	Low	Not detected	Low	$Ca(HCO_3)_2$

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Soil, water extraction analytical data

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION ANALYTICAL DATA SHEET

Division - မဂွေး
Township -မင်းလှ

EIA

Sheet No. 1
Lab No.S 1-10 / 14-15

Sr .no	Sample Plot	Depth in inches		ANIONS me/100gm				CATIONS me/100gm				pH	EC ms/cm	SAR	RSC	TDS %
				CO^{-}_{3}	HCO^{-}_{3}	Cl^{-}	$SO^{=}_{4}$	Ca^{++}	Mg^{++}	Na^{+}	K^{+}					
1	SQ 1	0-15		Not detected	0.24	0.11	0.02	0.27	Not detected	Not detected	0.02	8.13	0.05	Not detected	Not detected	0.02
2	SQ 2	0-15		Not detected	0.2	0.08	0.10	0.19	Not detected	Not detected	0.02	8.20	0.03	Not detected	0.01	0.01
3	SQ 3	0-20	I Layer	Not detected	0.2	0.11	0.06	0.15	0.04	0.01	0.02	8.22	0.04	0.03	0.01	0.01
4	SQ 3	20-30	II Layer	Not detected	0.32	0.08	0.06	0.15	0.04	0.27	0.02	8.28	0.07	0.86	0.13	0.03
5	SQ 3	30-39	III Layer	Not detected	0.48	0.11	0.06	0.23	Not detected	0.62	0.03	9.03	0.03	1.83	0.25	0.01
6	SQ 4	0-15		Not detected	0.64	0.08	0.02	0.15	0.08	0.74	0.01	8.83	0.23	2.18	0.41	0.08
7	SQ 5	0-12	I Layer	0.16	0.68	0.11	0.18	0.15	Not detected	1.00	0.02	9.81	0.36	3.64	0.69	0.13
8	SQ 5	12-20	II Layer	0.08	0.56	0.08	0.14	0.11	Not detected	0.70	0.01	9.92	0.30	2.95	0.53	0.10
9	SQ 5	20-35	III Layer	0.38	1.09	0.11	0.18	0.19	Not detected	1.19	0.03	11.39	0.43	3.85	1.28	0.15
10	SQ 6	0-15		Not detected	0.2	0.11	0.02	0.15	Not detected	Not detected	0.02	8.07	0.05	Not detected	0.05	0.02

ခင်ဝင်းမာ
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Soil, water extraction interpretation of results - 2

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION INTERPRETATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No .2
Lab No .S 11-20/14-15

Sr .no	Sample Plot	Depth in inches		pH	EC	TDS	SAR	RSC	Dorminant Salts
11	SQ 7	0-12		Slightly alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
12	SQ 8	0-12		Slightly alkaline	Very low	Low	Low	Not detected	$CaSO_4$
13	SQ 9	0-12		Slightly alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
14	SQ 10	0-12		Moderately alkaline	Very low	Low	Not detected	Not detected	$Ca(HCO_3)_2$
15	SQ 11	0-19		Moderately alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
16	SQ 12	0-12		Moderately alkaline	Very low	Medium	Low	Not detected	$Ca(HCO_3)_2$
17	SQ 13	0-10	I Layer	Moderately alkaline	Very low	Medium	Low	Not detected	$Ca(HCO_3)_2$
18	SQ 13	10-18	II Layer	Moderately alkaline	Low	Medium	Low	Low	$Ca(HCO_3)_2$
19	SQ 13	18-32	III Layer	Strongly alkaline	Very low	Medium	Low	Low	$Ca(HCO_3)_2$
20	SQ 14	0-10		Moderately alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$

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Soil, water extraction analytical data - 2

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION ANALYTICAL DATA SHEET

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 2
Lab No. S 11-20/14-15

Sr .no	Sample Plot	Depth in inches		ANIONS me/100gm				CATIONS me/100gm				pH	EC ms/cm	SAR	RSC	TDS %
				CO^{-}_{3}	HCO^{-}_{3}	Cl^{-}	$SO^{=}_{4}$	Ca^{++}	Mg^{++}	Na^{+}	K^{+}					
11	SQ 7	0-12		Not detected	0.24	0.08	0.14	0.27	0.08	0.04	0.02	7.24	0.04	0.09	Not detected	0.02
12	SQ 8	0-12		Not detected	0.12	0.11	0.14	0.19	Not detected	0.004	0.01	7.22	0.11	0.014	Not detected	0.04
13	SQ 9	0-12		Not detected	0.32	0.08	0.18	0.34	0.11	0.001	0.03	7.47	0.12	0.002	Not detected	0.04
14	SQ 10	0-12		Not detected	0.24	0.08	0.14	0.30	0.04	Not detected	0.02	7.81	0.10	Not detected	Not detected	0.04
15	SQ 11	0-19		Not detected	0.32	0.04	0.04	0.34	0.02	0.04	0.01	8.2	0.11	0.10	Not detected	0.04
16	SQ 12	0-12		Not detected	0.40	0.08	0.18	0.38	0.08	0.06	0.06	7.83	0.11	0.12	Not detected	0.05
17	SQ 13	0-10	I Layer	Not detected	0.32	0.10	0.21	0.27	0.15	0.15	0.01	8.26	0.14	0.33	Not detected	0.05
18	SQ 13	10-18	II Layer	Not detected	0.44	0.10	0.14	0.30	0.08	0.17	0.01	8.36	0.15	0.39	0.06	0.05
19	SQ 13	18-32	III Layer	Not detected	0.44	0.08	0.18	0.27	0.11	0.21	0.01	8.53	0.14	0.48	0.06	0.05
20	SQ 14	0-10		Not detected	0.36	0.08	0.18	0.42	0.08	0.01	0.01	8.17	0.11	0.02	Not detected	0.04

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Soil, water extraction interpretation of results – 3

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION INTERPRETATION OF RESULTS

Division - မကွေး
Township -မင်းလှ

EIA

Sheet No. 3
Lab No. S 21-30/14-15

Sr .no	Sample Plot	Depth in inches		pH	EC	TDS	SAR	RSC	Dorminant Salts
21	SQ 15	0-12		Strongly alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
22	SQ 16	0-15		Moderately alkaline	Very low	Medium	Low	Not detected	$Ca(HCO_3)_2$
23	SQ 17	0-19		Moderately alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
24	SQ 18	0-12		Strongly alkaline	Very low	Medium	Low	Not detected	$Ca(HCO_3)_2$
25	SQ 19	0-20		Slightly alkaline	Very low	Medium	Low	Not detected	$Ca(HCO_3)_2$
26	SQ 20	0-12	I Layer	Slightly acid	Low	Medium	Low	Not detected	$CaCl_2$
27	SQ 20	12 - 35	II Layer	Slightly acid	Very low	Low	Low	Not detected	$CaSO_4$
28	SQ 20	35-42	III Layer	Slightly acid	Very low	Low	Low	Not detected	$CaSO_4$
29	SQ 21	0-20		Slightly alkaline	Very low	Low	Low	Not detected	$Ca(HCO_3)_2$
30	SQ 22	0-20		Moderately alkaline	Low	Medium	Low	Not detected	$Ca(HCO_3)_2$

ခင်ဝင်းမာ
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Soil, water extraction analytical data - 3

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL WATER EXTRACTION ANALYTICAL DATA SHEET

Division - မတွေး
Township -မင်းလှ

EIA

Sheet No. 3
Lab No. S 21-30/14-15

Sr .no	Sample Plot	Depth in inches		ANIONS me/100gm				CATIONS me/100gm				pH	EC ms/cm	SAR	RSC	TDS %
				CO^{-}_{3}	HCO^{-}_{3}	Cl^{-}	$SO^{=}_{4}$	Ca^{++}	Mg^{++}	Na^{+}	K^{+}					
21	SQ 15	0-12		Not detected	0.36	0.08	0.27	0.30	0.13	0.06	0.02	8.4	0.07	0.12	Not detected	0.02
22	SQ 16	0-15		Not detected	0.32	0.08	0.18	0.34	0.15	0.02	0.01	8.24	0.14	0.04	Not detected	0.05
23	SQ 17	0-19		Not detected	0.28	0.08	0.1	0.34	Not detected	0.02	0.02	8.18	0.11	0.04	Not detected	0.04
24	SQ 18	0-12		Not detected	0.48	0.08	Not detected	0.46	0.04	0.001	0.03	8.41	0.13	0.002	Not detected	0.05
25	SQ 19	0-20		Not detected	0.24	0.11	0.18	0.30	Not detected	0.14	0.02	7.13	0.13	0.35	Not detected	0.05
26	SQ 20	0-12	I Layer	Not detected	0.19	0.23	0.18	0.53	Not detected	0.21	0.03	6.17	0.21	0.40	Not detected	0.07
27	SQ 20	12 - 35	II Layer	Not detected	0.19	0.08	0.24	0.30	0.04	0.15	0.03	6.06	0.12	0.36	Not detected	0.04
28	SQ 20	35-42	III Layer	Not detected	0.14	0.08	0.18	0.27	0.04	0.16	0.03	6.15	0.09	0.40	Not detected	0.03
29	SQ 21	0-20		Not detected	0.24	0.08	0.22	0.27	0.11	0.18	0.01	7.49	0.11	0.42	Not detected	0.04
30	SQ 22	0-20		Not detected	0.38	0.08	0.18	0.34	0.11	0.03	0.03	7.67	0.15	0.07	Not detected	0.05

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Heavy metal analysis – HM5

The Government of the Republic of the Union of Myanmar
Ministry of Agriculture and Irrigation
Department of Agriculture
Plant Protection Division
Pesticide Analytical Laboratory

e-mail : ppmas.moai @mptmail.net.mm **Tel : 640344, 644214, 644213,**
Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 5 / 2015

Description of consignments / lot	: SQ-1A (0-15") Young Alluvid Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-1A (0-15") Young Alluvid Soil
Laboratory registration No	: HM-5 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	30.6	3
Lead (Pb)	1.05	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

.....
(Analytical Chemist)
Pesticide Analytical Laboratory
Plant Protection Division
Department of Agriculture
Yangon, Myanmar

31/3/2015
.....
(Director)
Plant Protection Division
Department of Agriculture
Yangon, Myanmar

Heavy metal analysis- HM 6

The Government of the Republic of the Union of Myanmar
Ministry of Agriculture and Irrigation
Department of Agriculture
Plant Protection Division
Pesticide Analytical Laboratory

e-mail : ppmas.moai @mptmail.net.mm **Tel : 640344, 644214, 644213,**
Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 6 / 2015

Description of consignments / lot	: SQ-2A (0-15") Young Alluvid Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-2A (0-15") Young Alluvid Soil
Laboratory registration No	: HM-6 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	10.9	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

.....
(Analytical Chemist)
Pesticide Analytical Laboratory
Plant Protection Division
Department of Agriculture
Yangon, Myanmar

.....
(Director)
Plant Protection Division
Department of Agriculture
Yangon, Myanmar

Heavy metal analysis HM 7

The Government of the Republic of the Union of Myanmar
Ministry of Agriculture and Irrigation
Department of Agriculture
Plant Protection Division
Pesticide Analytical Laboratory

e-mail : ppmas.moai @mptmail.net.mm **Tel : 640344, 644214, 644213,**
Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 7 / 2015

Description of consignments / lot	: SQ-3A (0-20") Old Alluvial Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-3A (0-20") Old Alluvial Soil
Laboratory registration No	: HM-7 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 23-2-2015
Place of Sampling	: New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	10.75	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31 / 3 / 2015

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(Analytical Chemist)
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Department of Agriculture
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.....
(Director)
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Heavy metal analysis HM 8

The Government of the Republic of the Union of Myanmar
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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 8 / 2015

Description of consignments / lot	: B (20-30") Old Alluvial Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: B (20-30") Old Alluvial Soil
Laboratory registration No	: HM-8 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	38.75	3
Lead (Pb)	4.7	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31 / 3 / 2015

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Heavy metal analysis HM 9

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 9 / 2015

Description of consignments / lot	: C (30-39") Old Alluvial Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: C (30-39") Old Alluvial Soil
Laboratory registration No	: HM-9 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	92.95	3
Lead (Pb)	26.9	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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Heavy metal analysis HM 10

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 10 / 2015

Description of consignments / lot	: SQ-4 A (0-15") Gravelly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-4 A (0-15") Gravelly Compact Soil
Laboratory registration No	: HM-10 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	125	3
Lead (Pb)	5.6	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 11

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 11 / 2015

Description of consignments / lot	: SQ-5 A (0-12") Gravelly Eroded Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-5 A (0-12") Gravelly Eroded Red Brown Savanna Soil
Laboratory registration No	: HM-11 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	85.85	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 12 / 2015

Description of consignments / lot	: SQ-5 B (12-20") Gravelly Eroded Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-5 B (12-20") Gravelly Eroded Red Brown Savanna Soil
Laboratory registration No	: HM-12 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	78.7	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 13 / 2015

Description of consignments / lot	: SQ-5 C (20-35") Gravelly Eroded Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-5 C (20-35") Gravelly Eroded Red Brown Savanna Soil
Laboratory registration No	: HM-13 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 23-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	99.5	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31 / 3 / 2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 14 / 2015

Description of consignments / lot	: SQ-6 A (0-15") Gravelly Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-6 A (0-15") Gravelly Red Brown Savanna Soil
Laboratory registration No	: HM-14 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	83.25	3
Lead (Pb)	2.2	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 15 / 2015

Description of consignments / lot	: SQ-7 A (0-12") Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-7 A (0-12") Red Brown Savanna Soil
Laboratory registration No	: HM-15 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	89.55	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 16 / 2015

Description of consignments / lot	: SQ-8 A (0-12") Red Brown Compact Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-8 A (0-12") Red Brown Compact Savanna Soil
Laboratory registration No	: HM-16 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	122.05	3
Lead (Pb)	2.5	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 17 / 2015

Description of consignments / lot	: SQ-9 A (0-12") Red Brown Compact Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-9 A (0-12") Red Brown Compact Savanna Soil
Laboratory registration No	: HM-17 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	181.5	3
Lead (Pb)	18.02	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 18 / 2015

Description of consignments / lot : SQ-10 A (0-12") Gravelly Red Brown Savanna Soil
Name of owner and address :Myanmar Survey Research (EIA/SIA)
Original of sample :New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample : SQ-10 A (0-12") Gravelly Red Brown Savanna Soil
Laboratory registration No : HM-18 / 2015
The sample was taken by :U Myint Swe (Consultant Engineer)
Date of sampling : 26-2-2015
Place of Sampling : New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis : 31-3-2015
Remarks on the condition of the sample : Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	83.8	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 19 / 2015

Description of consignments / lot	: SQ-11 A(0-19") Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-11 A(0-19") Yellow Brown Savanna Soil
Laboratory registration No	: HM-19 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	119.2	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 20 / 2015

Description of consignments / lot	: SQ-12 A(0-20") Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-12 A(0-20") Red Brown Savanna Soil
Laboratory registration No	: HM-20 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	100.4	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31 / 3 / 2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 21 / 2015

Description of consignments / lot	: SQ-13 A(0-10") Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-13 A(0-10") Yellow Brown Savanna Soil
Laboratory registration No	: HM-21 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	83.1	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 22 / 2015

Description of consignments / lot	: SQ-13 B(10-18") Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-13 B(10-18") Yellow Brown Savanna Soil
Laboratory registration No	: HM-22 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	74.65	3
Lead (Pb)	11.5	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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Heavy metal analysis HM 23

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 23 / 2015

Description of consignments / lot	: SQ-13 C (18-32") Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA / SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-13 C(18-32") Yellow Brown Savanna Soil
Laboratory registration No	: HM- 23 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	86.2	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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Heavy metal analysis HM 24

The Government of the Republic of the Union of Myanmar
Ministry of Agriculture and Irrigation
Department of Agriculture
Plant Protection Division
Pesticide Analytical Laboratory

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Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 24 / 2015

Description of consignments / lot	: SQ-14 A(0-10") Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-14 A(0-10") Red Brown Savanna Soil
Laboratory registration No	: HM-24 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	Laboratory Finding (ppm)	Maximum Permitted Level (ppm)
Mercury (Hg)	98.6	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

.....
(Analytical Chemist)
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Department of Agriculture
Yangon, Myanmar

.....
(Director)
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Department of Agriculture
Yangon, Myanmar

Heavy metal analysis HM 25

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 25 / 2015

Description of consignments / lot	: SQ-15 A(0-12") Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-15 A(0-12")Yellow Brown Savanna Soil
Laboratory registration No	: HM-25 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	119.85	3
Lead (Pb)	1.8	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 26

The Government of the Republic of the Union of Myanmar
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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 26 / 2015

Description of consignments / lot	: SQ-16 A(0-15") Gravelly Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-16 A(0-15") Gravelly Red Brown Savanna Soil
Laboratory registration No	: HM-26 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	67.25	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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(Director)
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Heavy metal analysis HM 27

The Government of the Republic of the Union of Myanmar
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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 27 / 2015

Description of consignments / lot	: SQ-17 A(0-19")Yellow Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-17 A(0-19")Yellow Brown Savanna Soil
Laboratory registration No	: HM-27 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	56.5	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 28

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 28 / 2015

Description of consignments / lot	: SQ-18 A(0-12") Gravelly Red Brown Savanna Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-18 A(0-12")Gravelly Red Brown Savanna Soil
Laboratory registration No	: HM-28 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	75.75	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 29

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 29 / 2015

Description of consignments / lot	: SQ-19 A(0-20") Brown Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-19 A(0-20") Brown Compact Soil
Laboratory registration No	: HM-29 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	Laboratory Finding (ppm)	Maximum Permitted Level (ppm)
Mercury (Hg)	81.05	3
Lead (Pb)	1.8	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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Heavy metal analysis HM 30

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM –30/ 2015

Description of consignments / lot	: SQ-20 A(0-12") Medowish Slightly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-20 A(0-12") Medowish Slightly Compact Soil
Laboratory registration No	: HM- 30 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	44.85	3
Lead (Pb)	10.15	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

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Heavy metal analysis HM 31

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 31 / 2015

Description of consignments / lot	: SQ-20 B(12-35") Medowish Slightly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-20 B(12-35") Medowish Slightly Compact Soil
Laboratory registration No	: HM-31 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	93.15	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31 / 3 / 2015

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Heavy metal analysis HM 32

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 32 / 2015

Description of consignments / lot	: SQ-20 C(35-42") Medowish Slightly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-20 C(35-42") Medowish Slightly Compact Soil
Laboratory registration No	: HM-32 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	81.2	3
Lead (Pb)	ND	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 33

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CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 33 / 2015

Description of consignments / lot	: SQ-21A(0-20") Medowish Slightly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-21A(0-20") Medowish Slightly Compact Soil
Laboratory registration No	: HM-33 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	Laboratory Finding (ppm)	Maximum Permitted Level (ppm)
Mercury (Hg)	196.65	3
Lead (Pb)	11.85	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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Heavy metal analysis HM 34

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Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS
HM – 34 / 2015

Description of consignments / lot	: SQ-22 A(0-20") Medowish Slightly Compact Soil
Name of owner and address	:Myanmar Survey Research (EIA/SIA)
Original of sample	:New Refinery Project,Minhla Township(Thanpyarkan) Magway Region
Designation of Sample	: SQ-22 A(0-20") Medowish Slightly Compact Soil
Laboratory registration No	: HM-34 / 2015
The sample was taken by	:U Myint Swe (Consultant Engineer)
Date of sampling	: 26-2-2015
Place of Sampling	: New Refinery Project,Minhal Township(Thanpyarkan) Magway Region
Date of analysis	: 31-3-2015
Remarks on the condition of the sample	: Sample is packed in Plastic Bag

RESULTS:

Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by Myanmar Survey Research (EIA/SIA)) are as follow ;

Heavy Metal Contaminants	**Laboratory Finding (ppm)**	**Maximum Permitted Level (ppm)**
Mercury (Hg)	173.45	3
Lead (Pb)	14.9	85
Arsenic (As)	ND	29

NB: The results are valid only for the quantities the sample represented.
Date: 31 -3 -2015
Note : ND – Not Detected
ppm:parts per million

31/3/2015

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(Director)
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Yangon, Myanmar

APPENDIX 2: WATER QUALITY LAB RESULTS

Drinkingwater-WG1

Occupational And Environmental Health Laboratory

No.(250/A), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WG-1	**Reg no:**	032 / 2015
Address:	ဦးအောင်မင်းအိမ်၊ ညောင်ပင်သာအနောက်၊ မင်းလှမြို့နယ်		

Analyte	Reference Value	Unit	Result	Method
Color	15	TCU	1	*Spectrophotometer*
Turbidity	5	NTU	0.1	*Spectrophotometer*
Arsenic	50	ppb	1.453	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Copper	2	ppm	0.10	*Spectrophotometer*
Fluoride	1.5	ppm	0.49	*Spectrophotometer*
Lead	10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Nitrate	50	ppm	5	*Spectrophotometer*
Chloride	250	ppm	20	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	161	*Spectrophotometer*
Iron	1	ppm	0.06	*Spectrophotometer*
pH	6.5 – 8.5		7.3	*pH meter*
Sulphate	250	ppm	26	*Spectrophotometer*
Total Dissolved Solid	1000	ppm	320	*Spectrophotometer*
Magnesium	150	ppm	86	*Spectrophotometer*
Zinc	3	ppm	0.17	*Spectrophotometer*
Electro Conductivity	1500	µmhos/cm	490	*Standard method of waste water analysis*
Alkalinity	200	ppm	170	*Spectrophotometer*
Phenol	1	ppm	0	*Spectrophotometer*
Bacterial Growth(Total coliform 37°C)	0	coliform/100ml	4	*Incubation method by POTATEST*
Bacterial Growth(fecal coliform 44 °C)	0	coliform/100ml	2	*Incubation method by POTATEST*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med-Tech

Checked by

Signed by

Dr.Kyi Lwin Oo
Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Drinking water - WG2

Occupational And Environmental Health Laboratory

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Fax:+9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WG-2	**Reg no:**	033 / 2015
Address:	ဦးကျော်နိုင် (မင်းလှ) သံပုရာကန် မြောက်ပိုင်းရပ်ကွက်။		

Analyte	Reference Value	Unit	Result	Method
Color	15	TCU	0	*Spectrophotometer*
Turbidity	5	NTU	0.1	*Spectrophotometer*
Arsenic	50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Copper	2	ppm	0.42	*Spectrophotometer*
Fluoride	1.5	ppm	0.75	*Spectrophotometer*
Lead	10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Nitrate	50	ppm	0	*Spectrophotometer*
Chloride	250	ppm	50	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	265	*Spectrophotometer*
Iron	1	ppm	0	*Spectrophotometer*
pH	6.5 – 8.5		7.8	*pH meter*
Sulphate	250	ppm	106	*Spectrophotometer*
Total Dissolved Solid	1000	ppm	4570	*Spectrophotometer*
Magnesium	150	ppm	64	*Spectrophotometer*
Zinc	3	ppm	0.11	*Spectrophotometer*
Electro Conductivity	1500	µmhos/cm	1340	*Standard method of waste water analysis*
Alkalinity	200	ppm	325	*Spectrophotometer*
Phenol	1	ppm	0	*Spectrophotometer*
Bacterial Growth(Total coliform 37°C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Bacterial Growth(fecal coliform 44 °C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med-Tech

Checked by

Signed by

Dr.Kyi Lwin Oo
Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Drinking water - WG3

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
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Sample Name:	Drinking Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WG-3	**Reg no:**	034 / 2015
Address:	စေ့းတန်း၊ မင်းလှမြို့အာဝင်စေ့း။		

Analyte	Reference Value	Unit	Result	Method
Color	15	TCU	0	*Spectrophotometer*
Turbidity	5	NTU	0.05	*Spectrophotometer*
Arsenic	50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Copper	2	ppm	0.28	*Spectrophotometer*
Fluoride	1.5	ppm	0.58	*Spectrophotometer*
Lead	10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Nitrate	50	ppm	0	*Spectrophotometer*
Chloride	250	ppm	30	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	168	*Spectrophotometer*
Iron	1	ppm	0	*Spectrophotometer*
pH	6.5 – 8.5		7.4	*pH meter*
Sulphate	250	ppm	146	*Spectrophotometer*
Total Dissolved Solid	1000	ppm	650	*Spectrophotometer*
Magnesium	150	ppm	94	*Spectrophotometer*
Zinc	3	ppm	0.25	*Spectrophotometer*
Electro Conductivity	1500	µmhos/cm	1140	*Standard method of waste water analysis*
Alkalinity	200	ppm	285	*Spectrophotometer*
Phenol	1	ppm	0	*Spectrophotometer*
Bacterial Growth(Total coliform 37°C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Bacterial Growth(fecal coliform 44 °C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med-Tech

Checked by

Signed by

Dr.Kyi Lwin Oo
Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Drinking water – WG4

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WG-4	**Reg no:**	035 / 2015
Address:	ဦးမျိုးဝင်း + ဒေါ်အေးသန်း၊ ပန်းတောပြင်ရွာ၊ မြောက်ပိုင်း။		

Analyte	Reference Value	Unit	Result	Method
Color	15	TCU	0	*Spectrophotometer*
Turbidity	5	NTU	0.05	*Spectrophotometer*
Arsenic	50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Copper	2	ppm	0.30	*Spectrophotometer*
Fluoride	1.5	ppm	0.45	*Spectrophotometer*
Lead	10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Nitrate	50	ppm	16	*Spectrophotometer*
Chloride	250	ppm	40	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	203	*Spectrophotometer*
Iron	1	ppm	0	*Spectrophotometer*
pH	6.5 – 8.5		7.4	*pH meter*
Sulphate	250	ppm	136	*Spectrophotometer*
Total Dissolved Solid	1000	ppm	580	*Spectrophotometer*
Magnesium	150	ppm	170	*Spectrophotometer*
Zinc	3	ppm	0.17	*Spectrophotometer*
Electro Conductivity	1500	µmhos/cm	890	*Standard method of waste water analysis*
Alkalinity	200	ppm	205	*Spectrophotometer*
Phenol	1	ppm	0	*Spectrophotometer*
Bacterial Growth(Total coliform 37°C)	0	coliform/100ml	Numerous	*Incubation method by POTATEST*
Bacterial Growth(fecal coliform 44 °C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med-Tech

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Dr.Kyi Lwin Oo
Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Drinking water – WG5

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Drinking Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WG-5	**Reg no:**	036 / 2015
Address:	ဒေါ်မြစိန်အိမ်၊ မယ်ဇီတောကျေးရွာ။		

Analyte	Reference Value	Unit	Result	Method
Color	15	TCU	1	*Spectrophotometer*
Turbidity	5	NTU	0.05	*Spectrophotometer*
Arsenic	50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Copper	2	ppm	0.40	*Spectrophotometer*
Fluoride	1.5	ppm	0.29	*Spectrophotometer*
Lead	10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Nitrate	50	ppm	0	*Spectrophotometer*
Chloride	250	ppm	30	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	167	*Spectrophotometer*
Iron	1	ppm	0	*Spectrophotometer*
pH	6.5 – 8.5		7.5	*pH meter*
Sulphate	250	ppm	75	*Spectrophotometer*
Total Dissolved Solid	1000	ppm	390	*Spectrophotometer*
Magnesium	150	ppm	88	*Spectrophotometer*
Zinc	3	ppm	0.25	*Spectrophotometer*
Electro Conductivity	1500	µmhos/cm	600	*Standard method of waste water analysis*
Alkalinity	200	ppm	145	*Spectrophotometer*
Phenol	1	ppm	0	*Spectrophotometer*
Bacterial Growth(Total coliform 37°C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Bacterial Growth(fecal coliform 44 °C)	0	coliform/100ml	No Growth	*Incubation method by POTATEST*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*

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Signed by

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Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WR 1

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WR-1	**Reg no:**	028/2015
Address:	ဧရာဝတီမြစ်ရေ၊ ညောင်ပင်သာရွာ		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.2	*pH meter*
BOD	: 20-60	mg O_2/L	38	*Standard method of waste water analysis*
COD	: 200	ppm	28	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	120	*Standard method of waste water analysis*
Nitrate	: 10	ppm	8	*Spectrophotometer*
Arsenic	: 50	ppb	0.758	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	2.71	*Standard method of waste water analysis*
Phenol	: 1	ppm	0.14	*Spectrophotometer*
Sulphate	: 1000	ppm	22	*Spectrophotometer*
Chloride	: 1000	ppm	10	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	210	*Standard method of waste water analysis*
Lead	: 10	ppb	0.088	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	1	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	55	*Spectrophotometer*
Iron	: 3	ppm	0.28	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	10.1	*Standard method of waste water analysis*
Copper	: 3	ppm	0.24	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	10	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	73	*Spectrophotometer*
Fluoride	1.5	ppm	0.31	*Spectrophotometer*
Magnesium	150	ppm	32	*Spectrophotometer*
Zinc	3	ppm	0.04	*Spectrophotometer*

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C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WR 2

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WR-2	**Reg no:**	029/2015
Address:	ဓရာဝတီမြစ်ရေ၊ New Jetty နေရာ		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.9	*pH meter*
BOD	: 20-60	mg O_2/L	39	*Standard method of waste water analysis*
COD	: 200	ppm	30	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	110	*Standard method of waste water analysis*
Nitrate	: 10	ppm	7	*Spectrophotometer*
Arsenic	: 50	ppb	3.093	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	9.03	*Standard method of waste water analysis*
Phenol	: 1	ppm	0.03	*Spectrophotometer*
Sulphate	: 1000	ppm	10	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	180	*Standard method of waste water analysis*
Lead	: 10	ppb	4.452	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	5	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	60	*Spectrophotometer*
Iron	: 3	ppm	0.17	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	11.0	*Standard method of waste water analysis*
Copper	: 3	ppm	0.24	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	10	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	116	*Spectrophotometer*
Fluoride	1.5	ppm	0	*Spectrophotometer*
Magnesium	150	ppm	35	*Spectrophotometer*
Zinc	3	ppm	0.03	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med. Tech

Checked by

Signed by

Dr.Kyi Lwin Oo
Deputy Director
Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WR 3

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WR-3	**Reg no:**	030/2015
Address:	မင်းလှမြို့၊ မြစ်ဆိပ်၊ မြို့ရေပေးနေရာ။		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.9	*pH meter*
BOD	: 20-60	mg O_2/L	35	*Standard method of waste water analysis*
COD	: 200	ppm	34	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	110	*Standard method of waste water analysis*
Nitrate	: 10	ppm	5	*Spectrophotometer*
Arsenic	: 50	ppb	5.777	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	3.24	*Standard method of waste water analysis*
Phenol	: 1	ppm	0.01	*Spectrophotometer*
Sulphate	: 1000	ppm	7	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	170	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	5	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	55	*Spectrophotometer*
Iron	: 3	ppm	0.19	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	9.8	*Standard method of waste water analysis*
Copper	: 3	ppm	0.14	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	10	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	75	*Spectrophotometer*
Fluoride	1.5	ppm	0.31	*Spectrophotometer*
Magnesium	150	ppm	37	*Spectrophotometer*
Zinc	3	ppm	0.11	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med-Tech

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Signed by

Dr.Kyi Lwin Oo
Deputy Director
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C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WR 4

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WR-4	**Reg no:**	031/2015
Address:	ဧရာဝတီ မြစ်ရေ မလွန်ဇက်ဆိပ်		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.8	*pH meter*
BOD	: 20-60	mg O_2/L	40	*Standard method of waste water analysis*
COD	: 200	ppm	25	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	110	*Standard method of waste water analysis*
Nitrate	: 10	ppm	23	*Spectrophotometer*
Arsenic	: 50	ppb	3.411	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	15.35	*Standard method of waste water analysis*
Phenol	: 1	ppm	0	*Spectrophotometer*
Sulphate	: 1000	ppm	6	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	160	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	1	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	45	*Spectrophotometer*
Iron	: 3	ppm	0.27	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	11.2	*Standard method of waste water analysis*
Copper	: 3	ppm	0.16	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	5	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	64	*Spectrophotometer*
Fluoride	1.5	ppm	0.10	*Spectrophotometer*
Magnesium	150	ppm	33	*Spectrophotometer*
Zinc	3	ppm	0.12	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
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C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WW1

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WW-1	**Reg no:**	037/2015
Address:	စွန့်ပစ်ရေ၊ ပိုက်လိုင်းဘေး။		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.2	*pH meter*
BOD	: 20-60	mg O_2/L	35	*Standard method of waste water analysis*
COD	: 200	ppm	25	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	130	*Standard method of waste water analysis*
Nitrate	: 10	ppm	0	*Spectrophotometer*
Arsenic	: 50	ppb	0.615	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	1.68	*Standard method of waste water analysis*
Phenol	: 1	ppm	0	*Spectrophotometer*
Sulphate	: 1000	ppm	24	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	190	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	1	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	25	*Spectrophotometer*
Iron	: 3	ppm	0.02	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	9.6	*Standard method of waste water analysis*
Copper	: 3	ppm	0.76	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	1	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	72	*Spectrophotometer*
Fluoride	1.5	ppm	0	*Spectrophotometer*
Magnesium	150	ppm	39	*Spectrophotometer*
Zinc	3	ppm	0.24	*Spectrophotometer*

Tested by

Daw Aye Aye Thin

OH Lab

Med. Tech

Checked by

Signed by

Dr.Kyi Lwin Oo
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Occupational and Environmental Health Division

C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WW2

Occupational And Environmental Health Laboratory

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Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WW-2	**Reg no:**	038/2015
Address:	စက်ရုံနှင့် မင်းလှမြို့ကြားခွန့်ပစ်ရေ၊ ရထားလမ်းဘေး။		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.3	*pH meter*
BOD	: 20-60	mg O_2/L	33	*Standard method of waste water analysis*
COD	: 200	ppm	32	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	130	*Standard method of waste water analysis*
Nitrate	: 10	ppm	0	*Spectrophotometer*
Arsenic	: 50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	2.76	*Standard method of waste water analysis*
Phenol	: 1	ppm	0	*Spectrophotometer*
Sulphate	: 1000	ppm	23	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	200	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	0.05	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	20	*Spectrophotometer*
Iron	: 3	ppm	0.02	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	9.0	*Standard method of waste water analysis*
Copper	: 3	ppm	0.22	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	1	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	59	*Spectrophotometer*
Fluoride	1.5	ppm	0.16	*Spectrophotometer*
Magnesium	150	ppm	41	*Spectrophotometer*
Zinc	3	ppm	0.20	*Spectrophotometer*

Tested by

Daw Aye Aye Thin
OH Lab
Med. Tech

Checked by

Signed by

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C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WW3

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WW-3	**Reg no:**	039/2015
Address:	စွန့်ပစ်ရေ၊ ကားလမ်းဘေး၊ မင်းလှ။		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.2	*pH meter*
BOD	: 20-60	mg O_2/L	32	*Standard method of waste water analysis*
COD	: 200	ppm	33	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	140	*Standard method of waste water analysis*
Nitrate	: 10	ppm	1	*Spectrophotometer*
Arsenic	: 50	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	2.93	*Standard method of waste water analysis*
Phenol	: 1	ppm	0	*Spectrophotometer*
Sulphate	: 1000	ppm	27	*Spectrophotometer*
Chloride	: 1000	ppm	30	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	220	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	1	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	20	*Spectrophotometer*
Iron	: 3	ppm	0	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	8.8	*Standard method of waste water analysis*
Copper	: 3	ppm	0.32	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	1	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	63	*Spectrophotometer*
Fluoride	1.5	ppm	0.16	*Spectrophotometer*
Magnesium	150	ppm	33	*Spectrophotometer*
Zinc	3	ppm	0.26	*Spectrophotometer*

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Signed by

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Deputy Director
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C-6/D/KTDL(2015)/Lab Result(2015)

Waste water – WW4

Occupational And Environmental Health Laboratory

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Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	21-2-2015
		Reported Date:	9-3-2015
Site Name:	WW-4	**Reg no:**	040/2015
Address:	စွန့်ပစ်ရေ၊ ဇရပ်ဘေး (မိုးရေ)၊ အမှတ် (၆)နယ်မြေ၊ လက်လန်ကန်		

Analyte	Ref: Value	Unit	Result	Method
pH	: 5.5- 9	-	7.5	*pH meter*
BOD	: 20-60	mg O_2/L	37	*Standard method of waste water analysis*
COD	: 200	ppm	35	*Standard method of waste water analysis*
Total Dissolved Solid	: 2000	ppm	260	*Standard method of waste water analysis*
Nitrate	: 10	ppm	0	*Spectrophotometer*
Arsenic	: 50	ppb	1.853	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Oil and Grease	: 10	ppm	2.87	*Standard method of waste water analysis*
Phenol	: 1	ppm	0	*Spectrophotometer*
Sulphate	: 1000	ppm	31	*Spectrophotometer*
Chloride	: 1000	ppm	20	*Spectrophotometer*
Electro Conductivity	: 1500	µmhos/cm	390	*Standard method of waste water analysis*
Lead	: 10	ppb	0	*Atomic Absorption Spectrophotometer(Graphite furnace method)*
Turbidity	: 5-15	NTU	0.1	*Standard method of waste water analysis*
Alkalinity	: 200	ppm	65	*Spectrophotometer*
Iron	: 3	ppm	0	*Spectrophotometer*
Dissolved Oxygen	: 11	ppm	10.2	*Standard method of waste water analysis*
Copper	: 3	ppm	0.64	*Spectrophotometer*
Phosphate	0.0-70	ppm	0	*Spectrophotometer*
Color	15	TCU	1	*Spectrophotometer*
Hardness	500	ppm as $CaCO_3$	93	*Spectrophotometer*
Fluoride	1.5	ppm	0	*Spectrophotometer*
Magnesium	150	ppm	85	*Spectrophotometer*
Zinc	3	ppm	0.30	*Spectrophotometer*

Tested by

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Checked by

Signed by

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APPENDIX 3: AIR QUALITY LAB RESULTS

Air – AQ1

Occupational And Environmental Health Laboratory

No.(250/A), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	**Air**	**Received Date:**	22.2.2015
		Reported Date:	26.2.2015
Site Name:	AQ 1	**Reg no:**	109/2015
Address:	မင်းလှမြို့နယ်၊ မကွေးတိုင်းဒေသကြီး။		

Air

Name	Unit	Result	Remark
TSPM	$\mu g/m^3$	181.02	
PM_{10} (24 hr mean)	$\mu g/m^3$	87.74	
SO_2 (24 hr mean)	$\mu g/m^3$	0.003	
NO_2 (Annual mean)	$\mu g/m^3$	0.51	
NO_2 (1 hr mean)	$\mu g/m^3$	30.37	

Instruments : High Volume Sampler
Method : SO_2 in Air pollution (Modified West and Gaeke Method)
NO_2 in Air Pollution (Indian Standard with Sodium Arsenite Method)

Reference Value : (WHO Air Quality Guideline)
: PM_{10} (24 hr mean) 50 $\mu g/m^3$
: SO_2 (24 hr mean) 20 $\mu g/m^3$
: NO_2 (Annual mean) 40 $\mu g/m^3$
: NO_2 (1 hr mean) 200 $\mu g/m^3$

Tested by
U Toe Maung
U Thiha Lin
U Myat Kyaw Khaing
U Aung San Win

Checked by
Daw Jun Martha Aye
(Hygiene Officer)

Signed by
Dr. Kyi Lwin Oo
Deputy Director
Occupational & Environmental Health Division

C-6/D/KTDL(2015)/Hygiene Result

Air – AQ2

Occupational And Environmental Health Laboratory

No.(250/A), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	**Air**	**Received Date:**	21.2.2015
		Reported Date:	26.2.2015
Site Name:	AQ 2	**Reg no:**	107/2015
Address:	မင်းလှမြို့နယ်၊ မကွေးတိုင်းဒေသကြီး။		

Air

Name	Unit	Result	Remark
TSPM	$\mu g/m^3$	179.33	
PM_{10} (24 hr mean)	$\mu g/m^3$	66.9	
SO_2 (24 hr mean)	$\mu g/m^3$	0.006	
NO_2 (Annual mean)	$\mu g/m^3$	0.97	
NO_2 (1 hr mean)	$\mu g/m^3$	10.37	

Instruments : High Volume Sampler
Method : SO_2 in Air pollution (Modified West and Gaeke Method)
NO_2 in Air Pollution (Indian Standard with Sodium Arsenite Method)

Reference Value : (WHO Air Quality Guideline)
: PM_{10} (24 hr mean) 50 $\mu g/m^3$
: SO_2 (24 hr mean) 20 $\mu g/m^3$
: NO_2 (Annual mean) 40 $\mu g/m^3$
: NO_2 (1 hr mean) 200 $\mu g/m^3$

Tested by	**Checked by**	**Signed by**
U Toe Maung U Thiha Lin U Myat Kyaw Khaing U Aung San Win	Daw Jun Martha Aye (Hygiene Officer)	**Dr. Kyi Lwin Oo** **Deputy Director** **Occupational & Environmental Health Division**

C-6/D/KTDL(2015)/Hygiene Result

Air – AQ3

Occupational And Environmental Health Laboratory

No.(250/A), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	**Air**	**Received Date:**	21.2.2015
		Reported Date:	26.2.2015
Site Name:	AQ 3	**Reg no:**	108/2015
Address:	မင်းလှမြို့နယ်၊ မကွေးတိုင်းဒေသကြီး။		

Air

Name	Unit	Result	Remark
TSPM	$\mu g/m^3$	198.6	
PM_{10} (24 hr mean)	$\mu g/m^3$	107.29	
SO_2 (24 hr mean)	$\mu g/m^3$	0.009	
NO_2 (Annual mean)	$\mu g/m^3$	1.76	
NO_2 (1 hr mean)	$\mu g/m^3$	10.23	

Instruments : High Volume Sampler
Method : SO_2 in Air pollution (Modified West and Gaeke Method)
NO_2 in Air Pollution (Indian Standard with Sodium Arsenite Method)

Reference Value : (WHO Air Quality Guideline)
: PM_{10} (24 hr mean) 50 $\mu g/m^3$
: SO_2 (24 hr mean) 20 $\mu g/m^3$
: NO_2 (Annual mean) 40 $\mu g/m^3$
: NO_2 (1 hr mean) 200 $\mu g/m^3$

Tested by	**Checked by**	**Signed by**
U Toe Maung U Thiha Lin U Myat Kyaw Khaing U Aung San Win	Daw Jun Martha Aye (Hygiene Officer)	**Dr. Kyi Lwin Oo** **Deputy Director** **Occupational & Environmental Health Division**

C-6/D/KTDL(2015)/Hygiene Result

Air – AQ4

Occupational And Environmental Health Laboratory

No.(250/A), Lower Kyeemyindine Road, Ahlone Township, Yangon, Myanmar.
Tel:+9567-431139, 431138, +951-221387, 210844
Fax:+9567-431139, +951-223824

Sample Name:	**Air**	**Received Date:**	20.2.2015
		Reported Date:	26.2.2015
Site Name:	AQ 4	**Reg no:**	106/2015
Address:	မင်းလှမြို့နယ်၊ မကွေးတိုင်းဒေသကြီး။		

Air

Name	Unit	Result	Remark
TSPM	$\mu g/m^3$	229.43	
PM_{10} (24 hr mean)	$\mu g/m^3$	96.57	
SO_2 (24 hr mean)	$\mu g/m^3$	0.008	
NO_2 (Annual mean)	$\mu g/m^3$	0.95	
NO_2 (1 hr mean)	$\mu g/m^3$	8.79	

Instruments : High Volume Sampler
Method : SO_2 in Air pollution (Modified West and Gaeke Method)
NO_2 in Air Pollution (Indian Standard with Sodium Arsenite Method)

Reference Value : (WHO Air Quality Guideline)
: PM_{10} (24 hr mean) 50 $\mu g/m^3$
: SO_2 (24 hr mean) 20 $\mu g/m^3$
: NO_2 (Annual mean) 40 $\mu g/m^3$
: NO_2 (1 hr mean) 200 $\mu g/m^3$

Tested by
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C-6/D/KTDL(2015)/Hygiene Result

APPENDIX 4: NOISE PRESSURE LAB RESULTS

Noise pressure – AQ1

AQ (1)

Date :22-2-2015

No.	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Avg:
1	10:00	58.3	55.5	60.7	49	48.3	51.4	49.1	56.1	53.8	53.6	56.1	56.8	54	54.6	59.8	817.1	54.47333
2	11:00	45.7	43.8	44.8	46.3	43.7	42.9	44.2	44.8	44.7	42.9	43.3	44.8	44.2	48.3	43.8	668.2	44.54667
3	12:00	48.1	55.5	51.7	53.7	56.4	57.4	61.3	61.7	62.6	60.3	53	57.4	50.2	50.3	48.2	827.8	55.18667
4	13:00	44.2	49.3	34	31.8	30.8	43.5	34	33.9	33.3	31.1	30	33.3	33	34.6	44.2	541	36.06667
5	14:00	56.8	54.1	53.1	54	53.7	55.3	57.9	56	57.3	58.3	60.6	60.7	54.9	55.3	49.5	837.5	55.83333
6	15:00	49.8	56.3	57.4	45.6	43.6	43.4	50.6	49.5	49.9	49	44.6	44.2	50	49.8	45.6	729.3	48.62
7	16:00	43.3	42.8	42.6	49.3	46.5	59.6	57.7	46.2	47.7	51.1	56	62.1	56.6	58.1	62.1	781.7	52.11333
8	17:00	47.1	49.6	50	57.8	46	45.5	44.5	45.5	44.5	47.6	53.3	50.1	51.1	51.6	52.7	736.9	49.12667
9	18:00	44.5	51.7	70.5	67.8	66.9	44	44.6	44.6	47	46.3	47.3	44.3	45.5	44.4	44.7	754.1	50.27333
10	19:00	47.7	52.2	54.2	56.7	51.2	49.4	51.6	51.5	48.1	57.3	52.2	48.8	46.9	54	46.8	768.6	51.24
11	20:00	48.2	46.6	45.4	44.9	44.5	43.9	52.8	46.9	45.9	45.8	47.9	44.2	44.8	47.3	45	694.1	46.27333
12	21:00	47.6	46.1	45.3	45.1	47.3	52.5	49.5	51.8	50.3	46.7	46.9	44.4	44.5	45.1	46.1	709.2	47.28
13	22:00	39	48.3	39.4	39.7	40.5	43.8	40.6	39.9	57.2	46.9	51.8	39.3	39.8	52.7	39.9	658.8	43.92
14	23:00	35.2	35.9	35.3	35	35.4	36	36.6	36.1	35	35.2	35.3	35.8	35.7	35.1	34.5	532.1	35.47333
15	0:00	33.7	33.8	33.7	34	34.4	33.7	33.9	34.1	34.4	34.6	34	32.1	33.5	34.1	35.9	509.9	33.99333
16	1:00	39.2	39.7	39.5	39.7	39.6	39.5	39.6	39.8	39.7	39.9	40	39.8	40	39.6	39.8	595.4	39.69333
17	2:00	45.2	46.3	44.3	43.8	54.6	48.7	42.8	45	41.8	42.7	41.9	41.6	44.1	42.9	41.2	666.9	44.46
18	3:00	57.8	59.2	51.3	42.1	42.9	40.7	41.8	42	41	43.9	42.3	43.2	40.4	42.5	39.6	670.7	44.71333
19	4:00	59.7	48	49.4	48.5	44.2	42.6	40.7	40.8	40.3	39.9	40	39.8	47.3	57.7	47.8	686.7	45.78
20	5:00	48.1	44.1	44.4	44.3	40.9	45.2	48.2	50.3	43.6	52.5	49.8	40.6	40.3	50.3	53	695.6	46.37333
21	6:00	44.5	53	52	53.4	47.4	47.9	51.3	54.5	44.5	53	52	53.4	47.9	51.3	54.3	760.4	50.69333
22	7:00	42.8	41.8	40.9	45.6	43.5	43	43	43.1	41	41.4	42.8	41.3	41	41.3	40.9	633.4	42.22667
23	8:00	41.4	44.4	40.3	43.8	42.3	41.3	40.3	40.1	41.4	39.9	39.1	37.7	40.9	42.6	38.3	613.8	40.92
24	9:00	43.9	43.3	45.1	44.9	43.8	42.9	48.3	49	43.4	41	42.3	44.4	43.9	45.5	45.3	667	44.46667

Noise pressure – AQ2

AQ (2)

Date :21-2-2015

No.	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Avg:
1	9:30	43.8	44.4	44	44.1	44.5	44.1	44.3	44.5	50.8	48.6	48.3	44.4	44.7	45.2	44.3	680	45.33333
2	10:30	46.1	45.5	46.3	46.9	45.5	46	46.6	47.8	50	46.6	45	45.5	45.7	45.8	46.2	695.5	46.36667
3	11:30	45.6	45	46.3	45.6	47.2	47.3	46.3	45.6	45.3	44.5	45	45.6	45.8	45.6	45.1	685.8	45.72
4	12:30	43.5	43.3	42.9	42.5	43.7	43.5	43.8	44.3	44.7	44.5	43.3	43.7	44.9	44.4	43.6	656.6	43.77333
5	13:30	46.6	45.3	44.6	45.3	45.1	44.9	45.6	45.9	45.8	46.5	45.5	44.8	46	45.9	44.5	682.3	45.48667
6	14:30	39.5	39.6	40.2	39.9	40.1	37.1	39.9	39.7	40.1	39.8	39.6	40	39.9	40.2	39.5	595.1	39.67333
7	15:30	41.5	42.4	42.6	42.2	44.4	42.6	43.7	43.6	43.5	43.6	43.4	42	42.5	42.5	43.1	643.6	42.90667
8	16:30	47.5	47.6	47.1	47.6	41.2	46.5	47.5	47.7	47.8	47.3	46.2	47.4	47.1	47.5	47.7	703.7	46.91333
9	17:30	46.3	43.3	43.4	42.7	42.9	43	43.3	42.5	43.2	46.5	43.2	43.1	42.6	42.6	44.4	653	43.53333
10	18:30	46.1	47.3	46.6	46.5	46.9	47.3	49.5	51.2	51.1	49.8	48.3	46.9	46	45.9	46.2	715.6	47.70667
11	19:30	42.7	42.9	43	43.1	43.2	43	43.4	43.3	42.9	43	43.1	43.2	42.9	43	42.8	645.5	43.03333
12	20:30	43.9	43.7	43.6	43.4	43.9	44.8	43.6	43.6	43.9	43.6	43.8	43.6	43.5	43.7	43.6	656.2	43.74667
13	21:30	43.4	43.6	44.7	44	43.5	44.1	44	43.4	45.2	43.7	43.4	44	45.1	43.9	43.4	659.4	43.96
14	22:30	44.7	44.4	44.2	44.1	44.2	44.7	44.2	43.9	44.3	44	44.1	44.7	44.7	44.7	44.4	665.3	44.35333
15	23:30	44.3	44.1	44.3	44.4	44.3	44.8	44.5	44.6	44.9	44.5	44.8	44.3	44.4	44.3	44.6	667.1	44.47333
16	0:30	40.4	36.5	33.8	34	33.9	33.9	35	34.2	34.5	34.6	34.1	34.5	34.7	34.1	34.5	522.7	34.84667
17	1:30	43.1	32.5	39.9	42.8	42.5	43.4	31.9	32	44.5	32.3	32.5	40.7	43.2	39.9	32.1	573.3	38.22
18	2:30	32.7	32.5	43.1	32.1	32.3	43.1	39.9	42.8	42.5	34.3	31.9	32	44.5	32.3	32.5	548.5	36.56667
19	3:30	43.7	42.3	47.2	48.3	33.2	34.8	34.6	33.3	32.5	32.3	32.7	32.3	33.6	33.9	33.4	548.1	36.54
20	4:30	41.9	39.9	35.5	35.6	36	36.8	35.6	35	34.3	33.9	43.4	44.7	45.7	45	35.4	578.7	38.58
21	5:30	45	44.8	49.2	50.3	44.6	44.9	44.7	45.4	45.9	45.5	44.1	52.1	51.2	45.1	45.8	698.6	46.57333
22	6:30	44.4	44	44.1	44.4	44	43.8	44.6	44.5	44	43.8	44.4	44.1	44.4	43.7	43.9	662.1	44.14
23	7:30	43.8	43.3	47	48.2	48.1	49.2	49.9	46.6	46.5	43.6	54.1	43.1	45.5	46.5	43.6	699	46.6
24	8:30	47.2	46.6	46.9	46.1	46.8	48.4	48.8	48.4	47.6	47.9	46.8	45.9	45.7	46.2	46.3	705.6	47.04

Noise pressure – AQ3

AQ (3)

Date :21-2-2015

No.	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Avg:
1	19:00	55	54.3	54	54.2	53.8	53.7	53.6	53.4	53.5	53.7	53.6	54.4	54.7	54.9	71.5	828.3	55.22
2	20:00	56.7	57.1	57	57.1	56.8	57.3	56.8	57.1	56.7	57	56.9	56.7	57	56.5	56.8	853.5	56.9
3	21:00	56.8	57.1	56.8	56.5	56.4	56.7	56.4	57.2	57.3	56.9	56.7	56.8	56.7	57	56.9	852.2	56.81333
4	22:00	52.4	52.6	53	52.8	53	53.1	52.8	53.5	52.9	53	52	54.6	53.2	52.9	53.3	795.1	53.00667
5	23:00	40.4	38	49.4	54	37.5	38.6	34.6	40.3	41.5	40.8	41	41.7	42.5	42.9	44.1	627.3	41.82
6	0:00	47.3	46	47	45.9	45.1	46.8	47.4	46.1	49.3	46.5	45.5	50.7	48.9	46.8	48.3	707.6	47.17333
7	1:00	45.5	30.4	49.4	54	40.3	42.1	44.1	40.4	40.8	51.5	55	40.8	51.1	50.1	56.7	692.2	46.14667
8	2:00	51.7	51	52.5	50.9	50.7	49.7	49.1	48.7	48.3	53.4	48.7	48.5	49.5	49.3	40.8	742.8	49.52
9	3:00	52.2	50.7	51.5	48.7	49	50.1	47.1	49.6	49	50.8	52.3	50	47.3	45.5	47.1	740.9	49.39333
10	4:00	47.6	48	46.7	49	48.9	45.1	46.7	51.2	49.9	50.5	51.9	46.3	47.6	47.4	48.7	725.5	48.36667
11	5:00	46.7	47.8	48	48.5	45.8	46.2	47	50	50.4	49.8	48	47.2	47.8	47.5	46.4	717.1	47.80667
12	6:00	45.8	46.4	47	44.8	45.5	46	46.8	47.6	47.9	50.3	49.2	48.8	48.4	46	46.5	707	47.13333
13	7:00	43.4	44.9	45.4	47.5	45.9	45.8	49.6	50.2	50.8	51.5	49.6	47.1	46.5	46.3	45.6	710.1	47.34
14	8:00	55.6	55.3	55.7	56.1	55.6	55.8	55.7	55.4	55.5	55.9	55.1	56.1	56.6	56.9	55.8	837.1	55.80667
15	9:00	59.4	57.9	58.3	58.7	58.3	58.6	58.1	58.3	58.4	58.2	58.3	58.4	58.9	58.7	58	876.5	58.43333
16	10:00	59.5	57.5	57.3	57.8	57.6	57.7	57.5	57.6	57.2	57.4	57.1	57.6	57.5	57.4	57.6	864.3	57.62
17	11:00	52	53	52.7	52.9	53.6	52.9	52.8	52.7	51.2	51.8	51.1	51.4	51.6	52.8	51.9	784.4	52.29333
18	12:00	52.2	50.7	48.7	51.5	56.8	53.7	50.4	50.8	51.2	51.6	50.6	50.9	51.2	51.1	52.2	773.6	51.57333
19	13:00	47.5	47.7	47.5	48.4	48.9	49	48.8	48.7	48.6	48.7	48.6	49.5	48	48.2	48.8	726.9	48.46
20	14:00	49.2	47.4	47.2	46.5	46.1	46.8	46.9	47	46.2	46.5	46.8	46	47.2	46.7	46	702.5	46.83333
21	15:00	46.3	46.6	46.3	45.8	46.3	46.7	46.1	45.9	46.1	46.6	47.5	47.2	46.6	46.8	46	696.8	46.45333
22	16:00	47.4	46.1	46.9	46.2	47.2	46	46.8	49.2	47.2	46.8	47.2	46.7	46	46.6	47.2	703.5	46.9
23	17:00	55.4	51.2	55.3	50.9	53.7	50.5	51.9	54.3	49	50.5	54.5	55.1	54	51	52	789.3	52.62
24	18:00	49.7	46.8	47.4	47.6	53.2	49.9	48.9	47.9	53.7	53.5	47.4	51.5	53.6	47.6	48.8	747.5	49.83333

Noise pressure – AQ4

AQ (4)

Date : 20-2-2015

No.	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Avg:
1	18:30	61.4	62.4	57.7	57.4	73	69.1	59	75.5	71.6	74	71.8	71.5	73.9	61.3	60.9	1000.5	66.7
2	19:30	51.7	50.6	50.5	50.8	50.9	51.1	51.4	51	51.2	50.8	51.2	50.8	50.5	50.3	50.4	763.2	50.88
3	20:30	54.1	55.6	55.1	54.9	54.5	54.1	53.4	53.3	53.2	53	53.3	53	53.3	53	52.8	806.6	53.77333
4	21:30	53.4	53.7	53	53.1	53.3	52.8	53.9	53.5	53.9	53.4	54	54.4	53.4	53.3	53.4	802.5	53.5
5	22:30	49.4	49.6	50	49.6	49.4	49.1	49.5	49.3	48.9	49	49.3	49.2	48.9	49.1	49.2	739.5	49.3
6	23:30	48.9	49.2	48.7	48.5	48.7	48.8	48.9	49	49.3	49.1	48.6	49	48.5	48.4	48.8	732.4	48.82667
7	0:30	58	50.5	51	51.7	50.7	50.9	50.4	50.7	50.9	51.7	51.5	51	55.2	52.6	50.7	777.5	51.83333
8	1:30	48.3	48.6	48.5	48.9	48.7	49	49.2	48.9	48.8	49	49.2	48.8	48.9	48.8	49.1	732.7	48.84667
9	2:30	57.3	50.2	55.2	52	51.9	51.6	52.3	51.7	52.7	51.9	52.3	52.2	52.5	52.3	51.9	788	52.53333
10	3:30	51.4	61.9	52.1	44.6	42.5	33.3	31.6	31.4	32.3	31.5	32.5	31.7	44.9	33.2	31.2	586.1	39.07333
11	4:30	38.8	37.9	34.1	35.6	42.2	40.9	41.6	48.2	46.5	45.8	58.2	48.4	44.7	39.3	43.4	645.6	43.04
12	5:30	43.2	39.2	33.4	35.3	31.4	31.3	31.2	31.3	39.6	31	31.4	31.6	36.7	37.9	31.2	515.7	34.38
13	6:30	48.5	44.2	41.5	43.7	51.6	52.4	58	62.5	60.4	46.4	47.2	40.8	50.3	49.9	54.2	751.6	50.10667
14	7:30	58.3	51.7	51.9	51.3	50.8	52.5	50.3	52.3	50.2	50.1	50.7	51.5	50.3	50.2	50.3	772.4	51.49333
15	8:30	53.2	54	53.6	53.5	53.4	53.5	52.9	53.6	54	53.3	53.6	53.9	54	53.8	53.5	803.8	53.58667
16	9:30	56.5	56.7	57.3	57.4	58.1	57.6	57.2	58.6	59.9	59.6	59.3	58.8	59.9	60.1	59.6	876.6	58.44
17	10:30	53.4	52.7	53.8	53.4	53.5	53.6	54.4	54.9	55	54.1	54.4	54.7	54.5	54.2	55.7	812.3	54.15333
18	11:30	53.7	53.5	53.6	53.9	53.1	53.2	53.4	54.6	54.3	55.6	54.6	54.1	54.4	54.1	54.5	810.6	54.04
19	12:30	57.7	57.5	57.1	57	55.5	55.9	55.4	55.1	54.5	54.3	54.6	54.7	54.4	54.3	54.4	832.4	55.49333
20	1:30	57	55.1	53.4	54.6	55.6	53.1	53.9	54.6	54.4	53.1	54.5	53.9	53.5	53.7	54.4	814.8	54.32
21	2:30	54.5	55.1	53.7	53.9	53.6	53.3	55.7	54.1	53.2	53.6	52.1	54.5	55.4	56.1	55.1	813.9	54.26
22	3:30	59.7	57.5	50.2	50.4	53.1	51.9	51.7	52.8	53.7	54.8	58.8	52.5	50.3	49	49.5	795.9	53.06
23	4:30	41	40.4	41	39.1	39.5	39.1	42.3	43.3	43.6	42.8	41.2	40.8	41.5	40.1	40	615.7	41.04667
24	5:30	43.2	45.5	44.8	44.1	44.4	43.5	44.9	43	42.2	41.9	46.8	42.2	41	41.9	43.7	653.1	43.54

APPENDIX 5: METEOROLOGY AND HYDROLOGY DATA

DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION :MINBU YEAR : 2014

DAILY WIND SPEED(m.p.h.) AT (18:30)hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.0	1.2	1.2	2.4	1.2	2.4	2.4	1.2	0.0	0.0	1.2	0.0
2	1.2	1.2	1.2	1.2	0.0	2.4	0.0	1.2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	1.2	2.4	2.4	1.2	0.0	1.2	0.0	1.2	0.0
4	1.2	1.2	1.2	2.4	2.4	2.4	0.0	1.2	1.2	0.0	1.2	0.0
5	0.0	1.2	1.2	1.2	2.4	1.2	1.2	0.0	0.0	0.0	1.2	0.0
6	1.2	1.2	1.2	1.2	0.0	0.0	1.2	1.2	0.0	0.0	1.2	0.0
7	0.0	0.0	1.2	2.4	2.4	1.2	1.2	0.0	0.0	1.2	0.0	0.0
8	1.2	0.0	1.2	2.4	2.4	1.2	1.2	0.0	0.0	0.0	1.2	0.0
9	1.2	1.2	1.2	1.2	2.4	1.2	1.2	1.2	0.0	1.2	0.0	0.0
10	0.0	0.0	1.2	2.4	2.4	1.2	1.2	0.0	0.0	1.2	0.0	0.0
11	1.2	1.2	2.4	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0
12	0.0	2.4	1.2	1.2	0.0	1.2	0.0	0.0	0.0	0.0	1.2	0.0
13	0.0	2.4	1.2	2.4	1.2	1.2	0.0	0.0	0.0	1.2	0.0	0.0
14	1.2	1.2	0.0	1.2	2.4	1.2	1.2	0.0	1.2	0.0	1.2	0.0
15	1.2	1.2	1.2	1.2	1.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0
16	1.2	2.4	0.0	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	2.4	1.2	1.2	2.4	1.2	0.0	0.0	1.2	0.0	1.2	0.0
18	0.0	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.0	1.2	0.0	1.2
19	1.2	1.2	1.2	1.2	2.4	0.0	1.2	0.0	1.2	0.0	0.0	0.0
20	1.2	1.2	1.2	1.2	2.4	0.0	1.2	0.0	0.0	0.0	0.0	0.0
21	1.2	1.2	2.4	1.2	1.2	0.0	1.2	0.0	1.2	0.0	0.0	1.2
22	0.0	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	1.2
23	1.2	1.2	1.2	0.0	1.2	0.0	1.2	0.0	0.0	0.0	0.0	0.0
24	0.0	1.2	1.2	0.0	1.2	1.2	1.2	0.0	0.0	1.2	0.0	0.0
25	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	0.0	0.0	1.2	0.0
26	1.2	1.2	1.2	2.4	2.4	0.0	1.2	0.0	0.0	0.0	1.2	1.2
27	0.0	0.0	1.2	2.4	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0
28	0.0	1.2	2.4	2.4	1.2	0.0	0.0	0.0	0.0	1.2	0.0	1.2
29	0.0		1.2	2.4	1.2	1.2	1.2	0.0	0.0	1.2	1.2	1.2
30	1.2		1.2	2.4	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0
31	0.0		2.4		1.2		1.2	0.0		1.2		1.2

12.5.15

အိအိဖင်

ဦးစီးအရာရှိ

မိုးလေဝသနှင့်ဇလဗေဒညွှန်ကြားမှုဦးစီးဌာန

DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION :MINBU YEAR : 2014

DAILY WIND DIRECTION AT (09:30)hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	SE	SE	NE	NW	NW	NE	NW	NW	NW	NW	SE	SE
2	SE	W	SE	NE	NE	NE	N	NW	NW	NW	SE	E
3	SE	Calm	SE	NE	NE	NE	SE	NW	Calm	NE	SE	SE
4	SE	SE	SE	SE	NE	NE	N	NW	Calm	NE	E	SE
5	SE	NE	NE	SW	NE	NW	SW	NW	NW	NE	NE	SE
6	Calm	E	SE	NW	SW	NE	NW	NW	NW	SE	NE	Calm
7	SE	SW	NE	NW	NE	NE	NW	NW	NW	NW	NW	SE
8	SE	SE	NE	NE	NW	NW	NW	N	NE	SE	NW	Calm
9	Calm	SE	SE	NW	E	NW	NE	NW	NW	SE	NW	Calm
10	Calm	E	SE	NE	NW	NE	SE	NW	NW	SE	NE	Calm
11	Calm	SE	NE	E	NE	N	NE	NW	NW	SE	NE	E
12	SE	NE	SW	E	NW	NW	NW	NW	NE	NE	NE	Calm
13	SE	NW	SE	SE	NE	NE	NE	NE	NE	Calm	E	E
14	SE	NE	SE	E	NE	NE	NE	NW	NE	Calm	SE	Calm
15	SE	NE	SE	SE	NE	N	NW	NW	NE	NE	NE	SE
16	SE	NE	SW	NE	NE	NW	NE	NW	NE	E	NE	Calm
17	SE	NE	SE	NW	NE	NE	NE	NW	NE	NE	E	Calm
18	SE	NW	NW	NE	E	NW	NW	NE	NW	SE	SE	Calm
19	E	SE	NW	NE	NE	NW	NW	Calm	NW	NE	SW	SE
20	SE	SE	SE	NE	NE	NW	NE	NW	NE	Calm	SE	SE
21	S	SE	SE	SW	SE	N	NE	NW	NE	NE	SE	SE
22	E	NE	SW	NE	N	NE	NW	NE	NE	S	SE	SE
23	SE	SE	SE	NE	NW	NW	NW	NW	Calm	SE	Calm	SE
24	NW	SE	SE	NE	NE	NE	NE	NW	NE	SE	SE	E
25	Calm	NW	N	NW	NE	NE	NE	NW	NE	SE	NE	E
26	SE	NE	SE	NE	NE	NW	NE	NE	Calm	SE	E	Calm
27	Calm	SE	SE	NE	NW	NW	NE	NE	NE	SE	SE	SE
28	SE	E	SE	NE	NE	NE	NE	Calm	NE	S	SE	SE
29	SE		NE	NE	N	NW	NW	NW	E	SE	SE	E
30	E		NW	NW	NE	NW	NE	NW	NE	SE	SE	SE
31	SE		N		NE		NW	NW		SE		SE

12.5.15

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မိုးလေဝသနှင့်ဇလဗေဒညွှန်ကြားမှုဦးစီးဌာန

DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION :MINBU

YEAR : 2014

DAILY WIND SPEED(m.p.h.) AT (09:30)hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
2	1.2	1.2	1.2	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2
3	1.2	0.0	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2	1.2
4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2	1.2
5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
6	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
9	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
10	0.0	1.2	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2	0.0
11	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
12	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
13	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2
14	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	0.0
15	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
16	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
17	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
18	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0
19	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2	1.2	1.2
20	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2
21	1.2	1.2	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2	1.2
22	1.2	1.2	1.2	1.2	2.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2
23	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	0.0	1.2
24	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
25	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
26	1.2	1.2	1.2	1.2	1.2	2.4	1.2	1.2	0.0	1.2	1.2	0.0
27	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
28	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.0	1.2	1.2	1.2	1.2
29	1.2		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
30	1.2		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
31	1.2		2.4		1.2		1.2	1.2		1.2		1.2

12.5.15

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ဦးစီးအရာရှိ

မိုးလေဝသနှင့်ဇလဗေဒညွှန်ကြားမှုဦးစီးဌာန

DEPARTMENT OF METEOROLOGY AND HYDROLOGY

STATION :MINBU YEAR : 2014

DAILY WIND DIRECTION AT (18:30)hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	Calm	SE	NE	N	NE	NE	SE	NE	Calm	Calm	SE	Calm
2	SE	SE	S	E	Calm	NE	Calm	NE	Calm	Calm	Calm	Calm
3	Calm	Calm	Calm	SE	W	NE	NE	Calm	NW	Calm	SE	Calm
4	SE	E	SE	W	NE	NE	Calm	NE	NE	Calm	NE	Calm
5	Calm	E	SE	E	NW	NE	SE	Calm	Calm	Calm	N	Calm
6	S	W	E	W	Calm	Calm	NE	NE	Calm	Calm	NW	Calm
7	Calm	Calm	SE	NE	NE	NE	NE	Calm	Calm	NE	Calm	Calm
8	S	Calm	SE	NE	NE	NE	NW	Calm	Calm	Calm	NW	Calm
9	SE	E	SE	SW	N	E	NE	NE	Calm	SE	Calm	Calm
10	Calm	Calm	E	NE	NW	N	NE	Calm	Calm	NE	Calm	Calm
11	SE	E	SE	E	N	N	N	Calm	Calm	Calm	Calm	Calm
12	Calm	NE	E	E	Calm	NW	Calm	Calm	Calm	Calm	NE	Calm
13	Calm	NW	E	NE	NW	NE	Calm	Calm	Calm	E	Calm	Calm
14	S	SE	Calm	SE	N	N	NW	Calm	NE	Calm	SE	Calm
15	SE	NE	E	NE	N	Calm	Calm	NE	Calm	Calm	Calm	Calm
16	E	NE	Calm	NE	NE	NE	Calm	Calm	Calm	Calm	Calm	Calm
17	Calm	NW	NE	NE	NE	N	Calm	Calm	SE	Calm	SE	Calm
18	Calm	E	N	NE	NE	E	NE	Calm	Calm	NE	Calm	SE
19	E	SE	SE	E	N	Calm	N	Calm	NE	Calm	Calm	Calm
20	SE	E	SE	W	NE	Calm	NW	Calm	Calm	Calm	Calm	Calm
21	E	NE	NW	NE	NE	Calm	NE	Calm	NE	Calm	Calm	SE
22	Calm	E	N	E	NW	NE	N	Calm	Calm	Calm	Calm	SE
23	W	NE	SE	Calm	E	Calm	NE	Calm	Calm	Calm	Calm	Calm
24	Calm	SE	E	Calm	NE	N	NE	Calm	Calm	SE	Calm	Calm
25	S	SE	SE	E	NE	NE	N	Calm	Calm	Calm	NE	Calm
26	W	E	E	SE	W	Calm	NE	Calm	Calm	Calm	SE	SE
27	Calm	Calm	SE	NE	NW	N	NW	NW	Calm	Calm	Calm	Calm
28	Calm	NE	SE	NW	NE	Calm	Calm	Calm	Calm	SE	Calm	SE
29	Calm		W	NW	E	NE	N	Calm	Calm	S	SE	SE
30	E		N	NW	NE	NE	Calm	Calm	Calm	Calm	Calm	Calm
31	Calm		N		NW		NE	Calm		SE		NE

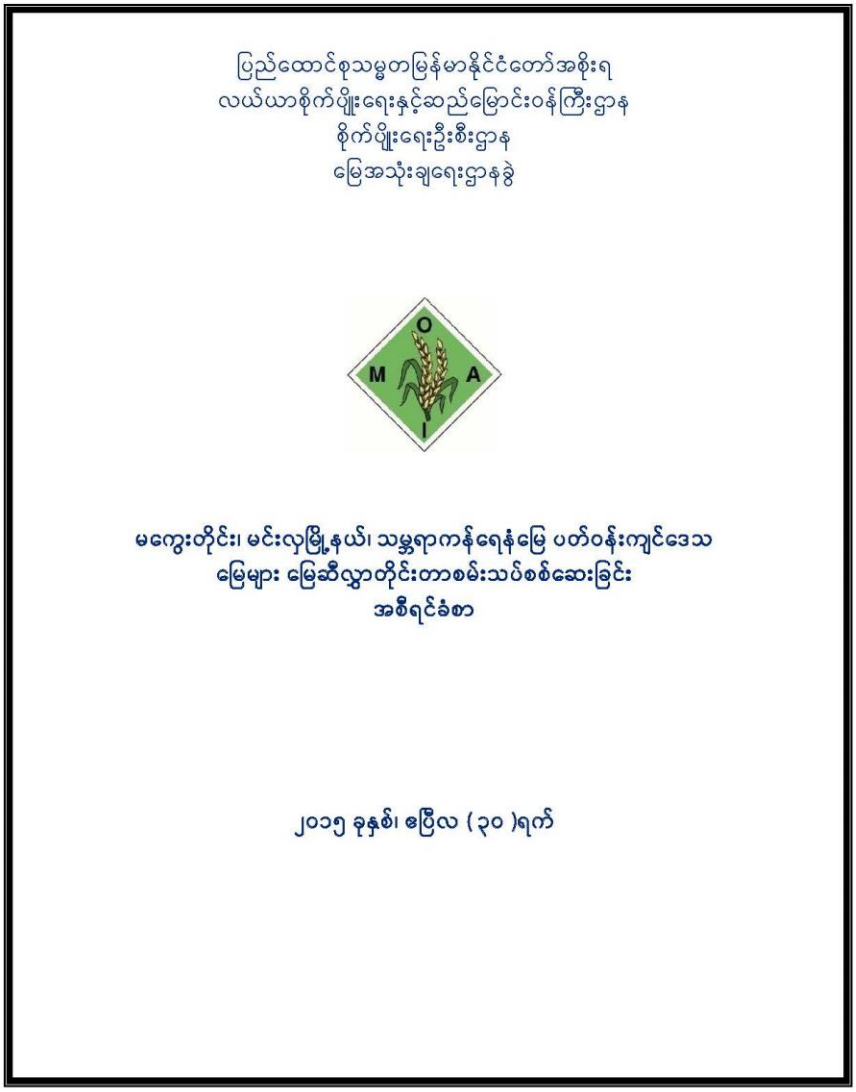
12.5.15

အိအိဝင်

ဦးစီးအရာရှိ

မိုးလေဝသနှင့်လေဗေဒညွှန်ကြားမှုဦးစီးဌာန

APPENDIX 6: REPORT ON SOIL TESTS OF SURROUNDING LAND



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
လယ်ယာစိုက်ပျိုးရေးနှင့်ဆည်မြောင်းဝန်ကြီးဌာန
စိုက်ပျိုးရေးဦးစီးဌာန
မြေအသုံးချရေးဌာနခွဲ

O
M A
I

မကွေးတိုင်း၊ မင်းလှမြို့နယ်၊ သမ္ဘရာကန်ရေနံမြေ ပတ်ဝန်းကျင်ဒေသ
မြေများ မြေဆီလွှာတိုင်းတာစမ်းသပ်စစ်ဆေးခြင်း
အစီရင်ခံစာ

၂၀၁၅ ခုနှစ်၊ ဧပြီလ (၃၀)ရက်

မာတိကာ

မကွေးတိုင်း၊ မင်းလှမြို့နယ်၊ သမ္ဘာရာကန်ရေနံမြေပတ်ဝန်းကျင်ဒေသ မြေဆီလွှာတိုင်းတာစမ်းသပ်ခြင်းလုပ်ငန်းအစီရင်ခံစာ

၁။ နိဒါန်း

မြန်မာနိုင်ငံသည် စိုက်ပျိုးရေးကို အခြေခံသောနိုင်ငံဖြစ်ပါသည်။ နိုင်ငံတော်၏ စိုက်ပျိုးရေး ကဏ္ဍဖွံ့ဖြိုး တိုးတက်ရေးလုပ်ငန်းများ အရေးကြီးသကဲ့သို့ သယံဇာတအရင်းအမြစ်များဖြစ်သော ရေနံ၊သဘာဝ ဓါတ်ငွေ့၊ သတ္တုတူးဖော်ခြင်းစသော လုပ်ငန်းများသည်လည်း တိုင်းပြည်၏ အရေးကြီးသော လုပ်ငန်း များ ဖြစ်ပါသည်။ ထို့ကြောင့် စိုက်ပျိုးလယ်မြေများနှင့် ဆက်စပ်နေသော စက်ရုံ၊ အလုပ်ရုံများ ပတ်ဝန်းကျင်တွင် မြေ၊ ရေ၊လေ စသော သဘာဝပတ်ဝန်းကျင်များ ထိခိုက်မှုရှိ/မရှိ စမ်းသပ်တိုင်းတာ ရန် လုပ်ငန်းသည် အရေးကြီးသော လုပ်ငန်းတခုဖြစ်၍ နိုင်ငံတကာ မှ ဆောင်ရွက်နေသော လုပ်ငန်းတခုလည်းဖြစ်ပါသည်။ သို့ပါ၍ မြေဆီလွှာများ တိုင်းတာ၍ ဓါတ်ခွဲစမ်းသပ်ပေးရန် လုပ်ငန်း တောင်းဆိုမှုအရ စိုက်ပျိုးရေးဦးစီးဌာန (မြေအသုံးချရေးဌာနခွဲ) ကွင်း ဌာနစုမှ ဦးသန်းဌေး (ဦးစီးမှူး)နှင့် အဖွဲ့သည် (MSR Myanmar survey Research) မှ အဖွဲ့များနှင့် အတူ မကွေးတိုင်း၊ မင်းလှမြို့နယ်၊ သမ္ဘာရာကန်ရေနံမြေ ပတ်ဝန်းကျင်မှ ချောင်း၊ မြောင်း၊ ရေဆိုးမြောင်း၊ ဆိပ်ကမ်းနှင့် လယ်ယာများမှ မြေများကို မြေနမူနာတူး၍ အလွှာအလိုက်ဓါတ်ခွဲရန် ကွင်းဆင်း မြေနမူနာယူခြင်း လုပ်ငန်းများကို ၂၀၁၅ ခုနှစ်၊ ဖေဖော်ဝါရီလ ဒုတိယအပတ်အတွင်း ဆောင်ရွက်ခဲ့ ပါသည်။

၂။ ကွင်းဆင်းဆောင်ရွက်မှု

ကွင်းဆင်းဆောင်ရွက်ရန် ((MSR Myanmar survey Research) (E.I.A Co.,Ltd) မှ စီစဉ်ပေး၍ မြေဆီလွှာများကို အလွှာအလိုက် မြေကျင်းများတူး၍ မြေဆီလွှာဖြစ်စဉ် များကို လေ့လာမှတ်တမ်းယူခြင်း၊ မြေ၏ ရူပဂုဏ်သတ္တိများကို မှတ်တမ်းရေးသားခြင်း၊ မြေ၏ Nutrients များကို အန္တရာယ်ပေးနိုင်သော ဓါတ်သတ္တု Heavy Metal များ စမ်းသပ်ခြင်းတို့ကို အခြေခံ၍ အစီရင်ခံစာ အပြည့်အစုံရေးသား ဆောင်ရွက်ပါသည်။

၃။ မြေဆီလွှာစမ်းသပ်တိုင်းတာသော ရည်ရွယ်ချက်များ

(၁) မင်းလှမြို့နယ်၊ သမ္ဘာရာကန်ရေနံမြေရှိ မြေဆီလွှာများကို စမ်းသပ်တိုင်းတာ၍ မြေ၏ မူလရှိရင်းစွဲအာဟာရဓါတ်များ သိရှိနိုင်ရန်။

(၂) မြေဆီလွှာများကို ဓါတ်ခွဲစမ်းသပ်ပြီး သီးနှံအာဟာရဓါတ်များ လိုအပ်ချက်များကို အကြံပြုနိုင်ရန်။

(၃) မြေဆီလွှာများ၏ ရူပလက္ခဏာ (morphology) (Physical) အခြေအနေများ နှင့် ဓါတ်ခွဲအဖြေများကို လေ့လာသုံးသပ်၍ မြေမျိုးမြေပုံရေးဆွဲခြင်း၊ မြေဆီလွှာဆိုင်ရာ အကြံပြုသုံးသပ်ချက်များ ရေးသားခြင်း။

(၄) မြေဆီလွှာများ၏ လူနှင့်အပင်များအန္တရာယ်ပေးနိုင်သော ဓါတ်များရှိ/မရှိ သိရှိနိုင်ရန် နှင့် သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုများရှိ/မရှိ သိရှိနိုင်ရန်တို့ဖြစ်ပါသည်။

၄။ မြေဆီလွှာစမ်းသပ်တိုင်းတာသောနည်းစနစ်များ

စိုက်ပျိုးရေးဦးစီးဌာန (မြေအသုံးချရေးဌာနခွဲ)အနေဖြင့် ရုရှားမြေဆီလွှာသိပ္ပံ ပညာရှင်များ လုပ်ကိုင် ဆောင်ရွက်သည့် နည်းစနစ်နှင့် (F.A.O/ UNESCO)နည်းစနစ်များကို အခြေခံ၍ မြေဆီလွှာ တိုင်းတာစစ်ဆေးပါသည်။

မြေဆီလွှာတိုင်းတာစစ်ဆေးရာတွင် Physical Properties များဖြစ်သော Colour, Texture, Structure, Moisture, Hardness, Drainage, Inclusion, New Formation စသည်တို့ကို မှတ်တမ်းတင်၍ ရုရှားမြေမျိုးစနစ် (မြန်မာပြည်မြေမျိုး)များ အသုံးပြု၍ မြေမျိုးအမည် ပေးပါသည်။ F.A.O မြေမျိုးများနှင့်လည်း ဖော်ပြထားပါသည်။

မြေမျိုးသတ်မှတ်ရာတွင် မြေဆီလွှာအလွှာများ၏ ဂုဏ်သတ္တိများအပေါ်တွင် အခြေခံ၍ ဆန်းစစ်ခွဲခြား လွှာများကို ခေါ်ဆိုသတ်မှတ်ပါသည်။ ဂုဏ်သတ္တိများသည် မြေဆီလွှာဖြစ်စဉ်များအရ ပေါ်ပေါက်ခြင်း သာဖြစ်ပြီး မြေဆီလွှာဖြစ်စဉ်များကို ကြိုတင်ခန့်မှန်း၍ အမျိုးအမည်ပေးခြင်း မဟုတ်ဘဲ မျက်စေ့ဖြင့် မြင်တွေ့တိုင်းတာနိုင်သော ကွဲပြားသည့် မူသတ်မှတ်ချက်များအရ မြေမျိုး အမည်ပေးခြင်းဖြစ်ပါသည်။ မြေဆီလွှာတစ်လက်မဖြစ်ပေါ်ရန် နှစ်သန်းထောင်နှင့်ချီ၍ ကြာတတ်ပြီး မြေဆီလွှာပြုန်းတီးရန်မှာ လူတို့၏ အသုံးပြုမှု မမှန်ကန်မှုများကြောင့် နှစ်အနည်းငယ်အတွင် ပျက်စီး ဆုံးရှုံးနိုင်ပါသည်။

၅။ ပထဝီဝင်ဆိုင်ရာ အချက်အလက်များ

မြေဆီလွှာစမ်းသပ်တိုင်းတာသော နေရာများသည် အပူပိုင်း၊ မိုးနည်းဒေသတွင် ပါဝင်သော မိုးရေချိန် လက်မပျမ်းမျှ (၃၀") အောက်ရှာသွန်းသော နေရာများဖြစ်ပါသည်။ သဘာဝပေါက်ပင်များ အနေဖြင့် ဆူးပါသော အပင်များပေါက်ရောက်၍ ထနောင်း၊ ရှား၊ ကန္တာရ၊ ထန်း၊ ဇီး၊ ဒဟတ်၊ မိုးနှံ သီးနှံပင် စသည်များ ပေါက်ရောက်ပါသည်။

မြေမျက်နှာပြင်အနေအထားမှာ လှိုင်းထကုန်းကြောသဏ္ဌာန် (Undulating Land Form) ဖြစ်ပါသည်။ Slope % 0 - 5% ခန့်ရှိပြီး မတ်စောက်မှုမရှိပါ။ ယာသီးနှံစိုက်ရာ ဒေသဖြစ်ပါသည်။

မင်းလှမြို့နယ်၊ သမ္ဘရာကန် ရေနံမြေပတ်ဝန်းကျင်တွင် မြေနမူနာယူခဲ့သောနေရာများ

Sr No.	Profile No	Soil depth & Layer	Location Lat : log	Soil name
1	SQ -1	A (0- 15")	N 19° 59′ 07.6" E 94° 59′ 19.1" တံတားအောက်	Young Alluvial Soil
2	SQ - 2	A (0 -15")	N 19° 59′ 07.6" E 94° 59′ 19.1" ချောင်းကောက်ချောင်း တံတား(ကားလမ်း)	″
3	SQ-3	A(0 - 20")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil
4		B(20- 30")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil

5		C(30 -39")	N 19° 59′ 24.3" E 94° 59′ 32.5"	Old Alluvid Soil
6	SQ -5	A(0 - 12")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
7	SQ -5	B(12- 20")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
8	SQ -5	B(20-35")	N 19° 59′ 51.2" E 94° 00′ 09.5"	Gravelly Eroded Red Brown Savanna Soil
9	SQ -6	(0 -15")	N 19° 58′ 38.8" E 94° 00′ 17.8"	Gravelly Eroded Red Brown Savanna Soil
10	SQ -7	A (0- 12")	N 19° 58′ 46.8" E 95° 00′ 26.4"	Red Brown Savanna Soil
11	SQ - 8	A (0 -12")	N 19° 58′ 37.3" E 94° 00′ 32.1"	Red Brown CompactSavanna Soil

Sr No.	Profile No	Soil depth & Layer	Location Lat : log	Soil name
12	SQ -9	A(0 - 12")	N 19° 58′ 22.0" E 95° 00′ 40.8"	Red Brown Compact Savanna Soil
13	SQ -10	A(0 - 12")	N 19° 58′ 26.9" E 95° 00′ 36.7"	Red Brown Compact Savanna Soil
14	SQ -11	A(0 -19")	N 19° 57′ 29.0" E 94° 59′ 32.5"	Yellow Brown Savanna Soil
15	SQ -12	A (0- 20")	N 19° 57′ 23.6" E 95° 00′ 27.1"	Reddiah Brown Savanna Soil
16	SQ -13	A(0 - 10")	N 19° 57′ 17.9" E 95° 00′ 28.6"	Yellow Brown Savanna Soil
17	SQ -13	B(10- 18")	N 19° 59′ 51.2" E 94° 00′ 09.5"	〃
18	SQ -13	C(18-32")	N 19° 59′ 51.2" E 94° 00′ 09.5"	〃
19	SQ -14	(0 -10")	N 19° 57′ 14.4" E 95° 00′ 33.4"	Red Brown Compact Savanna Soil

20	SQ-15	A(0 -12")	N 19° 57′ 26.7" E 95° 00′ 47.0"	Yellow Brown Savanna Soil
21	SQ -16	A (0- 15")	N 19° 57′ 28.1" E 95° 00′ 36.7"	Gravelly Red Brown Savanna Soil
22	SQ - 17	A (0 -19")	N 19° 57′ 29.3" E 95° 00′ 31.2"	Yellow Brown Savanna Soil
23	SQ -18	A(0 - 12")	N 19° 58′ 40.0" E 95° 01′ 42.2"	Gravelly Red Brown Savanna Soil
24	SQ -19	A(0 - 20")	N 19° 58′ 18.5" E 95° 00′ 22.4"	Brown Compact Savanna Soil
25	SQ -20	A(0 -12")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil
26	SQ -20	B (12- 35")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil

Sr No.	Profile No	Soil depth & Layer	Location Lat : log	Soil name
27	SQ -20	C (35 - 42")	N 19° 58′ 12.0" E 95° 01′ 29.9"	Meadowish Slightly Compact Soil
28	SQ -21`	A (0 -20 ")	N 19° 58′18.5" E 95° 00′28.4"	〃
29	SQ -22	A (0 -20 ")	N 19° 57′04.1" E 95° 01′56.7"	〃

၆။ မြေဆီလွှာများ၏ ဂုဏ်သတ္တိများ

မင်းလှမြို့နယ်၊ သမ္ဘရာကန် ရေနံမြေပတ်ဝန်းကျင်ရှိ စိုက်ပျိုးမြေများတွင် ချောင်းကောက်ချောင်း၊ စက်ရုံနယ်မြေနှင့် စက်ရုံနှင့် ကပ်နေသော ကော (၂၀၀) ရှိသော ယာကွက်များနှင့် သင်္ဘောဆိပ် (Jetty) တွင် မြေကျင်းများနေရာအနှံ့တူး၍ မြေနမူနာများယူ၍ မြေဆီလွှာစမ်းသပ် တိုင်းတာခဲ့ပါသည်။ မြေဆီလွှာအမျိုးအစား အဓိကမြေမျိုး (Main Type) အနေဖြင့် (၃) မျိုး တွေ့ရှိရပြီး (Sub Type) မြေမျိုးကွဲများအဖြစ် အောက်ပါအတိုင်း ခွဲခြားတွေ့ရှိရပါသည်။

(၁) နှုန်းမြေ (Alluvial Soil)
(F.A.O soil name) Fluvisols

(၂) မြေနီသဲဝန်း (Red Brown Savanna Soil) (F.A.O soil name) Luvisols

(၃) မြေဝါသဲဝန်း (Yellow Brown Savanna Soil) (F.A.O soil name) Savanna
(၄) ကျောက်ခဲရောမြေဝါသဲဝန်း (Gravelly Red Brown Savanna Soil) Savanna
(၅) ကျောက်ခဲရောမြေနီသဲဝန်း (Gravelly Yellow Brown Savanna Soil) Savanna
(F.A.O soil name)
(၆) လယ်မြေဆန်စနယ်ကြွပ်တီးမြေများ
Meadowish Compact Soil (F.A.O soil name)
(၇) စနယ်ကြွပ်တီးမြေများ
Compact Soil (F.A.O soil name) Vertisols
(၈) သဲရောစနယ်မြေများ (Compact Savanna Soil) Vertisols

(၁) နှုန်းမြေ (Alluvial Soil)

Fluvisol

ဤမြေများကို ချောင်းကောက်ချောင်းအတွင်း တံတားပတ်ဝန်းကျင်တွင် တွေ့ရပြီး ကျောက် စရစ်ခဲများ၊ သဲကြမ်း (Coarse Sand) များရှိနေပြီး မြေသားနည်းပါးစွာတွေ့ရသော သက်တမ်းနု နုန်းမြေ (Young Alluvial Soil)များနှင့် ချောင်းပတ်ဝန်းကျင်ယာကွက်များတွင် သက်တမ်း ရင့်နုန်းမြေ (Old Alluvial Soil) များအဖြစ်တွေ့ရှိရပါသည်။ သက်တမ်းနုမြေများတွင် နုန်းရာခိုင်နှုန်းများသော မြေများတွင် စိုက်ပျိုးရေးအတွက်ကောင်းပြီး မြစ်ကြီးများချောင်းကြီးများ၏ ရွှံ့နုန်းများသည် စိုက်ပျိုးရေးအတွက်ကောင်းမွန်သော်လည်း သဲနုန်းနှင့် ကျောက်စရစ်ခဲနှင့် သဲများသော နုန်းမြေများသည် စိုက်ပျိုး၍မရနိုင်ပါ။ ဤမြေများ၏ ခါတ်ခွဲစမ်းသပ်မှုများအရ အောက်ပါအတိုင်း တွေ့ရှိရပါသည်။ ဤမြေမျိုးတွင် မြေကျင်းနံပါတ် SQ-1, SQ-2, SQ-3 များတူး၍ ခါတ်ခွဲစမ်းသပ် ထားပါသည်။

မြေ၏သဲနုန်းမြေစေးပါဝင်မှု

Soil Texture	Sand, Coarse sand သဲ ၊ သဲကြမ်း
Soil structure	Structureless မြေစိုင်ခဲဖွဲ့စည်းမှုမရှိ
မြေချဉ်ငံကိန်း pH	pH ချဉ်ငံကိန်း(Moderately Alkaline)
N_2 နိုက်ထြိုဂျင်ခါတ်	နည်း (Low)
P_2O_5 ဖော့စဖရပ်ခါတ်	နည်း (Low)
K_2O ပိုတက်ဆီယမ်ခါတ်	နည်း (Low)
သစ်ဆွေးခါတ် Humus	အလွန်နည်း (very low) ၊ နည်း (low)
Organic Carbon	နည်း (Low)
ကယ်လ်စီယမ် Ca^{++}	များ (High)
မဂ္ဂနီစီယမ် Mg^{++}	နည်း (Low)
ပိုတက်ဆီယမ် K^{+}	များ (High)
အလူမီနီယမ် Al^{+++}	နည်း (Low)
ဟိုက်ဒြိုဂျင် H^{+}	Not detected
ဆိုဒီယမ် Na^{+}	Not detected

C.E.C	နည်း (Low)

မြေတွင်ပျော်ဝင်နေသော ဓါတ်ဆားများ(Soluble Salts) ၏ ဓါတ်ခွဲစမ်းသပ်မှုများမှာ

EC	Very Low (ဆား/ဆပ်ပြာပေါက်မှုမရှိ)
TDS	နည်းစုစုပေါင်းရေပျော်ဆားပါဝင်မှုနည်း
SAR	Not detected (မတွေ့ရပါ။)
RSC	Not detected (မတွေ့ရပါ။)
Dorminant Salts	$Ca(HCO_3)_2$ (ကယ်လ်ဆီယမ်ဘိုင်ကာဘွန်နိတ်)

Plant Protection (PP) ဌာနမှ ဓါတ်ခွဲတွေ့ရှိရသော လူ၊ အပင်တို့အတွက် အန္တရယ်ပေးနိုင် သော Heavy Metal များမှာ

Mercury (Hg)	အလွန်များ (Maximum Permitted Level) ထက်များစွာကျော်နေပါသည်။)
Lead (Pb)	နည်း
Arsenic(အာဆင်းနစ်)	Not detected (စမ်းသပ် မတွေ့ရပါ။)

(၂+၃)မြေနီသဲဝန်း၊ မြေဝါသဲဝန်း

Red Brown Savanna & Yellow Brown Savanna Soils

မြေနီသဲဝန်းနှင့်မြေဝါသဲဝန်းများကို သမ္မာရာကန်ရေနံမြေဝန်ထမ်း အိမ်ယာများ၏ တောင်ဘက်တွင် တွေ့ရပြီး EIA ကုမ္ပဏီမှ ဧက (၂၀၀) စိုက်ကွက်များဟု ဖော်ပြထားသောနေရာများ ဖြစ်ပါသည်။ မြေမျက်နှာပြင်အနေအထားမှာ လှိုင်းထကုန်းကြောမြေများဖြစ်၍ ညီညာပြန့်ပြူးခြင်းမရှိပါ။ မြေနီ သဲဝန်း၊ မြေဝါသဲဝန်းဟု အရောင်လိုက်၍ ခွဲခြားထားသော်လည်း အပူပိုင်းဒေသမိုးနည်းရပ်ဝန်း၏ အရေးပါသော ယာသီးနှံအမျိုးအစားများ ဖြစ်ပါသည်။ ကျောက်ခဲများပေါ်နေသော၊ မြေနီမြေဝါနှင့် ကျောက်ခဲများရောနေသော ကျောက်ခဲရောမြေနီသဲဝန်းမြေများနှင့်လည်း တစ်ဆက်တည်းတွေ့မြင်ရ ပါသည်။ အစိုဓါတ်ရှိချိန်တွင် အထက်ဖော်ပြပါမြေများကို လယ်အပုပ်၊ ယာအသုတ် ဆိုသည့်စကား အတိုင်း မြန်မြန်ထွန်ယက်စိုက်ပျိုးရသောမြေများဖြစ်ပါသည်။

ဤမြေများသည် အပေါ်ယံမြေလွှာသည် ချဉ်ငံကိန်း pH မျှတပြီး အောက်လွှာများသည် အငန်ဓါတ်ပို၍ များပါသည်။ မြေ၏ pH မှာ Extremely Alkaline အလွန်ငန်သောအဆင့်ရှိ၍ ကယ်လ်စီယမ် နှင့် မဂ္ဂနီယမ်ဓါတ်များစွာ ပါဝင်ပြီး ပိုတက်ဆီယမ်ဓါတ်အသင့်အတင့်ပါ၍ သစ်ဆွေးဓါတ်နှင့် ကျန်သော ဓါတ်များနည်းပါသည်။ ဤမြေများသည် သဲဆန်သောကြောင့် အပေါ်ယံမြေလွှာများသည် ရေနှင့်လေ တို့တိုက်စားခြင်း (Soil erosion) ဖြစ်မှုများစွာခံရပြီး မြေများသည် နှစ်ပေါင်း များစွာမြေဆီလွှာ ပြုပြင်တိုးတက်ရန် မပြုလုပ်ဘဲ နှစ်စဉ်ထွန်ယက်စိုက်ပျိုးကြခြင်းကြောင့် မြောင်းငယ်အလိုက် တိုက်စား ခံရခြင်း (Rill erosion) ချောက်များဖြစ်၍ တိုက်စားခံရခြင်း (Gully Erosion) များ ဖြစ်နေမှုကိုတွေ့ရပါသည်။

ရာသီသီးနှံများနှင့်၊ ယာသီနှံများ စိုက်ပျိုးရေးအတွက်အရေးပါသောမြေများဖြစ်၍ သစ်စိမ်း မြေဩဇာ၊ မြေဆွေးထည့်ခြင်းတို့ကို ပြုလုပ်သင့်ပြီး မြေဆီလွှာတိုက်စားမှုကာကွယ်နည်းစနစ် (Soil Conservation) များပြုလုပ်ရန် လေကာပင် (Wind Break) များပြုလုပ်စိုက်သင့်ပါသည်။ မြေဆီလွှာဓါတ်ခွဲစမ်းသပ်မှုများကို အောက်တွင်ဖော်ပြထားပါသည်။

မြေတွင်သဲနုန်း၊ မြေစေးပါဝင်မှု

Soil Texture	Sandy Clay Loam (သဲမြေစေးသမ)
Soil structre	crumbly structure
မြေစိုင်ခဲတည်ဆောက်မှု	ကြွေမွလွယ်သောအခဲများ
မြေချဉ်ငန်ကိန်း (pH)	Extremely Alkaline (အလွန်အမင်းငန်)
နိုက်ထြိုဂျင်ဓါတ် (N_2)	နည်း (Low)
ဖော့စဖရပ်ဓါတ် (P_2O_5)	နည်း (Low)
ပိုတက်ဆီယမ်ဓါတ် (K_2O)	Medium (သင့်တင့်)
သစ်ဆွေးဓါတ် (Humus)	နည်း (Low)
Organic Carbon	နည်း (Low)
ကယ်လ်စီယမ် (Ca^{++})	များ(High)
မဂ္ဂနီစီယမ် (Mg^{++})	နည်းမှ သင့်တင့်
ပိုတက်ဆီယမ် (K^{+})	နည်း (Low)
အလူမီနီယမ် (Al^{+++})	Not detected (စမ်းသပ် မတွေ့ရပါ။)
ဟိုက်ဒြိုဂျင် (H^{+})	Not detected (စမ်းသပ် မတွေ့ရပါ။)
ဆိုဒီယမ် (Na^{+})	များ (5.29)
Caton Exchangeable Capacity	နည်း
(C.E.C) ဓါတ်ဖိုအိုင်ယွန်းဖလှယ်နိုင်စွမ်းအား	(Low မှ Medium)

မြေတွင် ပျော်ဝင်နေသော ဆားများပါဝင်မှု. ဓါတ်ခွဲတွေ့ရှိချက်

ဆိုဒီယမ်ဆားပါဝင်မှု	
Electrical Conductivity (E.C)	Low ရေပျော်ဆားပါဝင်မှုနည်း
TDS	Medium စုစုပေါင်းဆားဓါတ်များ၊ သင့်တင့်ရှိ
SAR	Low
RSC	Low
Dorminant Salt	$Na(HCO_3)_2$ ဆိုဒီယမ်ဘိုင်ကာဘွန်နိုတ်

(၄+၅) ကျောက်ခဲရောမြေဝါသဲဝန်းမြေနှင့် ကျောက်ခဲရော မြေနီသဲဝန်းမြေများ

Gravelly Yellow Brown Savanna & Gravelly Red Brown Savanna Soils

ဤမြေများကို သမ္မန်ရာကန် စက်ရုံဝန်ထမ်းအိမ်ယာများ၏ တောင်ဘက်ဧက (၂၀၀) ယာကွက်များတွင် တွေ့ရပြီး စက်ရုံနယ်မြေအတွင်း အခြားနေရာများတွင် လည်းတွေ့ရပါသည်။ ဤမြေများသည် မြေနီသဲဝန်း၊ မြေဝါသဲဝန်းမြေများနှင့် တဆက်တည်းတွေ့ရပြီး အများအားဖြင့် (Top Soil) အပေါ်ယံမြေများသည် လေနှင့် မိုးရေတို့၏ တိုက်စားမှုများကြောင့် မြေဆီလွှာပြုန်းတီမှုဖြစ်ပေါ်နေပြီး Eroded soil များဖြစ်ပါသည်။ N,P,K ဓါတ်များနည်းပါး၍ သစ်ဆွေးဓါတ်လည်းနည်းပါသည်။ မြေ၏ structure ခေါ် မြေစိုင်ခဲဖွဲ့စည်းမှုမှာ မာကြော၍ မြေနှင့် ကျောက်ခဲများရောနှောနေသော structure Less ပုံစံများဖြစ်ပြီး အတုံးအခဲများဆိုလျှင်လည်း ရေနှင့်ထိတွေ့သည်နှင့် လက်ချင်း ပျော်ဝင်သော (Fragile)ပုံစံများ ဖြစ်ပါသည်။ ဤမြေများကို

လှိုင်းထကုန်းကျောသဏ္ဍာန် (Undulating Land Form) များပေါ်တွင် တွေ့ရတတ်ပါသည်။ ခြောက်သွေ့သောဒေသ၏ အဓိက ယာစိုက်ပျိုးသော မြေများဖြစ်ပါသည်။

မြေဆီလွှာဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု

သဲနုန်း၊ မြေစေးပါဝင်မှု Soil Texture	Sandy Clay Loam (သဲမြေစေးသမ)
မြေစိုင်ခဲဖွဲ့စည်းမှု Soil structure	Unstable Structure
မြေ၏ချဉ်ငန်ကိန်း(pH)	(Moderately alkaline &Extremely Alkaline)
နိုက်ထြိုဂျင်ဓါတ်(N_2)	နည်း (low)
ဖော့စဖရပ်ဓါတ်(P_2O_5)	နည်း (low)
ပိုတက်စီယမ်ဓါတ်(K_2O)	Medium
သစ်ဆွေးဓါတ်(Humus)	Low
Organic carbon	Low
ကယ်စီယမ်ဓါတ်(Ca^{++})	များ (High)
မဂ္ဂနီစီယမ်ဓါတ်(Mg^{++})	0.68 - 0.25 နည်း(low)
ပိုတက်စီယမ်ဓါတ် (K^{+})	0.13 - 0.25 နည်း
အလူမီနီယမ်ဓါတ်(Al^{+++})	Not detected (စမ်းသပ် မတွေ့ရပါ)
ဟိုက်ဒြိုဂျင် (H^{+})	0.03
ဆိုဒီယမ်ဓါတ်(Na^{+})	5.29 - 9.21 (High)

ဓါတ်ဖိုအိုင်ယွန်းဖလှယ်နိုင်စွမ်းအား Cation Exchangable Capacity (C.E.C)	Medium to High
ဆားဓါတ်ပါတင်မှု Ec Electrical conductivity	Low to Medium နည်းမှ သင့်တင့်

မြေတွင် ပျော်ဝင်နေသော ဆားဓါတ်များဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု
(Soil Soluble salts)

Ec	Low (ဆား/ဆပ်ပြာပေါက်မှု မရှိပါ)
TDS	Medium (စုစုပေါင်းဆားဓါတ်သင့်တင့်ရှိ)
RSC	နည်း(low)
Dorminant Salt	

Plant Protection (PP) ဌာနမှ ဓါတ်ခွဲတွေ့ရသော အပင်နှင့် လူတို့အတွက် အန္တရာယ်ပေးနိုင်သော (Heavy Metal) များမှာ

Mercury (Hg)(ပြဒါးဓါတ်)	အလွန်များ(Maximum Permitted Level) ထက်များစွာ

ကျော်လွန်နေပါသည်။

Lead (Pb)(ခဲဓါတ်)	နည်း
Arsenic (AS)(အာဆင်းနစ်)	Not detected (စမ်းသပ် မတွေ့ရပါ)

(၆+၇) လယ်မြေဆန်စနယ်မြေကြြပ်တီးမြေများနှင့် စနယ်မြေစေး (Meadowish compact soil& compact soil) vertisols

လယ်မြေဆန်စနယ်မြေ၊ ကြြပ်တီးမြေများနှင့် စနယ်မြေစေးများကို မြေမျက်နှာပြင်ညီသော နိမ့်သော နေရာများတွင် တွေ့ရပြီး လယ်(စပါး)နှင့် ဟင်းသီးဟင်းရွက်၊ ကုလားပဲစိုက်ပျိုးသော မြေများ ဖြစ်ပြီး မြေစေးရာခိုင်နှုန်း (clay %) များသော မြေများဖြစ်ပါသည်။ ခြောက်သွေ့ချိန်တွင် အလွန်မာကြောပြီး စိုဓါတ်ချိန်တွင် အလွန်စေးကပ်သောမြေများဖြစ်ပါသည်။ စက်ရုံရေဆိုးမြောင်း ထန်းတောလယ်ကွက် နှင့် ရေဆိုးမြောင်း အနီးအနားတွင် တွေ့ရပြီး Profile No. 21,22 နေရာ များ ဖြစ်ပါသည်။

မြေဆီလွှာဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု

မြေ၏သဲနုန်း၊ မြေစေးပါဝင်မှု Soil Texture	မြေစေးသမ (clay loam)
မြေစိုင်ခဲတည်ဆောက်မှု Soil structure	အတုံးအခဲငယ်များ (Sub- angular Blocky)
မြေ၏ချဉ်နဲ့ကိန်း Soil pH	Slightly acid (6.17)
နိုက်ထြိုဂျင်ဓါတ်(N_2)	Medium (သင့်တင့်)
ဖော့စဖရပ်ဓါတ် (P)	နည်း (low)
ပိုတက်စီယမ်ဓါတ် (K_2O)	High (များ)
သစ်ဆွေးဓါတ် (Humus)	High (များ)
Organic Carbon	High (များ)
ကယ်လ်စီယမ် (Ca^{++})	များ (21.92) (High)
မဂ္ဂနီစီယမ်ဓါတ်(Mg^{++})	4.82 (High)
ပိုတက်စီယမ်ဓါတ်(K^{+})	0.46 (Medium)
အလျူမီနီယမ်ဓါတ်(Al^{+++})	Not detected
ဟိုက်ဒြိုဂျင်	(H^{+}) 0.001
ဆိုဒီယမ်ဓါတ်	(Na^{+}) 0.74 (High)
Ec (ဆားဓါတ်ပါဝင်မှု)	0.21 (သင့်တင့်)
ဓါတ်ဖိုအိုင်ယွန်းဖလှယ်နိုင်စွမ်းအား Cation Exchangable Capacity (C.E.C)	27.93 (High)

မြေတွင် ပျော်ဝင်နေသော ဓါတ်ဆားများဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု

pH	Slightly acid

Ec	Low
TDS	Medium
SAR	Low
RSC	Not deteded
Dorminate Salts	$CaCl_2$, $CaSO_4$ (sub soil)

Plant Protection (PP) ဌာနမှ ဓါတ်ခွဲတွေ့ရသော အပင်နှင့် လူတို့အတွက် အန္တရာယ် ပေးနိုင်သော (Heavy Metal) များမှာ

ပြဒါးဓါတ် Mercury (Hg)	အလွန်များ (Maximum Permitted Level) ထက်များ
ခဲဓါတ် Lead (pb)	နည်း (low)
အာဆင်းနစ် Arsenic (AS)	Not detected (စမ်းသပ် မတွေ့ရပါ)

(၈) စနယ်သဲရောမြေများ (Compact Savanna Soil)

ဤမြေများသည် စနယ်မြေများလောက် မြေစေးရာခိုင်နှုန်းမများဘဲ သဲဝန်းမြေများလောက်လည်း သဲရာခိုင်နှုန်းမများသော မြေများဖြစ်၍ မြေစေးနှင့် သဲရာခိုင်နှုန်း သင့်တင့်ရောနေသော မြေများဖြစ်ပါသည်။ မြေအနိမ့်အမြင့်မှာလည်း အထက်ပါမြေ ၂ မျိုး၏ ကြားတွင်ရှိသော (Level) လောက်တွင်ရှိပြီး ယာသီးနှံနှင့် ရေရလျှင် စပါးစိုက်နိုင်သော မြေများဖြစ်ပါသည်။ မြေကျင်း Profile No များမှာ SQ -10, SQ -14, SQ -19 တို့ဖြစ်ပါသည်။

မြေဆီလွှာဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု

မြေ၏သဲ၊နုန်း၊ မြေစေးပါဝင်မှု	Sandy Loam (သဲသမ)၊ (Loam) သမ၊ Silty Clay
Soil Texture	Loam (နုန်းမြေစေးသမ)
မြေစိုင်ခဲတည်ဆောက်မှု (ကြေမွလွယ်)	(Crumbly &sub angularblo Clay)၊
Soil structure	သောအခဲများနှင့် အတုံးအခဲငယ်များ)
မြေ၏ချဉ်ငန်ကိန်း (Soil pH)	moderately alkaline (သင့်တင့်ငန်)
နိုက်ထြိုဂျင်ဓါတ် (N_2)	နည်း (low)
ဖော့စဖရပ်ဓါတ် P	နည်း (low)
ပိုတက်စီယမ်ဓါတ် (K_2O)	နည်း (low)
သစ်ဆွေးဓါတ် (Humus)	နည်း (low)
Organic Carbon	နည်း (low)
ကယ်လ်စီယမ် (Ca^{++})	13.56 (High)
မဂ္ဂနီစီယမ်ဓါတ် (Mg^{++})	1.36 (Medium)
ပိုတက်စီယမ်ဓါတ် (K^{+})	0.2၁ (low)
အလျူမီနီယမ်ဓါတ် (Al^{+++})	Not detected
ဟိုက်ဒြိုဂျင် (H^{+})	0.03
ဆိုဒီယမ်ဓါတ် (Na^{+})	0.44 (Medium)
ဓါတ်ဖိုအိုင်ယွန်းဖလှယ်နိုင်စွမ်းအား Cation Exchangable Capacity	15.59 (Medium)

(C.E.C)

Ec (Electrical Conductivity) (Medium)

မြေတွင် ပျော်ဝင်နေသော (Soil Souble Salts)များ ဓါတ်ခွဲစမ်းသပ်တွေ့ရှိမှု

Total dissolved soldids TDS -	Low
Electivity Cinductivity Ec	very low
Sodium Adsorption Ratio SAR	Not detdcted
Residual Sodium Carbonate RSC	Not detdcted
pH	Moderately alkaline
Dorminate Salts	$Ca(HCO_3)_2$

Plant Protection (PP) ဌာနမှ ဓါတ်ခွဲတွေ့ရသော အပင်နှင့် လူတို့အတွက် အန္တရာယ် ပေးနိုင်သော (Heavy Metal) များမှာ

ပြဒါးဓါတ် Mercury (Hg)	အလွန်များ (Maximum Permitted Level)ထက် များစွာကျော်
ခဲဓါတ် Lead (pb)	နည်း (low)
အာဆင်းနစ် Arsenic (AS)	Not detected (စမ်းသပ် မတွေ့ရပါ)

ဓါတ်ခွဲတွေ့ရှိချက်များကို သုံးသပ်ချက်နှင့် အကြံပြုတင်ပြချက်

မကွေးတိုင်း၊ မင်းလှမြို့နယ်၊ သမ္ဘာရာကန်ရေနံမြေပတ်ဝန်းကျင်ရှိ မြေများကို ဓါတ်ခွဲစမ်းသပ်ရာတွင် မြေဆီလွှာအာဟာရပိုင်းဆိုင်ရာ (Nutrients) များတွင် မြေဆီလွှာပြဿနာများ မတွေ့ရပါ။ ဆားပေါက်မှု၊ ဆပ်ပြာပေါက်မှုနှင့် Na^+ ဆိုဒီယမ်အဆိပ်သင့်မှု၊ ကယ်လ်စီယမ်များမှု၊ အလျှံမီနီယမ် အဆိပ်သင့်မှု စသည်တို့မရှိပါ။ မြေ၏ soil pH ချဉ်ငန်ကိန်းမြင့်ခြင်းသည် အပူပိုင်းဒေသ၏ ဖြစ်စဉ် တခုဖြစ်၍ ပြဿနာမဟုတ်ပါ။ အပူပိုင်းဒေသများသည် မြေပြင်သို့ မိုးရေကျဆင်းမှုနည်းပြီး အငွေ့ပြန်နှုန်း (Evapotranspiration) များသောကြောင့် မြေတွင်းမှ ဆားဓါတ်များသည် ဆံချဉ်မျှင် ပြွန်အား (Capaillary) ဖြင့် ပြန်တက်လာပြီး အပေါ်မြေပြင်တွင် ဆား/ဆပ်ပြာပေါက် များ (soluble salts)များသည် အငွေ့ပြန်ပြီး အဖြူရောင်ဆားပွင့်များကျန်ခြင်း pH မြင့်ခြင်း ဖြစ်ပါသည်။ ရေပျော် ဆားအမျိုးအစား အားလုံးပါဝင်ပါသည်။ (မြေကြီးထဲတွင် K^+ ဝိုတက်စီယမ်၊ ကယ်လ်ဆီယမ် (Ca^{++})၊ မဂ္ဂနီဆီယမ် (Mg^{++})၊ ဆိုဒီယမ်စသည့်တို့သည် ဆားပုံစံဖြင့် တည်ရှိနေ တတ်ပါသည်။)

ရေပျော်ဆားများ (water souble salts) များကို စမ်းသပ်မှုများတွင် TDS – Total Dissolved Salt (စုစုပေါင်း ဆားပါဝင်မှု) ကို Pr No. များ၍ ကျန်သော Pr No. မြေများ တွင် နည်းပါသည်။

SAR - Sodium Assorption Ratio (ဆိုဒီယမ်ဆွဲကပ်မှုအချိုး) ရှာဖွေရာတွင် ပြဿနာ မတွေ့ရပါ။ ရေပျော်ဆားပါဝင်မှု EC (Electrical Conductivity) မှာလည်း အပင်များ ခံနိုင်ရည်ရှိသော အဆင့်တွင် ရှိသောကြောင့် ပြဿနာမရှိပါ။ RSC (Residual Sodium Carbonate) ဆိုဒီယမ်ကို ရှာဖွေမှုတွင်လည်း ပြဿနာမရှိပါ။

ထို့ကြောင့် မြေဆီလွှာအာဟာရဓါတ်များ (Nutrients) များ၊ ရေပျော်ဆားများ (soil souble salts) များတွင် ဓါတ်ခွဲစမ်းသပ်မှုများအရ ပြဿနာမရှိသော မြေများဖြစ်ပါသည်။

Plant Prodection (PP) ဌာနမှ ဓါတ်ခွဲစမ်းသပ်သော Heavy Metal များတွင် လူနှင့် အပင်တို့အတွက် အန္တရာယ်ပေးနိုင်သော ဓါတ်များတွင် ခဲဓါတ် (Lead) (pb)နှင့် အာဆင်းနစ် (Arsenic) ဓါတ်တို့မှာ ပါဝင်မှုအလွန်နည်း၍ ပြဒါးဓါတ် (Mercury) (Hg)ဓါတ်မှာ အလွန်များသော (Permetted Level) ထက်ကျော်နေကြောင်း တွေ့ရှိရပါသည်။

စိုက်ပျိုးရေးရှုဒေါင့်အရ တောင်သူများသည် ဝဲအမျိုးမျိုးစိုက်ပျိုးရာတွင် ပေါင်းသတ်ဆေး၊ မှိုသတ်ဆေး၊ ရွက်ဖြန်းအားဆေးများကို နိုင်ငံခြားမှ တင်သွင်းသော ဆေးများကို အလွန်အကျွံ သုံးစွဲခြင်းကြောင့် မြေဆီလွှာတွင် ပြဒါးဓါတ်များဖြစ်၍ များပြားနေခြင်းဖြစ်နိုင်ပါသည်။

သန်းဌေး
ဦးစီးမှူး
ကွင်းဌာနစု
စိုက်ပျိုးရေးဦးစီးဌာန
မြေအသုံးချရေးဌာနခွဲ

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APPENDIX 7: NOTIFICATION NO 583/94 (FOREST DEPARTMENT)

GOVERNMENT OF THE UNION OF MYANMAR

MINISTTRY OF FORESTRY

FOREST DEPARTMENT

Notification No. 583/94

Yangon, October 26, 1994

The Director General with the approval of the Minister, shall declare in accordance with "The Protection of Wildlife and Wild Plants and Conservation of Nature Areas Law 1994" the following wildlife species as;-

Category (1) Completely Protected Wild Animals

(a) Mammals

No.	Scientific Name	English Name
1.	*Rhinoceros sondaicus*	Javan Rhinoceros
2.	*Didermocerus sumatrensis*	Sumatran Rhinoceros
3.	*Tapirus indicus*	Tapir
4.	*Budorcas taxicolor*	Takin
5.	*Cervus eldi thamin*	Brow antlered Deer
6.	*Cervus eldi eldi*	Brow antlered Deer
7.	*Elphas maximus*	Asian Elephant
8.	*Moschus moschiferus*	Musk Deer
9.	*Muntiacus feae*	Fea's Barking Deer
10.	*Naemorhedus cranbrooki*	Red Goral
11.	*Neofelis nebulosa*	Couded Leopard
12.	*Felis temmincki*	Golden Cat
13.	*Panthera tigris tigris*	Bengal or Indian Tiger
14.	*Panthera Pardus*	Leopard
15.	*Panthera tigris corbetti*	Indochinese Tiger
16.	*Felis marmorata*	Marbled Cat
17.	*Prionodon pardicolor*	Spotted Linsang
18.	*Prionodon linsang*	Banded Linsang
19.	*Ailurus fulgens*	Red Panda
20.	*Orcaella brevirostris*	Irrawaddy Dolphin
	Dugong dugon	Dugong
	Canis Lupus	Wolf
	Hylobates hoolock	Hoolock Gibbon
	Hylobates lar	Lar Gibbon/ White – handed Gibbon
	Symphalangus sundactylus	Siamang Gibbon
	Presbytis obscures	Dusky Leaf Monkey
	Presbytis phayrei	Phayre's Leaf Monkey
	Capricornis sumatraensis	Serow
	Naemohedus goria	Goral
	Lutra lutra	The Common Otter
		The smooth-coated Indian Otter

21.	*Lutra perspicillata*	Pp[the The small-clawed otter
22.	*Aonyx cinera*	The Malayan Sun Bear
23.	*Helarctos malayamus*	The Chinese Pangolin
24.	*Manis pantadactyla* *Manis javanica*	The Malayan Pangolin Gaur
25.	*Bos gaurus*	Banteng or Wild Cow
26.	*Bos banteng Bos. Javancus* *Viverricula indica*	The small Indian Civet Chebrotain or Larger Mouse Deer
27.	*Tragulus napu*	Lesser Mouse Deer
28.	*Tragulus javanicus*	
29.		

(b) Birds

No.	Scientific Name	English Name
1.	*Family Phasianidae*	Peafowls/Pheasants
2.	*Heliopais personata*	Masked finfoot
3.	*Cairina scutulata*	White –Winged Wood Duck
4.	*Leptoptilos dubius*	Greater Adjutant Stork
5.	*L. javanicus*	Lesser Adjutant stork
6.	*Sarkidiornis melanotos*	Comb Duck
7.	*Anser indicus*	Bar – headed Goos
8.	*Aix galericulata*	Mandarin Duck
9.	*Rhodonessa caryophyllaceae*	Pink – headed Duak
10.	*Aythya nyroca*	Ferruginous Duck
11.	*A baeri*	Bear ‘s Pocard
12.	*Tringa guttifer*	Nordmann’s Green shank
13.	*Gallinago nemoricola*	Wood Snipe
14.	*Ardea insignis*	White- belled Heron
15.	*Anhinga melanogaster*	Oriental Darter
16.	*Pelecanus philippensis*	Spot- billed Pelican
17.	*P. onocrotalus*	Eastern White Pelican
18.	*Pseudibis davisoni*	White –shoulder Ibis
19.	*Phnchops albicolis*	Indian Skimmer
20.	*Grus antigone*	Sarus Crane
21.	*G. grus*	Comman Crane
22.	*Anthropoids virgo*	Demoiselle Crane

23.	*Family Bucerotidae*	Hornbills
24.	*Family Accipitridae*	Eagle, Kite, Falcon, Hawk, Vulture
25.	*Pitta gurneyi*	Gurney's Pitta
26.	*Turdoides gularis*	White –throated Babbler
27.	*Crypsirina cucullata*	Hooded Treepie
28.	*Yuhina humilis*	Myanmar Yuhina
29.	*Sitta victoriae*	White –browed Nuthatch
30.	*Family Rallidae*	Rails, Crakes
31.	*Gallicrex cinerea*	Water Cock
32.	*Phalacrocorax carbo*	Great Cormorant
33.	*Ardeidae (all species)*	Bitterns
34.	*Upupa epoc*	Hoopoe
35.	*Trogonidae (all species)*	Trogons
36.	*Pididae (all species)*	Woodpeckers
37.	*Otis tarda*	Great bustard
38.	*Strigiformes (all species)*	Owls, fish Owls, Barn Owl
39.	*Pandion haliaetus*	Osprey
40.	*Falconidae (all species)*	Falcon
41.	*Caloenas nicobarica*	Nicobar Pigeon
42.	*Phalacrocorax fuscicollis*	Indian Shag
43.	*Sula leucogaster plotus*	Brown Gannet
44.	*Gracula religiosa*	Grackle
45.	*Ciconidae (all species)*	Storks
46.	*Threskiornithidae (all species)*	Ibises, Spoonbills
47.	*Anatidae (all species)*	Geese, Duck
48.	*Jacanidae (all species)*	Jacanas
49.	*Laridae (all species)*	Gulls, Tern's
50.	*All shore bird species*	Lapwing, Curlew, Shank, Sandpiper, Snipe

(c) Reptiles

No.	Scientific Name	English Name
1.	*Garcialis gangetius*	Gharial or Garvial Crocodile
2.	*Caretta caretta*	Loggerhead Turtle
3.	*Lepidochelys olivacea*	Sea Turtle
4.	*Chelonian mydas*	Green Turtle
5.	*Eretmochelys imbricate*	Hawksbill Turtle
6.	*Demochelys coriacea*	Leathery Turtle
7.	*Platysternon megacephalum*	Big –headed Turtle
8.	*Geochelone platynota*	Spider Tortoises
9.	*Python reticulatus*	Reticulated Python

Category (2) Protected Wild Animals

(a) Mammals

No.	Scientific Name	English Name
1.	*Cervus unicolor*	Sambhur
2.	*Bubalus bubalis*	Wild Buffalo
3.	*Viverridae species*	Wild Cats/Civets
4.	*Canidae species*	Wild dogs
5.	*Herpestidae species*	Mangooses
6.	*Presbytis species*	Leaf-Monkeys
7.	*Macaca species*	Mecaques/Old World Monkeys
8.	*Tupaia gils*	Tree Shrew
9.	*Nycticebus coucang*	Slow Loris
10.	*Selenarctos thibetanus*	Asiatic Black Bear
11.	*Mates flavigula*	Yellow-throated Marten
12.	*Cynocephalus variegatus*	Flying Lemur or Colugo

(b) Birds

No.	Scientific Name	English Name
1.	*Family- Corvidae*	Magpie
2.	*Family- Corvidae*	Treepie
3.	*Family- Corvidae*	Jay
4.	*Family-Paridae*	Tit
5.	*Garrulax species*	Laughing Trush
6.	*Yuhina species*	Yuhina
7.	*Family- Sittidae*	Nuthatch
8.	*Heterophasia species*	Sibia
9.	*Irena puella*	Fairy Bluebird
10.	*Troglodytes troglo dytes*	European Wren
11.	*Cinclus species*	Dipper
12.	*Family- Certhidae*	Tree creeper
13.	*Prunella species*	Accentors
14.	*Oriolus species*	Oriole
15.	*Apolonis panayensis*	Gloosy Starling
16.	*Sturnus species*	European Starling
17.	*Ploceus philippinus*	Baya Weaverbird
18.	*Family- Fringillidae (Sub Family-Carduelinae)*	Finch
19.	*Family- Alaudide*	Skylark
20.	*Family- Zosteropidae*	White eye
21.	*Family- eury laimidae*	Broad bill
22.	*Family- Capitonidae*	Barbet
23.	*Phoenicophaeus species*	Malcoha
24.	*Nystyonis amicta*	Red- bearded Bee-eater
25.	*Indicator xanthonotus fluvus*	Yellow- backed Honey guide
26.	*Family-Psittacidae*	Parakeet/ parrot
27.	*Alcedinidae species*	Kingfisher
28.	*Collocalia fuciphaga*	Edible- nest Swiftlet
29.	*Collocalis maxima*	Black – nest Swiftlet
30.	*Ardea purpurea*	Purple Heron
31.	*Ardea Cinerea*	Grey Heron
32.	*Ardea Species*	Heron
33.	*Egretta alba*	Great Egret
34.	*Egretta sacra*	Reef Egret
35.	*Ardeola bacchus*	Chinese Pond Heron
36.	*Ardeola speciosa continentalis*	Javan Pond Heron
37.	*Butorides species*	Little Green Heron
38.	*Family-Podargidae*	Frog Mouth
39.	*Family-Nectarinidae*	Sunbird
40.	*Family-Dicaeidae*	Flowerpecker
41.	*Family-Pittidae*	Pittas
42.	*Family-Columbidae*	Green Pigeon
43.	*Family- Compephagidae*	Minivets

(c) Reptiles

No.	Scientific Name	English Name
1.	*Crocodylus species*	Estarine or Saltwater Crocodiles/ Mugger or Marsh Crocodiles/ Crocodiles
2.	*Siamese*	Fresh- water Turtles
3.	*Emydiade species*	Land Tortoises
4.	*Testudinidae species*	Soft – shelled Turtles
5.	*Trionychidae species*	Monitor Lizards
6.	*Veranus species*	Rock Python
	Python molurus	

Category (3) Seasonally Protected Wild Animals

1. List of Wild Animals Protected from June 15th to September 30th.

(a) Mammals

No.	Scientific Name	English Name
1.	*Axis porcinus*	Hog Deer
2.	*Muntiacus muntjak*	Barking Deer

2. List of Wild Animals Protected from March 15th to September 30th .

No.	Scientific Name	English Name
1.	*Family-Phasianidae*	Partridge/Framcolin
	Sub Family-Perdicinae	
2.	*Turnix species*	Quails
3.	*Aegithina tiphia*	Lora
4.	*Chlorosis species*	Leaf birds
5.	*Family-Columbidae*	Doves
6.	*Gallinula Chloropus*	Common Moorhen
7.	*Porphyrio porphyrio*	Purple Swamphen
8.	*Family-Pycononotidae*	Bulbul
9.	*Family-Turtidae*	Robin<red stars<Chats<Forktails
10.	*Family-Muscicapidae*	Paradise Flycatcher
11.	*Family-Cuculidae Sub Family-Cuculinae*	Cuckoo<kole
12.	*Family-Capriumulgidae*	Nightjars
13.	*Family-Decruridae*	Drongos

By order

Director General

Forest Department

APPENDIX 8: ENVIRONMENTAL POLICY OF THE PROJECT PROPONENT

Environmental Policy of Minhla New Refinery Plant

Sustainable Development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The developer is committed that their new refinery plant project to establish a sustainable development.

The developer has prepared its Environmental Policy in consultation with the National Environmental Policy (1994), the environmental responsibilities described in the Constitution of the Republic of the Union of Myanmar (2008) and the Environmental Conservation Law (2012), and has based it on the following key values:

- The wealth of the nation is its people, its cultural heritage, its environment and its natural resources;
- It is the responsibility of the State and every citizen to preserve its natural resources in the interests of present and future generations; and
- Environmental protection should always be the primary objective in seeking development.

The developer's Environmental Policy also acknowledges that:

- every person and citizen living in the country has the right of access to a clean and healthy environment;
- the tangible and intangible values of the environment need to be recognized;
- ecosystems are to be protected and managed in a sustainable manner;
- recognition of the rights and beliefs of indigenous and ethnic peoples;
- resource efficient and avoidance and minimization of pollution and waste at the sources;
- climate friendly ways to development; and
- importance of environmental education.

The policy puts emphasis on the environmental considerations to promote economic and social development, reduce poverty by increasing job opportunities, control the illegal border trade and establish peace and tranquility in the region, attract the local and international investors, mitigate and adapt to climate change and natural disasters.

The company sets the policies to make sure that the environment is protected by conserving energy and natural resources and proper management of the wastes generated. The policy addresses the following aspects:

- Taking significant environmental aspects and impacts into account throughout the process of project development: planning (pre-construction), construction, operation, and decommission and closure phases;
- Ensuring that the environmental issues are properly assessed and considered when key decisions are taken for the project activities;
- Establishing and measuring the significant environmental impacts of construction and operations, setting targets for performance improvements and monitoring progress against those targets in areas including, but not limited to, energy, greenhouse gas emissions, water usage/quality and waste;

- Using energy and natural resources wisely and efficiently: reduction, re-using and recycling (3Rs principle) whenever possible and practical;
- Developing and improving operations and technologies to minimize waste and other pollution, minimize health and safety risks, and dispose of waste safely and responsibly;
- Ensuring that employees have a level of knowledge and understanding appropriate to their environmental responsibilities and are aware of actions they can take to reduce their impacts; and
- Updating the policy as needed according to the new laws, rules and regulations.

A unit with members will be formed with specific responsibilities for the project's environmental policy and performance. The findings and results of the project's environmental performance would be available at the project website. All employees of project and other involved companies, suppliers and contractors (all stakeholders of this project) are to adopt the aspects described in this policy into their day-to-day work activities.

The company is also committed to achieving 'zero incident' level in Safety, Security, Health and Environment (SSHE). It will achieve this excellence level through following measures:

- Prevent incidents through comprehensive construction and operational safety management.
- Ensure compliance with safety management measures.
- Ensure effective response to emergencies and crises.
- Ensure environmentally friendly and socioeconomically sound operation of the special economic zone.

The developer will impress on its contractors and operators to work with commitment to these policies.

APPENDIX 9: SOCIAL POLICY OF THE PROJECT PROPONENT

Social Policy of New Refinery Plant

The developer is committed that their project to establish a socially responsible development. The developer intends its workers to enjoy more security in social life and health care. In addition to that, the developer aims to implement the Corporate Social Responsibility programs for the local community, and these are briefly included in this policy.

The developer has prepared its Social Policy in consultation with the Constitution of the Republic of the Union of Myanmar (2008), Social Security Law (2012), Myanmar National Social Protection Strategic Plan (2014), Myanmar Maternal and Child Welfare Association Law (2013), and The Child Law (1993). The policy covers the following aspects: education, on-job skills training, safety, healthcare and monetary benefits, mandatory social security, and engaging, learning from, respecting and supporting the local communities and cultures.

The developer's social policy addresses the following factors.

Conducting on-job skills trainings for the workers;

- Arranging and carrying out the health promotion programs, occupational health programs and programs for creation of a healthy environment;
- Establishing plans for Occupational Safety and Health;
- Registration of social security systems (Health and Social Care Insurance System, Family Assistance Insurance System, Invalidity Benefit, Superannuation Benefit and Survivors' Benefit Insurance System, Unemployment Benefit Insurance System and Other Social Security System) for enjoyment of social security benefits (according to the determination of the Ministry of Labor, Employment and Social Security in coordination with the Social Security Board);
- Benefits relating to maternity;
- Carrying out effective welfare work and rendering assistance relating to the health and social affairs of mothers and children;
- Protecting and safeguarding the rights of the child (avoidance of child labor and supporting free and compulsory primary education);
- Understanding and respecting the cultural values and laws where the developer operates and supporting initiatives in those communities where the employees live and work;
- Recognizing the importance of natural disaster and emergency risks and responses

The policy will also cover:

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

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

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

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

All employees of New Refinery Plant and other involved companies, suppliers and contractors (all stakeholders of this project) are to adopt the developer's social policy into their day-to-day work activities.

It is the developer's intention to implement the following in its CSR program.

Education	❖ Building and upgrading school building and facilities ❖ Providing school uniforms and stationery to the students in need ❖ Supporting and donating to monastic education schools
Healthcare	❖ Providing assistance (cash or medicines) to health care centers ❖ Organizing health education talks and seminars ❖ Providing health care program with specialists
Social welfare	❖ Donating to orphanage and elderly houses ❖ Participating and donating in communities' affairs and cultural and traditional festivals
Natural disaster	❖ Providing disaster awareness program ❖ Providing assistance to local communities' disaster preparedness programs
Local community	❖ Creating business and job opportunities ❖ Providing assistance in building the infrastructure (roads, lamp posts, water supply)

APPENDIX 10: OCCUPATIONAL HEALTH AND SAFETY GUIDELINES AND STANDARDS OF PROJECT PROPONENT

The developer, as an employer considers its employees to be its most valuable assets and undertakes to safeguard them through providing and maintaining, as far as reasonably practical, a working environment that is safe and without risk to the health of its employees.

The project developer believes that health and safety orientation is a vital component of the health and safety management system. It is the process of introducing new, inexperienced, transferred and returning employees to a safe and healthy workplace.

Orientation provides employees with necessary safety information about their job and tasks, informs them of specific details about workplace hazards and provides an opportunity to learn about the developer and their colleagues, ask questions and to clarify new or confusing information.

The orientation will be conducted for all employees, and workers for the construction phase and the length of time required for orientation will depend on the workplace, and the specific job and tasks. Orientation will not consist of a whirlwind of checklists and safety manuals handed to the new employee, but rather needs to be practical and hands-on, and will focus on the skills the employee must develop to be successful at their job.

Orientation Topics

The following topics are the minimum requirement for the developer to review with new employees before they begin work:

1. Contact Information:

Names, phone numbers of employee's supervisor and developer personnel, including emergency contact information.

2. Rights and Responsibilities:

Explain both the employee and employer responsibilities as outlined in Occupational Safety and Health Law (Draft) by Pyidaungsu Hluttaw.

3. Procedures and Codes of Practice:

Explain the developer's procedures and codes of practice as it pertains to the employee's job and department. Outline the expectations for the employee and the employee's supervisor to adhere to all standards.

4. First Aid:

Introduce first aid providers, indicate areas for first aid kits or room, explain to employees how to summon first aid for themselves or for a co-worker.

5. Accident/Injury Reporting Procedures:

Explain the established developer procedure and contact people for reporting any injuries sustained by the employee.

6. Emergency Procedures and Preparedness:

Review the developer's emergency personnel contact info; evacuation plan, including exit routes; evacuation signals and sirens; location of eyewash stations and showers, fire extinguishers, and alarm pull boxes; identify fire marshal(s); and identify exposures. Other procedures may include:

- ✓ Bomb threats/suspicious packages

- ✓ Threatening, violent or disruptive behaviours
- ✓ Chemical spills, gas leaks
- ✓ Debriefing assistance for critical incidents

7. Personal Protective Equipment (PPE):

Review the required PPE (legal) standards for specific jobs or job tasks, including the appropriate use, fitting, storage, and maintenance for assigned jobs.

8. Code of Practice for Working Alone:

Outline the process for any employee who works alone so they can remain safe on the job or to be able to summon emergency assistance, if required.

9. Workplace Hazardous Material Information System (WHMIS):

Explain where hazardous material and substances are located and review the labelling system, hazardous symbols and location and contents of the Material Safety Data Sheets (MSDS). Train employees on site-specific products and accompanying MSDS material.

APPENDIX 11: GUIDELINES, STANDARDS AND ACTIVITIES FOR OCCUPATIONAL HEALTH AND SAFETY

1. Organising the Site

1.1 Planning the work

A good planning will be made by gathering as much information about the project and the project site before works begin to ensure safety during construction phase. Information that could be sought would be:

a) Underground services;

b) Presence of live bare electrical conductors, underground/overhead insulated cables. Advice from the authority concerned would also be sought prior to start of work;

c) Ground conditions;

d) Contract documents;

e) Nearby schools, footpaths and roads; and

f) Other activities going on the site.

1.2 Organizing the work

Responsibilities regarding safety and health between different stakeholders would be clearly allocated:

a) Between client/main contractor/subcontractor;

b) By appointment of competent supervisors/safety and health officers; and

c) By proper coordination on site between parties.

d)

1.3 Common facilities to be provided

The provision of basic facilities to ensure safety, health and welfare of employees would be ascertained.

1.3.1 Site access

Adequate, safe and separate pedestrian and vehicular traffic routes would be provided on and around the site.

1.3.2 Site boundaries

The construction site will be fenced to prevent the entry of unauthorized persons on construction sites, which are located in built-up areas and alongside vehicular and pedestrian traffic routes.

1.3.3 Public safety

The public safety would be ensured through appropriate fencing of site or by other means.

1.3.4 Lighting

The adequate lighting of all worksite would be ensured through natural and/or artificial lighting.

1.3.5 Site tidiness

a. The site would be kept tidy.

b. Walkways and stairs would be kept free of slipping and tripping hazards.

c. There will be no protruding nails on loose or fixed materials.

1.3.6 Storage areas

a) The storage areas would be set up for plants, materials, flammable substances (e.g. flammable liquids and gases) and hazardous substances (e.g. chemicals).

b) The flammable materials would be stored away from other materials and protected from accidental ignition.

c) The obstruction of access routes/emergency escapes by proper storage of materials would be prevented.

d) Materials to be properly stacked to prevent falls.

1.3.7 Fire Safety

Details can be reviewed in Fire Safety Management and Fire Emergency Plan.

2.0 Excavations

a) All utility services, such as electrical, water and sewer in the area would be located and identified before beginning to excavate.

b) The pointed tools will not be used to probe for underground electrical cables.

c) Trees, utility poles, rocks or similar objects near the edge of an excavation would be removed or secured to prevent workers from being injured.

d) The sides of excavations would be supported by sheet piling, shoring and bracing to guard against danger to workers from fall or dislodgement of earth, rock or other material.

e) The excavation slopes and/or supporting systems would be inspected daily for erosion or deterioration.

f) The excavated materials will be kept back at least 600 mm (2 ft.) from the edge of any trench excavation and 1.2 m (4 ft.) from any other excavation.

g) The substantial guardrails or barriers would be erected around excavations to prevent workers or other persons from falling into them.

h) A ladder will be provided when workers are required to enter excavations over 1.5 m (5 ft) in depth.

i) The load, plant or equipment would not be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.

j) The anchored stop blocks, and barriers would be provided to prevent vehicles being driven into the excavation.

k) The heavy vehicles will not be allowed near the excavation unless the support work has been specially designed to permit it.

l) If an excavation is likely to affect the security of a structure on which persons are working, precautions would be taken to protect the structure from collapse by providing shoring.

3.0 Working at Height

3.1 General provisions

a. Ensure that working platform is secure and check that it:
   i. will support the weight of workers using it and any materials and equipment they are likely to use or store on it.
   ii. is stable and will not overturn.
   iii. is footed on stable ground or on a stable support or structure.

b. Provide guard rails, barriers, etc. at open edges, including edges of floors, floor openings, edges of roofs and edges of working platforms.

3.2 Guard rails

Guard rails would:

a) be made from any material, provided they are strong and rigid enough to prevent people from falling and be able to withstand other loads likely to be placed on them.

b) be fixed to a structure, or part of a structure capable of supporting them.

c) Include:
   i. a main guard rail at least 900 mm above any edge from which people are liable to fall.
   ii. a toe board at least 150 mm high.
   iii. a sufficient number of intermediate guard rails or suitable alternatives.

d) Risks of falls through openings or fragile material (e.g. rooflights), to be reduced by providing appropriate and adequate guard rails or barriers to cover the opening or material.

3.3 Safe working platforms

All working platforms would be:

a) Fully boarded and securely fixed to prevent displacement.

b) Strong enough to support the load usually placed on it (workers and materials).

c) Provided with toe-boards so as to prevent materials and tools from falling over the edges.

3.4 General access scaffolds

All scaffolds would be:

a) Properly designed, constructed, erected and maintained so as to prevent collapse or accidental displacement.

b) Based on a firm and level foundation.

c) Erected on a firm ground capable of supporting the weight of the scaffold and any load likely to be placed on it.

d) Braced and tied into a permanent structure or otherwise stabilized.

e) Provided with platforms that are fully boarded and wide enough for the work and for access.

f) Provided with scaffold boards that are properly supported and rest on at least three supports.

g) Have a safe ladder or other access onto the work platforms.

3.5 Safe use of access ladders

a) Any ladder would be properly fixed to prevent slipping.

b) A good handhold would be provided to the ladder.

c) The ladder would be leaned at the proper angle to minimize the risk of slipping outwards, that is, about 1 m out at the base for every 4 m in height.

d) The top of the ladder would rest against a solid surface and not on fragile or other insecure materials such as cement or plastic guttering.

e) Both feet of the ladder would rest on a firm footing and cannot slip.

f) If the ladder is more than 3 m long or used as a way to and from a workplace, it would be secured from falling by fixing it at the top or sometimes at base.

g) If the ladder cannot be fixed a second person would secure the ladder at the base while it is being used.

h) The ladder would extend a sufficient height (about 1 m) above any landing place where workers will get on and off it unless some other adequate handhold is available.

3.6 Stepladders

a) Stepladders would be fully opened, and both spreader bars would be locked.

b) Stepladders would not be used on top of scaffolds, platforms, or other surfaces above the ground.

c) Unattended tools, such as hammers, would not be left on top of stepladder.

d) Stepladder would be dismounted before being moved.

e) Top most rung of a stepladder would not be used.

3.7 Care of ladders

a) Ladders would be inspected regularly by a competent person and damaged ladders should be removed from service.

b) Ladders would be properly stored on racks under cover and above ground.

c) Ladders would not be hung from its rungs.

3.8 Roof works

a) All roof-work operations would be pre-planned and properly supervised.

b) Roof work would only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

c) Work on roofs should not be carried on in weather conditions that threaten the safety of workers.

3.8.1 Flat roofs

a) All the edges and openings on a roof from or through which there is a risk of fall would be protected with suitable guardrails and toe boards.

b) All covers for openings in roofs would be of substantial construction and be secured in position.

3.8.2 Sloping roofs

a) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders would be provided and firmly secured in position as soon as practicable.

b) During extensive work on sloping roofs, edge protection in the form of barriers or guardrails high enough and strong enough would be provided to stop worker from falling off the roof.

3.8.3 Fragile Roofs

Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they would be provided with sufficient suitable roof ladders or crawling boards strong enough, when spanning across the supports for the roof covering, to support those workers.

4.0 Moving, Lifting and Handling Loads

4.1 Manual handling

a) Work site and storage of materials would be planned so that manual handling is reduced to a minimum.

b) Manual handling would be done by the kinetic lifting technique and the person involved should be properly trained.

4.2 Hoists

a) Selection of a hoist, which is suitable for the site and capable of lifting the loads required will be made.

b) To prevent people being struck by the platform or other moving parts:

   i. Enclose the hoistway at places where people might be struck, e.g., working platforms or window/door openings;

   ii. Provide gates at all landings and at ground level;

c) Prevent falling down the hoistway by making sure;

   i. the hoistway is fenced where people could fall it;

   ii. the gates at landings are kept closed except during loading and unloading;

   iii. the edge of the hoist platform is close to the edge of the landing so that there is no gap to fall through;

d) Prevent being hit by falling materials by:

   i. stopping loads falling from the platform, e.g., make sure wheelbarrows are not overfilled;

   ii. not carrying loose loads. Put loose loads in proper container or use a hoist with an enclosed platform;

   iii. not overloading the platform;

   iv. enclosing the hoistway;

   v. hoist should be used to carry materials only.

4.3 Lifts

Lifts for the carriage of persons need to be especially constructed and installed for the purpose, with such features as mechanical and electrical interlocking devices on the cage and landing gates.

4.4 Mobile cranes

a) The crane would be able to lift the load on a site.

b) It should be of such a size so that it can be used safely on a site.

c) Crane's inspection certificates would be up-to-date.

d) The crane would be fitted with an automatic Safe Load Indicator, which should be in good working order.

e) The employer would ensure that the driver is trained and experienced in the operation of the type of crane being used.

f) The crane should be sited in a safe place, so that;

- The driver has a clear view of the site.
- It is well away from excavations and overhead powerlines.
- It is on level ground which can take its full weight and together with its maximum load.

5.0 Site Vehicles and Mobile Plant

a) Provide safe site entry and exit points with adequate turning room and good visibility for vehicle drivers;

b) Keep pedestrians separate from vehicles, e.g., by providing separate site entry and exit points;

c) Consider a one - way system and avoid needs for vehicles to reverse wherever possible;

d) Consider fitting reversing alarms to vehicles;

e) Make use of signallers to control high-risk situations, e.g., where visibility is restricted;

f) Prepare the running surface of temporary roads. Where the site is muddy, use hardcore or other fill to overcome the problem of skidding and repair potholes;

g) Protect any temporary structures, such as scaffolds or falseworks, which might be damaged and made unsafe if struck by a vehicle;

h) Protect any excavations and alongside any areas of water if vehicles must pass close by;

i) Take precautions, such as stop blocks, where vehicles tip materials into excavations;

j) Make sure that vehicles are not overloaded as they may become unstable, difficult to steer or have their braking efficiency impaired;

k) Make sure loads are securely attached to vehicles and that loose materials cannot fall from lorries or site dumpers and strike workers; and

l) Take special precautions with blind corners.

6.0 Chemicals

a) Follow the instructions provided on the labels when working with glues, paints, and solvents;

b) Work with glue, paint, or solvents in well-ventilated areas so as to prevent build-up of hazardous environment to chemical vapours; and

c) Use appropriate personal protective equipment and clothing to employees working with chemicals based on labels and Material Safety Data Sheet (MSDS).

7.0 Protective Equipment

Employees on construction sites need specific Personal Protective Equipment (PPE) to ensure their safety and health. e.g.:

7.1 Safety helmet

a) Employees would be provided with safety helmets to protect the head from injury due to falling or flying objects or due to striking against objects or structures.

b) Employers would ensure that the safety helmets are worn.

c) When working at height, a strap would additionally be used to prevent the safety helmets from falling.

7.2 Footwear

a) Protective footwear would be provided to workers who are exposed to the risk of injury of materials being dropped on their feet or nail or other sharp objects penetrating their sole.

b) Where it is likely that employees will be working in water or wet concrete, appropriate boots would be provided.

7.3 Goggles and safety spectacles

The employer would provide goggles or other suitable protective device when likely to be exposed to eye or face injury from airborne dust or flying particles, dangerous substances, harmful heat, light or other radiation, and in particular during welding, flame cutting, rock drilling, concrete mixing or other hazardous work;

7.4 Gloves and protective clothing

Protective gloves and suitable protective clothing to protect hands or the whole body as required when exposed to heat radiation or while handling hot, hazardous or other substances which might cause injury to the skin would be provided by the employer.

7.5 Other protective equipment's

Where necessary, workers would be provided with and required to wear the following personal protective equipment:

a) Ear protection when exposed to noise.

b) Dust masks when exposed to excessive dust.

c) Waterproof clothing and head coverings when working in adverse weather conditions.

d) Safety harnesses with independently secured lifelines where protection against falls cannot be provided by other appropriate means.

e) Life vests and life preservers where there is a danger of falling into water.

f) Distinguishing clothing or reflective devices or otherwise conspicuously visible material when there is regular exposure to danger from moving vehicles.

Note: All protective equipment's would be properly maintained and stored after use.

8.0 Emergency Procedures

8.1 Transport

a) Where an employee has suffered injury or illness at work necessitating his removal to his home or to a hospital or other similar institution, the employer shall promptly and at his own expense provide an appropriate means of conveyance for the employee.

b) The appointed person or first-aider shall accompany the injured or ill employee to a hospital or other similar institution whenever the circumstances so justify.

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APPENDIX 12: FIRE SAFETY MANAGEMENT AND FIRE EMERGENCY PLAN

FIRE SAFETY MANAGEMENT

Statement of intent

The project developer believes that ensuring the health and safety of staff, guests, service users and all relevant persons is essential to our success.

We are committed to:

1. Preventing accidents and work-related ill health.
2. Compliance with statutory requirements (Myanmar Fire Brigade Law, Pyidaung Su Hluttaw Law No. 11/ 2015 and Myanmar Fire Brigade Rules, Ministry of Home Affairs Notification No. 1047/2015).
3. Assessing and controlling the risks that arise from our work activities.
4. Providing a safe and healthy working and learning environment.
5. Ensuring safe working methods and providing safe working equipment.
6. Providing effective information, instruction and training.
7. Consulting with employees and their representatives on health and safety matters.
8. Monitoring and reviewing our systems and prevention measures to ensure the effectiveness.
9. Setting targets and objectives to develop a culture of continuous improvement.
10. Ensuring adequate welfare facilities exist throughout the department.
11. Ensuring adequate resources are made available for health and safety issues, so far as is reasonably practicable.

A Fire Safety Management System will be created to ensure the above commitments can be met. Employees throughout the department must play their part in the creation of a safe and healthy working environment for all.

Signed: _____ **Date:** _____

(Managing Director / Chief Executive Officer

Employer / Owner)

1. INTRODUCTION AND SCOPE

1.1 Fire is a hazard in any part of the premises. Its consequences include the threat to the lives or health and safety of relevant persons, damage to or loss of property and severe interruption to normal business activities or opportunities.

1.2 Managing the risk of fire demands and fire safety precautions based on a combination of appropriate prevention and protection measures depending upon building use and occupancy.

1.3 This fire safety management and fire emergency plan applies to all premises which are to any extent under the control of the company as the employer and owner. Its requirements extend to all persons at those premises including staff, guests and contractors whether permanently or temporarily engaged.

1.4 The developer will, so far as is reasonably practicable, and in accordance with legal obligations and standards, in respect of every premises to:

- provide and maintain passive and active fire prevention, protection and measures according to the purpose or use of the building, the numbers of occupants and the activities or processes undertaken therein;
- provide comprehensible and relevant information to staff and others, through the provision and availability of emergency instructions or fire safety plans and the risks identified by relevant risk assessments;
- provide a programme of fire safety training;
- carry out and keep under review a fire risk assessment to analyse building and process fire risks, the existing preventive and protective measures and to identify areas for improvement;
- have in place a programme of works to improve or maintain the existing fire safety specifications;
- identify a sufficient number of persons, whether staff, security or others, to be present at all times the building is occupied with responsibility for initiating the fire evacuation procedure and provide information and assistance to the fire service;
- where appropriate, to prepare and keep under review risk assessments in relation to the use, storage, handling, disposal and transportation of dangerous substances and ensure that, so far as is reasonably practicable, the risks associated with dangerous substances are reduced or controlled.

2. PRACTICAL FIRE SAFETY ARRANGEMENTS

2.1 As part of a holistic fire safety management system, in addition to the management action outlined below, considerations of passive and active fire precautions are essential.

2.2 Passive fire precautions are concerned with the physical conditions in premises which are designed to facilitate containment of fire by design, construction and layout, effective communication and safe evacuation. In particular,

- materials specification, design, construction and inspection of buildings, fire doors and escape routes taking into account the needs of service users, people with disabilities, contractors, the public, etc;
- appropriate safe and secure location of building services e.g. gas and electricity;

- provision of clear fire safety signage for escape routes and final exits in conformity with the Myanmar Fire Brigade rules and Myanmar National Building Code (2016).
- provision of prominently located fire action notices (e.g. by fire alarm manual break glass points) to inform people of the action to be taken in the event of fire; and
- education and training of staff in fire safety arrangements, in particular evacuation procedures and drills.

2.3 Active fire precautions are those features of the fire safety management system that detect and operate in the event of a fire, including fire alarm systems, emergency lighting systems and firefighting equipment. In particular,

- the installation, maintenance, inspection and weekly testing of fire alarms;
- the appropriate design, location, operation, monthly inspection and annual testing of adequate (emergency) lighting systems for fire escape routes;
- the provision, use, appropriate type and location, and annual maintenance of portable fire extinguishers.
- A quarterly / six monthly / annual premises fire safety inspection will be carried out.

2.4 The fire safety arrangements will be based on the followings:

- Effective planning, organisation, control, monitoring and review of protective and preventative measures
- Fire safety risk assessments and building audits
- Fire safety systems and maintenance
- Fire warden and staff training
- Fire evacuation drills
- Building design, alterations and commissioning

3. PLANNING

3.1 Fire risk assessments are a requirement and a structured approach to determining the risk of fire occurring in a premise or from a work activity, and identifying the precautions necessary to eliminate, reduce or manage the risk. The outcome of the risk assessment must be incorporated in the fire emergency plan.

3.2 Fire Risk Assessments must be carried out and reviewed regularly (recommended to be annually) or when there is any building alteration or change of occupation and use of the premises, or following a fire incident/emergency, etc.

3.3 The risk evaluation and appropriate control measures to be taken into account will include those practical fire safety arrangements outlined above.

3.4 Risk assessments must take into account those who could be affected, e.g. numbers involved, their location, physical and mental capabilities and employees of organizations with whom a workplace is shared. The significant findings of the fire safety risk assessment will be made known to all other responsible persons as appropriate.

3.5 Where appropriate, an individual Personal Emergency Evacuation Plan (PEEP) must be developed for staff or service users who have known disabilities that will impact on their ability to evacuate the particular premises.

3.6 Maintenance of fire safety systems include:

- Fire detection and warning system
- Emergency lighting
- Fire fighting facilities
- Emergency routes and exits
- Fire safety signs and notices
- Portable electrical appliances (PAT) and premises installation testing (5 yearly)

3.7 Fire Warden and staff training will be provided through a competent trainer**.** It is the responsibility of all Fire Wardens to attend one refresher training annually on one of the dates available.

3.8 Fire evacuation exercises will be carried out each term / 3 monthly, 6 monthly / annually within individual premises. The purpose of these exercises is to educate premises occupants in the correct manner of evacuating a building in the event of an emergency situation and to meet legal obligations. All evacuations will be conducted by the Fire Wardens. Pre and post de-briefing sessions will accompany each evacuation drill.

3.9 Provisions will be made for the safe evacuation of disabled people.

3.10 Fire evacuation of a building will be in accordance with established procedures in the fire emergency plan. In the event of a fire alarm outside of normal business hours, building occupants are to evacuate the building. All staff, guests and contractors will be made aware of the fire procedures.

3.11 All building design work shall comply with relevant codes and standards. New building works and refurbishment projects that include fire safety equipment and systems will be sanctioned by the concerned government departments.

3.12 Testing of building passive and active fire evacuation systems are to be conducted by the responsible Fire Department officer at agreed appropriate times during normal hours and in line with current standards. All building fire wardens will be trained in the use of the evacuation system and operate from pro-forma instructions.

3.13 Fire wardens will report any faults or problems to the Manager.

3.14 A fire safety log book will be kept to record the details of all tests on passive and active preventative and protective measures, as well as training and fire drills.

4. ORGANIZATION AND CONTROL

Specific named individual responsibility for overall responsibility for Fire Safety, maintenance, Emergency Plans and Staff Training can be found in Appendix.

Managers / Section Heads / Department Managers with responsibility for premises or parts of premises will:

- ensure that this Policy and/or any departmental fire safety policies/codes of practice that complement this Policy are in place, properly implemented and reviewed.
- ensure that a Responsible Person is appointed for all of their premises to oversee and implement fire safety arrangements, and ensure that they are competent and appropriately trained to undertake their duties;

- ensure that arrangements are in place for the completion of fire risk assessments, including, where appropriate, technical surveys in respect of fire protection;
- ensure that fire, security, and health and safety arrangements at each premise are complementary;
- ensure that fire risk assessments are carried out for all their workplaces, and for specific activities such as hot working involving welding, cutting, work with bitumen, etc;
- ensure, in conjunction with the outcome of the fire risk assessment that the optimum number and type of fire extinguishers are installed in appropriate locations;
- ensure that fire alarm and detection systems, emergency lighting and fire extinguishers are appropriately located and properly maintained;
- ensure that a robust and effective emergency plan is in place at each location to safely evacuate all persons, whether employees, visitors or service users and this emergency plan must take into account people with mobility, some sensory and some learning impairments, including those with temporary impairments, which will affect their ability to use stairs or otherwise evacuate premises promptly. the plan must be internally deliverable and not reliant on the Fire and Rescue Service to complete the evacuation;
- arrange for the emergency plan to be issued to their employees, guests, etc. to inform them what to do in the event of fire, particularly safe evacuation;
- arrange for a competent responsible person to be nominated to oversee and implement fire safety arrangements at their workplace(s) on their behalf;
- ensure that if there is any doubt about the provision of new or replacement fire extinguishers;
- ensure that staff are appropriately trained in fire safety procedures to reflect the requirements of the fire risk assessment;
- ensure that a copy of the current fire risk assessment for their premises is readily accessible, its provisions complied with;
- ensure that fire risk assessments are reviewed at least annually or whenever there is any building alteration, change of occupation or use of the premises or following an incident involving fire;
- ensure that effective arrangements are in place for contacting the emergency services;
- ensure that the Fire and Rescue Service are aware of any significant hazards associated with the premises e.g. oxygen cylinders, storage of petrol, etc; and
- confirm that their quarterly premises fire safety inspections address fire safety arrangements.

The Competent Persons (who must be competent to carry out this role) must:

- assist and support with the preparation and review (at least annually) of fire safety risk assessments;
- ensure compliance with the outcomes of the Fire Risk Assessment and that the necessary control measures are implemented;
- prepare and review the emergency plan issued to all staff;
- ensure information on fire safety arrangements is available to service users and guests;

- ensure all staff and, where appropriate, contractors are instructed in the emergency plan;
- arrange and review fire drills at a frequency of not less than six months;
- specify and rehearse the arrangements for assisting guests, disabled people or those with temporary physical impairments to safely evacuate the premises. Where appropriate, a PEEP must be developed;
- ensure Fire Alarms are regularly tested at the recommended frequency e.g. weekly;
- monitor that fire alarm systems, detection devices, emergency lighting and fire extinguishers are appropriately and regularly maintained;
- keep the fire log book or equivalent up to date;
- ensure that fire action notices (displayed as a minimum at fire alarm call points) and fire signage are appropriate and kept up to date;
- ensure all escape routes are kept clear of obstructions and that access to fire extinguishers and fire alarms is not impeded;
- ensure that the annual testing of portable electrical equipment and periodic testing (5 yearly) of the fixed electrical installations has been carried out, and
- ensure that quarterly fire safety inspections of the premises are carried out and that these address fire safety arrangements.

Employees must:

- ensure they are familiar with the emergency plan for their workplace and co–operate by participating in fire evacuation/drill procedures and by observing practical fire safety arrangements;
- know, and co-operate with, the responsible person for their workplace;
- report to their manager or supervisor any concerns about fire safety;
- be familiar with all escape routes;
- not wedge fire doors open, nor block or obstruct them;
- be aware of the action to be taken on discovering a fire, hearing a fire alarm, for raising the alarm (including the location of fire alarm call points) and calling the fire and rescue service;
- promptly evacuate the premises, in accordance with the emergency plan, to a place of safety without putting themselves and others at risk, and NOT attempt to extinguish a fire unless they have been specifically trained; and
- comply with the No Smoking legislation.

5. MONITORING

5.1 The following Key Performance Indicators will be used to monitor the effectiveness of the Fire Safety Management Plan: -

i. Number of fires recorded annually / number of fire related incidents.

ii. Achieving set schedules and time frames (evacuation drills and building audits).

iii. Measuring the number of Fire Service call outs against cause.

iv. Number and nature of enforcement, alterations or prohibition notices from statutory authorities.

v. Quarterly / six monthly/ annual premises inspection and meetings to ensure actions and progress are made.

vi. Annual audit of all fire systems by the manager.

6. REVIEW

6.1 Annual audit of all fire systems by the manager to ascertain compliance with not only statutory provisions but with this Fire Safety Management Plan.

6.2 Active reviews will take place quarterly prior to any likely accident or event.

6.3 Reactive reviews will take place following a fire safety event occurring.

6.4 A review will also be undertaken following a fire, changes to the premises construction and facilities, new procedures, new equipment, new materials and changes in staff numbers and roles.

APPENDIX 13: FIRE EMERGENCY PLAN

All aspects of the plan will consider out of hours occupation and identify where there would be differences e.g. personnel; locked doors; different escape routes etc.

Training and Training Provision

Identify any training needed and how it will be provided. This will include the following:

- Staff identified as trained in the use of fire equipment.
- Staff identified as trained in the use of the fire panel.
- Staff identified to register guests at the assembly point(s).
- Staff identified as having duties specific to the type of evacuation.
- Method of ensuring everyone understands how to operate the fire alarm.
- Method of ensuring everyone has sufficient instruction and training for fire evacuation.
- Method of ensuring guests / contractors have sufficient information on procedures in the event of an emergency evacuation.

Information Distribution

Detail the method(s) of informing personnel (incl. guests / contractors) of escape routes. This will include the following:

- Instruction
- Training
- Emergency exit / route signage
- Fire action Notices
- Include method of informing personnel of an alternative escape route should the main one be blocked or inaccessible. (Consideration should also be given to a route that leads past a potential arson attack area, such as near rubbish skips.)
- The Emergency Plan

What People / Staff Should Do If They Discover a Fire

- Raise the alarm by operating the nearest fire alarm call point
- Evacuate to a safe place
- DO NOT USE THE LIFT (unless it has been designated as a refuge or part of the emergency escape route)
- Trained personnel to tackle the fire only where appropriate
- Where appropriate check toilets and close windows and doors on the way out
- If have responsibilities for assisting persons with Personal Evacuation Plans respond as required following the actions as identified in the Plan
- Leave the building by the nearest exit
- Do not stop or return to collect personal belongings
- Ensure visitors are escorted from the building to the assembly point

- Close any doors en-route without delaying your escape
- You must remain at the assembly place
- Return to the building only when authorised to do so

What People / Staff Should Do If They Hear the Fire Alarm

If a person also has responsibilities for assisting persons with Personal Evacuation Plans respond as identified in the Plan. If not then:

- Leave the building by the nearest exit
- Close any doors en-route without delaying your escape
- Do not stop or return to collect personal belongings
- Do not use any fire fighting equipment unless you have been trained
- Do pass any information to the building responsible person at the assembly point
- Remain at the assembly place
- Return to the building only when authorised to do so

Contacting the Emergency Services

Detail:

- Who will contact the emergency services?
- What are the means of calling the emergency services? For example, by mobile telephone or landline
- Include a method in the event of a power failure

Identify Processes, Machines or Power That Must Be Shut Down

This would include the following where appropriate:

- Staff responsible for ensuring any hot work equipment is turned off
- Technology departments
- Welding
- Cookery
- Kitchen

Specific Arrangements for Any High-Risk Areas

For Example:

- Boiler room
- Chemical storage areas
- Gas storage
- Generators
- Work processes

Emergency Services Liaison Procedures

- Who will liaise with the emergency services on arrival?
- What information will they have and how will they get it?
- How will the person, identified above, direct the emergency services to the emergency? i.e. will they meet them at the gate or at a pre-determined place?
- How will the emergency services be able to identify this person? e.g. hi-viz vest, armband etc
- If anyone is missing and where they were last seen

Specific Information for the Emergency Services

How will the emergency services be given specific information such as:

- Type of emergency
- Location of the fire / incident
- Missing persons
- Flammable material stores
- Location of high risk areas
- Any unusual activities such as building works or temporary structures
- Hazardous work process

Location of information

Detail:

- Where will the information be kept on risks

  E.g. Maps / sketches / alarm identification?
- For example - held near the fire panel.

Accounting for Personnel

- How will all people be accounted for?
- How will the manager be informed?
- Who will ensure that all personnel are accounted for?
- How will this be managed if there is more than one assembly area?
- What is the procedure if someone is missing?
- How are the emergency services informed? (Note: Only the Fire Service personnel with appropriate breathing apparatus can enter the building if there is a person identified as missing)

Escape Routes

A map or diagram will be included for ease of reference. Include other relevant information such as details of firefighting equipment provided, location of designated 'Safe Refuges', types and location of emergency exit signs, locations of manual break glass points and emergency lighting.

Assembly Points

Give the locations of assembly points, including:

- the point where guests/ contractors must assemble
- Identify how each assembly area is recognised
- Identify who should be in each assembly area e.g. groups or departments or sections
- Identify the locations of any designated safe refuges
- Where possible provide plans or schematic diagrams

Identify Persons Especially at Risk

- Identify lone workers, contractors and the areas where they may be at risk
- Include methods of escape and identify how they will be located
- If there is sleeping accommodation on site, identify the method of ensuring that they are safely out of the building and accounted for

Evacuation Arrangements for Disabled People

The safe and effective evacuation of disabled people needs careful thought. Management procedures need to be in place which takes account of the various scenarios that may arise. For example, the procedures adopted for people with a disability are employed in the building will be different to those for person with a disability visiting the building that will be unfamiliar with its layout.

Systems of evacuation that may be implemented include:

Progressive Horizontal Evacuation. This system can be used in buildings with a phased alarm system. It involves a person passing from one 'fire compartment' into another that is not part of the initial evacuation zone. A ‘fire compartment’ is a part of a building separated from other parts of the same building by fire-resisting walls, ceilings, floors and doors of 60 minutes fire resisting construction.

Evacuation by Stairs. This method involves the use of equipment such as special evacuation chairs but is usually only possible if people are being evacuated downwards or horizontally.

Use of Refuges. Relatively safe waiting areas for short periods. They are not areas where disabled people should be left alone indefinitely until rescued by the fire brigade or until the fire is extinguished. *(This should not be confused with the use of refuges in progressive horizontal evacuation)*

A refuge is an area that is separated from the fire by a fire-resisting construction and has access via a safe route to a final fire exit and be clearly marked up with appropriate signage. It provides a temporary space for people to wait for others who will then help them evacuate.

Identify the method of ensuring that persons with any disability (permanent or temporary) are evacuated or taken to a designated 'Safe Refuge’ (if one is in place), until they can be evacuated in safety. Identify what communication channels will be used to ensure that persons in the 'Safe Refuge' are kept informed about what is happening.

Designate responsibilities for persons at special risk and:

- Who is responsible for ensuring that personnel at special risk are conducted to a place of safety or refuge until they can be evacuated in safety?

- Have they had any specific training e.g. using the 'evacuation chair'?

Staff with Specific Responsibilities

Give the name (post) and duties of identified personnel in the event of a fire or other emergency. E.g. the fire marshals / fire wardens, ushers

This would include backup personnel in the event that identified personnel are not available.

Overall Control

- Who is in overall control of the emergency situation and what are their responsibilities?
- Who records the emergency situation and actions taken?

A senior person would be nominated to:

- Take overall control of the evacuation
- Ensure that other people with specific duties have taken relevant action
- Account for all persons in the premises
- Liaise with the Fire Department
- Initiate any additional response in relation to the care of people with special needs

Fire Marshals and Fire Wardens

Fire marshals / fire wardens are valuable in any premises and vital in large ones. Fire Marshals / Fire Wardens will always be given responsibility for a specific area, i.e. a floor or a section, and will have general duties in an evacuation such as:

Who are the Fire Wardens and what are their responsibilities?

- Do they 'sweep' the building on their way out?
- Do they carry out ‘first aid’ fire fighting if trained and safe to do so?
- How do they ensure they do not work alone and put themselves at risk?
- Proceed to the assembly point close doors on route
- Helping the person in overall control of the evacuation by confirming their area has been checked

Fire Fighting

- Who is trained to use the fire fighting equipment?
- What are their responsibilities?
- Where is fire fighting equipment located?

Fire Control Panel

- Who will check the fire panel?
- What is their next step?
- What do they do with the information?
- Who is responsible for silencing and resetting the panel and on what occasions?

Contingency Plans

Have contingency plans for when life safety systems such as evacuation lifts, fire-detection and warning systems, sprinklers or smoke control systems, emergency lighting or building power system are out of order.

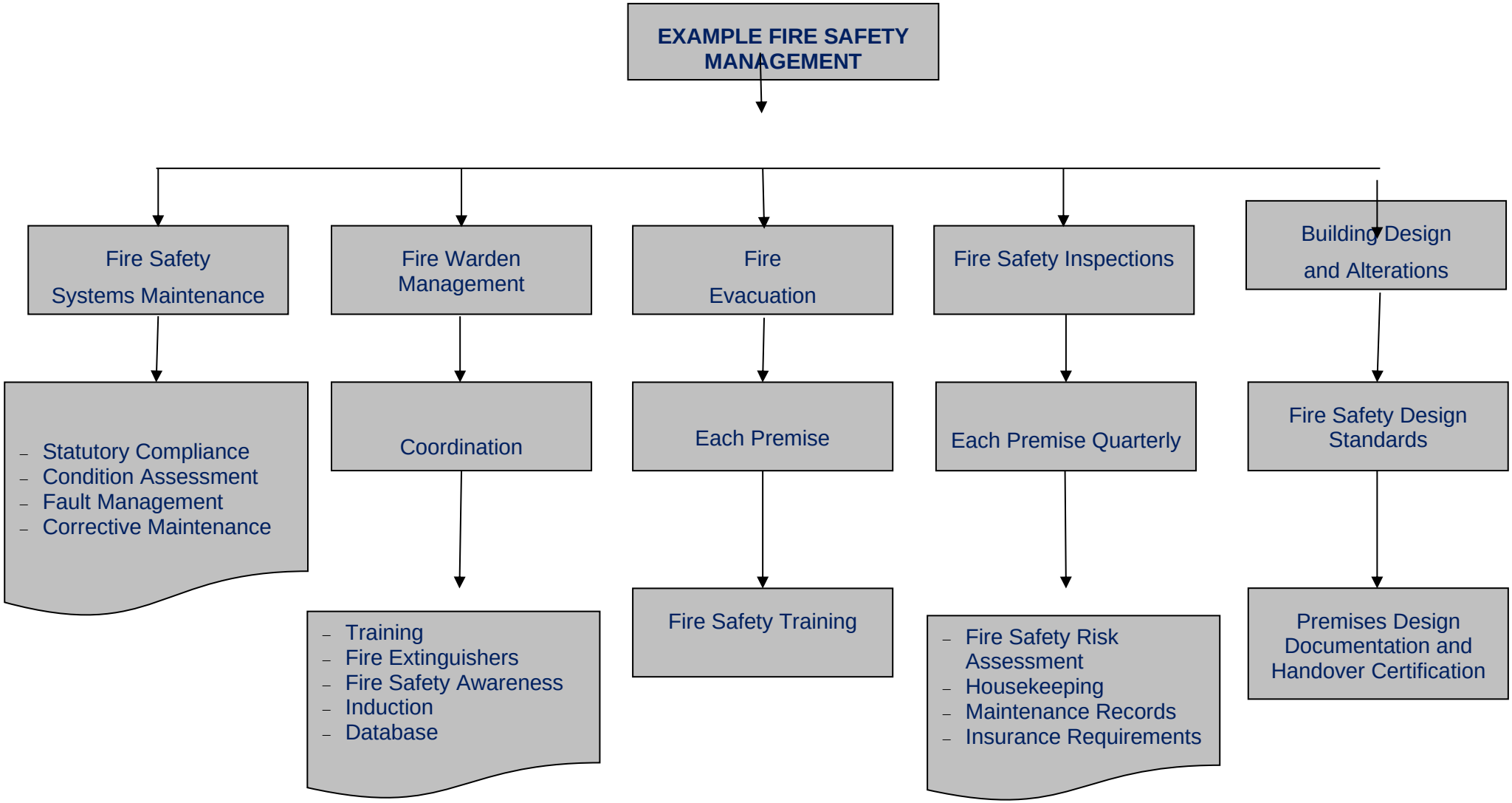
As part of the emergency plan it is good practice to prepare post-incident plans for dealing with situations that might arise such as those involving:

- unaccompanied children;
- people with personal belongings (especially valuables) still in the building;
- people wishing to rejoin friends;
- getting people away from the building (e.g. to transport);
- inclement weather; or
- the building cannot be re-entered / reoccupied.

Re-Entering the Building

- How people be prevented from re-entering the building?
- How will people know when they can re-enter the building?
- Note: If the emergency services have been called then the Fire Department Officer is responsible for giving permission for re-entry to the building

APPENDIX 14: EXAMPLE FIRE SAFETY MANAGEMENT AND CHECKLIST



EXAMPLE FIRE SAFETY MAINTENANCE CHECKLIST

	YES	NO	N/A	COMMENTS
Daily Checks				
Escape Routes				
Can all fire exits be opened immediately and easily?	☐	☐	☐	
Are fire doors clear of obstruction?	☐	☐	☐	
Are escape route clear?	☐	☐	☐	
Fire Warning Systems				
Is the main indicator panel showing "normal"?	☐	☐	☐	
Are whistles, gongs or air horns in their correct place?	☐	☐	☐	
Escape Lighting				
Are luminaries and exit signs in good condition?	☐	☐	☐	
Is the emergency lighting and signs working normally?	☐	☐	☐	
Fire fighting Equipment				
Are all fire extinguishers in place?	☐	☐	☐	
Are all fire extinguishers clearly visible?	☐	☐	☐	

Are all fire hydrants accessible for the fire service?	☐	☐	☐	
Weekly Checks				
Escape Routes				
Do all emergency fastening devices work correctly?	☐	☐	☐	
Are fire doors clear of obstruction?	☐	☐	☐	
Are all external escape routes clear?	☐	☐	☐	
Fire Warning Systems				
Did the fire alarm work correctly when tested?	☐	☐	☐	
Did staff and all others hear the alarm working?	☐	☐	☐	
Did any linked fire protection system operate correctly?	☐	☐	☐	
Did visual alarms, pagers or vibrating pads work?	☐	☐	☐	
Do voice alarms work and was the message understood?	☐	☐	☐	
Escape Lighting				
Are charging indicators visible and illuminated?	☐	☐	☐	
Fire fighting Equipment				

Are all fire fighting equipment in working order?	☐	☐	☐	
Are all fire extinguishers mounted 1 - 1½ metres?	☐	☐	☐	
Monthly Checks				
Escape Routes				
Do all electronic release mechanisms work correctly?	☐	☐	☐	
Do all automatic doors "failsafe" in the open position?	☐	☐	☐	
Are all self-closing devices working correctly?	☐	☐	☐	
Are all door seals and intumescent strips in good condition?	☐	☐	☐	
Are all external stairs in good condition and non-slip?	☐	☐	☐	
Do all roller shutters for compartmentation working correctly?	☐	☐	☐	
Do all internal fire doors close against their rebate / stop?	☐	☐	☐	
Escape Lighting				
Do all luminaries and exit signs	☐	☐	☐	

working when tested?				
Are emergency generators working correctly?	☐	☐	☐	
Fire fighting Equipment				
Is the "pressure" in stored pressure extinguishers correct?	☐	☐	☐	

	YES	NO	N/A	COMMENTS
Three Monthly Checks				
General				
Are emergency tanks / ponds at their normal / correct level?	☐	☐	☐	
Are vehicles blocking fire hydrants or access to them?	☐	☐	☐	
Additional items from manufacturers requirements?	☐	☐	☐	
Six Monthly Checks				
General				
Have sprinkler systems been tested by a competent person?	☐	☐	☐	
Have release and closing mechanisms on fire resisting compartment doors and	☐	☐	☐	

shutters been tested?				
Fire Warning Systems				
Has the system been checked by a competent person?	☐	☐	☐	
Escape Lighting				
Do all luminaries work for a third of their rated value?	☐	☐	☐	
Annual Checks				
Escape Routes				
Do all fire doors work correctly?	☐	☐	☐	
Is escape route compartmentation in good condition?	☐	☐	☐	
Fire Warning Systems				
Has the system been checked by a competent person?	☐	☐	☐	
Escape Lighting				
Do all luminaries operate on test for their full duration?	☐	☐	☐	
Has the system been checked by a competent person?	☐	☐	☐	
Fire fighting Equipment				
Has all equipment been checked by a competent person?	☐	☐	☐	

Miscellaneous				
Have dry / wet risers been tested by a competent person?	☐	☐	☐	
Has smoke control systems been tested by a competent person?	☐	☐	☐	
Has external access for the fire and rescue service been checked for availability at all times?	☐	☐	☐	
Have any fire fighters switches been tested?	☐	☐	☐	
Are fire assembly points clearly indicated by signs?	☐	☐	☐	

EXAMPLE FIRE SAFETY TRAINING PROGRAMME

All employees will receive adequate fire safety training and all fire safety training sessions will be delivered by a competent person. There will be one / two fire drills per year to test the fire safety training.

Fire Safety Training Sessions

New Employees:	Induction Programme
Current Employees:	One / Two training session per year
Fire Wardens:	One / Two training session per year specific to their duties
Managers:	One / Two training session per year specific to their duties and including fire safety risk assessment, responding to fire hazards, fault reporting procedures, liaising with the fire service, record keeping, induction of new staff, fire safety policies and procedures.

Fire Safety Training Topics

- The significant findings from the fire risk assessment and fire safety policies;
- What to do on discovering a fire;
- How to raise the alarm, including the locations of fire alarm call points (break glass points);
- The action to take upon hearing the fire alarm;
- The evacuation procedure for alerting guests, residents and visitors including, where appropriate, directing them to exits and assembly points at a place of total safety;
- The arrangements for calling the fire and rescue service;
- The location and, where appropriate, the correct use of portable fire extinguishers and fire-fighting equipment;
- Knowledge of escape routes including stairways and especially those not in regular use;
- How to open all emergency exit doors;
- The appreciation of the importance of fire doors, keeping them closed and not wedged open to prevent the spread of smoke and heat, keeping escape routes unobstructed;
- Where appropriate, isolating electrical power and gas supplies and stopping machines and processes;
- The safe use of and risks from storing and working with highly flammable and explosive substances;
- General fire precautions, fire awareness and good housekeeping practices;
- The no smoking policy (where applicable);
- Special provisions for assisting disabled people and any training needed;
- Identifying fire hazards and fire incidents reporting procedures; and
- Equipment fault reporting procedures.

EXAMPLE FIRE SAFETY MANAGEMENT STRUCTURE

The person with the **overall responsibility for fire safety**: **Planning**: Structure of organisation **Organisation**: Setting objectives, policy and procedures **Control**: Identify person responsible to tasks / actions **Monitoring**: Checks and the implementation of standards **Review**: Reviews of fire safety performance standards	**Responsible Person:** **Position:**

The person with responsibility for **fire safety risk assessment**: – Carrying out fire safety risk assessment – Review of fire safety risk assessments	**Competent Person:** **Position:**

The person with responsibility for the **maintenance programme**: – Fire detection and warning system – Emergency lighting – Escape routes – Fire safety signs and notices – Fire resisting walls, partitions and doors – Fire fighting facilities – Electrical appliances and premises installations	**Competent Person:** **Position:**

The person with responsibility for developing and reviewing the premises **Fire Safety Management Plan** which details the procedures to be taken by all staff, visitors, members of the public, service users and all relevant person in the event of fire.	**Competent Person:**

	Position:

The person with responsibility for **staff training**: – What to do in the event of fire – What to do upon hearing the fire alarm – Liaison with the fire service – Emergency shut down procedures – Fire fighting arrangements – The reason for good housekeeping practices etc	**Competent Person:** **Position:**

Emergency Response Plan

The developer is committed to the safety and well-being of its staff, employees and visitors. With this commitment, the Corporation established an emergency response plan and the emergency response team to manage and respond the emergency conditions.

The summary of the plan including procedures and practices to be followed in responding to emergency situations, namely, utility failure and fire and natural disaster like earthquake, storm, and floods is as follows:

Utility Failures

These include electrical outages, plumbing failure, gas leaks, steam line breaks, ventilation problems, elevator failures, etc. and when the utility failures occur, the people who are using these utilities or facing with these incidents have to follow the following procedures.

- Remain calm
- Immediately notify Security in the compound at given phone number xxxxxx
- If the building must be evacuated, follow the instructions on Building Evacuation
- Unplug all electrical equipment (including computers) and turn off light switches
- Use a flashlight: Do not light candles or use other kinds of flames for lighting
- Laboratory personnel:
  - Secure all experiments, unplug electrical equipment, and shut off research gases prior to evacuating
  - Close all fume hoods and chemical containers
- Elevators:
  - Remain calm
  - Use the Call Button of Phone to call for help
  - Do not try to climb out or exit the elevator without assistance

Fire

The detailed procedures are described in Fire Safety Management and Fire Emergency Plan.

Earthquakes

In the event of an earthquake:

- Stay away from large windows, shelving systems, or tall room partitions
- Get under a desk, table, door arch, or stairwell
- If none of these is available: move against an interior wall and cover your head with your arms
- Remain under cover until the movement subsides
- After the shaking stops, survey your immediate area for trapped or injured persons and ruptured utilities (water, gas, etc.)
- If damage has occurred in your area, inform Safety and Security immediately
- If it is safe to do so, remain at your location and await further instructions from responsible personnel
- Do not evacuate until instructed by emergency personnel
- Laboratory personnel:
  - Exit the lab to the corridor
  - Duck and cover near an interior wall
- If out in the open:
  - Stay in an open area away from buildings, power lines, trees or roadways
  - If in a car, pull over and stop. Do not park under an overpass or near a building. Be cautious about driving again, in the event roads are damaged
- After an earthquake:
  - Put on enclosed shoes to protect against broken glass
  - If the power is out use a flashlight. Do not light a match or candle
  - Be alert for safety hazards such as fire, electrical wires, gas leaks, etc.
  - Check on others. If there are injuries or other urgent problems, report them to Safety and Security
  - Give or seek first aid. Assist any disabled persons in finding a safe place for them
  - Evacuate if the building seems unsafe or if instructed to do so:
  - Use stairs, not elevators
  - Unplug small electrical appliances
  - Bring keys, purses, wallets, warm clothing
  - Be prepared for aftershocks
  - Cooperate with emergency personnel, keep informed, and remain calm

Floods

Minor or area flooding in the compound could occur as a result of a water main break, loss of power to sump pumps, or major multiple rainstorms.

- Secure vital equipment, records, and other important papers
- Move to higher, safer place
- Shut off all electrical equipment
- If in a lab, secure all laboratory experiments

- Do not attempt to drive or walk through flooded areas
- Wait for further instructions on immediate action from responsible staff and Security
- If the building must be evacuated, follow the instructions on Building Evacuation
- Do not return to your building if you have been evacuated by flooding until you have been instructed to do so by responsible personnel
- If you are assisting with flood cleanup, report immediately to Environmental Health and Safety unit any oil, chemical, or radioactive materials suspected of mixing with flood waters

Storms and Tornadoes

If storms and tornadoes happen

- Go to a basement, or lower floor of interior hallway or corridor (preferably a steel-framed or reinforced concrete building)
- Seek shelter under a sturdy workbench or heavy furniture if no basement is available
- Avoid:
  - Top floors of buildings
  - Areas with glass windows or doors
  - Auditoriums, gymnasiums, cafeterias, or other areas with large, free-span roofs
- If out in the open:
  - Cars -do not wait out the storm in a car; cars are not safe in tornadoes
  - Move away from the path of the tornado at a right-angle direction
  - Lie flat in the nearest depression, ditch, or ravine if there is no time to escape

Medical Emergency

If someone is injured or becomes ill:

- Stay Calm
- Dial **the nearest hospital or ambulance department number** and explain the type of emergency, the location, condition, and number of victims
- Let the dispatcher know of any safety hazards - chemical spill, fire, fumes, etc.
- Do not hang up unless told to do so by the dispatcher
- Do not move the victim unless there is danger of further injury if she/he is not moved
- Render first-aid or Cardiopulmonary Resuscitation (CPR) only if you have been trained
- Do not leave the injured person except to summon help
- Comfort the victim until emergency medical services arrive
- Have someone stand outside the building to flag down the ambulance and/or Safety and Security when they reach the vicinity

Shelter in Place/Safe Shelter

Shelter in place is useful when evacuation is not an option. Refuge is sought in an interior room with few or no windows. It is helpful to identify these locations within the department ahead of time and to ensure employees are familiar.

- Stop operations in the building.
- If there are visitors in the building, provide for their safety by asking them to stay—not leave. When public safety officials provide directions to shelter in place, they want everyone to take those steps immediately, where they are.
- Close and lock all doors, windows, and other openings to the outside.
- If necessary/possible, turn off heating or cooling system.
- Select interior room(s) above the ground floor with the fewest windows and vents. The room(s) should be large enough for everyone to sit comfortably and quietly. Use multiple rooms if necessary.
- Stay away from windows and doors.
- Remain calm and await further instructions.

DO NOT leave the room until directed to do so by a public safety official.

Note: There will be an orientation or training (including refresher course) related to the emergency response plan and procedures for all staff and employees every six months. Also, the practical exercise will be conducted on a regular basis. The emergency plan would be updated as needed.

APPENDIX 15: EMERGENCY PREPAREDNESS AND RESPONSE PROCEDURE

This Emergency Preparedness and Response procedure is established specifying how it will respond to potential environmental emergency situations and potential accidents. The management of the organization shall ensure implementation of the following procedure effectively.

a) Identify Hazardous materials used on-site and their locations

b) Assess the potential for accidents and emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)

c) Prevent incidents and their associated environmental impacts

d) Respond to actual emergency situations and accidents

e) Take action to mitigate the consequences of accidents and environmental emergency situations, appropriate to the magnitude of the emergency or accident and the potential environmental impact

f) Periodically test the procedure where practicable

g) Periodically review and, where necessary, revise the procedure, in particular, after the occurrence of accidents, emergency situations or tests 7.4.3.5 Emergency response facilities and arrangements

The management is required to determine, establish and provide the following emergency response facilities and arrangements;

a) Key organizational responsibilities, including emergency coordinator;

b) Arrangements with local emergency support providers;

c) Emergency response requirements, including emergency communication channels;

d) Locations and types of emergency response equipment;

e) Maintenance of emergency response equipment;

f) Training/testing of personnel, including the on-site emergency response team if applicable;

g) Testing of alarm/public address systems;

h) Evacuation routes and exits (map); and

i) Assembly points.

Assessment of Potential Emergencies

This section covers the aspects of the activities which have been identified as having the potential for accidents and emergency situations and which could have a significant environmental impact.

The management shall ensure that a high level assessment of potential emergencies at the organisation's premises is conducted and reviewed annually. This assessment shall include, but not limited to the following considerations.

a) Fire

- Rubbish fire, bush fire, electrical fire, oil / fat fire, gas fire.

b) Medical Emergency

- Heart attack, burns, cuts/lacerations, asthma, poisons

c) Internal Emergency

- Flood, oil spill, chemical spill, gas leak, power failure, structural instability.
- Health & Safety serious incident & dangerous occurrence

d) External Emergency

- Civil disturbance, vehicle accident, severe storm damage

e) Bomb or Substance Threat

- Chemical, biological or radiological threat, suspicious package

f) Armed or Aggressive Intruder

- Building invasion, armed intrusion, assault, act of terrorism

APPENDIX 16: POTENTIAL EMERGENCIES AND RESPONSE PLAN

Potential environmental incidents and emergencies likely to occur at the facility shall be identified and methods to respond to, mitigate, and prevent environmental emergencies shall be established and maintained at the organisation and reviewed annually by the management

Example of Potential Emergency Scenario

Potential Emergency Scenario	Action Required / Person Responsible
In the Event of a Fire	Pull the Fire Alarm and Call emergency contact number(s) Fire and Evacuation
See smoke or flames	Use CARE: - Contain the fire by closing all doors as you leave - Activate the nearest Fire Alarm pull station (Pull stations are located near all building exits) - Report the fire by dialing emergency contact number(s) - Evacuate or extinguish (In most cases, it is best to Evacuate)
	Use a Fire Extinguisher only if: - You have been trained - You have your back to an unobstructed exit - You have a fully charged and proper type unit for the fire you are fighting - The fire is contained, and you have reported the fire by Fire Alarm or emergency contact number(s) activation - Everyone else has left the area - There is little smoke or flames
	Never fight a fire if: - You lack a safe way to escape should your efforts fail - It has left its source of origin - You are unsure of the type of extinguisher you need or have - If you can't control the fire within 30 seconds, abandon your efforts, close the door(s) and evacuate immediately.
Medical Emergency	If someone is injured or becomes ill - Stay Calm - Dial emergency contact number(s) and explain the type of emergency, the location, condition, and number of victims - Let the dispatcher know of any safety hazards - chemical spill, fire, fumes, etc.

	- Do not hang up unless told to do so by the dispatcher - Do not move the victim unless there is danger of further injury if s/he is not moved - Render first-aid or CPR only if you have been trained - Do not leave the injured person except to summon help - Comfort the victim until emergency medical services arrive - Have someone stand outside the building to flag down the ambulance and/or Safety and Security when they reach the vicinity
Utility Failures	These may include electrical outages, plumbing failure/flooding, gas leaks, steam line breaks, ventilation problems, elevator failures, etc. For personal safety, in the event of a utility failure: - Remain calm - Immediately notify the management - If the building must be evacuated, follow the instructions - Unplug all electrical equipment (including computers) and turn off light switches - Use a flashlight: Do not light candles or use other kinds of flames for lighting - Laboratory personnel: - Secure all experiments, unplug electrical equipment, and shut off research gases prior to evacuating - Close all fume hoods and chemical containers
	- Elevators: • If passengers are trapped in an elevator, advise them to stay calm and tell them you are getting help • If it is safe for you to stay in the building, stay near the passengers until assistance arrives • If you are trapped in an elevator, - Help will be there soon: - Remain calm - Use the Call Button of Phone to call for help - Do not try to climb out or exit the elevator without assistance
Natural Disaster Earthquakes	In the event of an earthquake: - Stay away from large windows, shelving systems, or tall room partitions - Get under a desk, table, door arch, or stairwell - If none of these is available: move against an interior wall and cover your head with your arms - Remain under cover until the movement subsides - After the shaking stops, survey your immediate area for trapped or injured persons and ruptured utilities (water, gas, etc.)

	- If damage has occurred in your area, inform management immediately - If it is safe to do so, remain at your location and await further instructions from the management - Do not evacuate until instructed by responsible emergency personnel - Laboratory personnel: • Exit the lab to the corridor • Duck and cover near an interior wall - If out in the open, stay in an open area away from buildings, power lines, trees or roadways - If in a car, pull over and stop. Do not park under an overpass or near a building. Be cautious about driving again, in the event roads are damaged - After an earthquake: • Put on enclosed shoes to protect against broken glass • If the power is out use a flashlight. Do not light a match or candle • Be alert for safety hazards such as fire, electrical wires, gas leaks, etc. • Check on others. If there are injuries or other urgent problems, report them to the management • Give or seek first aid. Assist any disabled persons in finding a safe place for them • Evacuate if the building seems unsafe or if instructed to do so: • Use stairs, not elevators • Unplug small electrical appliances • Bring keys, purses, wallets, warm clothing • Be prepared for aftershocks • Cooperate with emergency personnel, keep informed, and remain calm

Emergency Protocols (Response to emergency situation)

a) **Emergency situation**

- Any of the above mentioned situations is considered to be emergency situation and must be reported to the management or member of the Emergency Team.

b) **Inform emergency situation**

- Any member of the staff who notices the emergency situation has the primary responsibility to inform the management or Emergency Team.

c) **Safety**

- For any occurrence of emergency situation, assure the safety of personnel in the area. Cordon the area and put “Caution” sign visible and make sure no one will enter into the affected area.

- Evacuate the area if necessary. Assembly Points are identified and Location Maps are displayed at strategic places.
- Check if anyone injured. Assess injury (eye, skin, inhalation, etc) and apply first aid. If necessary, make arrangements for further assistance (after applying first aid).
- If near the electrical outlet, shut off the supply and inform the electrician.

d) **Contain**

- The staff, who notices the emergency situation (related to environment) shall take prompt action to contain the emergency situation and prevent not to spread further (where possible). Absorbents and other materials are made available at several locations around the perimeter of the service centers.
- While containing the emergency situation, the staff shall use respirator mask.

e) **Communication**

- The staff, who notices the emergency situation shall report to the management. Call outside emergency assistance if the situation is uncontrollable.
- Names and contact information of the management team, EHS Team and other relevant Emergency Numbers are displayed at strategic places.
- Coordinate and direct emergency response activities and evacuation until arrival of the outside emergency services
- Where applicable, regulatory agencies shall be notified of environmental incidents.

f) **Access to the emergency site**

- The route to the access area is to be cleared to ensure that the outside emergency services vehicles can enter. Ensure that there should always be two access paths to the emergency site

g) **Drills**

- Annual drills are carried out to verify that the Emergency Plan is up to date and to verify staff understanding and conformance. Drills shall be conducted once per year assuming occurrence of the emergency situations.

h) **Analyse and report**

- After suppressing the leakage/ spill and the area is cleaned, remove the cordon.
- Prepare and submit a report indicating the cause of the spill and how to prevent it from happening again.
- Following an environmental emergency situation, the cause of the emergency and corresponding emergency methods shall be reviewed.

i) **Evaluation**

- The management shall maintain records of these tests. Methods to respond to, mitigate, and prevent environmental emergencies shall be amended as required based on the results of these tests. The Environmental Management Representative shall evaluate effectiveness of the Emergency Preparedness and Response procedure. The evaluation results shall be further discussed with management team for improvement where necessary.
- This emergency procedure is reviewed and updated as needed at least annually and in particular after the occurrence of accidents or emergency situations.

APPENDIX 17: RESPONSIBILITY AND AUTHORITY

Management

Management is responsible for planning for emergencies and initiating an emergency response arising from organisation's activities.

The management assisted by the EHS Team has the management responsibility for planning, implementation, and staff appointments for handling emergencies.

The Management Representative and respective Managers have primary responsibility at the site under emergency situation.

The management is responsible for communications within the facility and for obtaining outside support services.

Classification

The response / support services required associated with the individual Tier classes to the spill dimensions are classified in the table below:

Tier	Volume	Response
I	Up to 10,000 liters (10 m^3)	Organisation / Facility / Onboard Capability
II	Up to 1,000,000 liters (1,000 m^3)	Tier I response including the capabilities of other industries and government agencies
III	More than 1,000,000 liters (> 1,000 m^3)	Total national resources and foreign resources

Individual Responsibilities and Emergency Actions

Individuals within the premises are responsible for reporting emergency conditions and for responding to situation in a timely and orderly manner. In the event of an emergency, warn others in the vicinity; then, from a safe location, call immediate superior and / or the respective Service Manager and describe the nature and location of the emergency.

Each employee is responsible for their personal emergency preparedness. Knowing what to do when a major emergency occurs in the organisation and what personal preparedness measures are needed will strengthen the ability of the staff to care for themselves.

Training

All staff of the organisation receives training which includes information on emergency situation and response, action to be taken by anyone who observes an emergency situation. Training and emergency response exercises ensure that response personnel understand the organisation's emergency response procedures and know their responsibilities in an emergency.

Drills and Exercises

Exercises enable the staff to identify strengths and incorporate them within best practices to sustain and enhance existing capabilities. They also provide an objective assessment of gaps and shortfalls within plans, policies and procedures to address areas for improvement prior to a real-world incident. Exercises help clarify roles and responsibilities among different entities, improve interagency coordination and communications and identify needed resources and opportunities for improvement

Practice, Practice, Practice!

The best way to ensure the correct relationships have been established, the correct information has been collected, and the correct mechanisms are in place is to test the process through drills and exercises.

APPENDIX 18: PROJECT EMPLOYMENT

Introduction

As a result of this Project, 700 direct employment opportunities and about 1,000 indirect opportunities - mainly Project service provisions during operations – will be created. It is estimated that over 90% of the direct job opportunities will be for local workers with around 10% expatriates. Expatriate numbers are planned to be reduced through replacement by local employees over time as per MPE employment policies, specifically to train nationals and on the job training whenever possible.

Preference in employment will be given to staff residents in the communities surrounding the Project if their qualifications meet job requirements. The majority of security, cleaning and other routine manual jobs will be allocated to local contractors with preference given to the employment of local residents. The percentage of jobs that can be allocated to residents of the surrounding neighbourhoods will be known on completion of a community skills audit.

Construction Phase

The construction phase of the Project will be led by the EPC (engineering, procurement and construction) Contractor. However, the majority of site preparation and equipment erection will be subcontracted to local companies with some level of support by foreign companies for specialized roles. The construction team will comprise over 7,000 workers at the peak of activity and will include all levels of workers from a number of nationalities.

The construction team comprises 7 categories:

1. Contractor site management team. This will be predominantly expatriates (engineers from all related disciplines) supported by a number of expatriates from different nationalities as well as local engineers.
2. Local/national subcontractors' engineers. These will be principally local engineers, though major local construction companies also employ expatriate experts. Therefore, a small percentage of these engineers may be expatriates.
3. Local subcontractors' technicians and workers. These are normally direct employees of the Myanmar subcontractors and Myanmar nationals.
4. Casual workers. These are unskilled labour hired on a daily basis to support the subcontractors' technicians and workers. MPE will ensure that the EPC contractor will hire from the local communities to the maximum extent possible.
5. Project management consultant team (PMC team). These are expatriates and locals with international experience to help the owner in Project management tasks and high-level work supervision (e.g. specialist engineers).
6. The MPE team will be developed step-by-step during construction, such that a full team is assembled before commissioning. The team will be a mixture of no more than 5% expatriates with 95% being Myanmars.
7. ESMP implementation team.

The construction phase will be an intense period of activity when over 7,000 workers (at the peak of activity) will be employed on activities on the Project's Plots. HSE organizational charts are being prepared which will include the management of the ESMP.

Operational Phase

Employee numbers during the operational phase of the Project are estimated to be 700, including contracted staff. Employees at the New Refinery will work eight-hour shifts. There will be three shifts a day.

Staffing for operations begins during the design and construction phases with hiring of key personnel who will lead the Project into operations. During the construction phase, MPE will be identifying and hiring experienced Local and expatriate personnel (including two Area Supervisors to be hired in the 4Q 2022) who will join the MPE team to support engineering and construction. Based on their history and knowledge, these personnel will become an integral part of the operations and maintenance organisation for the operating oil product processing facility. In 2025, the last year of construction, recruitment will be accelerated to employ the remainder of the MPE team members who will manage and operate the oil product processing facility. This will enable the key team members to participate in the later phases of construction as well as during the pre-commissioning, testing and commissioning of the facilities, giving them a sound basis for operating the oil product processing facility in a safe and efficient manner. It is anticipated that initially the first Oil product processing facility Manager, the Operations and Maintenance General Manager, Technical Services General Manager, Maintenance and Reliability Manager and HSE Manager will be expatriates (to be replaced by experienced Local managers over time).

The recruitment will be phased during construction with the rapid increase of most staff during the last year of construction. To supplement its technical/engineering/operations resources, MPE is entering into an agreement with EPC to source key management and supervisory personnel to mentor and provide hands-on support to MPE personnel. In addition, EPC has committed to identify and provide qualified Myanmar nationals on an as-required basis.

Currently two top MPE positions are filled by expatriates with diverse experience in infrastructure construction and oil product processing facility operations; the Chief Executive Officer and Chief Operating Officer.

Training for Operations

The successful operation of the oil product processing facility will largely be dependent upon the professionalism and capability of the personnel engaged to execute the operations and maintenance functions. It is anticipated that the oil product processing facility will be staffed by approximately 700 personnel, either directly employed by MPE or through outsourced service providers. The EPC Contractor is committed in the EPC Contract to provide the Developer's personnel with extensive training programmes.

MPE will employ a Training Manager to manage training and employee development during operation of the oil product processing facility. Ongoing training programmes for personnel will be conducted on site and elsewhere if specialist training is needed to ensure that those who maintain and operate the facilities employ the latest technology, safe operation methodologies and know- how developed through industry experience and shared best practice. Training materials and support will be secured through well-known firms such as Technology Training Systems (Aurora, Colorado). For less technical training, where required, local (Myanmar) specialists will be sought.

Technical Support for Operations and Maintenance

It is MPE's plan to extend commercial arrangements with the process licensors and key suppliers to secure the presence of at least one of their representatives for the first 4 - 6 months of operations to ensure a smooth transition into efficient operations by the MPE operations and maintenance team. In addition, to support operations and maintenance programmes, MPE will put in place commercial arrangements in the form of long term service agreements with licensors and major equipment suppliers to ensure their availability on an

as-requested basis to consult on operations and maintenance issues and to support scheduled and unscheduled outages with the participation of key personnel with the appropriate expertise.

Employee Issues and Accommodation

It is common in major Projects of this size to establish a construction work camp to house foreign workers and often some nationals, as this is economic and efficient for the contractor. The local area is space-constrained and a number of options are currently being considered for worker accommodation. If camps start to be utilized, strict controls will be developed and implemented to ensure good community relations. Management of worker influx will be provided by the ESMP, which will include procedures for Project induction for all staff, camp rules, etc. This will be developed in due course following ongoing dialogue between MPE, the Contractor, PMC, and ultimately the Lender Advisors.

The oil product processing facility is strategically located in the south-west of Magway with easy access from all Magway areas. All the local employees will therefore supply their own accommodation, although in view of the large Myanmar workforce, consideration may be given to establishing a camp, which would be outside of the proposed new refinery area. Further ESIA studies of this area will be conducted (ESIA addendum). Accommodation arrangement options will be made for the entire expatriate team to be located in existing refinery's staff quarters.

A canteen will be built to provide food on site that is compliant to health and hygiene standards and to minimize potential disruption to local services within the community. However, where feasible, procurement of foods and canteen labour will be from the local community, who will be afforded the appropriate skills training.

Employee conduct and community relations will be governed by compliance with the overall ESMP, which in its draft form provides a framework for management of the integration of the large temporary workforce during construction. The ESMP is cognizant of the potential social issues that can arise from the introduction of a large foreign workforce and establishes procedures for minimizing adverse impacts to the local communities. The ESMP includes:

- The requirement for Project induction for all workers;
- Training on social attitudes and social context for all foreign workers, including induction training on conduct of life and work in Myanmar;
- Employment policy;
- Health and safety at work policy;
- Community relations policy; and
- Social policy. Employee and management communications will be conducted via the managerial hierarchy.

APPENDIX 19: WASTEWATER TREATMENT PLAN

Wastewater

Relatively large volumes of water will be used by MPE, resulting in the production of four types of wastewater:

- surface water runoff;
- cooling water;
- process water; and
- sanitary wastewater.

Surface water runoff

Surface water runoff is intermittent and contains constituents from spills, leaks from equipment and any material that may have been collected in drains. Surface runoff water also includes water collected in the roof drains of storage tanks.

Cooling water

A large portion of water used by MPE is for cooling. Cooling water does not typically come into direct contact with process oil streams and therefore contains less contaminants than process wastewater. Most cooling water is recycled with a bleed or blow downstream to the wastewater treatment works (WWTW) to control the concentration of contaminants and solid content in the water. Cooling towers within the recycle loop cool the water using ambient air.

Process wastewater

Water used in processing operations also accounts for a significant portion of the total wastewater. Process wastewater arises from steam stripping operations, pump gland cooling, product fractionator reflux, drum drains and boiler blow-down.

Sanitary wastewater

The sanitary wastewater will be discharged to the wastewater treatment plant with no untreated wastewater discharged into the local system.

Wastewater Treatment

Wastes associated with the primary treatment of wastewater at the MPE complex are considered as hazardous waste and include sludge, dissolved air flotation (DAF) float and wastes from settling ponds.

As previously mentioned, wastewater consists of cooling water, process water and sanitary sewage water.

Although cooling water does not come into direct contact with oil streams, it may contain some oil contamination due to leaks in the process equipment. Process water often comes into direct contact with oil, so it is usually highly contaminated. The process effluents along with the oily water and cooling water will be treated in the WWTP. The quality of treated wastewater will conform to the regulation limits for discharging to sewer system.

Wastewater Treatment Technology

Wastewater produced from the MPE complex will be treated in two stages with a final supplementary or polishing stage whenever needed.

Primary WWT consists of the separation of oil, water and solids in two stages. During the first stage, a corrugated plate interceptor is used. Wastewater moves very slowly through the separator allowing free oil to float to the surface and be skimmed off and solids to settle to the bottom and be scraped off to a sludge collecting hopper.

The second stage utilizes physical or chemical methods to separate emulsified oils from the wastewater.

Secondary treatment or biological treatment is performed by the addition of oxygen to assist the biological consumption of oil and organic pollutants and generate biomass waste, which is typically treated anaerobically and then de-watered.

Additional treatment, known as the polishing stage, may be performed, in which activated carbon (or sand) is used to eliminate the remaining impurities such as biomass, trace metals or organic chemicals.

The use of an intermediate settling pond will be considered to allow the silt in the cooling water to drop out before the water is routed to the water service coolers and condensers.

Wastewater Treatment Works

The quality of the discharged water from the oil product processing facility must meet both domestic and international standards for wastewater, sludge and solid waste and provisions must be made for the treatment of the existing refinery's sour water.

The MPE processing units, like as hydro-cracking unit will produce sour water highly loaded with contaminants such as H_2S and ammonia, and with high BOD, COD and TOC values. This will require treatment in sour water strippers, an API interceptor, dissolved air flotation (DAF) and a Biotreater to reduce BOD, COD and TOC.

Wastewater treatment plant

The treatment plant should be designed on the following philosophy

- To treat and recycle the effluents from one process to another and also the domestic effluent
- To ensure that the treated effluent is within the stipulated standards or statutory norms of ECD/MONREC.
- Stream wise treatment of wastewater
- To reduce the load on the secondary treatment units

Effluent Treatment Plant

The composite effluent from the rest of the plants mainly consist of oil, grease, organic matter and suspended solids which should be treated in effluent treatment plant consisting of primary, secondary and tertiary facilities.

The primary treatment facilities consist of TPI (Tilted plate inceptor pit) for removal of free oil, equalization tank and pH Adjustment tank for pH correction, Flocculator followed by Dissolved Air Flotation Unit (DAF) for removal of emulsified oils.

The secondary treatment is a combination of the attached growth and suspended growth system consisting of Equalization tank, Bio tower and Aeration tank and Secondary clarifier followed by Guard pond and polisher.

The tertiary treatment facility consists of clarified water sump, Rapid sand filter and Activated carbon filter.

The air is continuously blown from the bottom of the tank so that effluent mixed properly in the tank, due to flowing of air in upward direction it will carry the free oil to the surface, is taken to the slop oil tank via slop oil sump. There is a provision to removal of water from the tank. The equalized effluent should be further treated in Dissolved Air Flotation (DAF) tank for removal of emulsified oils and suspended solids. The oil and scum from the surface should be removed with the help of mechanical

skimmer. The scum and oil should then be taken to the sludge pump.

The effluent from the equalization tank should then pumped into 2 stage biological system compromising of plastic media bio towers as the first stage and a part of the effluent should be taken to the fine bubble diffused aeration system as the second stage.

The overflow of the effluent should then take to the clarifier for removal of biomass and the overflow from clarifier should be collected in clean clarified sump where chlorine would be added. Then the effluent should be pumped through dual media filters. Then effluent from the filter should be send to the polishing aeration tank. In this DO level will rise and the effluent from this unit could be used for horticultural purposes and make up water in cooling towers.

The MPE sought clarification on details of Common Effluent Treatment plant. Some of the plants that have typical effluent characteristics that need pre-treatment will have their own effluent treatment plant within the battery limit of the specific plant. These plant specific ETPs will treat their respective effluent to the specified standard that would be acceptable at the Central ETP.

The composite effluent from the all the plants will mainly consist of oil, grease, organic matter and suspended solids which would be treated in effluent treatment plant consisting of primary, secondary and tertiary facilities.

The primary treatment facilities consist of two stage oil removal – the first being free oil removal and the second would be emulsified oil removal.

The secondary treatment is a combination of the attached growth and suspended growth biological system consisting of Equalization tank, Bio tower and Aeration tank and Secondary clarifier followed by Guard pond and polisher. The tertiary treatment facility consists of clarified water sump, Rapid sand filter and Activated carbon filter.

For further recycle and reuse of the treated wastewater, effluent polishing methods like RO, Ion Exchange columns etc will be explored and implemented.

APPENDIX 20: WASTE MANAGEMENT PLAN

Waste Management (Hazardous /Solid waste)

Solid waste disposal and management is a prime concern in the New Refinery as it not only comprises of the household waste but also the industrial waste. The domestic waste with assumed solid waste generated of 0.5 kg / capita / day solid waste will be generated in the New Refinery township. However, the catalyst waste generation frequency varies based on the type of catalyst and its frequency of regeneration.

Proposed Solid waste management system

In the short-term, the trash collection areas should be designed for collection of recyclables and should have a used oil collection tank or a rack on which to store containers of used oil. In the short-term, this oil should then be exported off-site to a refinery for recycling or to a facility where it could undergo proper disposal.

This emphasizes the need of on-site recycling of oil, which is an upcoming concept. There are two main uses for recycled oil:

- It can be re-refined in the refinery and then used in combustion engines and as a lubricant, or
- It can be burned as fuel, if the proper procedures and equipment are used.

For this facility, the oil collection service transport should collect the oil to an onsite facility for treatment. Ideally, this facility should be located near or in conjunction with New Refinery's petroleum, oil, and lubricant facility.

For most of the collected oil, a simple oil separation and storage apparatus should suffice. The used oil should be emulsified; however, a more advanced system called "ultra-filtration" is required. If high levels of metals or other contaminants are present, a chemical or reverse osmosis unit may be necessary. In both ultra-filtration and osmosis, the waste water that is removed during separation is clean enough to be used directly for gray water and should go to the proposed gray water collection area.

Once treated, the oil should be utilized within New Refinery industries with oil boilers for use as a fuel source. The treated oil is actually a preferred fuel source for many industrial facilities. Many of the industries in the New Refinery can be potential candidates for this treated oil.

For the residential township, the effective solid waste management systems are needed to ensure better human health and safety. They should be safe for workers and safeguard public health by preventing the spread of disease. In addition to these prerequisites, an effective system of solid waste management should be both environmentally and economically sustainable. Clearly it is difficult to minimize the two variables, cost and environmental impact, simultaneously. There will always be a tradeoff. The balance that needs to be struck should reduce the overall environmental impacts of the waste management system as far as possible, within an acceptable level of cost.

It is proposed that mechanical composting process be adopted, which is eco-friendly and also some revenue can be generated by the sale of compost.

Recycling turns materials that would otherwise become waste into valuable resources. Materials like glass, metal, plastics and paper are collected, separated and sent to facilities that can process them into new material.

All biodegradable municipal solid waste should be mixed with sewage sludge to undergo composting to produce saleable fertilizer. Composting is another form of recycling. Non-biodegradable waste should be brought together with the industrial waste to the landfill for

ultimate disposal. Although source reduction, reused, recycling and composting can divert large portions of municipal solid waste from disposal, non-biodegradable waste should be collected in landfills. Landfills within the New Refinery should be well-engineered facilities that are to be located, designed, operated, monitored, closed, and cared for after closure, cleaned up when necessary to protect human health and the environment.

Different processes have different catalyst, which have to be replaced at different intervals. Based on the process, the spent catalyst will be deactivated based on the methods prescribed by the catalyst suppliers. The spent deactivated catalyst will either be taken back by the catalyst supplier for regeneration or the catalyst with available activity can be sold to other processing units. Spent Catalyst containing precious metals can be sold to authorized processors for precious metal recovery. The management and disposal of catalyst will be in line with the requirements of the Hazardous Waste (Management and Handling) Rules.

Segregation and Storage at source

It will be necessary to segregate the solid waste generated at every household as well as in the commercial premises. The segregation will entirely depend upon its source of generation, it should be segregated as biodegradable as well as non-biodegradable and accordingly, it should be stored in different containers or bags with different color codes.

There will be another types of solid waste termed as Bio-medical waste, which will be generated at the medical centre. It will also be of hazardous and non-hazardous type, and hence required to be segregated and collected in separate containers provided at individual medical centers.

Control of contamination risk linked to the storage of toxic or hazardous waste:

- Water-proofing and installation of containment system for loading and unloading area.
- Installation of chemical storage areas which are linked to containment systems, if possible covered.
- Avoidance of chemical and storage tank drainage systems installed underground.

Collection and transportation

The refuse collector should collect the bags daily from the container placed in residential areas. Small trucks (dumpers) of capacity 4.5 m3 is suggested for collection of waste. It should be rear loading type equipped with hydraulic loading and mechanical tipping mechanism. Truck shall be designed for manual loading of bags and mechanical unloading at the storage depot.

Waste collected from the litter bins provided at suitable intervals on the street should be a mixture of biodegradable and non-biodegradable waste. This waste should be emptied in to the closed truck and transported to storage transfer depot. Road sweeping is proposed to be done mechanically. Garden waste should be collected once in three days.

Treatment and Disposal Strategies

Several technologies are recommended for processing, treatment and / or disposal of solid waste. Some of them are Microbial composting, Vermi composting, Incineration, Power generation, Fuel pelletisation etc. Each waste has a separate destination depending on its quality. However a general treatment and disposal strategies as out lined in Municipal Solid wastes (Management and Handling) Rules that can be adopted is as follows:

- After collection and bringing all the coloured bags at one storage area, the biodegradable waste from residential, commercial areas can be transported on routine basis through the authorized contractors to composting plant, whereas non biodegradable should be disposed off to common land fill site. Due care should be taken to avoid fly nuisance throughout the cycle of collection, transportation, treatment and disposal of biodegradable waste from residential and commercial areas
- The recyclables such as metal canes, plastics etc. should be sold to only authorized vendors.
- Hazardous part of bio-medical wastes should be incinerated at common incineration facilities and the incinerated ash should be disposed in the on-site secured landfill, while non-hazardous wastes should be disposed off on pre-identified landfill site in consultation with local administration body.
- The final designing and modalities may be carried out during construction phase of the project or a tie-up with local administration should be made for entire solid waste disposal, after being collected and segregated at township complex.
- The tank truck loading and unloading area should be sealed and linked to containment facilities.
- Hazardous substance storage area should be contained and when possible, covered to any pollution through run-offs.
- Wastewater and chemical drainage systems must undergo regular inspection for leaks.
- Chemical drainage systems inside the facility and storage tanks should be above ground, unless otherwise recommended for reasons of hygiene and safety.
- It is also recommended that a monitoring programme be implemented to check underground water for any spillage.
- It is the best practice that all necessary measures should be taken in the design and operation of the facility to ensure proper waste treatment through the definition of procedures which aim to:
  - limit the quantity and toxicity of waste at source.
  - sort, recycle and reuse manufacturing sub-products.
  - ensure the treatment or pre-treatment of toxic waste.
  - ensure storage of final waste in the best possible condition

Disposal of catalyst used in the different process

Different processes have different catalyst, which have to be replaced at different intervals. Based on the process, the spent catalyst is deactivated based on the methods prescribed by the catalyst suppliers. The spent deactivated catalyst is either taken back by the catalyst supplier for regeneration or the catalyst with available activity is sold to other processing units. Spent Catalyst containing precious metals will be sold to authorized processors for precious metal recovery. The management and disposal of catalyst will be in line with the requirements of the Hazardous Waste (Management and Handling) Rules.

Management & treatment measures of hazardous and non-hazardous wastes for each discharge source during operation phase of the Complex are presented in *Table below.*

***Hazardous waste** management & treatment measures in operation phase*

No.	Waste type	Handling, storage and transportation of wastes	Treatment and disposal of wastes
1	Spent catalyst	To be collected into HDPE bags/ drums, labelling and transfer to designated hazardous Waste storage area prior to offsite transportation to Hazardous waste management facility.	Appropriate treatment Of hazardous waste (e.g. Physical, chemical, biological or thermal oxidation, reuse as feedstock of cement factory etc.) followed By suitable landfill both through approved/ licensed waste management facility
2	Spent Hydrotreater catalyst		
3	Spent solid phosphoric acid catalyst		
4	Spent catalyst from SRU		
5	Spent catalyst from SCOT		
6	Spent absorbent		
7	Replacement of inert material		
8	Spent absorbent		
9	Spent desorbent		
10	Catalyst grading material (from HDS reactor)		
11	Spent selective hydrogeneration catalyst		
12	Clay treater waste		
13	Waste oil from air and Nitrogen compressor	To be collected into drums, labelling and transfer to designated hazardous waste storage area prior to offsite transportation to approved/ licensed Lube oil recycling agencies.	Sent for used lube oil recycling through approved /Licensed lube oil recycling agencies. Requirements of Basel convention to be followed in case of transboundary movement of wastes.
14	Sludge from API of the ETP	To be collected into HDPE	
15	Sludge from CPI of the ETP	bags/drums, labelling,	
16	Sludge from FFB of the ETP	and transfer to	

17	Sludge from biological treatment section of the ETP	Designated hazardous waste storage area	Burnt at incinerator of ETP
18	Sludge from tertiary treatment section of the ETP	prior to ETP Waste Incineration facility	
19	Ash from incinerator of the ETP	To be collected in to HDPE bags/ drums, labelling, and transfer to designated hazardous waste storage area prior to offsite transportation to hazardous waste management facility.	Sent to licensed hazardous waste treatment facility
20	Waste fuel	To be collected in drums/tanker, labelling and transfer to designated hazardous waste storage area prior to offsite disposal to approved Units/ Plants (e.g. cement manufacturer, etc.) having adequate facilities to utilise Refinery waste oil/ tarry material/ sludge without causing any harm to environment.	In-house use or offsite disposal to approved Units/ Plants (e.g. cement manufacturer, etc.) having adequate facilities to utilise Refinery waste oil/ tarry material/ sludge without causing any harm to environment.
21	Empty chemical drum	To be transferred to designated hazardous waste storage area prior to offsite disposal.	In-house use or offsite disposal to approved used drum handling facilities having adequate facilities to decontaminate drums prior to its further use.
22	Waste lubricant	To be collected into drums, labelling, and transfer to designated Hazardous waste storage area prior to offsite transportation to approved / licensed Lube oil recycling agencies.	Sent for used lube oil recycling through approved /Licensed Lube Oil Recycling Agencies. Requirements of Basel Convention to be followed in case of transboundary movement of wastes.

23	Cooking oil	To be collected in to drums, labelling, and transfer to designated domestic waste storage area prior to offsite transportation to approved / licensed cooking oil recycling or incineration agencies.	Sent for used cooking oil recycling through approved domestic waste storage area prior to offsite transportation to approved / licensed cooking oil recycling or incineration agencies.
24	Dry battery	To be separately collected in plastic bag, labelled and stored in a designated storage area or Hazardous waste storage area.	Waste to be disposed to approved recycling or hazardous waste disposal facility
25	Medical waste	Medical waste to be collected in plastic bag labeled and sealed. Sharps to be placed in puncture resistant container Both container/ bag to be stored under control of medical staff	Medical waste to be incinerated at approved medical waste incineration facilities and incineration ash to be disposed to the licensed / approved secured landfill facility.
26	Toner (from copiers)	Used toner to be collected in a separate container, labeled and stored at area designated for its storage.	Waste to be disposed to Vendor or approved waste disposal facility
27	Solvent/ paint/thinner residue		
28	Sealants/ mastic	Waste to be collected in waste storage containers/bag, labeled and stored at designated storage or Hazardous waste storage area.	
29	Spill absorbents	Spill absorbent (contaminated with hazardous material) waste to be collected in waste storage containers/bag, labeled	Waste to be disposed to approved Hazardous waste disposal facility

		and stored at Hazardous waste storage area	
30	Contaminated Soil	Contaminated soil waste to be collected in waste storage containers/bag, labeled and stored at Hazardous waste storage area.	
31	Used Fluorescent tubes	Used fluorescent tube to be collected in puncture resistant container, labeled and stored at area designated for its storage	Waste to be disposed to approved waste land fill facility
32	Aerosol containers	Empty /used aerosol cans to be collected in a puncture resistant container, labeled and stored at area designated for its storage	

Non-hazardous *handling & treatment measures in operation phase*

No.	**Waste type**	**Handling, storage and transportation**	**Treatment and disposal of wastes**
1	Tyres	To be stored at area designated for its storage or at non hazardous waste storage area.	
2	Plastic bottle, containers	To be collected in puncher resistant bags/ drums stored at area designated for its storage or at non hazardous waste storage area.	Waste to be disposed to approved scrap dealers or inert waste disposal facility

3	Drums /container (non contaminated)	To be stored at area designated for its storage or at non hazardous waste storage area. Explore possibility of reuse of the drums.	Waste to be disposed to approved scrap dealers or drum disposal facility
4	Glass	Used waste to be collected in punchure resistant bags/ drums stored at area designated for its storage or at non hazardous waste storage area.	Waste to be disposed to approved scrap dealers or inert waste disposal facility
5	Waste paper	Office paper waste from shredding collected in plastic bags to be stored at area designated for its storage.	Paper waste to be disposed to approved Paper waste recycling agency.
6	Office furniture wastes	Used waste to be stored at area designated for its storage.	Waste to be disposed to approved scrap dealers or inert waste disposal facility
7	Office Electronic wastes	Used electronic waste to be collected in a separate container, labeled and stored at area designated for its storage.	Waste to be disposed to Vendor or approved electronic waste disposal facility
8	Laboratory waste e.g. broken glass wares, equipment/ instruments, etc.	Laboratory waste to be collected in separate puncture resistant bags/drums, labeled, and stored at designated storage facility near laboratory or at Non hazardous waste storage area	Waste to be disposed to approved inert waste disposal facility
9	Domestic waste	Waste to be collected in domestic waste bins. To avoid unhygienic	Domestic waste to be collected and disposed to approved/licensed

		/septic condition/odour nuisance, the waste to be collected and disposed daily.	municipal landfill /disposal facility.
10	Domestic sewage	Sanitary waste /sludge to be collected and disposed on periodic basis.	Sanitary waste to be collected and disposed to in house incineration facility or approved/ licensed offsite municipal landfill /disposal facility.
11	Used PPE (Noncontaminated)	Waste to be collected in separate bags/drums, labeled, and stored at designated storage facility or at Nonhazardous waste storage area	Waste to be disposed to approved inert waste disposal facility
12	Spent catalyst sludge from scrubber at RFCC Unit	Waste to be collected in separate bags/drums, labeled, and stored at designated storage facility or at Nonhazardous waste storage area	Waste to be disposed to approved inert waste disposal facility/ Cement Manufacturers, Brick manufacturer, inert land fills, filler in bituminous mixtures, etc

APPENDIX 21: TERRESTRIAL HABITAT RESTORATION PLAN

The proposed greenbelt development in the New Refinery should be of a suitable width along the periphery of the New Refinery area including residential complex, space between the units located within the the New Refinery, along the roads, railway sidings, the hazardous waste disposal facility, storage areas, loading / unloading areas of products etc.

Criteria for selection of species for greenbelt

The plant species suitable for green belt development should be selected based on the following characteristics.

- It should have thick canopy cover
- They should be perennial and evergreen
- They should have high sink potential for pollutants
- They should be efficient in absorbing pollutants without significantly affecting **their growth.**
-

Guidelines for plantation

The plant species identified for greenbelt development should be planted using pitting technique. The pit size should be either 45 cm x 45 cm x 45 cm or 60 cm x 60 cm x 60 cm. Bigger pit size is prepared on marginal and poor-quality soil. Soil used for filling the pit should be mixed with well decomposed farm yard manure or sewage sludge at the rate of 2.5 kg (on dry weight basis) and 3.6 kg (on dry weight basis) for 45cm x 45 cm x 45 cm and 60 cm x 60 cm x 60 cm size pits respectively. The filling of soil should be completed at least 5-10 days before actual plantation. Healthy sapling of identified species should be planted in each pit.

Roadside Plantation

Roadside plantation plays a very important role for greening the area, increasing the shady area, increasing aesthetic value and for eco-development of the area. The approach roads to project site, colony, hospitals, etc. should be planted with flowering trees. Reliance refinery complex should encourage plantation outside the plant boundary. Adequate care should be taken to encourage greenbelt development on the road side, however to uplift the regional ecosystem of the area by greenbelt development, all the voluntary organizations should take initiative to encourage massive plantation along the roadside Trees should be planted to increase aesthetic value as well as shady area along the roads. The list of selected evergreen plants species for development of green belt is given in the following table.

List of Plant Species suggested for Green belt

Trees

No.	Local Name	Common Name	Scientific Name	Maximum Hight	Photos
1.	မလေးရှားပိတောက် (အော်ရေးရှား)ပင်	Earleaf acacia	*Acacia auriculoformis*	16m	
2.	နန်းလုံးကြိုင်ပင်	Gum Arabic Tree	Vachellia nilotica	8m	
3.	သကြားသီးပင်	*sapodilla sapota*	*Manilkara zapota*	10m	
4.	ဥသျှစ်ပင်	Indian bael	*Aegle marmelos*	12m	
5.	သြဇောပင်	Sugar-apple	*Annona squamosa*	10m	

6.	သဘော်သြဇောပင်	Wild sweetsop	*Annona reticulata*	10m	
7.	တမာပင်	Neem Tree	*Azdirachta indica*	20m	
8.	မယ်ဇလီပင်	Senna siamea	*Senna siamea*	10-12m	
9.	ပင်လယ်ကဝိပင်	sheoak	*Casuarina equisetifolia*	10m	
10.	ကုလားပိတောက်ပင်	Indian rosewood	*Dalbergia sissoo*	10m	
11.	ညောင်ပင်	Banyan	*Ficus bengalensis*	20m	

12.	ဗောဓိညောင်ပင်	Bodhi tree	*Ficus religiosa*	20m	
13.	သရက်ပင်	Mangp	*Mangifera indica*	15m	
14.	ခရေပင်	Spanish cherry	*Mimusops elengi*	10m	
15.	ပန်းမယ်ဇလီပင်	Copperpod	*Peltophorum pterocarpum*	10m	
16.	သဘော်မန်ကျည်းပင် မန်ကျည်းတလုပ်ပင်	Manila Tamarind	*Pithecellobium dulce*	8m	
17.	ကီလိုမာလကာပင်	Common guava	*Psidium guayava*	15m	

18.	အာသောကပင်	*Ashoka*	*Saraca asoka*	5m	
19.	ဇမ္ဗူသပြေပင်	Jambolan	*Syzygium cumini*	20m	
20.	**မန်ကျည်းပင်**	Tamarind	*Tamarindus indica*	20m	
21.	ဆီး(ဇီး)ပင်	Indian jujube	*Zizyphus mauritiana*	10m	

Shrubs

No.	Local Name	Common Name	Scientific Name	Maximum Hight	Photos
1.	စက္ကူပန်းပင်	Paper Flower	*Bougainvillea spectabillis*	8m	

2.	ရှောက်ပင်	Lemon	*Citrus lemon*	3m	
3.	ခေါင်ရမ်းပန်းပင်	Gudhal	*Hibiscus rosa-sinensis*	3m	
4.	ဒန်းပန်းပင်	Henna	*Lawsonia inermis*	5m	
5.	နွယ်သာကီပန်းပင်	Indian Oleander	*Nerium indicum*	5m	
6.	ရေသကျည်းပင်	Sesban	*Sesbania sesban*	6m	
7.	ဆယ့်နှစ်ရာသီပင်	Yellow Oleander	*Thevetia peruviana*	6m	

APPENDIX 22: IFC GUIDELINES AND RECOMMENDATIONS FOR ENVIRONMENTAL HEALTH AND SAFETY

This chapter outlines the necessary IFC guidelines and recommendations:

22.1 Potential Environmental Issues

Potential environmental issues associated with petroleum refining include the following:

- Air emissions
- Wastewater
- Hazardous materials
- Wastes
- Noise

22.2 Air Emissions

22.2.1 Exhaust Gases

Exhaust gas and flue gas emissions (carbon dioxide (CO2), nitrogen oxides (NOX) and carbon monoxide (CO)) in the petroleum refining sector result from the combustion of gas and fuel oil or diesel in turbines, boilers, compressors and other engines for power and heat generation. Flue gas is also generated in waste heat boilers associated with some process units during continuous catalyst regeneration or fluid petroleum coke combustion. Flue gas is emitted from the stack to the atmosphere in the Bitumen Blowing Unit, from the catalyst regenerator in the Fluid Catalytic Cracking Unit (FCCU) and the Residue Catalytic Cracking Unit (RCCU), and in the sulfur plant, possibly containing small amounts of sulfur oxides. Low-NOX burners should be used to reduce nitrogen oxide emissions.

Air quality impacts should be estimated by the use of baseline air quality assessments and atmospheric dispersion models to establish potential ground level ambient air concentrations during facility design and operations planning as described in the General EHS Guidelines.

Guidance for the management of small combustion source emissions with a capacity of up to 50 megawatt thermal (MWth), including air emission standards for exhaust emissions, is provided in the General EHS Guidelines. For combustion source emissions with a capacity of greater than 50 MWth, refer to the EHS Guidelines for Thermal Power**.**

22.2.2 Venting and Flaring

Venting and flaring are important operational and safety measures used in petroleum refining facilities to ensure that vapors gases are safely disposed of. Petroleum hydrocarbons are emitted from emergency process vents and safety valves discharges. These are collected into the blow-down network to be flared.

Excess gas should not be vented, but instead sent to an efficient flare gas system for disposal. Emergency venting may be acceptable under specific conditions where flaring of the gas stream is not possible, on the basis of an accurate risk analysis and integrity of the system needs to be protected. Justification

for not using a gas flaring system should be fully documented before an emergency gas venting facility is considered.

Before flaring is adopted, feasible alternatives for the use of the gas should be evaluated and integrated into production design to the maximum extent possible. Flaring volumes for new facilities should be estimated during the initial commissioning period so that fixed volume flaring targets can be developed. The volumes of gas flared for all flaring events should be

recorded and reported. Continuous improveme nt of flaring through implementation of best practices and new technologies should be demonstrated.

The following pollution prevention and control measures should be considered for gas flaring:

- Implementation of source gas reduction measures to the maximum extent possible;
- Use of efficient flare tips, and optimization of the size and number of burning nozzles;
- Maximizing flare combustion efficiency by controlling and optimizing flare fuel / air / steam flow rates to ensure the correct ratio of assist stream to flare stream;
- Minimizing flaring from purges and pilots, without compromising safety, through measures including installation of purge gas reduction devices, flare gas recovery units, inert purge gas, soft seat valve technology where appropriate, and installation of conservation pilots;
- Minimizing risk of pilot blow-out by ensuring sufficient exit velocity and providing wind guards;
- Use of a reliable pilot ignition system;
- Installation of high integrity instrument pressure protection systems, where appropriate, to reduce over pressure events and avoid or reduce flaring situations;
- Installation of knock-out drums to prevent condensate emissions, where appropriate;
- Minimizing liquid carry-over and entrainment in the gas flare stream with a suitable liquid separation system;
- Minimizing flame lift off and / or flame lick;
- Operating flare to control odor and visible smoke emissions

  (no visible black smoke);
- Locating flare at a safe distance from local communities and the workforce including workforce accommodation units;
- Implementation of burner maintenance and replacement programs to ensure continuous maximum flare efficiency;
- Metering flare gas.

To minimize flaring events as a result of equipment breakdowns and plant upsets, plant reliability should be high (>95 percent), and provision should be made for equipment sparing and plant turn down protocols.

22.2.3 Fugitive Emissions

Fugitive emissions in petroleum refining facilities are associated with vents, leaking tubing, valves, connections, flanges, packings, open-ended lines, floating roof storage tanks and pump seals, gas conveyance systems, compressor seals, pressure relief valves, tanks or open pits / containments, and loading and unloading operations of hydrocarbons. Depending on the refinery process scheme, fugitive emissions may include:

- Hydrogen;
- Methane;
- Volatile organic compounds (VOCs), (e.g. ethane, ethylene, propane, propylene, butanes, butylenes, pentanes, pentenes, C6-C9 alkylate, benzene,

toluene, xylenes, phenol, and C9 aromatics);

- Polycyclic aromatic hydrocarbons (PAHs) and other semivolatile organic compounds;
- Inorganic gases, including hydrofluoric acid from hydrogen fluoride alkylation, hydrogen sulfide, ammonia, carbon dioxide, carbon monoxide, sulfur dioxide and sulfur trioxide from sulfuric acid regeneration in the sulfuric acid alkylation process, NOX, methyl tert-butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), t-amylmethyl ether (TAME), methanol, and ethanol.

The main sources of concern include VOC emissions from cone roof storage tanks during loading and due to out-breathing; fugitive emissions of hydrocarbons through the floating roof seals of floating roof storage tanks; fugitive emissions from flanges and/or valves and machinery seals; VOC emissions from blending tanks, valves, pumps and mixing operations; and VOC emissions from oily sewage and wastewater treatment systems. Nitrogen from bitumen storage tanks may also be emitted, possibly containing hydrocarbons and sulfur compounds in the form of aerosols. Other potential fugitive emission sources include the Vapor Recovery Unit vents and gas emission from caustic oxidation.

Recommendations to prevent and control fugitive emissions include the following:

- Based on review of Process and Instrumentation Diagrams (P&IDs), identify streams and equipment (e.g. from pipes, valves, seals, tanks and other infrastructure components) likely to lead to fugitive VOC emissions and prioritize their monitoring with vapor detection equipment followed by maintenance or replacement of components as needed;
- The selection of appropriate valves, flanges, fittings, seals, and packings should be based on their capacity to reduce gas leaks and fugitive emissions;
- Hydrocarbon vapors should be either contained or routed back to the process system, where the pressure level allows;
- Use of vent gas scrubbers should be considered to remove oil and other oxidation products from overhead vapors in specific units (e.g. bitumen production);
- Incineration of gas should be conducted at high temperature (approximately 800 °C) to ensure complete destruction of minor components (e.g. H2S, aldehydes, organic acids and phenolic components) and minimize emissions and odor impacts;
- Emissions from hydrofluoric acid (HF) alkylation plant vents should collected and neutralized for HF removal in a scrubber before being sent to flare;
- Naphtha, gasoline, methanol / ethanol, and MTBE / ETBE / TAME loading / unloading stations should be provided with vapor recovery units.

Additional guidelines for the prevention and control of fugitive emissions from storage tanks are provided in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.

22.2.4 Sulfur Oxides

Sulfur oxides (SOx) and hydrogen sulfide may be emitted from boilers, heaters, and other process equipment, based on the sulfur content of the processed crude oil. Sulfur dioxide and sulfur trioxide may be emitted from sulfuric acid regeneration in the sulfuric acid alkylation process. Sulfur dioxide in refinery waste gases may have pre-abatement concentration levels of 1500 -7500 milligrams per cubic meter (mg/m^3).

Recommended pollution prevention and minimization measures include the following:

- Minimize SOX emissions through desulfurization of fuels, to the extent feasible,

or by directing the use of high-sulfur fuels to units equipped with SOX emission controls;

- Recover sulfur from tail gases using high efficiency sulfur recovery units (e.g. Claus units);
- Install mist precipitators (e.g. electrostatic precipitators or brink demisters) to remove sulfuric acid mist;
- Install scrubbers with caustic soda solution to treat flue gases from the alkylation unit absorption towers.

22.2.5 Particulate Matter

Particulate emissions from refinery units are associated with flue gas from furnaces; catalyst fines emitted from fluidized catalytic cracking regeneration units and other catalyst based processes; the handling of coke; and fines and ash generated during incineration of sludges. Particulates may contain metals (e.g. vanadium, nickels). Measures to control particulate may also contribute to control of metal emissions from petroleum refining.

Recommended pollution prevention and minimization measures include the following:

- Install cyclones, electrostatic precipitators, bag filters, and/or wet scrubbers to reduce emissions of particulates from point sources. A combination of these techniques may achieve >99 percent abatement of particulate matter;
- Implement particulate emission reduction techniques during coke handling, including:
  a) Store coke in bulk under enclosed shelters
  b) Keep coke constantly wet
  c) Cut coke in a crusher and convey it to an intermediate storage silo (hydrobins)
  d) Spray the coke with a fine layer of oil, to stick the dust fines to the coke
  e) Use covered and conveyor belts with extraction systems to maintain negative pressure
  f) Use aspiration systems to extract and collect coke dust
  g) Pneumatically convey the fines collected from the cyclones into a silo fitted with exit air filters, and recycle the collected fines to storage.

22.2.6 Greenhouse Gases (GHGs)

Carbon dioxide (CO2) may be produced in significant amounts during petroleum refining from combustion processes (e.g. electric power production), flares, and hydrogen plants. Carbon dioxide and other gases (e.g. nitrogen oxides and carbon monoxide) may be discharged to atmosphere during in-situ catalyst regeneration of noble metals.

Operators should aim to maximize energy efficiency and design facilities (e.g. opportunities for efficiency improvements in utilities, fired heaters, process optimization, heat exchangers, motor and motor applications) to minimize energy use. The overall objective should be to reduce air emissions and evaluate cost-effective options for reducing emissions that are technically feasible.[5] Additional recommendations for the management of GHGs, in addition to energy efficiency and conservation, are addressed in the General EHS Guidelines.

22.2.7 Noise

The principal sources of noise in petroleum refining facilities include large rotating machines, such as compressors and turbines, pumps, electric motors, air coolers (if any), and heaters. During emergency depressurization, high noise levels can be generated due to high

pressure gases to flare and/or steam release into the atmosphere. General recommendations for noise management are provided in the General EHS Guidelines.

22.3 Wastewater

22.3.1 Industrial Process Wastewater

The largest volume effluents in petroleum refining include “sour” process water and non-oily/non-sour but highly alkaline process water. Sour water is generated from desalting, topping, vacuum distillation, pretreating, light and middle distillate hydrodesulphurization, hydrocracking, catalytic cracking, coking, visbreaking / thermal cracking. Sour water may be contaminated with hydrocarbons, hydrogen sulfide, ammonia, organic sulfur compounds, organic acids, and phenol. Process water is treated in the sour water stripper unit (SWS) to remove hydrocarbons, hydrogen sulfide, ammonia and other compounds, before recycling for internal process uses, or final treatment and disposal through an onsite wastewater treatment unit. Non-oily / non-sour but highly alkaline process water has the potential to cause Waste Water Treatment Plant upsets. Boiler blowdown and demineralization plant reject streams in particular, if incorrectly neutralized, have the potential to extract phenolics from the oil phase

into the water phase, as well as cause emulsions in the WWTP. Liquid effluent may also result from accidental releases or leaks of small quantities of products from process equipment, machinery and storage areas/tanks.

Recommended process wastewater management practices include:

- Prevention and control of accidental releases of liquids through regular inspections and maintenance of storages and conveyance systems, including stuffing boxes on pumps and valves and other potential leakage points, as well as the implementation of spill response plans;
- Provision of sufficient process fluids let-down capacity to maximize recovery into the process and avoid massive discharge of process liquids into the oily water drainage system;
- Design and construction of wastewater and hazardous materials storage containment basins with impervious surfaces to prevent infiltration of contaminated water into soil and groundwater;
- Segregation of process water from stormwater and segregation of wastewater and hazardous materials containment basins;
- Implementation of good housekeeping practices, including conducting product transfer activities over paved areas and prompt collection of small spills.

Specific provisions to be considered for the management of individual wastewater streams include the following:

- Direct spent caustic soda from sweetening units and chemical treating routed to the wastewater treatment system following caustic oxidation;
- Direct spent caustic liquor from the caustic oxidation (containing soluble thiosulfates, sulfites and sulfates) to the wastewater treatment system;
- Install a closed process drain system to collect and recover leakages and spills of MTBE, ETBE, and TAME. These substances are not conducive to biological treatment, and should be prevented from entering and adversely affecting the wastewater treatment system;
- If present at the facility, acidic and caustic effluents from the demineralized water preparation should be neutralized prior to discharge into the wastewater treatment system;

- Cool blowdown from the steam generation systems prior to discharge. This effluent, as well as blowdown from cooling water towers, may contain additives (e.g. biocides) and may require treatment in the wastewater treatment plant prior to discharge;
- Hydrocarbons contaminated water from scheduled cleaning activities during facility turn-around (cleaning activities typically are performed annually and may last several few weeks) and hydrocarbon-containing effluents from process leaks should be treated in the wastewater treatment plant.

22.3.2 Process Wastewater Treatment

Techniques for treating industrial process wastewater in this sector include source segregation and pretreatment of concentrated wastewater streams. Typical wastewater treatment steps include: grease traps, skimmers, dissolved air floatation or oil water separators for separation of oils and floatable solids; filtration for separation of filterable solids; flow and load equalization; sedimentation for suspended solids reduction using clarifiers; biological treatment, typically aerobic treatment, for reduction of soluble organic matter (BOD); chemical or biological nutrient removal for reduction in nitrogen and phosphorus; chlorination of effluent when disinfection is required; dewatering and disposal of residuals in designated hazardous waste landfills. Additional engineering controls may be required for (i) containment and treatment of volatile organics stripped from various unit operations in the wastewater treatment system, (ii)advanced metals removal using membrane filtration or other physical/chemical treatment technologies, (iii) removal of recalcitrant organics and non biodegradable COD using activated carbon or advanced chemical oxidation, (iii) reduction in effluent toxicity using appropriate technology (such as reverse osmosis, ion exchange, activated carbon, etc.), and (iv) containment and neutralization of nuisance odors.

Management of industrial wastewater and examples of treatment approaches are discussed in the General EHS Guidelines. Through use of these technologies and good practice techniques for wastewater management, facilities should meet the Guideline Values for wastewater discharge as indicated in the relevant table of Section 2 of this industry sector document.

Other Wastewater Streams & Water Consumption Guidance on the management of non-contaminated wastewater from utility operations, non-contaminated stormwater, and sanitary sewage is provided in the General EHS Guidelines. Contaminated streams should be routed to the treatment system for industrial process wastewater. Recommendations to reduce water consumption, especially where it may be a limited natural resource, are provided in the General EHS Guidelines.

Hydrostatic Testing Water: Hydrostatic testing (hydro-test) of equipment and pipelines involves pressure testing with water (generally filtered raw-water), to verify system integrity and to detect possible leaks. Chemical additives (e.g. a corrosion inhibitor, an oxygen scavenger, and a dye) are often added to the water to prevent internal corrosion. In managing hydrotest waters, the following pollution prevention and control measures should be implemented:

- Using the same water for multiple tests;
- Reducing the need for corrosion inhibitors and other chemicals by minimizing the time that test water remains in the equipment or pipeline;
- If chemical use is necessary, selection of effective chemicals with the lowest toxicity, biodegradability, bioavailability, and bioaccumulation potential.

If discharge of hydrotest waters to the sea or to surface water is the only feasible alternative for disposal, a hydrotest water disposal plan should be prepared that considers points of discharge, rate of discharge, chemical use and dispersion, environmental risk, and required monitoring. Hydrotest water disposal into shallow coastal waters should be avoided.

22.3.3 Hazardous Materials

Petroleum refining facilities manufacture, use, and store significant amounts of hazardous materials, including raw materials, intermediate / final products and by-products. Recommended practices for hazardous material management, including handling, storage, and transport, are presented in the EHS Guidelines for Crude Oil and Petroleum Product Terminals and in the General EHS Guidelines.

22.4 Wastes

22.4.1 Hazardous Wastes: Spent Catalysts

Spent catalysts result from several process units in petroleum refining including the pretreating and catalytic reformer; light and middle distillate hydrodesulphurization; the hydrocracker; fluid catalytic cracking (FCCU); residue catalytic cracking (RCCU); MTBE/ETBE and TAME production; butanes isomerization; the dienes hydrogenation and butylenes hydroisomerization unit; sulfuric acid regeneration; selective catalytic hydrodesulphurization; and the sulfur and hydrogen plants. Spent catalysts may contain molybdenum, nickel, cobalt, platinum, palladium, vanadium iron, copper and silica and/or alumina, as carriers.

Recommended management strategies for catalysts include the following:

- Use long life catalysts and regeneration to extend the catalyst life cycle;
- Use appropriate on-site storage and handling methods, (e.g., submerging pyrophoric spent catalysts in water

  during temporary storage and transport until they can reach the final point of treatment

  to avoid uncontrolled exothermic reactions);
- Return spent catalysts to the manufacturer for regeneration or recovery, or transport to other off-site management companies for handling, heavy or precious metals recovery

  /recycling, and disposal in accordance with industrial waste management recommendations included in General EHS Guidelines.

22.4.2 Other Hazardous Wastes

In addition to spent catalysts, industry hazardous waste may include solvents, filters, mineral spirits, used sweetening, spent amines for CO2, hydrogen sulfide (H2S) and carbonyl sulfide (COS) removal, activated carbon filters and oily sludge from oil / water separators, tank bottoms, and spent or used operational and maintenance fluids (e.g. oils and test liquids). Other hazardous wastes, including contaminated sludges, sludge from jet water pump circuit purification, exhausted molecular sieves, and exhausted alumina from hydrofluoric (HF) alkylation, may

be generated from crude oil storage tanks, desalting and topping, coking, propane, propylene, butanes streams dryers, and butanes isomerization.

Process wastes should be tested and classified as hazardous or non-hazardous based on local regulatory requirements or internationally accepted approaches. Detailed guidance on the storage, handling, treatment, and disposal of hazardous and non-hazardous wastes is provided in the General EHS Guidelines.

Recommended industry-specific management strategies for hazardous waste include the following:

- Send oily sludges from crude oil storage tanks and the desalter to the delayed coking drum, where applicable, to recover the hydrocarbons;
- Ensure excessive cracking is not conducted in the visbreaking unit to prevent

production of an unstable fuel oil, resulting in increased sludge and sediment formation during storage;

- Maximize recovery of oil from oily wastewaters and sludges. Minimize losses of oil to the effluent system. Oil can be recovered from slops using separation techniques (e.g. gravity separators and centrifuges);
- Sludge treatment may include land application (bioremediation), or solvent extraction followed by combustion of the residue and / or use in asphalt, where feasible. In some cases, the residue may require stabilization prior to disposal to reduce the leachability of toxic metals.

22.4.3 Non-hazardous Wastes

Hydrofluoric acid alkylation produces neutralization sludges which may contain calcium fluoride, calcium hydroxide, calcium carbonate, magnesium fluoride, magnesium hydroxide and magnesium carbonate. After drying and compression, they may be marketed for steel mills use or landfilled. Detailed guidance on the storage, handling, treatment, and disposal of non- hazardous wastes is provided in the General EHS Guidelines.

22.5 Occupational Health and Safety

The occupational health and safety issues that may occur during the construction and decommissioning of petroleum refining facilities are similar to those of other industrial facilities, and their management is discussed in the General EHS Guidelines.

Facility-specific occupational health and safety issues should be identified based on job safety analysis or comprehensive hazard or risk assessment, using established methodologies such as a hazard identification study [HAZID], hazard and operability study [HAZOP], or a quantitative risk assessment [QRA]. As a general approach, health and safety management planning should include the adoption of a systematic and structured approach for prevention and control of physical, chemical, biological, and radiological health and safety hazards described in the General EHS Guidelines.

The most significant occupational health and safety hazards occur during the operational phase of a petroleum refining facility and primarily include:

- Process Safety
- Oxygen-deficient atmosphere
- Chemical hazards
- Fire and explosions

22.5.1 Process Safety

Process safety programs should be implemented, due to industry-specific characteristics, including complex chemical reactions, use of hazardous materials (e.g. toxic, reactive, flammable or explosive compounds), and multi-step reactions.

Process safety management includes the following actions:

- Physical hazard testing of materials and reactions;
- Hazard analysis studies to review the process chemistry and engineering practices, including thermodynamics and kinetics;
- Examination of preventive maintenance and mechanical integrity of the process equipment and utilities;
- Worker training; and
- Development of operating instructions and emergency response procedures.

22.5.2 Oxygen-Deficient Atmosphere

The potential release and accumulation of nitrogen gas into work areas may result in the creation of asphyxiating conditions due to the displacement of oxygen. Prevention and control measures to reduce risks of asphyxiant gas release include:

- Design and placement of nitrogen venting systems according to industry standards;
- Installation of an automatic Emergency Shutdown System that can detect and warn of the uncontrolled release of nitrogen (including the presence of oxygen deficient atmospheres in working areas), initiate forced ventilation, and minimize the duration of releases;
- Implementation of confined space entry procedures as described in the General EHS Guidelines with consideration of facility-specific hazards.

22.5.3 Chemical Hazards

Releases of hydrofluoric acid, carbon monoxide, methanol and hydrogen sulfide may present occupational exposure hazards. Hydrogen sulfide leakage may occur from amine regeneration in amine treatment units and sulfur recovery units. Carbon monoxide leakage may occur from Fluid and Residue Catalytic Cracking Units and from the syngas production section of the Hydrogen Plant. Carbon monoxide / air mixtures are explosive and spontaneous / explosive re-ignition may occur. Hydrogen sulfide poses an immediate fire hazard when mixed with air.

Workers may be exposed to potential inhalation hazards (e.g. hydrogen sulfide, carbon monoxide, VOCs, polycyclic aromatic hydrocarbons (PAHs) during routine plant operations. Dermal hazards may include contact with acids, steam, and hot surfaces. Chemical hazards should be managed based on the results of a job safety analysis and industrial hygiene survey and according to the occupational health and safety guidance provided in the General EHS Guidelines. Protection measures include worker training, work permit systems, use of personal protective equipment (PPE), and toxic gas detection systems with alarms.

22.5.4 Hydrofluoric Acid

Workers may be exposed to hydrofluoric acid (HF) in the HF alkylation unit. Occupational safety measures include the following:

- Reducing HF volatility by adding suitable vapor pressure suppression additives;
- Minimizing HF hold-up;
- Designing plant lay-out to limit the extent of the plant area exposed to potential HF hazards, and to facilitate escape routes for workers;
- Clearly identifying hazardous HF areas, and indicating where PPE should be adopted;
- Implementing a worker decontamination procedure in a dedicated area;
- Implementing a safety distance buffer between the HF Alkylation Unit, other process units and the refinery boundary;
- Use of scrubbing systems to neutralizing and remove HF prior to flaring;
- Use of a HF neutralization basin for effluents before they are discharged into the refinery oily sewage system;
- Use of a dedicated tank to collect alkylate product and undertake routine pH measurements before dispatching to gasoline pool;
- Treating butane and propane products in alumina defluorinators to destroy organic fluorides, followed by alkali to remove any remaining HF ;
- Transport of HF to and from the plant should be handled according to guidance for the

transport of dangerous goods as described in the General EHS Guidelines.

22.5.5 Fire and Explosions

Fire and explosion hazards generated by process operations include the accidental release of syngas (containing carbon monoxide and hydrogen), oxygen, methanol, and refinery gases. Refinery gas releases may cause 'jet fires', if ignited in the release section, or give rise to a vapor cloud explosion (VCE), fireball or flash fire, depending on the quantity of flammable material involved and the degree of confinement of the cloud. Methane, hydrogen, carbon monoxide, and hydrogen

sulfide may ignite even in the absence of ignition sources, if their temperature is higher than their auto ignition temperatures of 580°C, 500°C, 609°C, and 260°C, respectively. Flammable liquid spills present in petroleum refining facilities may cause pool fires. Explosive hazards may also be associated with accumulation of vapors in storage tanks (e.g. sulfuric acid and bitumen).

Recommended measures to prevent and control fire and explosion risks from process operations include the following:

- Designing, constructing, and operating petroleum refineries according to international standards for the prevention

  and control of fire and explosion hazards, including provisions for segregation of process, storage, utility, and safe areas. Safety distances can be derived from specific safety analyses for the facility, and through application of internationally recognized fire safety standards;
- Providing early release detection, such as pressure monitoring of gas and liquid conveyance systems , in addition to smoke and heat detection for fires;
- Evaluation of potential for vapor accumulation in storage tanks and implementation of prevention and control techniques (e.g. nitrogen blanketing for sulfuric acid and bitumen storage);
- Avoiding potential sources of ignition (e.g. by configuring the layout of piping to avoid spills over high temperature piping, equipment, and / or rotating machines);
- Providing passive fire protection measures within the modeled fire zone that are capable of withstanding the fire temperature for a time sufficient to allow the operator to implement the appropriate fire mitigation strategy;
- Limiting the areas that may be potentially affected by accidental releases by:
  a) Defining fire zones and equipping them with a drainage system to collect and convey accidental releases of flammable liquids to a safe containment area, including secondary containment of storage tanks
  b) Installing fire / blast partition walls in areas where appropriate separation distances cannot be achieved;
  c) Designing the oily sewage system to avoid propagation of fire.

Further recommendations on the management of fire and explosion hazards relating to crude oil storage are addressed in the EHS Guidelines for Crude Oil and Petroleum Product Terminals.

22.5.6 Community Health and Safety

Community health and safety impacts during the construction and decommissioning of petroleum refining facilities are common to those of most other industrial facilities and are discussed in the General EHS Guidelines.

The most significant community health and safety hazards associated with petroleum refining facilities occur during the operational phase including the threat from major accidents related to fires and explosions at the facility and potential accidental releases of raw materials or finished products during transportation outside the processing facility. Guidance for the management of these issues is presented below and in the

22.5.7 General EHS Guidelines.

Additional relevant guidance applicable to the transport by sea and rail as well as shore-based facilities can be found in the EHS Guidelines for Shipping; Railways; Ports and Harbors; and Crude Oil and Petroleum Products Terminals.

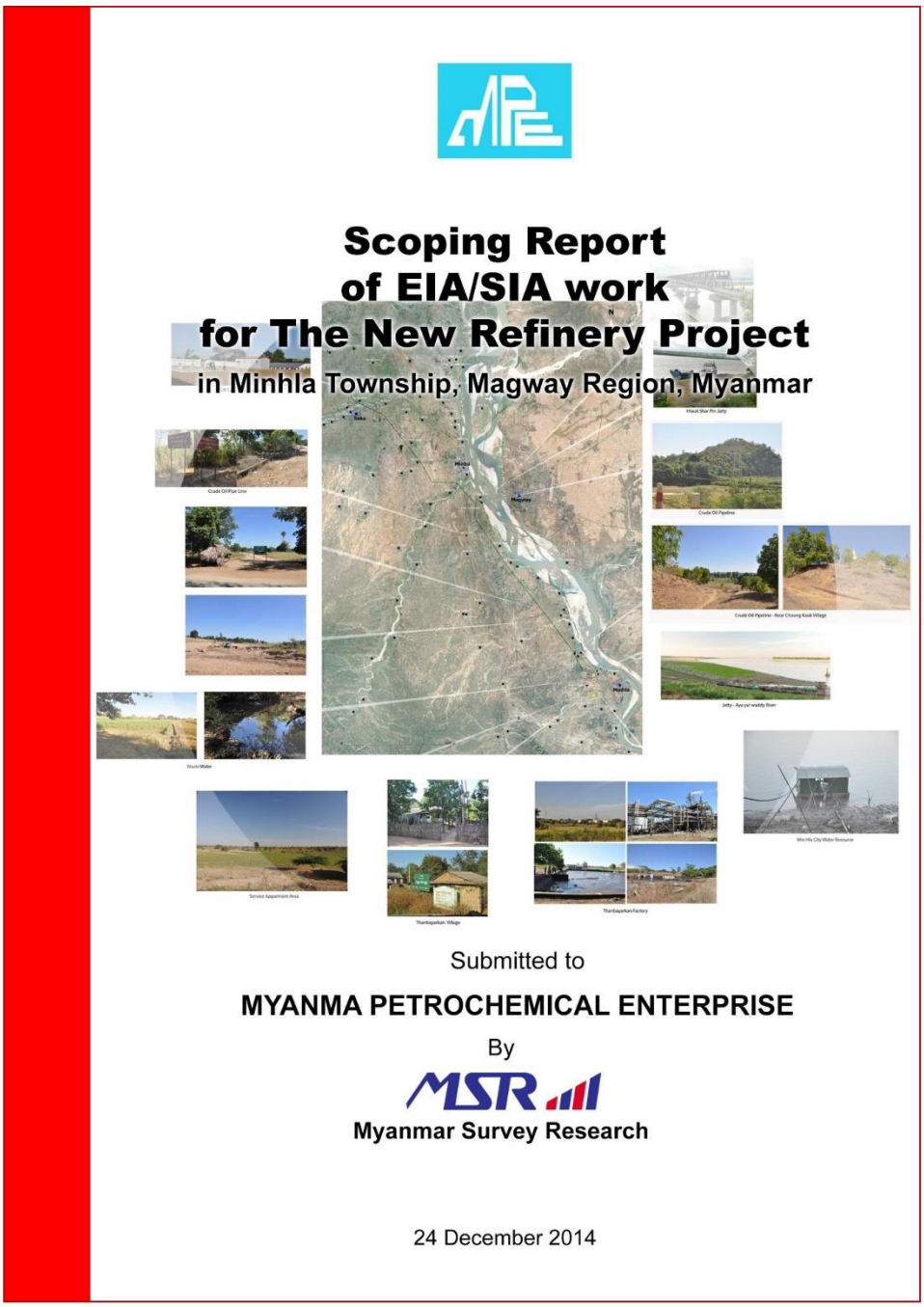
22.5.8 Major Hazards

The most significant safety hazards are related to the handling and storage of liquid and gaseous substances. Impacts may include significant exposures to workers and, potentially, to surrounding communities, depending on the quantities and types of accidentally released chemicals and the conditions for reactive or catastrophic events, such as fire and explosion.

Major hazards should be prevented through the implementation of a Process Safety Management Program that includes all of the minimum elements outlined in the respective section of the General EHS Guidelines including:

- Facility wide risk analysis, including a detailed consequence analysis for events with a likelihood above 10^{-6}/year (e.g. HAZOP, HAZID, or QRA);
- Employee training on operational hazards;
- Procedures for management of change in operations,
- process hazard analysis, maintenance of mechanical integrity, pre-start review, hot work permits, and other essential aspects of process safety included in the General EHS Guideline;
- Safe Transportation Management System as noted in the General EHS Guidelines if the project includes a transportation component for raw or processed materials;
- Procedures for handling and storage of hazardous materials;
- Emergency planning, which should include, at a minimum, the preparation and implementation of an Emergency Management Plan, prepared with the participation of localauthorities and potentially affected communities.

APPENDIX 23: ESIA SCOPING REPORT OF EIA/SIA WORK FOR NEW REFINERY PROJECT IN MINHLA TOWNSHIP



Scoping Report of EIA/SIA work for New Refinery Project in Minhla Township, Magway Region, Myanmar

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The EIA/SIA team

A team including responsible persons and EIA/SIA experts from Myanmar Survey Research Company has made a site visit for doing field observation and preliminary ESIA investigation for the new refinery project, located near Petrochemical Complex (Thanbayakan, Minhla, Magwe Region, and Off-take Point, located in Saku Township, also in the same region. The survey team is composed of the following persons:

1. U Kyaw Hlaing, President of MSR and Research Director,
2. U Tin Than, Head of EIA Department, MSR and Wildlife Biologist,
3. U Than Tun, Engineer and International Management Consultant,
4. U Myint Swe, Engineering Consultant
5. Professor Dr. Lay Kyi, Socio-economic Consultant,
6. U Aung Lynn, Databank Manager of MSR and social survey expert, and
7. U Ko Ko Soe Lwin Thaw, GIS Specialist of MSR.

The field observatory survey was made from 8th December to 11th December, 2014.

What we have done with this trip

We started our site visit trip on the evening of 8th December, 2014. We went by car. We reached at Magwe at 5:30 am of 9th morning.

We explored who could help us gain knowledge and information about the project area and the way to reach the Petrochemical Complex, Thanbayakan in Minhla.

We reached at the Headquarters of Petrochemical Compound at about 12:00 am and met the head of the factory, Col. Phe Thet Nyunt, General Manager, and some senior officials. We had a very lively meeting between two sides. The General Manager provided about thirty minutes briefing on current factory's performance and expectation on undertaking of ESIA of proposed new refinery to be established next to this currently running one. We discussed our plan and how we will conduct EIS/SIA in the area and vicinity of project site. The factory side provided their knowledge and view on the history and current situation of factory presence in this contemporary circumstances and outputs of the refinery with background information of last 30 years experiences of factory presence and future outlook with an extension with new refinery project which could have new impacts on social and economy as well as biophysical environment.

Meeting with General Manager

After the meeting with senior staffs we were taken to the Factory's Laboratory where U Thet Tun

who is in charge of the lab explained every section of the laboratory activities. The laboratory works were impressive though the building and laboratory tools and materials looked old. Then went out the factory compound and see where waste water was disposed and let it drained down the lower part of the field surrounded the factory compound which we could observed the natural environment and agricultural fields. U Kyaw Myint and U Aung Kyi Htay led us to go to the field demarked to establish a new refinery plant next to the currently existing one and the where the staffs quarter of new factory is to be constructed.

Then we were taken to the Jetty area and Water Purification Plant. Water purification plant works elegantly for a long time. We could observe how it had been functioning, as the responsible staff of the plant explained us well about it.

Laboratory

Waste Water

We could also observe the pipe lines which carry crude oils brought by barge and refined products from the refinery plant and its environment.

We could also see a small dredger which was dredging sand and mud formed by siltation along the river bank and a barge which could carry products of the refinery plant. We recorded the water pumping machines and pontoons at the jetty area of the Ayeyawaddy river bank in the east of the Petrochemical Complex compound.

Jetty - Ayeyawaddy River

Water Treatment Factory

Then we went to visit the town of Minhla and investigated the water delivery system which pumps up water from Ayeyawaddy River and observed the water suction pump and pontoon, motors, and water storage ground-tank. We met responsible staffs and get the information of water delivering time, sedimentation tank, duration of water pumping in and delivering, resting period of machines, capacity of machine, rate of water pumping (gallon per day).

Pipelines

Minhla Water suction Pump

We could also visit an historical monument, Minhla Khandut, a Fort which was built and used at the time of Englo-Burman War more than 150 years ago.

Minhla Khandut

Off-take Point - Saku

On 10th December, we went to Saku, a small town 25 miles away from the project of Thanbayakan, Minhla, where an off-take point was established. By this off-take point, the crude oil carried by Myanmar-China SEAP pipeline started at the Deep-sea Port of Maday Island located near the central coast of Rakhine State. At the Off-take Point, there are two stations namely Gas off-take and Crude oil off-take have already been constructed.

We observed the physical environment of this off-take point area and route of proposed pipe layout including villages, agricultural fields, life of local people, religious entities, heritage sites, etc.

Off-take Point - Saku

After coming back from the off-take point, we visited the head office of current refinery plant and met the head of the Petrochemical Complex (Thanbayakan), Col Pet Thet Nyunt. He kindly allowed us to go around the whole compound and various section of the refinery plant and study the process of refining the crude oil through various sectors of the plant including cooling system and waste water treatment system. Then, we revisited the field where new refinery plant is supposed to be built. We observed the natural vegetation covering the whole project site area.

1 Preliminary investigation/observation of environmental and social impacts

What we discovered in preliminary investigation and observation

Currently running refinery plant in Petrochemical Complex (Thanbayakan) is performing well and products are in high demand of the market. Though it has been running for 32 years, it has been well maintained in its range safely.

Semi-wild area allocated for new refinery plant

The area allocated for the new refinery plant is covered by degraded dry forest of Sha-Dahat Thorn Forest which is made up of *Acacia-Tectonahamiltonia* association. With a lower rain fall, both grow in tree and bush form cover on stiff clay with a rainfall of from 80 to 100 cm. Apart from dahat nearly all the trees in this forest are armed with spines or prickles. Very spiny Sha and Gandara are dominating in this forest patch at this time. It is a stunted and xerophilous forest produced by a dry soil.Detail fauna and flora investigation will be made with baseline survey next trip.

Air Pollution

When oil or petroleum distillates are burned, usually the combustion is not complete. This means that incompletely burned compounds are created in addition to just water and carbon dioxide. The other compounds are often toxic to life. However no significant air pollution is known from the knowledge of this trip.There is no foul air in the surrounding of the existing factory and new project site. No significant gas leakage and no uncontrollable amount of gas blownout is found.

However, we could mark the sites for air quality measurement depending on wind direction in the next trip as follow:

We have marked for AQ and WQ measurement site in the project and surrounding environment as follow with GPS marking.

Water Pollution

Water pollution is seen only at the waste water drained area of the current petro-chemical complex.

Water Quality Measurement is to be made at the following points where drainage and river flow could have effect of toxic materials and chemical contamination. Pollutioncan cause from the drainage of waste water. It should be measured in the next trip for baseline survey of task 2.

	Latitude	Longitude
WQ1	19°58'53.97"N	95° 1'9.93"E
WQ2	19°58'9.00"N	95° 2'45.16"E
WQ3	19°55'21.06"N	95° 2'5.16"E

Soil

Soil Pollution is not known in this observatory step. Beds of dry coarse sands are common. Mottled clay is common in this area. For the baseline data of soil property we have marked to collect soil data at the following points.

	Latitude	Longitude
SQ1	19°58'33.82"N	95° 0'35.96"E
SQ2	19°57'22.04"N	95° 0'35.77"E

Health Issus is not known by the impact of current petrochemical plant.

Land use in this area is agriculture of growing green gram, pigeon pea, sesame and groundnut. land grabbing is not likely to occur at and near the refinery plant site, for who are growing pigeon pea in the vacant land allocated for staff quarter is temporarily enjoying for using the land of factory (MPE owned) free of charge.

Plantation near staff quarter

Land Disputes

So far, "land grabs" is not known as an issue in this area of petrochemical complex and nearby area. A few farmers from other villages come to the vacant land allocated for the future staff quarter for the new refinery project to grow pigeon pea. There may not have involuntary resettlements of villagers to make way for pipeline construction from Saku to Thanbayakan and to protect the oil and gas pipelines.

The Pipeline Route will certainly have impacts upon local people and their livelihoods

Pipeline Corridor

When a company comes in to build the oil pipeline, people may lose their land. Land issue and relocation may occur along the new section of oil and gas pipelines .connecting Saku and Thanbayakan

What we need to be clarified is ownership of land and possible relocation of currently living local people at and near the pipeline routes from Saku to Thanbayakan.

Exact location of the project site

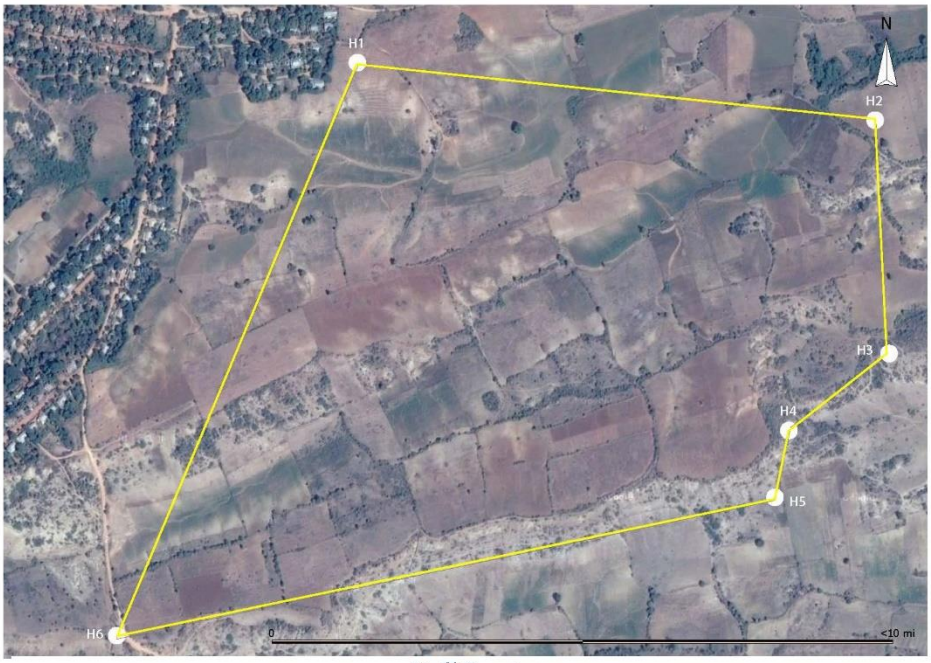
The proposed project site is situated within the vicinity of existing Petrochemical complex (Thanbayakan) Minhla Township, Magwe Division, 530 km by road, 600 km by river from Yangon. Allocated area for the new refinery plant, 132.61 acres, and for storage tanks and other associated structures, 211 acres, totals 343.61 acres.

The new refinery plant is centered on following UTM marks/ GPS marking.

	Latitude	Longitude
New1	19°58'50.35"N	95° 0'8.22"E
New2	19°58'58.36"N	95° 0'20.57"E
New3	19°58'29.55"N	95° 0'51.23"E
New4	19°58'20.63"N	95° 0'40.26"E
New5	19°58'19.66"N	95° 0'12.25"E
New6	19°58'27.12"N	95° 0'24.14"E

New Refinery Plant

Along with site of the new refinery plant, the following GPS marking indicates the allocated area of staff quarter for the new project.



Staff Quarter

	Latitude	Longitude
H1	19°57'34.60"N	95° 0'25.11"E
H2	19°57'31.55"N	95° 0'54.37"E
H3	19°57'19.08"N	95° 0'54.98"E
H4	19°57'15.20"N	95° 0'49.56"E
H5	19°57'11.29"N	95° 0'48.68"E
H6	19°57'3.96"N	95° 0'11.59"E

Actually current existing petrochemical complex (Thanbayakan) is located 26Km from Magwe, 50 Km from China-Myanmar Oil and Gas Pipeline and 2 Km away from the Ayawady River in Minhla Township. It has total area of 1,573, i.e. 192 acres for refinery site, 77 acres for storage tanks at the port, and 1,204 acres for residential and others.

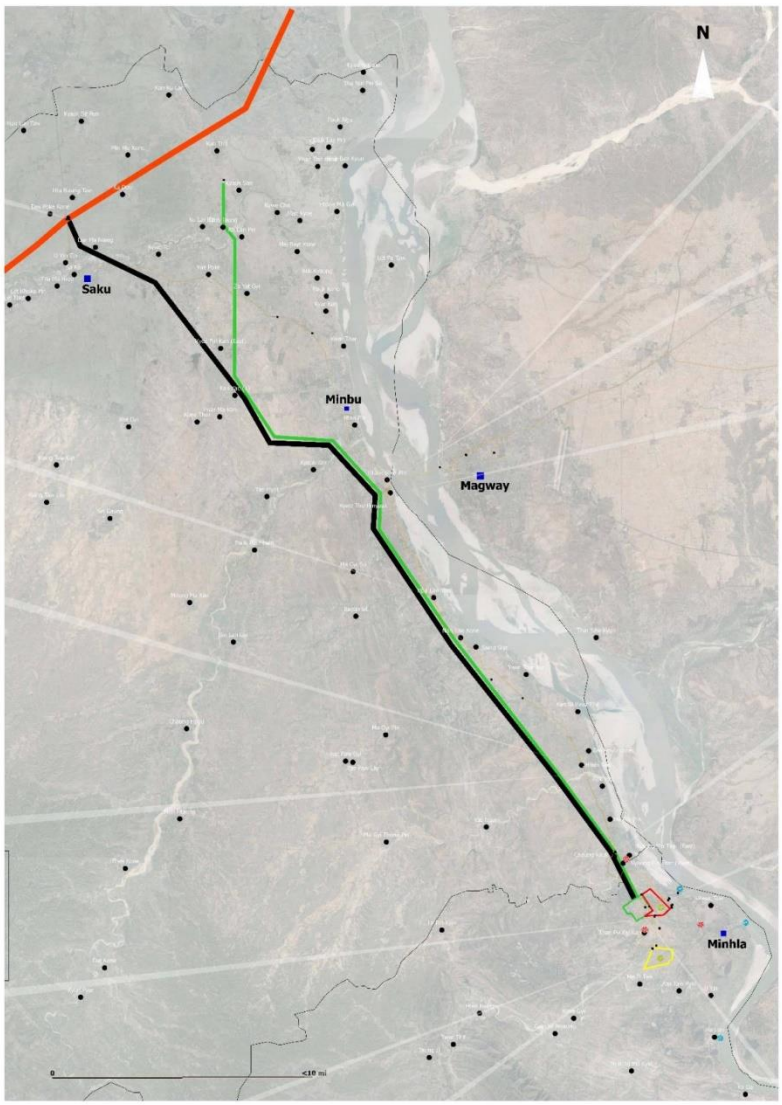
Petrochemical complex (Thanbayakan)

The GPS marking of old refinery compound is:

	Latitude	Longitude
Old1	19°58'32.56"N	94°59'38.98"E
Old2	19°58'37.90"N	94°59'47.89"E
Old3	19°58'38.41"N	94°59'47.61"E
Old4	19°58'50.02"N	95° 0'6.75"E
Old5	19°58'49.97"N	95° 0'7.57"E
Old6	19°58'31.40"N	95° 0'20.16"E
Old7	19°58'31.88"N	95° 0'20.88"E
Old8	19°58'27.11"N	95° 0'24.09"E
Old9	19°58'12.28"N	94°59'59.75"E
Old10	19°58'22.93"N	94°59'52.46"E
Old11	19°58'23.13"N	94°59'45.25"E

In terms of landscape, land of the project site slopes imperceptibly toward the river bank, as it is the part of the Ayarwaddy valley.

(We are still in need of exact location marks formally made by MPE to have the legal right of ownership through Land use Department)



2 Summary of the project initiation

The refining industry in Myanmar is driven by the demand for transportation fuels and their required specifications. Since petroleum is not only strategic goods for each country but also commercial ones, the energy sector in Myanmar plays a vital role for the sustainable economic development of the state.

Myanmar Petrochemical enterprise is responsible for the production of petroleum and petrochemical products from crude oil and natural gas in the country. MPE is assigned for the followings:

a. Refining of petroleum products from the crude oil and natural gas.
b. Production of petrochemicals from crude oil and natural gas.
c. Export of petroleum and petrochemical products.
d. Production of urea fertilizer from natural gas.

In view of this, Ministry of Energy, Myanmar has made a particular emphasis on promotion of energy efficiency and conservation program by inviting rich experiences, excellent technology and know-how in accordance with Myanmar Energy Policy (Hla Hla Kyi, 2006).

The Ministry of Energy and CNPC of People Republics of China has signed a MoU and Cooperation Agreement and had a discussion on facilitation of acquiring crude oil for internal use. As a result, the Ministry of Energy and CNPC signed the "MINUTES OF MEETING" on 14 March, 2013. With this agreement, Myanmar Government will get additional 1.5 million ton of crude oil upon the previous agreement of acquiring two million tons. So that Myanmar will get total 3.5 million tons by the cooperation of China Oil and Ministry of Energy had cooperated with CNPC South-East Asia Pipeline Co. LTD to conduct feasibility study for the construction of new refinery plant near the currently existing Petrochemical Complex (Thanbayakan) by using the crude oil acquired from Myanmar-China Oil pipeline. CNPC has conducted the feasibility study for this new refinery plant.

The new refinery project is seen as an addition to the capability of production from MPE to meet the demand of the time and to increase the capability of reducing the amount of import.

The refinery project is designed to position the refinery to be more competitive and viable for the long term so that it can provide reliable and cost effective energy supply for the country on a sustainable basis.

The project is of national importance, as it is expected to achieve a number of technical and national objectives, of which the most importance is as follows.

2.1 Background information and the description of the project

The new refinery plant will be built within 5 years of time. This plant will produce propane, butane, naphtha, BTX raw material, gasoline, jet fuel, kerosene, diesel fuel, MEK, fuel oil, asphalt and sulphur. For this, refinery will be built with international standard to include nine main process units and waste water treatment plant, and a flare system.

The Process Flow Diagram (Figure 2-1) depicts the following units:

1. Crude Oil Distillation Unit,
2. Vacuum Distillation Unit,
3. Delayed Coker Unit
4. Hydrocracker Unit
5. Diesel Hydrotreater Unit
6. Kerosene Hydrotreater Unit

7. Naphtha Catalytic Reformer Unit,
8. Hydrogen Production Unit,
9. Sulphur Recovery Unit,
10. Power Station

This refinery will have the capacity of refining 3.5 million tons of crude oil per year (78,484.84 barrels per day). The foreign crude oil will be taken from the Southeast Asia Crude Oil Pipeline and the products will be produced to meet the Euro IV standard.

Fresh water need is 415 gallon per hour and cooling water system needs 19,707 tons per hour. Electricity requirement is 57, 713 Kilowat. Factory design will be in Chinese Standard.

Oil sources are: Kuwait Crude Oil – 50%, Saudi Light Crude Oil – 25%, Saudi Mediate crude oil – 25%

2.2 Relevant policies of MPE, legal and Institutional framework

The refining industry in Myanmar is driven by the demand for transportation fuels and their required specifications.

Since petroleum is not only strategic goods for each country but also commercial ones, .the energy sector in Myanmar plays a vital role for the sustainable economic development of the state.

In view of this, Ministry of Energy, Myanmar has made a particular emphasis on promotion of energy efficiency and conservation program by inviting rich experiences, excellent technology and know-how in accordance with Myanmar Energy Policy.

Nowadays, the trend of energy in the world is tremendously increasing as the demand for energy has been rising up.

In order to step up the industrialization and urbanization processes and to improve people's living standard at current growth rate, all of our ASEAN countries stress our needs for more energy.

Energy production and consumption have been increasing steadily and as a consequence, the effective and efficient utilization of energy becomes more and more evident, since the crude oil price has become up day by day.

The action program of energy savings for the oil industry in Myanmar for the short term is being carried out under the management of Ministry of Energy.

2.3 Legal status of the proposed project site

The proposed project site is owned by the Myanmar Petrochemical Enterprise, Ministry of Energy, and Government of Union of Myanmar.

We should have seen documents or certificates that prove the legal ownership of land by MPE, e.g. Grant, Ownership approval, history of land record, etc. (MPE should kindly provide us these documents). This need is also subjected to the land ownership of people at the pipeline area.

2.4 Assessment of the proposed site and justification for selecting the present site

Myanmar Petrochemical Enterprise (MPE) had formed a committee to select the site of the new refinery plant which can be near the Myanmar-China Pipeline at the area of central Myanmar.

The following advantages favour the selection of this site.

1. The land to be used for the building of the proposed project of new refinery plant is the property of existing petrochemical complex of Myanmar Petrochemical Enterprise and

owned by the Ministry of Energy. Therefore is no land right demand from local people, no land grabbing is needed.

2. People living in Thanbayakan village and Minhla township have been familiar with the existence of petrochemical factory where no significant negative impact has been known since the establishment of the existing refinery plant in 1982.
3. The location is just near the Ayawaddy River where needed amount of water can be pumped up to the factory
4. The Saku Off-take Point where crude oil will be taken out from Myanmar-China Oil Pipe Line, SEAP is just 25 mile away from the project site.
5. Needed electricity can be obtain from Minbu substation by building an additional transformer.
6. In the construction period, water, electricity, and staffs from the existing petrochemical complex can be shared for new one.
7. A rail-road just crossing just in front of the current factory can be used for transportation and logistics need of new one.
8. Two complementary projects: (1) excavation of silted land near jetty which costs Ks. 240 million and (2) dam building which costs Ks. 175, billion will help the new refinery project facilitate in use of the Ayewaddy River for the refinery plant.
9. If more crude oil is available for further refining, the existing plant can be upgraded.

Weaknesses

1. The presence of railroad and car road, make two factory-compounds separated.
2. Closeness of two factories has danger of fire outbreak and demands an efficient fire-fighting system.
3. If new project is Joint-Venture, salary of staff can be higher that current government staffs of existing factory. Then, managing the staff can become a burden.

2.5 Study on project option alternative considerations for the project

PROJECT ALTERNATIVES AND SELECTED PROJECT

Options for the project alternatives might have been for several years. Various options for the site selection had been made until recently.

Pre-feasibility was done by CNPC South-east Asia Pipeline Co Ltd and a report together with site selection Report was prepared and submitted. That was the result of collaborated effort of Ministry of Energy and CNPC.

Do nothing alternative (No new refinery plant)

The do nothing alternative would mean that there would be inability of producing adequate petroleum products against the demand even for the in-country needs.

3 Some existing laws, regulations, and rules

The conduct of EIA and SIA is the mandatory requirement for the construction of the oil refinery plant/project in accordance with statement of rules and regulation of the Environmental Law of the Union of Myanmar.

RELATED LEGAL FRAMEWORKS

This topic describes and discusses the involvement of laws and acts related to the implementation and the assessment impacts of this project.

The Environmental Conservation Law

The Pyidaungsu Hluttaw enacted this law by law No. 9 of 2012 on the date of 30th March, 2012. This law was enacted with the objectives of:

a. To enable to implement the Myanmar National Environmental Policy;
b. To enable to lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process;
c. To enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations;
d. To reclaim ecosystems as may be possible which are starting to degenerate and disappear;
e. To enable to manage and implement for decrease and loss of natural resources and for enabling the sustainable use beneficially;
f. To enable to implement for promoting public awareness and cooperation in educational programmes for dissemination of environmental perception;
g. To enable to promote international, regional and bilateral cooperation in the matters of environmental conservation;
h. To enable to cooperate with Government Departments, Government Organizations, International organizations, non-government organizations and individuals in matters of environmental conservation.

The Forest Law

The State Law and Order Restoration Council was promulgated the Forest Law in 1992. This law was formulated by focusing on the balanced approach towards conservation and development issues implicit in the concept of sustainable forestry. It decentralizes the management and opens up opportunities for increased private sector involvement in timber trade. Highlighting environmental and biodiversity conservation, the law encourages community forestry and people's participation in forest management to meet the basic needs of the rural people, but prescribes severe punishments for forest offences. In addition, the MOF has promulgated the Forest Rules in 1995.

The Vacant, fallow and Virgin Lands Management Law

The Pyidaungsu Hluttaw enacted this law by law No. 10 of 2012 on the date of 30th March, 2012 in order to ensure the management task concerning the use of Vacant, Fallow and Virgin Lands for Economic Development in relation to commercial agriculture, livestock breeding, mining and government allowable other purposes in line.

The Foreign Investment Law

The Pyidaungsu Hluttaw enacted this law by Law No. 21 of 2012 dated 2nd November, 2012. This Law shall apply to business with the objectives of:

a. Supporting the objectives of the national economic development project, business which cannot be affordable by the Union and citizens and business of complete finance and technology;
b. Development of employment opportunities;
c. Promotion and expansion of exports;
d. Production of import substituted goods;
e. Production of products which require
f. Acquisition of high technology and development of manufacturing business by high technology;
g. Supporting the business of production and services involving large capital;
h. Bringing out of business which would save energy consumption;
i. Regional development;
j. Exploration and extraction of new energy and the emergence of renewable; energy sources such as bio-basic new energy;
k. Development of modern industry;
l. Protection and conservation of environment;
m. Causing to support for enabling to exchange the information and technology;
n. Not affecting the sovereign power and the public security;
o. Development of knowledge and skill of citizens;
p. Development of bank and banking in accord with international standard;
q. Appearing the required modern services for the Union and Citizens;
r. Causing to be sufficient the local use of the Union energy and resources in the short and long term.

The Conservation of Water Resources and Rivers Law

The State Peace and Development Council Law enacted this law by Law No.8/2006 on the date of 2nd October, 2006 with the objectives of:

a. To conserve and protect the water resources and rivers system for beneficial utilization by the republic.
b. To smooth and safety waterways navigation along rivers and creeks;
c. To contribute to the development of State economy through improving water resources and river system;
d. To protect environment impact

The Protection and Preservation of Cultural Heritage Regions Law

The State Peace and Development Council Law enacted this law by law No.9/98 on the date 10th September, 1998 with the objectives of :

a. To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years;
b. To protect and preserve the cultural heritage regions and the cultural heritage therein so as not to deteriorate due to natural disaster or man-made destruction;
c. To uplift hereditary pride and to cause dynamism of patriotic spirit of citizens by protecting and preserving the cultural heritage regions;
d. To promote public awareness and will as to the high value of the protection and preservation of the cultural heritage regions;
e. To protect the cultural heritage regions from destruction;
f. To carry out protection and preservation of the cultural heritage regions in conformity with the International Convention approved by the State.

The Freshwater Fisheries Law

The State Law and Order Restoration Council Law enacted the Freshwater Fisheries Law by Law No.1/91 on the date of 4th March, 1991 with the objectives of:

a. To further develop the fisheries;
b. To prevent the extinction of fish;
c. To safeguard and prevent the destruction of freshwater fisheries waters;
d. To obtain duties and fees payable to the State;
e. To manage the fisheries and to take action in accordance with the law.

Pesticide Law

Plant Protection Division, Myanmar agriculture Services enacted this law by Law No.7/2002 on the date of 1st October, 2002 with the objectives of:

- Analysis of chemical residues
- Assessment of toxicity of registered pesticides
- Monitoring of residue levels of pesticides with ASEAN harmonized MRLs.

The Fertilizer Law

The State Peace and Development Council Law enacted this law by Law No.7/2002 on the date of 1st October, 2002 with the objectives of;

a. To enable supporting the development of agricultural sector which is the basic economy of the State;
b. To enable supervision and control the fertilizer business systematically;
c. To enable growers to use fertilizer of quality in conformity with the specifications;
d. To support the conservation of soil and environment by utilizing suitable fertilizer;
e. To enable carrying out of educative and research works extensively for the systematic utilization of fertilizer by the agriculturalist;
f. To cooperate with government departments and organizations, international organizations and local and foreign non-governmental organizations regarding fertilizer business.

4 Scoping and developing data collection plan

The Scope of Work (SOW) and Terms of Reference (TOR) have been described in a formal way as Appendix A in the Agreement between Myanma Petrochemical Enterprise (MPE) and Myanmar Survey Research Co. Ltd. (MSR) to do EIA/SIA signed by both parties on 25 November 2014. The text of Agreement also includes EIA Report Requirements which describes some detail topics and headings that MSR should have done in the works of EIA/SIA for the new refinery project.

Therefore we are constantly adopting these guidelines to conduct EIA process and study to be able to complete the needs of activities and to apply the standardized methodology.

4.1 Scoping process:

Identification of the project's area of influence

- the direct footprint of all project components
- off-site areas required for resettlement or compensatory tracts
- the air shed

- the watershed and drainage system.
- forests and other areas which may be either directly impacted or which have demonstrable ecological or social connectivity to the directly affected areas
- aquatic and terrestrial habitats are to be examined and terrestrial and riverine flora and fauna are to be recorded.
- The public health, economic activities, or environmental conservation are assed.
- areas used for livelihood activities (hunting, fishing, grazing, gathering, agriculture etc.) or religious or ceremonial purposes of a customary nature which may be affected by the project.

4.2 Scope of work

Scoping includes the following components:

- Initial project description and definition of overall project area of influence (including environmental and social impact zones)
- Findings on the key social and environmental baseline aspects and potential impacts, including an indicative assessment of scale and severity, which should be included for further study in the environmental and social assessment and planning studies (Task 2 of ESIA Work Plan, Appendix D)
- Stakeholder consultation strategy for the planning phase, and initial consultation (Task 3)
- Conduct stakeholder consultation meetings to discuss the findings of the scoping, major issues of the project and plan of the studies (Task 3)
- Conduct central level workshop to present the findings of the scoping to the key stakeholders who directly or indirectly influence the project development (Task 3)
- Carry out and document a round of scoping stage stakeholder consultations on the contents of the scoping report (Task 3)

Based on feedback received during the consultations, the scoping report and TOR will be revised and finalized and develop a detailed work plan for carrying out the assessments.

4.3 SIA Baseline Process: Task 2

SCOPE OF WORK

The scope of works for Environmental and Social Impact Assessment (ESIA) of the New Refinery Project comprises of following scope but not limited to them:

4.3.1 Physical environment

4.3.1.1 Hydrology:

Although there is not large watershed existed, the baseline will provide information on discharge (mean monthly, maximum, minimum) at the project site and nearby area of proposed project sites along with locations upstream and downstream and capture seasonal variation in flow.

Drainage Assessment

Runoff from the refinery processing area

Water Quality

Baseline information of water quality is required to identify and quantify actual and/or potential future influences on water quality in the vicinity of the refinery.

Three sampling sites were established to monitor water quality in ../ near the outfall

Surface and ground water quality study to be conducted

Describe the baseline water quality of IrrawadyRiver at Mnhla's water collecting site. Parameters relevant to public health and aquatic resources (e.g. biodiversity, and habitat). Water quality parameters of the IAyawaddyRiveratMinhla area shall be measured.

4.3.1.2 Geology, geomorphology, and seismology:

Soil type would be identify and check the traces of pollution as a result of current petrochemical complex's function. The presence or absence of sulfides or heavy metals in subsurface and surface rock in the areas should be examined.

Characterize faults and overall seismic activity in the region which could affect or influence design, construction and maintenance aspects of the factory and other project infrastructure.

Soil, sediment movement, sedimentation near the jetty, and erosion:

Include a characterization of soil types, locations and qualities. Characterize erosion rates in the jetty area, noting the corresponding geological conditions, slope steepness, vegetation type, and present land-use conditions.

Describe the dynamics of sediment movement in the Ayawaddy River at the jetty area, along with seasonal variations in the estimated amounts of suspended sediments and digging at the jetty sites. Also include a baseline for any potential "pollutant" in sediments and river water.

Landslide and other natural hazard propensity:

Describe the natural phenomena that pose potential risk to the Project including landside and effect of flood caused by river.

Soil analysis

Soil samples to be collected in the proposed project area and outside the area as well and to be sent to the laboratory. Soil is to be tested for various parameters to use as baseline information. Fertility, texture and soil chemicals are to be identified. The sampling locations to be selected in randomize design.

4.3.1. 3 Air quality Study to be conducted

Air quality baseline characterization to be done by sampling with the following parameters:

- particulate matter less than 10 microns (PM10) and concentration expressed in (µg/m^3 for 24 hours averaging time.
- Particulate matter less than 2.5 microns (PM2.5), concentration expressed in (µg/m^3 for 24 hours averaging time;
- Carbon monoxide (CO), concentration expressed in (µg/m^3 for maximum hour and 8 hours averaging moving time (maximum concentration).
- Nitrogen dioxide (NO_2), concentration expressed in (µg/m^3 for maximum hour and 24 hours averaging time.
- Sulfur dioxide (SO_2), concentration expressed in (µg/m^3 for 24 hours averaging time.

These parameters, called criteria air pollutants, can injure health, harm the environment and cause infrastructure damage. Thereby, sampling purpose is to obtain mass concentration and chemical composition data for air quality baseline.

4.3.1.4 Noise and vibration

Collection of baseline data for noise and vibration levels to be measured in and around the proposed project site for 24 hr period

4.3.1.5 Cultural and historical heritage.

Historic structures and districts may require protection from direct physical impacts but should also be considered in their visual dimension.

4.3.1.6 Aquatic ecology:

A characterization of aquatic flora, fauna and natural habitats near jetty area and downstream would be made.

Collection of information regarding habitat, flora and fauna in and around the proposed site

a. Aquatic fauna (Ayawaddy River):

i. Fish

- Collection of Fishes from upstream and downstream sites of the River and selected based on the site of the proposed project area.
- The fishes to be collected from the river during the survey period and to be photographed soon after the collection.
- Preservation of fishes in 10% formalin solution for further identification in the laboratory. The fishes will be identified according to U Khin (1981) and other authors.

ii. Plankton species

- Collection of Plankton sampling using plankton net. Two transect lines to be set up across the river on a map at upstream and downstream sites. Three sampling points along each transect line to be defined with equal interval.

Terrestrial ecology:

A detailed characterization of terrestrial flora, fauna and natural habitats based on full field data, secondary information, as well as interviews with local residents.

For avifauna, the baseline should in particular make note of any direct observation and secondary data.

Natural habitats:

Terrestrial Flora and Fauna

iii.Vegetation Resource

- Study the tree species composition and their distribution near the project site.
- The plant families to be identified by using key to the families of the flowering plants, issued by Department of Botany, Yangon University (1994Wildlife Resource

vi. Birds:

Bird watching and study to be done in the habitats of the study area to build up a true picture of species-habitat relationship.

vii. Large mammals:

Distribution and presence of large mammals be examined by conducting track and sign surveys. Sighting of prey species, tracks, scats, droppings as data gathering in the field.

Questionnaire surveys to be conducted.

viii. Small mammals:

The tracks and signs of small mammals to be observed along the proposed project area. The small mammal species will be identified following after Tun Yin (1966), Lekagul and McNeely (1988) and Francis (2001). Field survey and Questionnaire surveys to be conducted.

ix. Reptiles and Amphibians:

In the present study, methodology of the study on reptilian and amphibian species to be based on active search and trapping method. Stratification of the habitat will be relatively similar to that of mammal study. Turtles and tortoises to be identified.

x. Butterflies and Odonates:

Collection of Butterflies and odonates along the transect lines to be set up at various habitats in the proposed project area. The specimens to be photographed.

4.3.2 SOCIO-ECONOMIC ENVIRONMENT

4.3.2.1 Water use and users:

Identify all existing water uses, river, tributaries, and tube wells.

4.3.2.2 Land use:

Characterize current land uses in the Project area and indicate major trends in land use change in nearby areas.

Land tenure:

Characterize types of land tenure (e.g., titles, customary), formal and informal institutions related to land ownership, and modes of land transactions in the Project area (a full land and asset

registry for individuals and households to be displaced will be prepared separately as part of the resettlement action plan).

4.3.2.3 Demography and ethnicity:

Develop a demographic and ethnic profile of the population in the Project area. For communities specifically affected by the Project, describe in detail their history, physical spread, social clustering, cultural and traditional characteristics, interactions and relations among various groups.

4.3.2.4 Livelihood activities:

Characterize economic and subsistence-oriented livelihood activities, both for communities residing within the Project area of influence as well as for individuals or industries which depend on resources in the Project area of influence. Discuss in particular those activities related to fisheries, forestry or other natural resources, as well as agriculture and industry (if any). Discuss gender related work load sharing and family economy; dependency and use of local and external resources; and production and marketing systems and patterns.

4.3.2.5 Community health:

Provide an overview of key health issues, focusing on the presence of any disease vectors which may become more prevalent in the area due to the Project (for example, waterborne vectors as well as the coverage and quality of health services available in the Project area.

4.3.2.6 Indigenous and vulnerable peoples:

Identify the presence of vulnerable and indigenous peoples residing in the project idea and compile information on their demographics, socio-cultural features, livelihood and employment patterns, use of natural resources, formal and information institutions, and interactions with other ethnic groups.

Discuss social cohesion and leadership institutions. Provide gender-specific information as possible. Any contact or interviews for preparation of baselines or social assessment should be planned and carried out in a culturally appropriate manner, in a language acceptable and used by the communities and in coordination with any other preparation work being carried out with regard to indigenous peoples

4.3.2.6 Religion and culture:

Provide relevant information on community festivals and rituals, other key resources to be affected by the Project.

Collection of Baseline data of demographic pattern, population density, educational facility, Agriculture, income, fuel, medical facility and health status, transport, recreational Facilities.

The study, the socio-economic assessment (SEA), to be designed to gather data and through the analysis of data, identification of any significant issues associated with the Project that have their basis in the socio-economic environment.

The study to propose **management and monitoring options** to mitigate any socio-economic issues identified and provide the baseline information for inclusion in the ESIA as follows -

i. Interview sample survey on the socio-economic conditions and perception of local villagers
ii. Secondary data collection

- To describe the social and cultural features that differentiates social groups in the project area. Their different interests in the project, and their levels of influence to be mentioned. In particular, any particular effects the project may have on the poor to be explained.
- To examine whether the project can offer any opportunities to influence the behavior of such groups.
- To observe whether there is any known conflicts among groups that may affect project implementation.
- Examine how people are organized into different social groups, based on the status ascribed to them at birth-according to their ethnicity, clan, gender, locality, language, class, or other marker or on the status or identity they have achieved or chosen status of profession etc.

The analysis of social diversity also includes looking at the way in which such diversity interacts with social, power relations and the implications towards access, capabilities and opportunities.

To identify the various groups who have an interest or a stake in the project. The characteristics, interests and likely influence of various groups in the development process to be the subject of stakeholder analysis.

5 Stakeholder Engagement (Task 3)

Stakeholder identification

When identifying affected stakeholders, as ystematic approach often works well,starting with delineating the project's geographic sphere of influence. It is needed to think not only about the primary project site(s), but also all related facilities, including associated facilities, transport routes, areas potentially affected by cumulative impacts, or unplanned but predictable developments.

This process will begin to reveal those most directly affected by the project, whether from the use of land at the project site or the effects of air and water emissions, from off-site transportation of hazardous materials, or even the socio-economic effects of job creation throughout the supply chain.

E.g. Stakeholder Mapping,

A quick and practical technique for undertaking this type of stakeholder mapping exercise is "impact zoning" which includes mapping the sphere of influence of different types of environmental and social impacts. This function will starts with identifying distinct groups by impact area and from this prioritize stakeholders for consultation. For larger–scale projects, with different phases to their development, mapping out both the near-term and future facilities may assist the company to identify potential "cumulative impacts" on stakeholder groups that might not have been evident by just looking at the immediate project.

To gain public opinion, meetings and discussion for are to be made with the following stakeholder groups:

Government Agencies
Private sector
Environmental NGOs and Network
INGOs
Women' group and Network

Knowledge institution-University, Science and Technology
Local level stakeholder: Women CSOs

Stakeholder Analysis and stakeholder interview will also be made.
The following activities are to be made.

Display notice board, sign board, etc. at strategic places
Publish in media
Public (affect people, local authorities, civil society, and others) consultation
Focus group discussion

6 Environmental and Social Impact Assessment/Analysis and Mitigation (Task 4)

Assess the positive and negative direct and indirect impacts to physical, biological, socio-economic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods in the Project's area of influence, **with various assessment methods**, in quantitative terms to the extent possible) and provide relevant mitigation measures.

6.1 Environmental Impact Analysis and Mitigation

Determine potential effects on ecologically sensitive areas.

Review available animal population inventories and habitat by type, location, and species affected.

Provide a list of threatened animals that are present in the Project area.

Predict loss or alteration of terrestrial habitats including wetland and riparian habitats, deforestation and disruption of wildlife movement from one habitat to another.

Assess the potential impact of the dam and reservoir on sedimentation on both in the reservoir area and downstream reaches.

Assess the environmental impacts and consequences of local, regional and national road construction to include but not be limited to its effect on terrestrial and aquatic ecosystem.

Identify and evaluate feasible measures to prevent or minimize or compensate significant negative impacts associated with the Project.

Such measures will include the following components:

- Measures necessary for avoidance and/or prevention of adverse impacts on water quality, air quality, noise levels, public health and safety, biophysical environment, land use, archaeological and cultural resources, aquatic and terrestrial species and habitat, socio-economic resources, etc.
- Biodiversity offset areas for the habitat loss to ensure no net loss of affected biodiversity. Compensatory reforestation programme.

Assess impacts on physical cultural resources.

Identify potential impacts on endangered species and habitats.

6.2 Social Impact Analysis and Mitigation

6.2.1. Land Acquisition and Involuntary Resettlement

Identified past, present and future potential permanent or temporary socio-economic impacts as a result of the Project, changes in land use or restrictions of access to assets and common property resources, or disruption to current livelihood activities on communities outside the Project area. Identify livelihoods at risk, individuals and groups who may be differentially or disproportionately affected by the Project because of their disadvantaged or vulnerable status.
Conduct socio-economic survey(s) and a census, with appropriate socio-economic baseline data to identify all persons who will be displaced by the project and to assess the Project's socio-economic impacts on them.

Define categories and significance of impact, and present inventory of affected assets and numbers of affected persons/households in the following impact areas

(i) construction areas
(ii) upstream and downstream areas
(iii) transmission lines right of way and substation.

Describe how the Project would manage socio-economic impacts and suggest avoidance mechanisms, or where it is not possible to avoid, mitigation measures on all potential social and environmental impacts, and describe community responses towards benefit sharing and community development strategies.

When developing measure, pay adequate attention to gender concerns, including specific measures addressing the need of female headed households, gender-inclusive consultation, information disclosure, and grievance mechanisms, to ensure that both men and women receive adequate and appropriate compensation for their lost property and resettlement assistance, if required, as well as assistance to restore and improve their incomes and living standards.

Undertake a valuation of affected assets to ensure that the rate of compensation is equivalent to replacement cost. The calculation of full replacement cost will be based on the following elements:

(i) fair market value
(ii) transaction costs
(iii) interest accrued
(iv) transitional and restoration costs,
(v) other applicable payments, if any.

Where market conditions are absent or in a formative stage, affected persons and host populations will be consulted to obtain adequate information about recent land transactions, land value by types, land titles, land use, cropping patterns and crop production, availability of land in the Project area and region, and other related information.

Develop various options for relocating housing, identify resettlement sites and design new resettlement sites and replacement housing in consultation with affected people. Preference will be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. If land is not the preferred option of the displaced persons, or sufficient land is not available at a reasonable price, non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost.

Identify resettlement sites, and locations of replacement agricultural lands and conduct an environmental and social impact assessment of sites, and development needs. Present the design

of resettlement sites, and development of replacement agricultural lands in the resettlement plan.

For each impact area, prepare a detailed budget including base costs and timetables integrated with the Project schedule.

6.2.2 Labour Management

Assess the impacts of establishing workers' camps and migrant labor (and camp follower) influx in the Project areas especially impacts related to health and safety, social, gender, human trafficking, and environmental consequences and describe how the Project would address such impacts.

Propose measures to ensure that the project is in compliance with national labor laws (e.g., minimum wage, equal pay, safe working conditions, social security contributions) and international core labor standards (including freedom of association, non-discrimination and equal pay, and prohibitions of forced and child labor).

Describe measures to manage migrant labor influx and ensure compliance with national labour laws and international core labor standards in a labor management plan.

6.2.3 Community Health and Safety

Describe how the Project will affect the health and safety of people's living in and adjacent to Project impact areas.

Identify any other potential social risks associated with the Project, such as risks of increased HIV/AIDS transmission or human trafficking in some Project impact areas.

Prepare a public health action plan describing measures and activities to be implemented during pre-construction, construction and operations phases of the Project to avoid and/or minimize the impact of the Project on the health and safety of the local population and which further describes the measures required to improve public health services provided by the principal health centers in the Project impact areas.

7 Risk Analysis/analysis (Task 4)

Risk Analysis, Assessment, and Management (Task 4)

Risk Analysis

So far, we have mentioned risk analysis several times, but not given any clear definition. A commonly used definition is:

Risk Analysis: Systematic use of available information to identify hazards and to estimate the risk to individuals, property, and the environment.

A risk analysis is always a proactive approach in the sense that it deals exclusively with potential accidents.

A risk analysis is carried out in three main steps:

1. Hazard identification. In this step, the hazards and threats related to the system are identified together with the potential hazardous events. As port of this process, assets that may be harmed are also identified.

2. Frequency analysis. This step will usually involve a deductive analysis to identify the causes of each hazardous event and to estimate the frequency of the hazardous event based on experience data and/or expert judgments.
3. Consequence analysis. Here, an inductive analysis is carried out to identify all potential sequence of events that can emerge from the hazardous event. The objective of the inductive analysis is usually to identify all potential end consequences and also their probability of occurrence.

The risk analysis may be qualitative or quantitative, depending on the objective of the analysis.

Qualitative risk analysis: A risk analysis where probabilities and consequences are determined purely qualitatively.

Risk evaluation: Process in which judgments are made on the tolerability of the risk on the basis of a risk analysis and taking into account factors such as socioeconomic and environmental aspects.

Assets	Hazard source		
	Humans	The environment	Technology/materials
Humans	1	2	3
The environment	4	5	6
Material/financial	7	8	9

Different types of risk analyses.

Risk Assessment

When risk assessment and risk evaluation are carried out in a joint process, that becomes a risk assessment.

Risk Assessment: Overall process of risk analysis and risk evaluation.

Example: Five steps risk assessment of the UK HSE risk assessment includes:

1. Identify the hazards.
2. Decide who might be harmed and how.
3. Evaluate the risks and decide on precautions.
4. Record your findings and implement them.
5. Review your assessment and update if necessary. Risk Management

If we, in addition, identify and (if necessary) implement risk-reducing actions and survey how the risk changes over time, we conduct risk management.

Risk management: A continuous management process with the objective to identify, analyze, and assess potential hazards in a system or related to an activity, and to identify and introduce risk control measures to eliminate or reduce potential harms to people, the environment, or other assets (Rausand, 2011).

8 Preparation of Environmental & Social Management Plan (EMP) and Monitoring Plan (Task 4)

We shall prepare the environmental and social management plan encompassing the following, among other elements as determined to be necessary to meet the objectives of the ESIA work based on the findings of the assessment process.

Specific sub-plans to manage identified issues, including but not limited to the following elements (some of which may be combined, where determined to be appropriate), to incorporate site-specific and phase-specific mitigation measures that are identified through impact assessment process

- Land clearing
- Aquatic ecology management, including fish and fisheries restoration measures
- Measures to minimize and mitigate natural habitat degradation and loss
- Reforestation/afforestation programs (including management of tree nurseries and plantations
- Erosion prevention and sediment management program
- Pollution abatement
- Topsoil saving management
- Occupational health and safety management
- Environmental, health and safety training
- Emergency preparedness and response

The training and capacity building needs to ensure satisfactory implementation of the ESMP and proposed measures for each actor involved in implementation should also be specified based on an assessment of the organizational capacity of each to fulfill their proposed functions.

8.1 A monitoring plan that details the key parameters to be monitored, monitoring locations and frequencies, monitoring methodologies, required budgets, and responsible entities to carry out monitoring for each of the above-mentioned sub-plans as well as to follow upon monitoring outcomes, including to identify root causes and correct non-compliances (including through remedial measures if required), as well as to enable continuous evaluation of overall performance and adjustments to management measures and arrangements as needed to enhance overall project sustainability.

Monitoring is the regular collection of information to find out what is happening in the area where the project is operating in. the objective of monitoring is to provide an "early warning system' of harmful effects humans or project may be having. By identifying, early on, any problem the project is causing, it can be seen whether mitigation measures are working or if any needed to be implemented.

9 Develop detailed methodology and data collection plan (Determine research and survey methodology) Task 2

STUDY AREA

The study area for various aspects of the EIA is dependent on the particular aspect. The sizes of the study areas for the various aspects are as follows:

Occupational	On site
Aquatic	Riverside at Minhla
Water Quality	On site at streams, well, tanks, and Riverside
Wastewater	On-site and drainage at river side
Heritage site	within a 0.5 km radius surrounding the site
Geology	On-site
Hydrology	Within a 2 km radius surrounding the site

10 Description of the existing Environment – Baseline Studies (Task 2)

Baseline studies will be conducted to characterize the physical, biological, and sociological/socioeconomic features that are influenced by the existing refinery operations.

The aspects covered in each of the three areas are as follows:

Physical aspect

- Geology, soil,
- Hydrology, water resources,
- Climate,
- Air quality
- Noise and vibration
- Risks and hazards
- Occupational exposure, emergency response plans,
- Waste management
- Biological/Ecological
- Terrestrial
- Aquatic flora and fauna

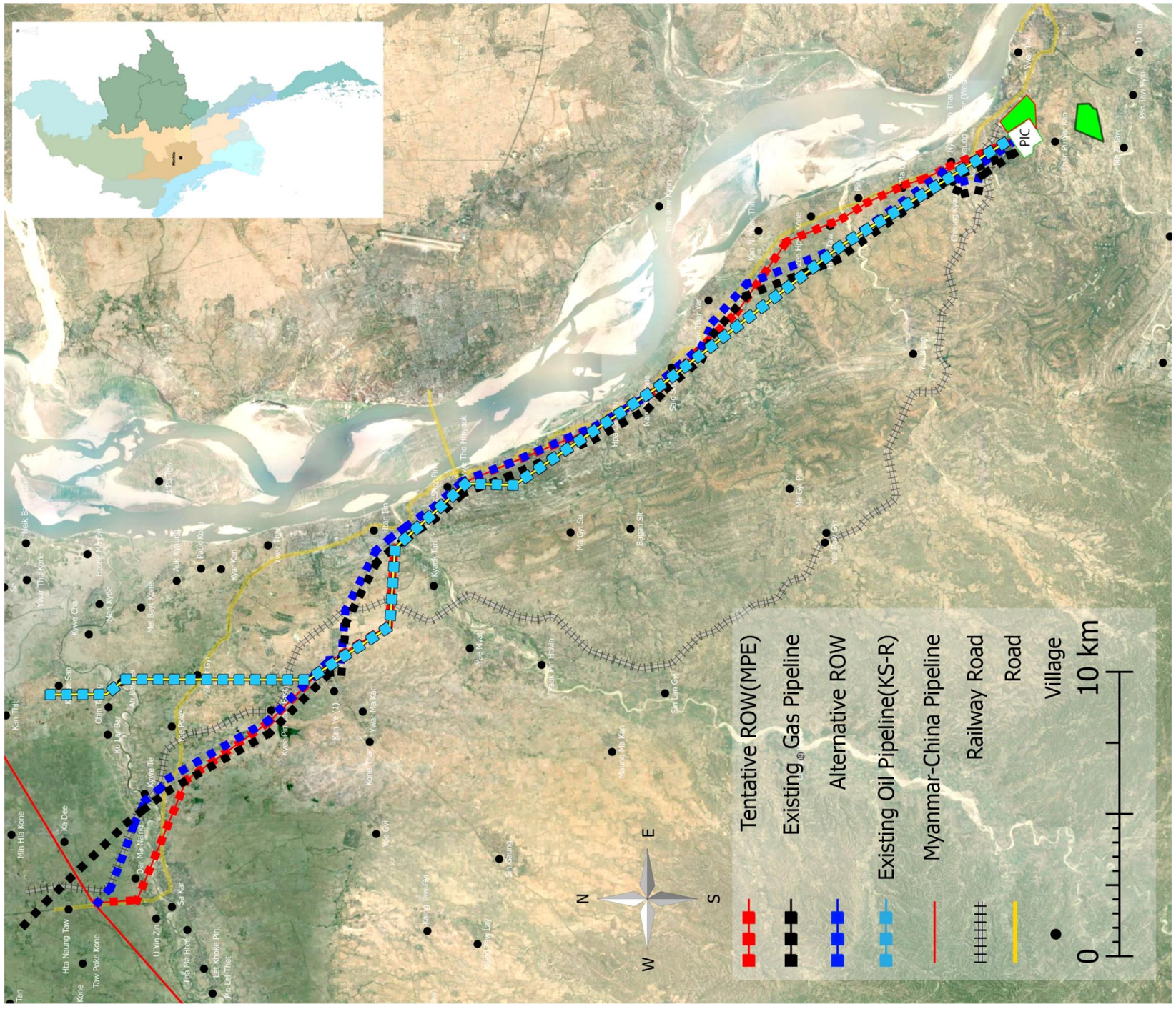
Socioeconomic aspect

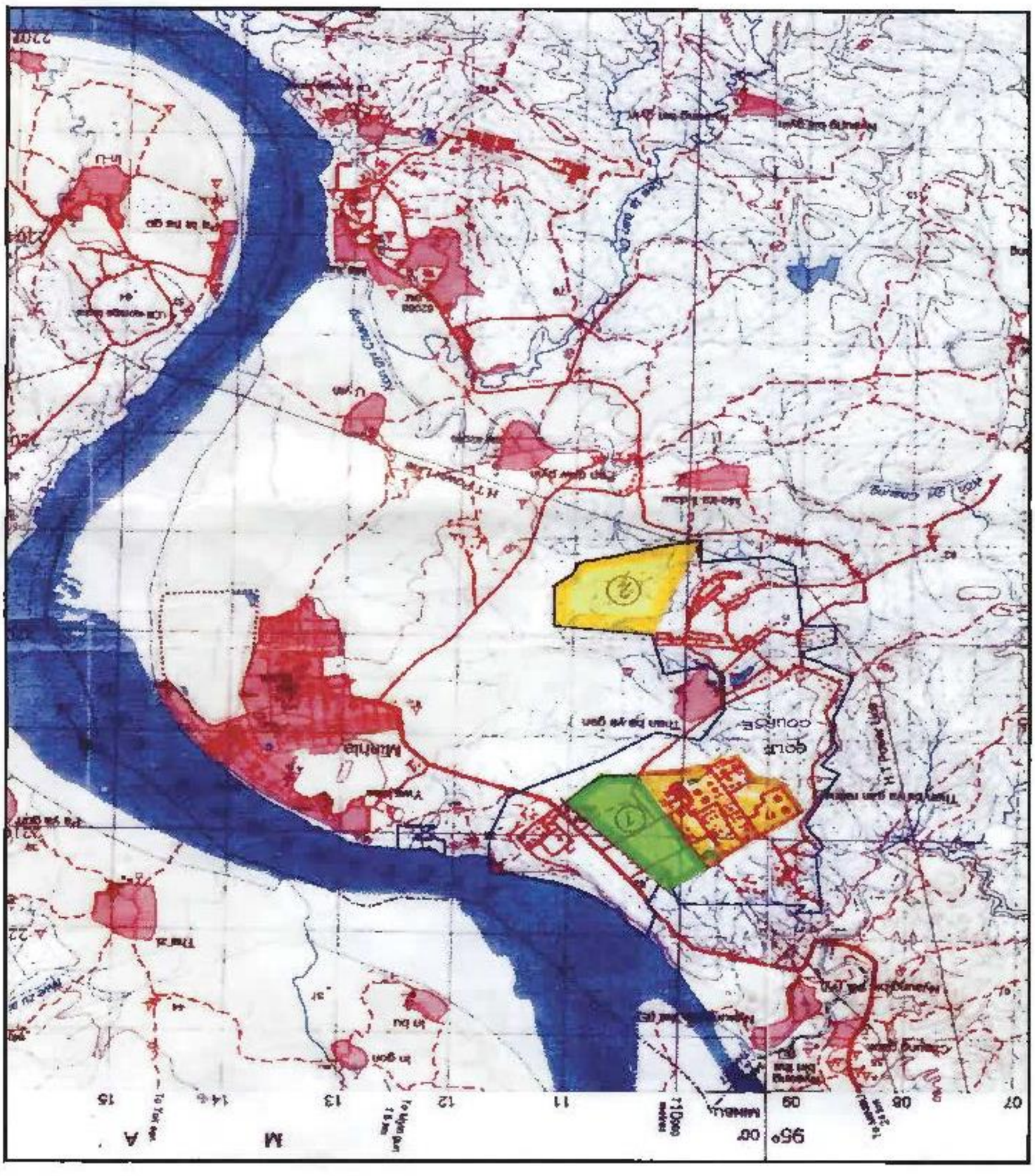
- Demography,
- Infrastructure services, housing, amenities, community fabric/cohesion, economy
- Education, Population Health profile, existing coping patterns
- Agricultural practices, non-agricultural practices
- Employment Profile, expenditure profile
- activities, public perception, land use,
- Macroeconomics

References:

1. Canter, Larry W., (1996). Environmental Impact Assessment, McGraw-Hill, Inc. New York.
2. HlaHlaKyi, Daw, (2006) Progress Report on Oil Refineries Earlier Audited in Myanmar.Seminar on the Promotion of Energy Efficiency and Conservation (PROMEEC) for Major Industries in Southeast Asia.
3. Rausand, Marvin. (2011). Risk Assessment. A John Wiley & Sons, Inc., Publication, USA.

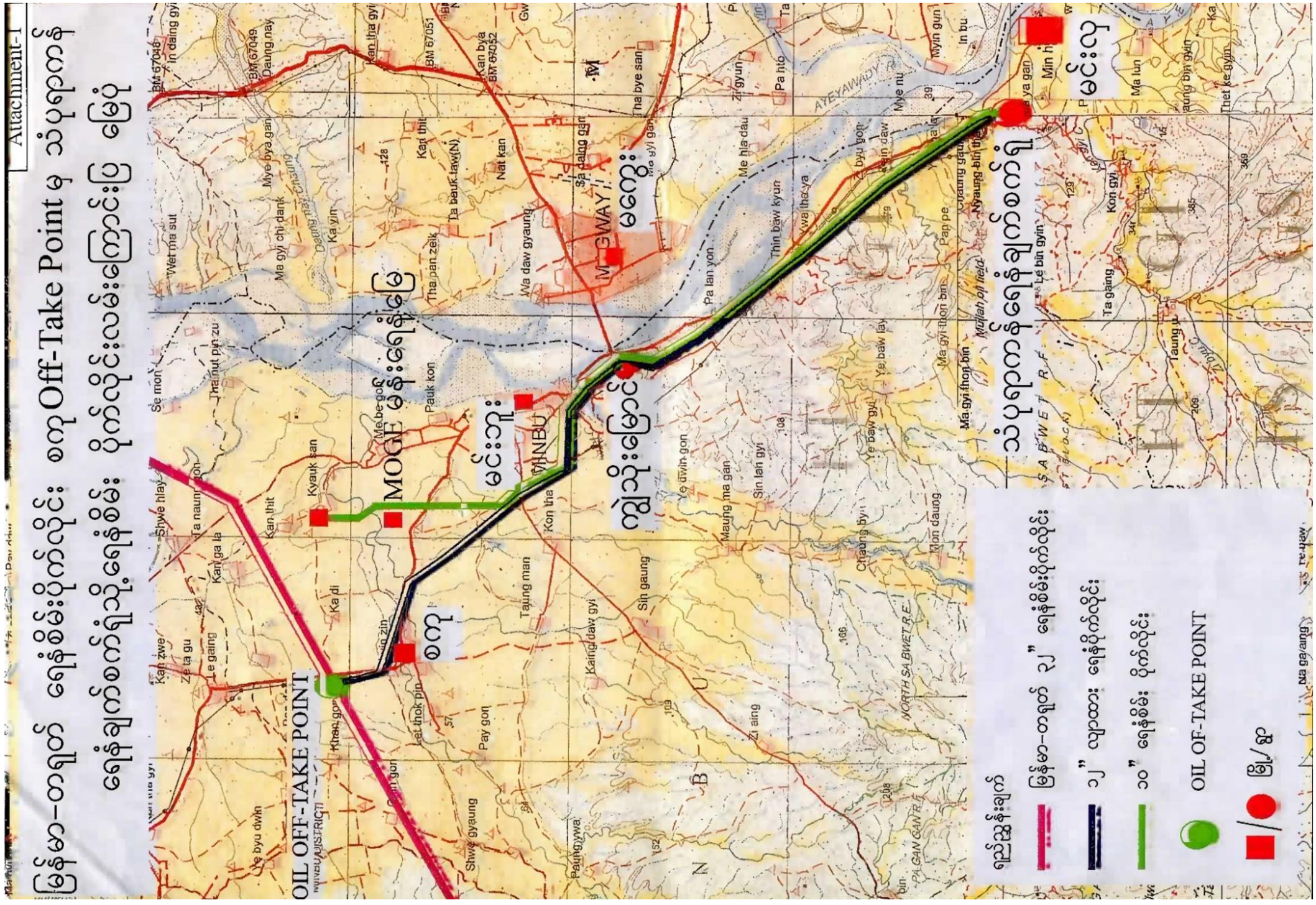
APPENDIX 24 : PROJECT LOCATION



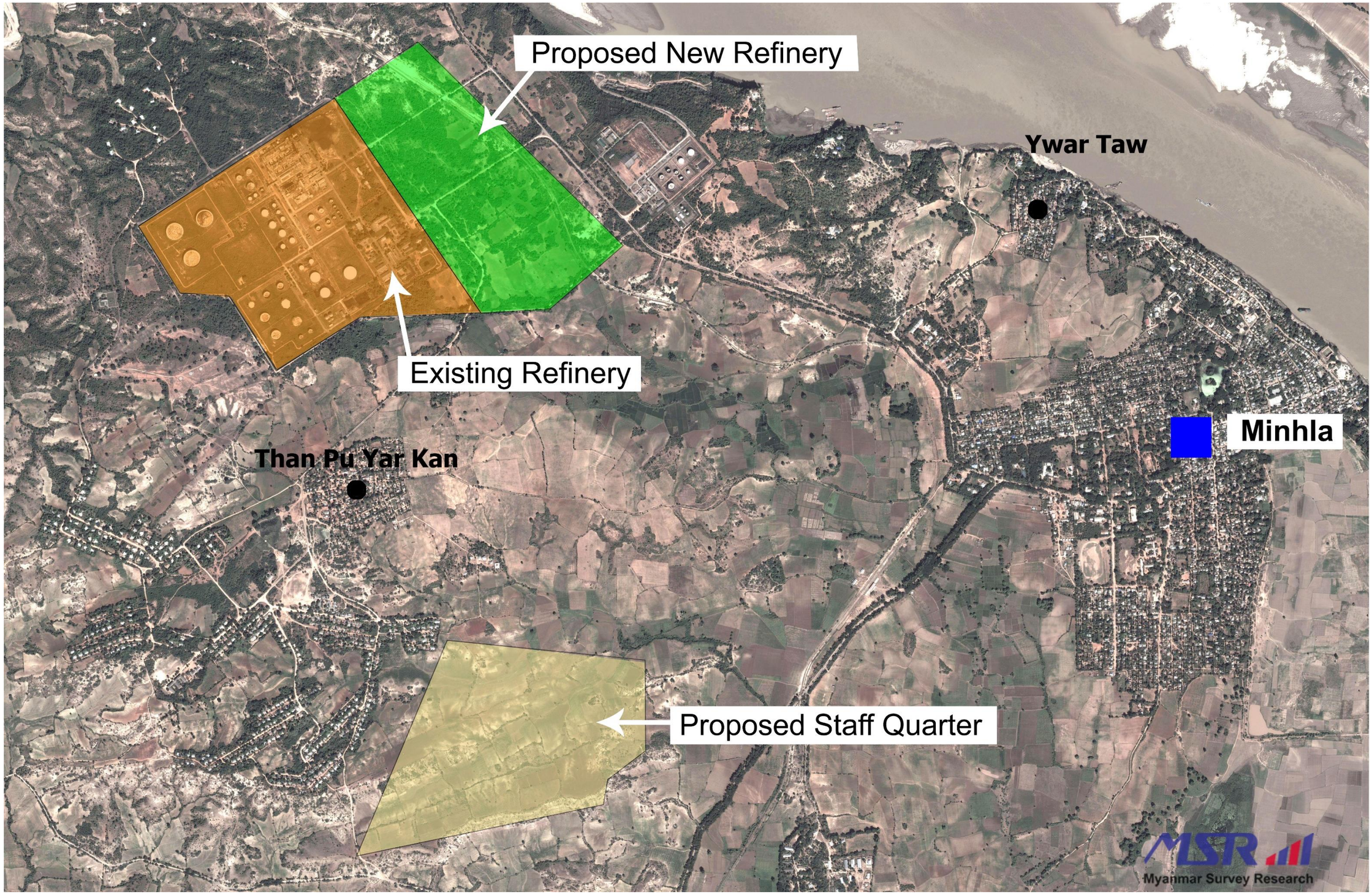


ပုံ(၂၅)-၁ စီမံကိန်းနယ်မြေဧရိယာ ပုံ

APPENDIX 26 : PROPOSED PIPELINE FROM OFF-TAKE POINT TO REFINERY PROJECT AREA

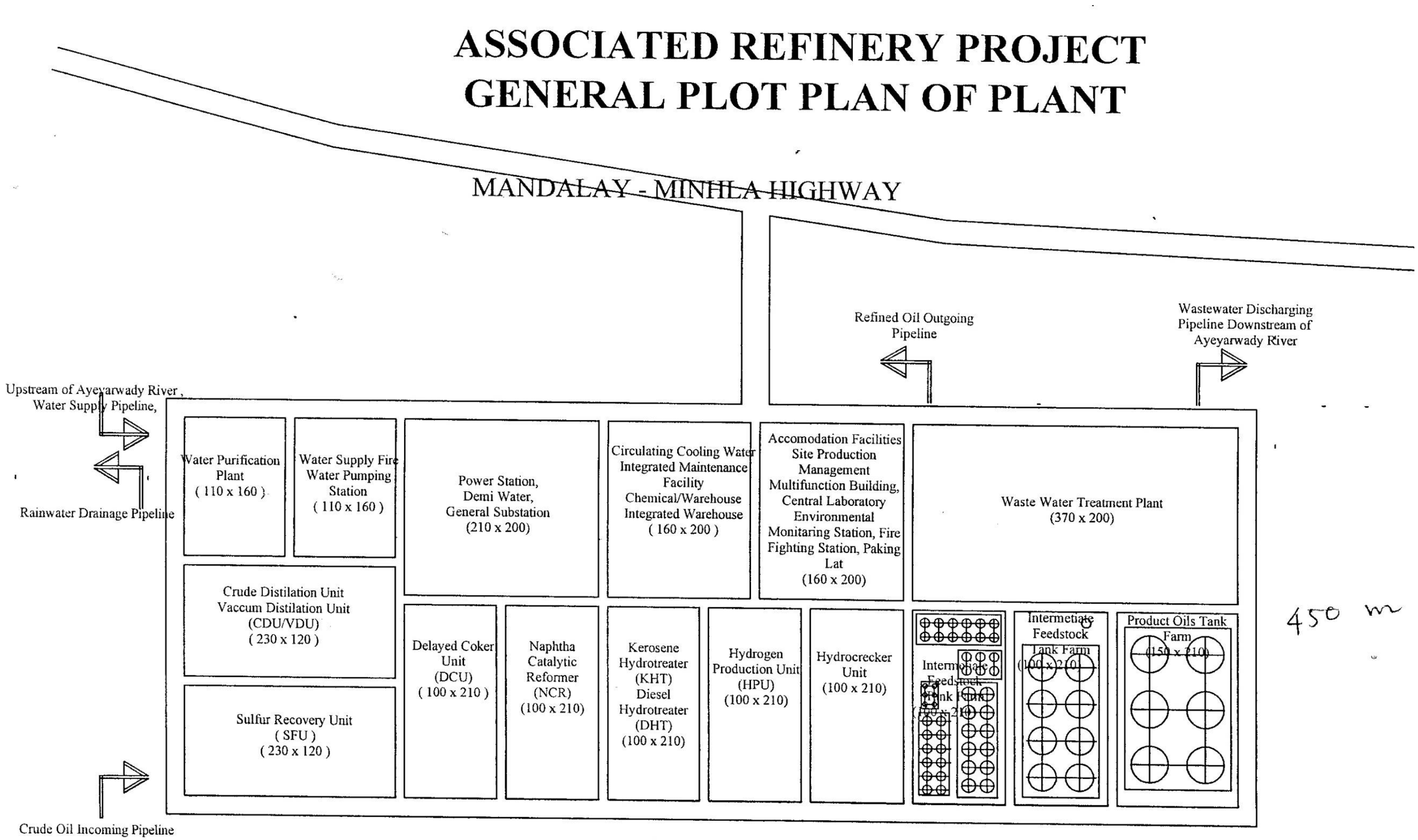


APPENDIX 27: EXISTING REFINERY AND NEW REFINERY LOCATION

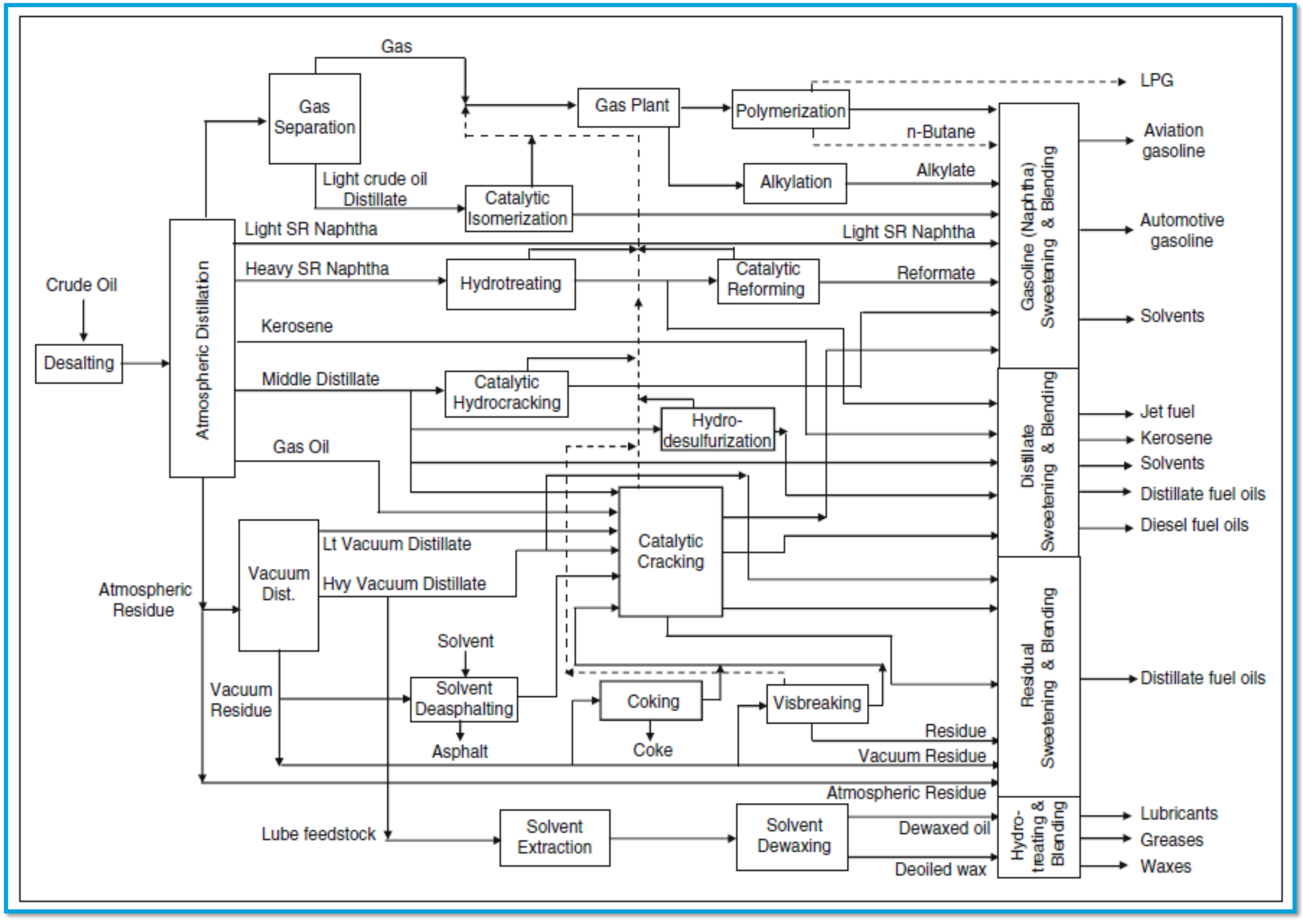


APPENDIX 28: NEW OIL REFINERY LAYOUT PLAN

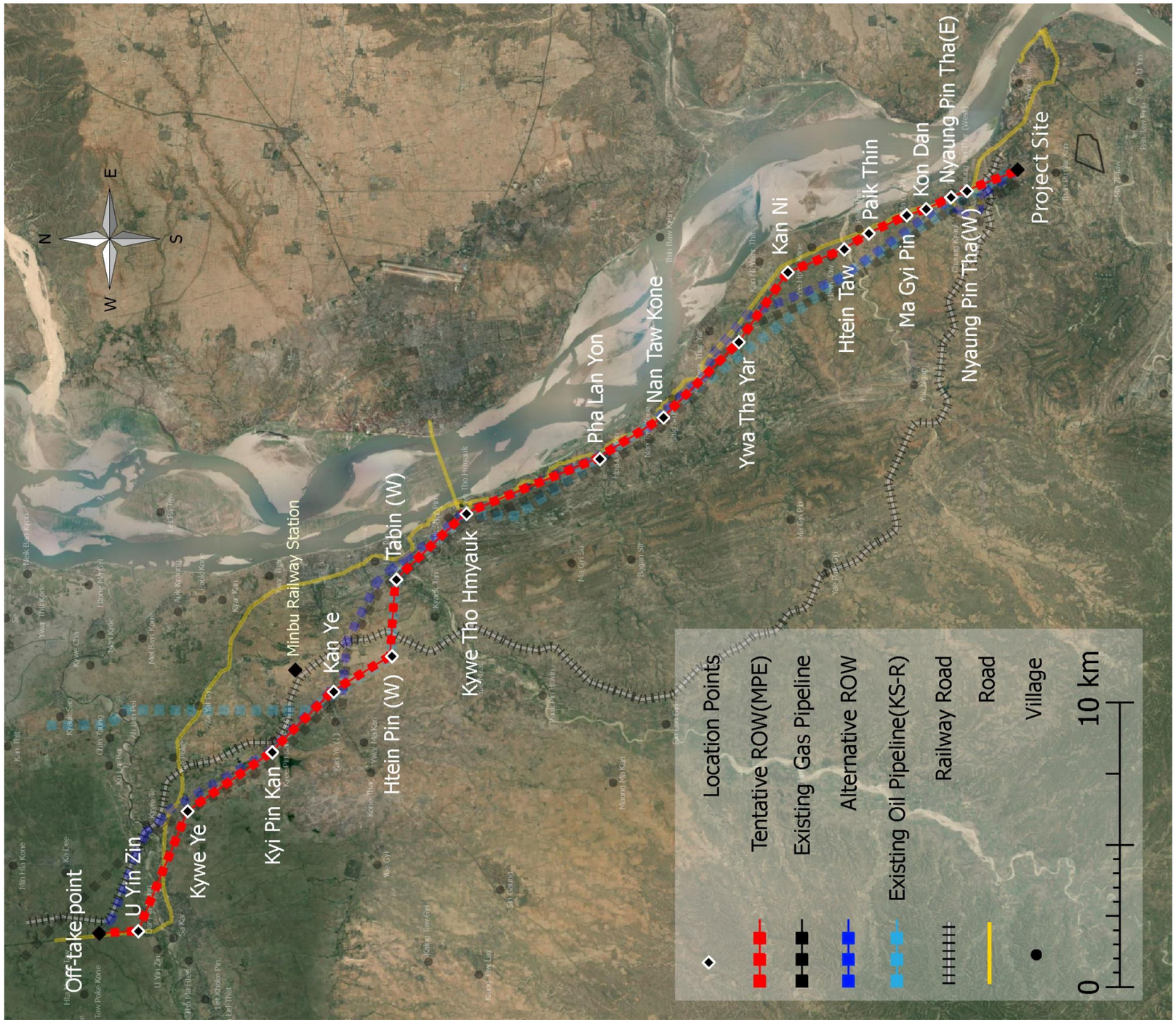
APPENDIX *29*: NEW REFINERY PROJECT GENERAL PLOT PLAN



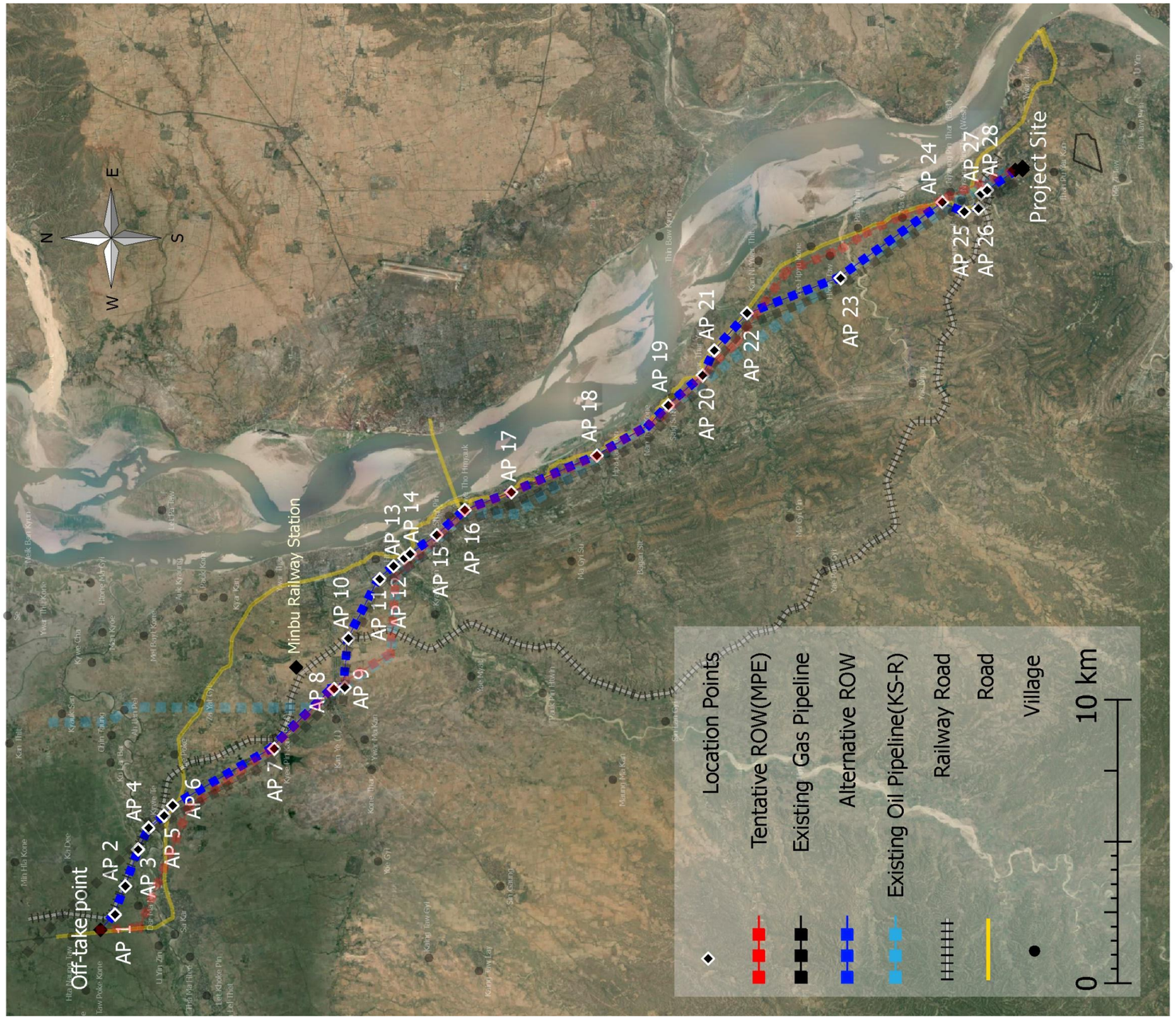
APPENDIX 30: FLOW DIAGRAM OF A TYPICAL OIL REFINERY



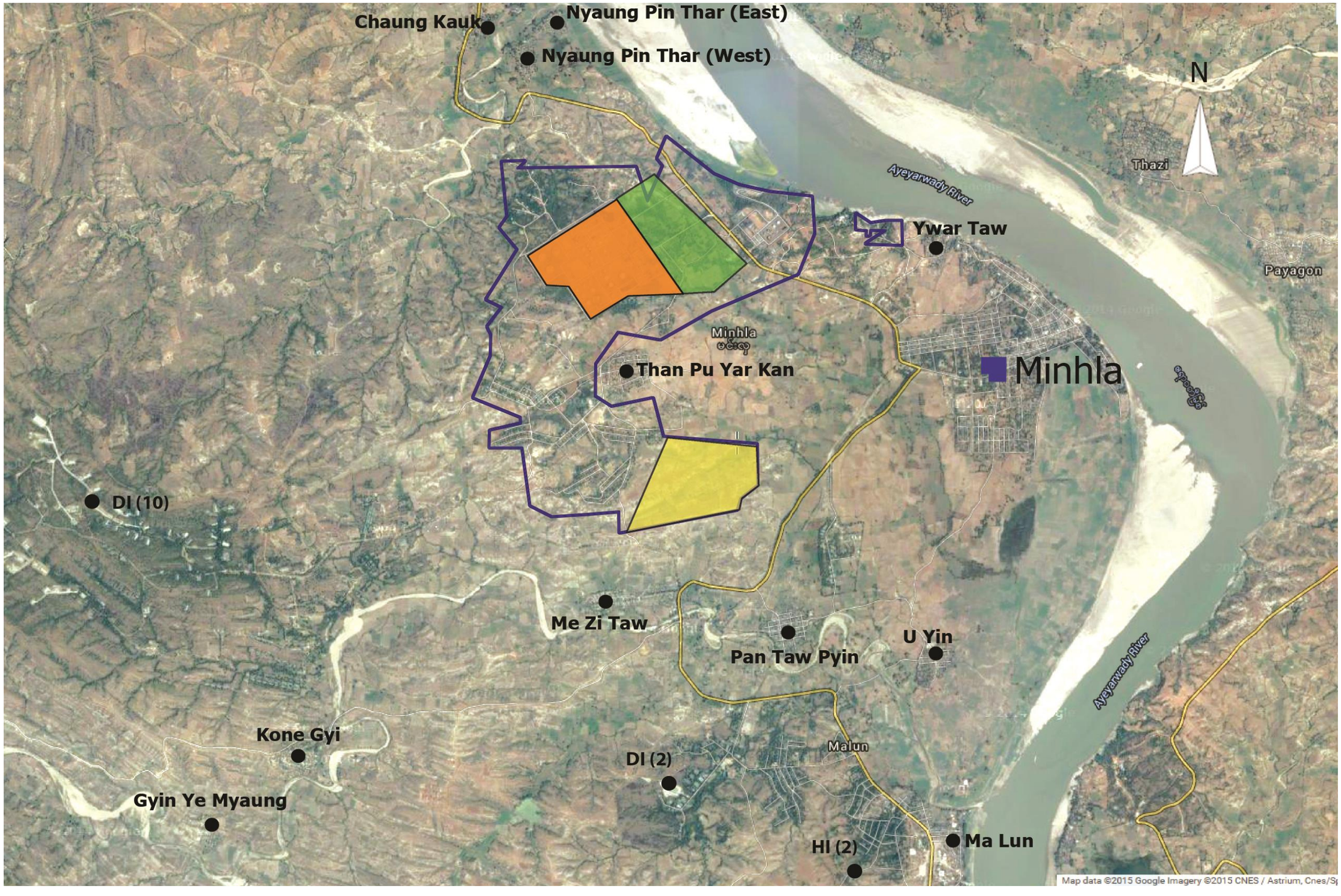
APPENDIX 31: TENTATIVE PIPELINE SUGGESTED BY MPE



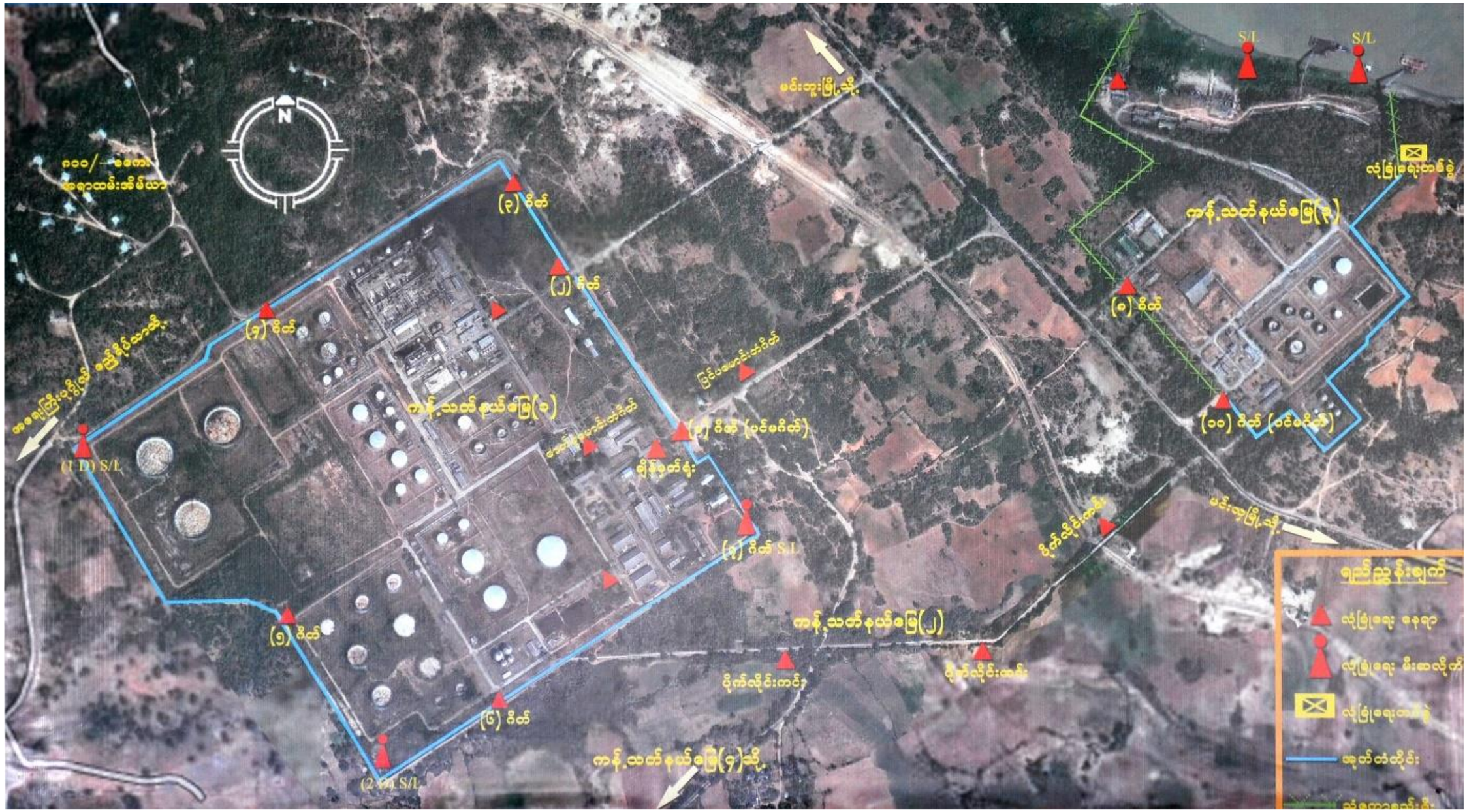
APPENDIX 32: LOCATION MAP OF RECOMMENDED ALTERNATIVE PIPELINE ROW



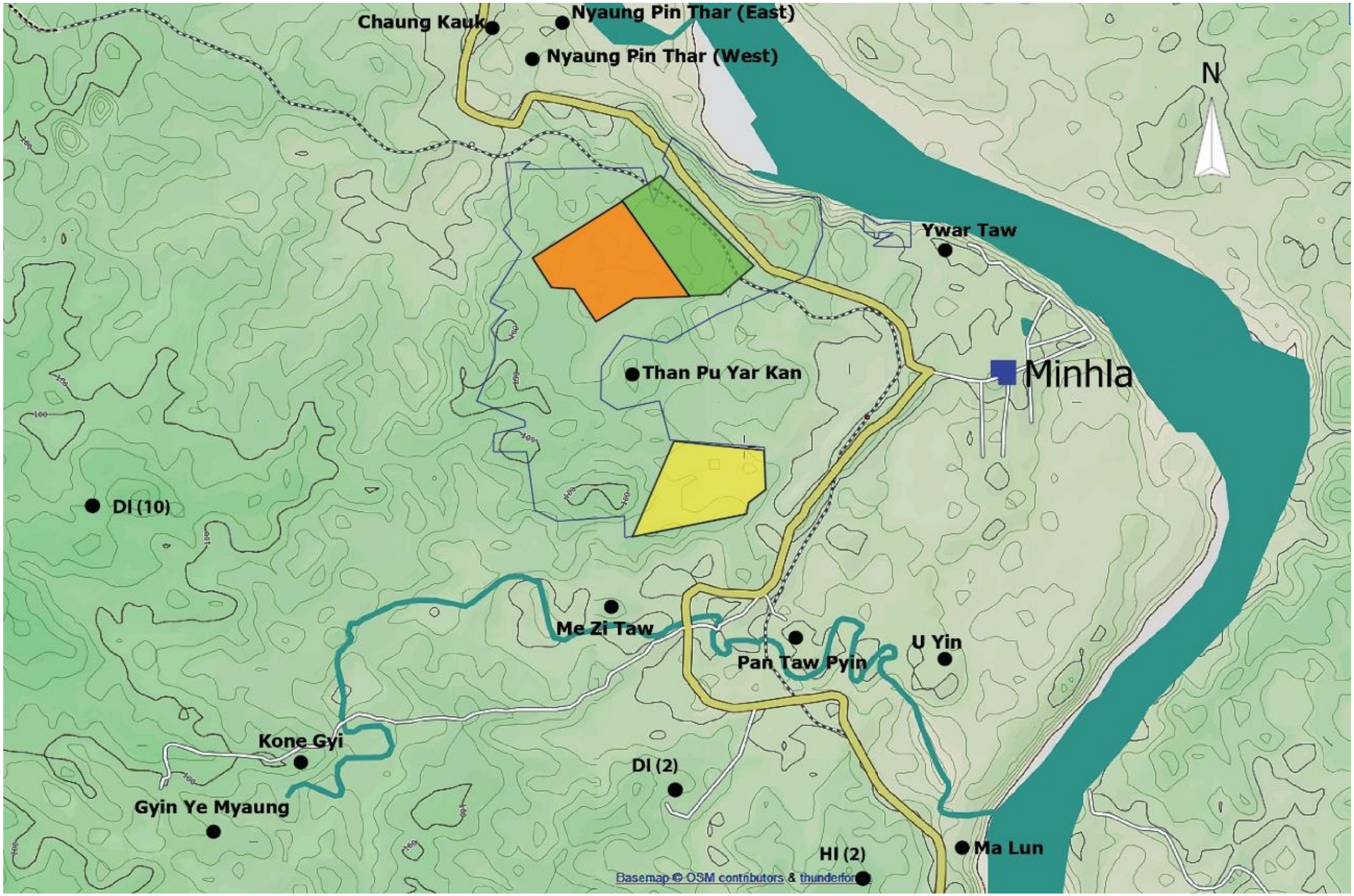
APPENDIX 33: LOCATION MAP OF REFINERY, STAFF QUARTER AND SURROUNDING AREA



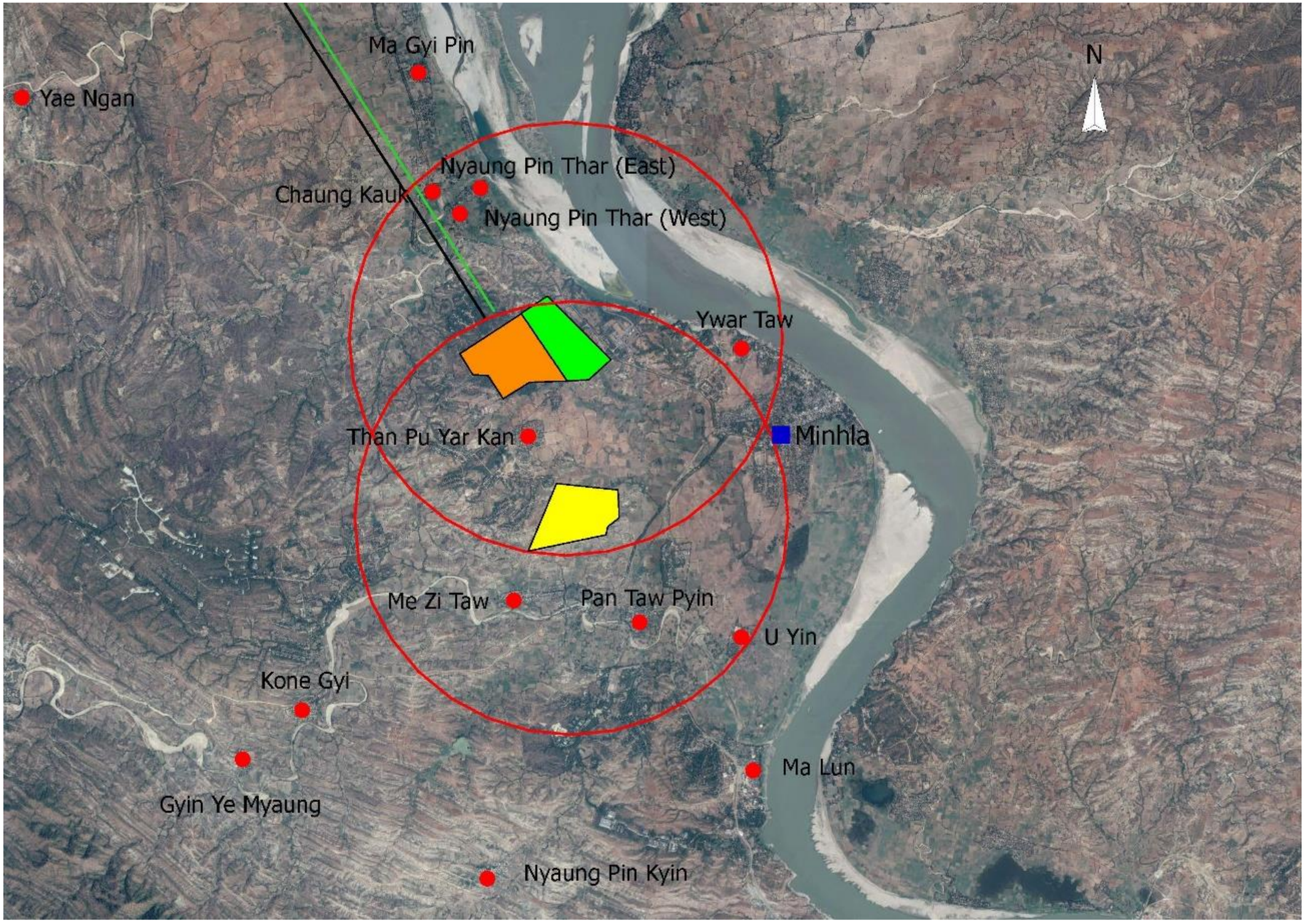
APPENDIX 34: EXISTING PETROCHEMICAL COMPLEX LAYOUT PLAN



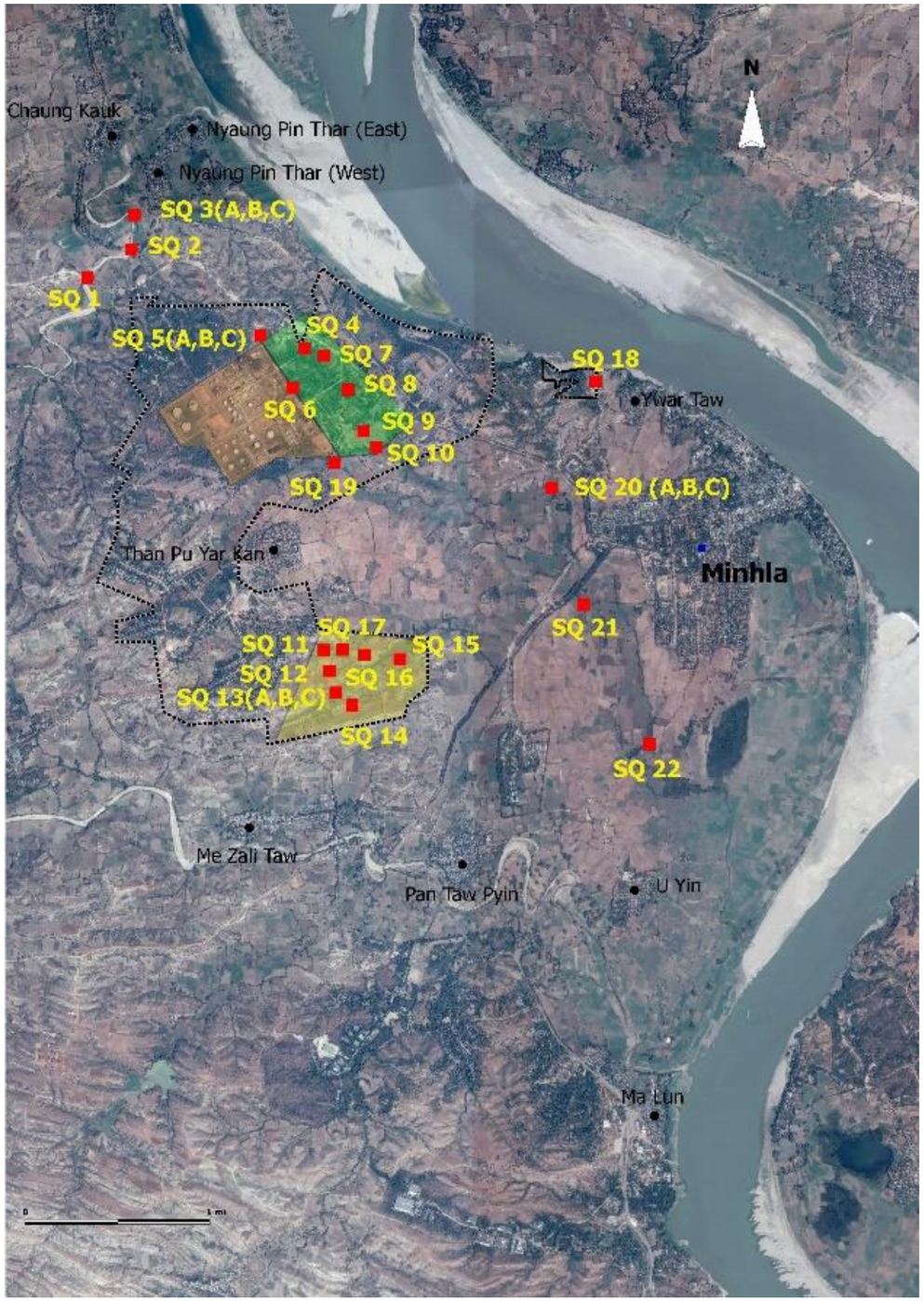
APPENDIX 35: TOPOGRAPHY



APPENDIX 36: 3 KILOMETER RADIUS MAP (STUDY LIMIT)

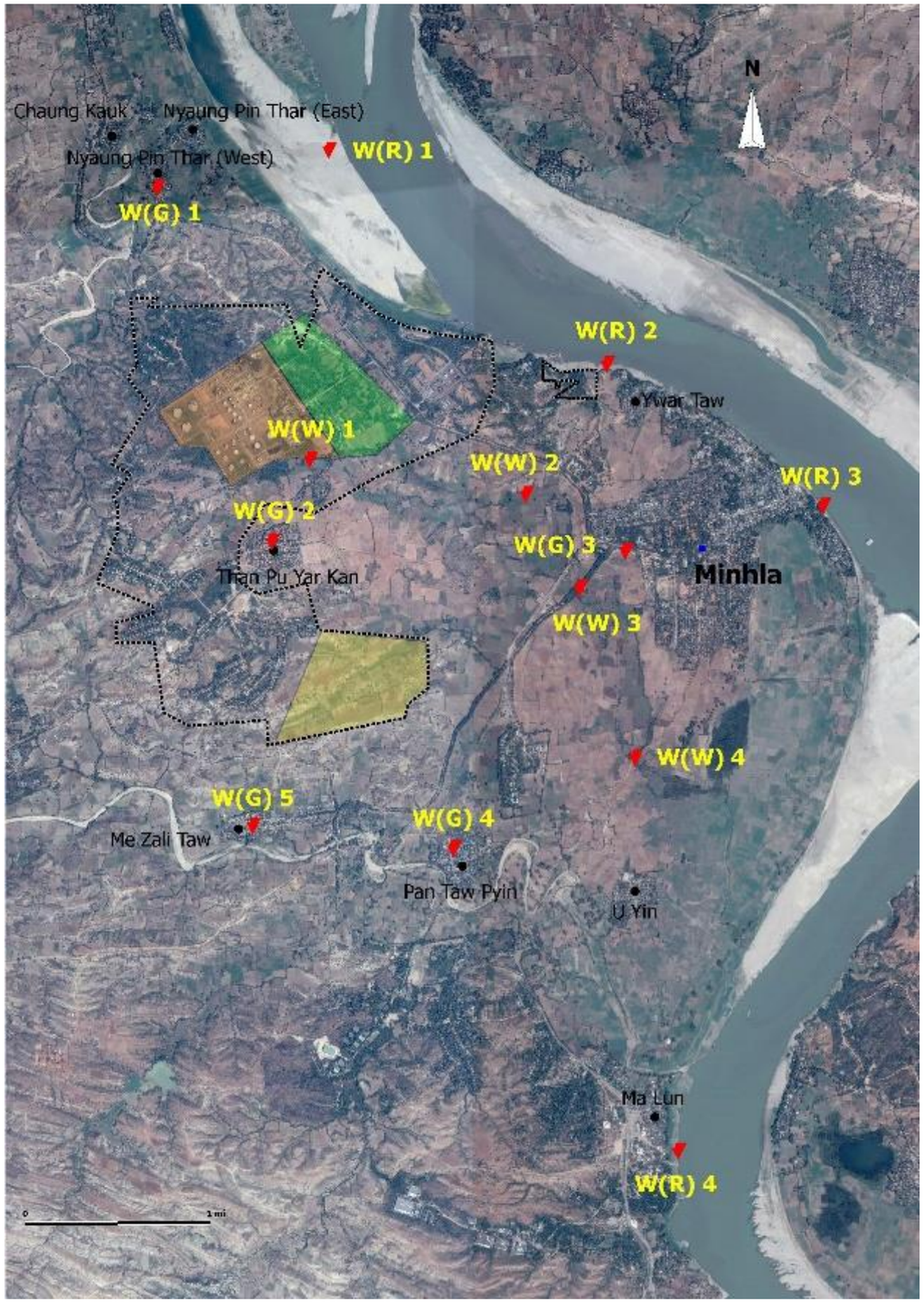


APPENDIX 37: LOCATION MAP OF SOIL SAMPLE POINTS



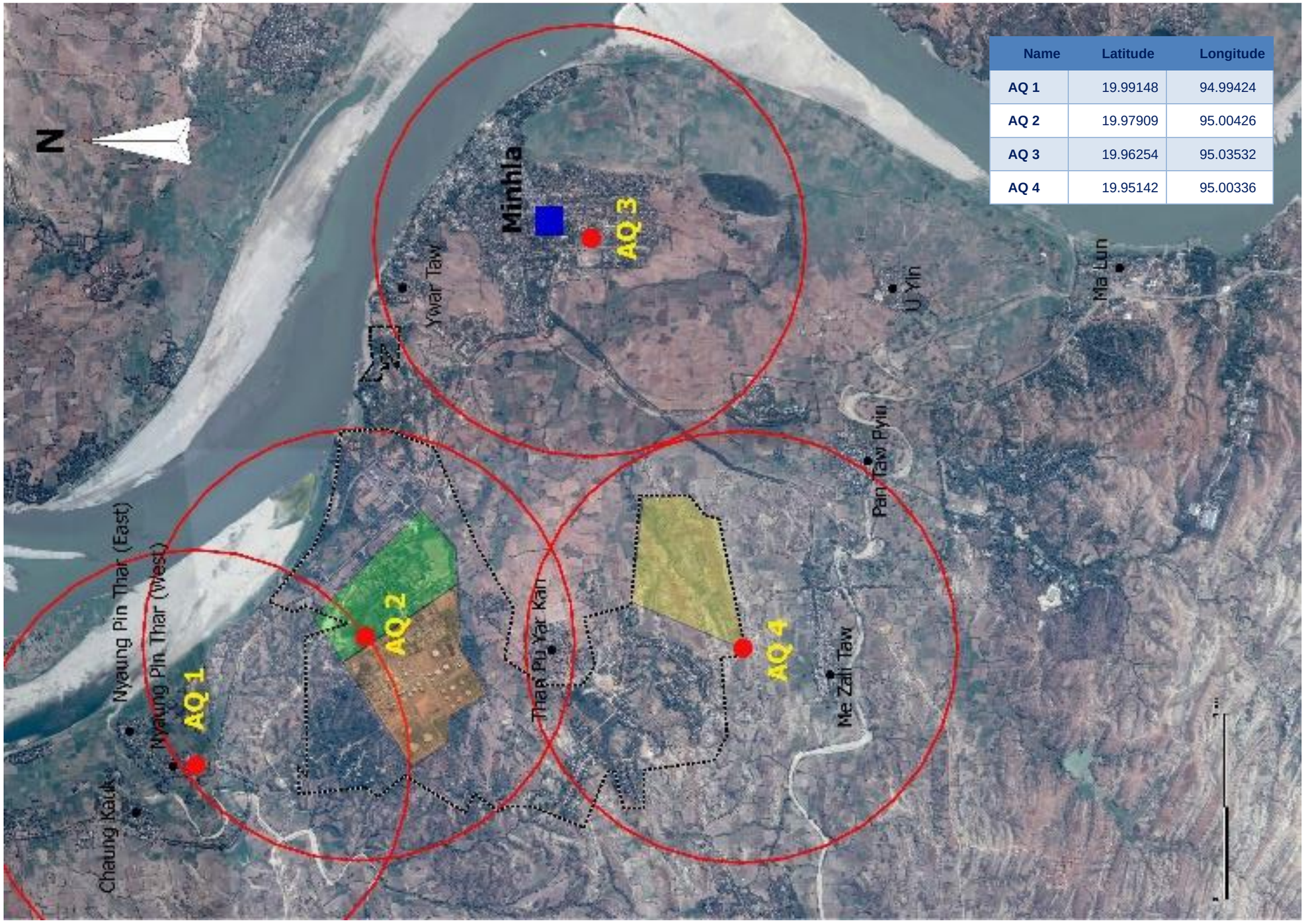
Name	Latitude	Longitude
SQ 1	19.98541	94.98866
SQ 2	19.98750	94.99210
SQ 3(A,B,C)	19.99002	94.99234
SQ 4	19.98022	95.00564
SQ 5(A,B,C)	19.98118	95.00218
SQ 6	19.97733	95.00470
SQ 7	19.97968	95.00716
SQ 8	19.97719	95.00905
SQ 9	19.97414	95.01024
SQ 10	19.97295	95.01125
SQ 11	19.95805	95.00714
SQ 12	19.95654	95.00759
SQ 13(A,B,C)	19.95496	95.00807
SQ 14	19.95401	95.00936
SQ 15	19.95739	95.01309
SQ 16	19.95773	95.01032
SQ 17	19.95810	95.00863
SQ 18	19.97780	95.02838
SQ 19	19.97181	95.00796
SQ 20 (A,B,C)	19.96998	95.02494
SQ 21	19.96142	95.02746
SQ 22	19.95116	95.03258

APPENDIX 38: WATER QUALITY DATA COLLECTION POINTS (Ground Water (WG), Irrawaddy River Water (WR), Waste Water (WW))



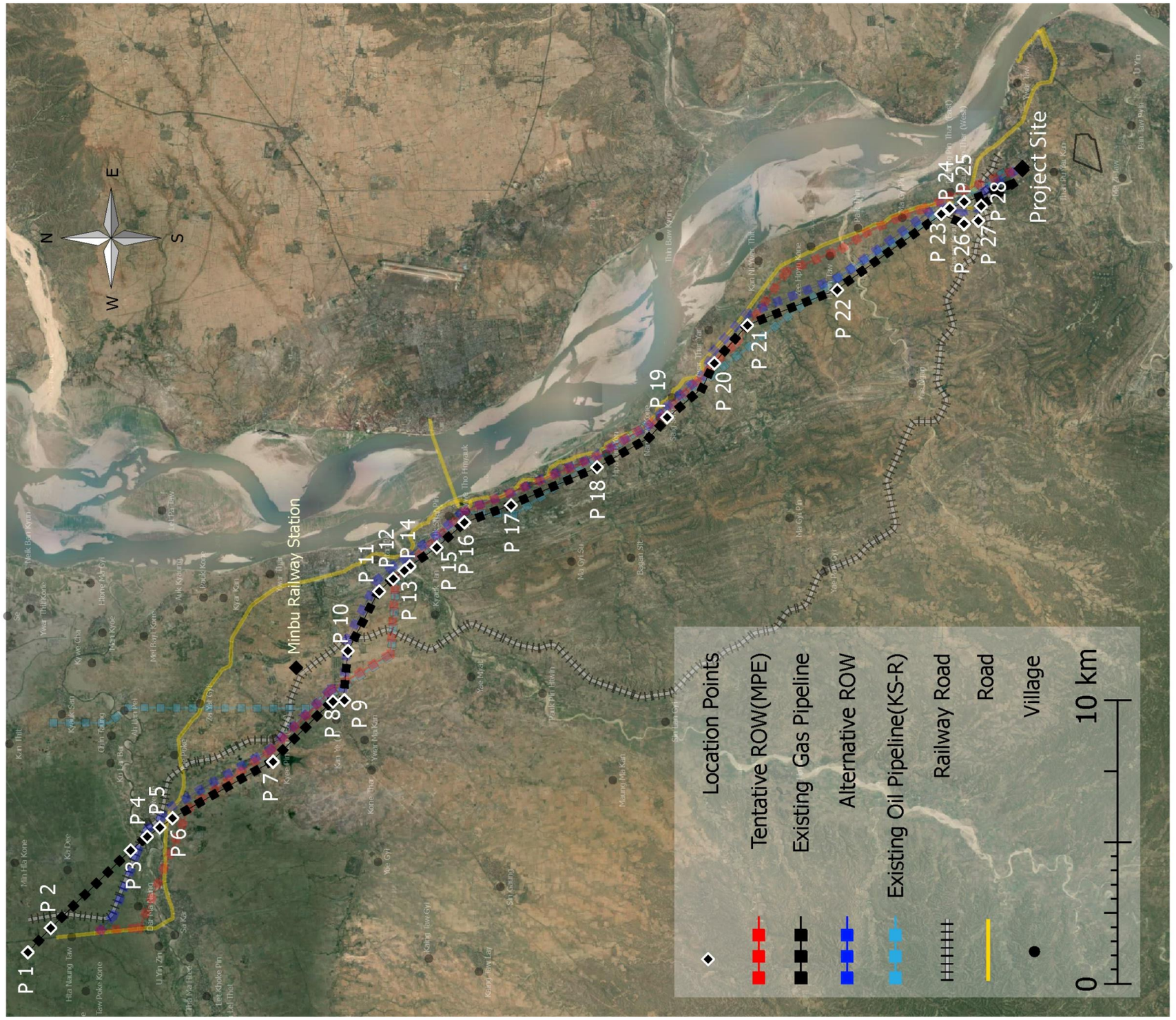
Name	Latitude	Longitude
W(G) 1	19.99156	94.99412
W(G) 2	19.96625	95.00309
W(G) 3	19.96553	95.03069
W(G) 4	19.94371	95.01724
W(G) 5	19.94538	95.00158
W(R) 1	19.99499	95.00752
W(R) 2	19.97926	95.02922
W(R) 3	19.96888	95.04612
W(R) 4	19.92150	95.03480
W(W) 1	19.97227	95.00602
W(W) 2	19.96973	95.02290
W(W) 3	19.96283	95.02713
W(W) 4	19.95036	95.03143

APPENDIX 39: AIR QUALITY AND NOISE PRESSURE DATA COLLECTION POINTS



Name	Latitude	Longitude
AQ 1	19.99148	94.99424
AQ 2	19.97909	95.00426
AQ 3	19.96254	95.03532
AQ 4	19.95142	95.00336

APPENDIX 40: EXISTING GAS PIPELINE



APPENDIX 41: VILLAGE PROFILE, STAKEHOLDER AND HOUSEHOLD INTERVIEWS IN MYANMAR LANGUAGE

မယ်ဇလီတောကျေးရွာ

မယ်ဇလီတောကျေးရွာသည် ပန်းတော်ပြင်ကျေးရွာအုပ်စုတွင် ပါဝင်ပါသည်။ လွန်ခဲ့သော နှစ်ပေါင်း (၂၅၀) မြန်သက္ကရာဇ် ၁၃၁၅ခုနှစ်ကပင် အိမ်ခြေ ၄၅အိမ်နှင့် စတင်နေထိုင်ခဲ့ကြပါသည်။ ယခင် ရွာဟောင်းမှာ ယခုရွာသစ်၏ အနောက်ဘက်တွင်ရှိပါသည်။၁၉၅၉ ခုနှစ် ဦးနုလက်ထက်ပြည်တော် သာ စီမံကိန်းနှင့် အတူစည်ကားခဲ့ပါသည်။ ကျေးရွာရှိ လူဦးရေမှာ ကျား ၅၂၈ ယောက် နှင့် မ ၆၀၄ ယောက် ရှိပြီး စုစုပေါင်း လူဦးရေမှာ ၁၁၃၂ ယောက် ရှိပါသည်။ အိမ်ထောင်စုအရေအတွက်မှာ ၂၃၅ အိမ်ထောင် နေထိုင်ကြပါသည်။

စီးပွားရေး

ရွာ၏အဓိကစီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နမ်း၊ ပဲအမျိုးမျိုးနှင့် ဝါတို့ကို အဓိကထား စိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧက မှာ (၃၆၀) ကျော်ရှိပါသည်။ ကျန်စီးပွားရေးလုပ်ငန်းများမှာ ဈေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ ရေနံနှင့်ရေနံထွက်ပစ္စည်းလုပ်ငန်း၊ ကျွမ်းကျင်လုပ်သားအဖြစ် ပန်းရံလုပ်ကိုင်သည့်လုပ်ငန်းနှင့် လက်သမားလုပ်ငန်းတို့ဖြစ်သည်။

လူမှုရေး

ကျေးရွာတွင်ဘာသာရေးအဖွဲ့ဖြစ်သောအဖွဲ့ဝင် ၃၂ဦးပါဝင်သောဂေါပကအဖွဲ့ရှိပြီး လူမှုရေးအဖွဲ့မှာ အမျိုးသမီးရေးရာနှင့် မိခင်နှင့်ကလေးစောင့်ရှောက်ရေးအဖွဲ့ ရှိပါသည်။

နိုင်ငံရေးပါတီများအနေဖြင့် ပြည်ထောင်စုကြံ့ခိုင်ရေးနှင့်ဖွံ့ဖြိုးရေးပါတီ၊ အမျိုးသားဒီမိုကရေစီအဖွဲ့ချုပ်ပါတီ နှင့် တိုင်းရင်းသားစည်းလုံးညီညွတ်ရေးပါတီတို့ရှိပါသည်။

လျှပ်စစ်မီးမှာကိုယ်ထူကိုယ်ထစနစ်ဖြင့် ၂၄နာရီမီးရရှိသည့် အိမ်ထောင်စုမှာ ၂၄၆ အိမ်ရှိပြီးကျန်အိမ်ထောင်စုများမှာ ဖယောင်းတိုင်၊ ထင်းမီးတို့ဖြင့် အသုံးပြုနေကြရပါသည်။

ပညာရေး

မယ်ဇလီတောကျေးရွာတွင် မူလတန်းအဆင့် ကျောင်းတစ်ကျောင်းရှိပြီး သင်ကြားသည့် ဆရာ/ဆရာမမှာ (၃) ဦးသာရှိပါသည်။ တက်ရောက်သင်ယူသည့် ကျောင်းသား/ကျောင်းသူအရေ အတွက်မှာ ၈၈ ဦး ခန့်ရှိ သည်။

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ကျေးလက်ဆေးပေးခန်းမရှိပါ။ ၃ မိုင်ခန့်ဝေးသောမင်းလှမြို့သို့ သွားရောက်ကုသကြရပါသည်။ အများအားဖြင့် ဒူးနှင့်ပတ်သက်သောရောဂါ အဖြစ်များပြီး ချို့မှာ သွေးတိုးရောဂါ၊ လေဖြတ်ရောဂါတို့ဖြစ်ကြသည်။ အချို့အနည်းငယ်မှာ တီဘီရောဂါနှင့် အသက်ရှူလမ်းကြောင်း ဆိုင်ရာရောဂါများ ဖြစ်ကြသည်။

သယ်ယူပို့ဆောင်ရေး

မယ်ဇလီတောကျေးရွာတွင် ဆိုင်ကယ်အများဆုံး အသုံးပြုကြပြီး စက်ဘီးကယ်ရီများ၊ အင်္ဂားသုံးဘီးယာဉ်များလည်းရှိပါသည်။

ဘာသာရေး

မယ်ဇလီတောကျေးရာတွင် ထူးခြားသည့်ဘုရားစေတီနှင့် ဘုန်းကြီးကျောင်းတစ်ကျောင်း ရှိပါသည်။ ရာသီအလိုက်ထင်ရှားသည့် ပွဲတော်များမှာသီတင်းကျွတ်လတွင် မီးထွန်းပွဲတော်၊ တပို့တွဲလပြည့်နေ့တွင်ထမ

နဲ့ပွဲနှင့် တပေါင်းလပြည့်နေ့တွင်ဆီထမင်းများကို ရွာလုံးကျွတ်ပြုလုပ်ကြပြီး တစ်အိမ်နှင့် တစ်အိမ် ကူးလူး ဆက်သွယ်၍ အပြိုင်အဆိုင်ကျွေးမွေးကြပါသည်။

ပန်းတော်ပြင်ကျေးရွာ

ပန်းတော်ပြင်ကျေးရွာသည်ပန်းတော်ပြင်ကျေးရွာအုပ်စုတွင်ပါဝင်ပါသည်။ ကျေးရွာစတည်သည့်နှစ်မှာ နှစ် (၁၅၀) ခန့်ရှိပြီဖြစ်သည်။ အရင်က မင်းလှ-သရက်လမ်းကို လှည်းဖြင့်သွားကြရပါသည်။ ၁၉၉၂-၁၉၉၃တွင် ကပစစက်ရုံများပေါ်လာပြီးကတ္တရာလမ်းဖြစ်လာခဲ့သည်။ ဆက်သွယ်ရေးမှာ စာတိုက် ကြေးနန်း ရိုက်ကြရပါ သည်။

ကျေးရွာရှိ လူဦးရေမှာ ကျား/မ စုစုပေါင်းလူဦးရေမှာ၁၂၈၂ ယောက် ရှိပါသည်။ အိမ်ထောင်စုအရေ အတွက် မှာ ၃၀၅ အိမ်ထောင် နေထိုင်ကြပါသည်။

စီးပွားရေး

ရွာ၏အဓိက စီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပဲအမျိုးမျိုးနှင့် ဝါတို့ကို အဓိက ထားစိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧကမှာ (၄၃၀) ကျော်ရှိပါသည်။ စက်ရုံမဆောက်မီက စိုက်ပျိုးရေးမှာ ပဲနှင့်နှမ်းကို အဓိကစိုက်ပျိုးကြပါသည်။ကျန်စီးပွားရေးလုပ်ငန်းများမှာ ဈေးဆိုင်ရောင်းချသော လုပ်ငန်း၊ နွားနှင့်ဝက် မွေးမြူရေးလုပ်ငန်း၊ လက်သမားလုပ်ငန်းတို့ဖြစ်သည်။

လူမှုရေး

ပညာရေး၊ ကျန်းမာရေးနှင့်ဆိုင်သည့် ကျေးရွာအထောက်အကူပြုတစ်ခုဖွဲ့စည်း၍ ဆေးရုံတက်လူနာများနှင့် ပညာရေးတွေ့မှာ ထောက်ပံ့သည့်အဖွဲ့တစ်ဖွဲ့ ကျေးရွာကော်မတီအနေဖြင့် ဖွဲ့စည်းထားပါသည်။ လူမှုရေးအဖွဲ့ မှာ အမျိုးသမီးရေးရာနှင့် မိခင်နှင့်ကလေးစောင့်ရှောက်ရေးအဖွဲ့ ရှိပါသည်။

နိုင်ငံရေးပါတီများအနေဖြင့် ပြည်ထောင်စုကြံ့ခိုင်ရေးနှင့်ဖွံ့ဖြိုးရေးပါတီ၊ အမျိုးသားဒီမိုကရေစီအဖွဲ့ချုပ်ပါတီနှင့် တိုင်းရင်းသားစည်းလုံးညီညွတ်ရေးပါတီတို့ရှိပါသည်။

လျှပ်စစ်မီးမှာ ကိုယ်ထူကိုယ်ထစနစ်ဖြင့် ဓါတ်တိုင်မှမီးသွယ်ယူခြင်းဖြင့် ၂၄နာရီမီးရရှိသည့် အိမ်ထောင်စုမှာ အများစုဖြစ်ပြီး အချို့မှာ ဖယောင်းတိုင်၊ ထင်းမီးတို့ဖြင့် အသုံးပြုနေကြရပါသည်။

ပညာရေး

ပန်းတော်ပြင်ကျေးရွာတွင် ယခင်၁၉၈၅ခုနှစ်တွင် မူလတန်းအဆင့်ကျောင်းရှိပြီး ၂၀၀၆ခုနှစ်မှစ၍ မူလတန်းလွန်အဆင့် တိုးမြှင့်ပေးခဲ့ပါသည်။ သင်ကြားသည့်ဆရာ/ဆရာမမှာ (၈)ဦးပြီး တက်ရောက်သင်ယူသည့် ကျောင်းသား/ကျောင်းသူအရေအတွက်မှာ ၁၇၇ ဦးခန့်ရှိသည်။ အလယ်တန်းပညာများကို မလွန်အထက ကျောင်းသို့သွားရောက်သင်ကြားရပါသည်။

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ကျေးလက်ဆေးခန်းမရှိပါ။ သားဖွားဆရာမတစ်ဦးနှင့် အရပ်လက်သည် တစ်ဦးသာရှိပါသည်။ မင်းလှမြို့သို့သွားရောက်ကုသကြရပါသည်။ တီဘီရောဂါနှင့် အသက်ရှူလမ်းကြောင်းဆိုင်ရာ ရောဂါများဖြစ်ပြီး မျက်စိရောဂါများဖြစ်သော မျက်ခမ်းစပ်ရောဂါ၊ အတွင်းတိမ်၊ အပြင်ရောဂါများ အနည်းငယ်ဖြစ်ကြပါသည်။

သယ်ယူပို့ဆောင်ရေး

ပန်းတော်ပြင်ကျေးရွာတွင် ဆိုင်ကယ်အများဆုံး အသုံးပြုကြပြီး စက်ဘီးကယ်ရီများလည်းရှိပါသည်။

ဘာသာရေး

ပန်းတော်ပြင်ကျေးရာတွင် ဘုရားနှစ်ဆူနှင့်ဦးဖိန်ခွန်ရာမဘုန်းကြီးကျောင်းတိုက်တစ်ကျောင်းရှိပါသည်။ ရာသီအလိုက်ထင်ရှားသည့် ပွဲတော်များမှာ ရွာအနောက်ဖက်(အရာတော်ဘုရား)တပေါင်းလပြည့်ဆွမ်းချက်ပွဲ ပြုလုပ်ကြပါသည်။ တပို့တွဲလတွင် အေးစေတီဘုရားပွဲနှင့် တန်ခူးလတွင် မိုးကောင်းဘုရားပွဲတို့ ကျင်းပကြပါသည်။

သံပုရာကန်ကျေးရွာ

သံပုရာကန်ကျေးရွာသည် ရွာတော်ကျေးရွာအုပ်စုတွင်ပါဝင်ပါသည်။ ကျေးရွာရှိ လူဦးရေမှာ ကျားဦးရေ ၅၉၆ယောက် နှင့် မဦးရေ၇၂၇ ယောက် ရှိပြီး စုစုပေါင်းလူဦးရေမှာ ၁၃၂၃ ယောက် ရှိပါသည်။ အိမ်ထောင်စု အရေအတွက်မှာ ၂၉၅ အိမ်ထောင် နေထိုင်ကြပါသည်။

စီးပွားရေး

ရွာ၏အဓိက စီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပဲအမျိုးမျိုးနှင်ဝါတို့ကို အဓိကထားစိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧက မှာ (၃၆၀)ဧကကျော်ရှိပါသည်။ ကျန်စီးပွားရေးလုပ်ငန်းများမှာ စျေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ဆတ်မွေးမြူရေးလုပ်ငန်း ကျွမ်းကျင်လုပ်သားအဖြစ်ပန်းရံလုပ်ကိုင်သည့်လုပ်ငန်းနှင့် ကျပန်းလုပ်ငန်းတို့ဖြစ်သည်။

လူမှုရေး

ကျေးရွာတွင်ဘာသာရေးအဖွဲ့ဖြစ်သော ဂေါပကအဖွဲ့ရှိပြီး ကျေးရွာမီးရရှိရေးကော်မတီနှင့် မြစိမ်းရောင်ကော်မတီတို့ရှိပါသည် လူမှုရေးအဖွဲ့မှာအမျိုးသမီးရေးရာနှင့်မိခင်နှင့်ကလေး စောင့်ရှောက်ရေး အဖွဲ့ရှိပါသည်။

နိုင်ငံရေးပါတီများအနေဖြင့် ပြည်ထောင်စုကြံ့ခိုင်ရေးနှင့်ဖွံ့ဖြိုးရေးပါတီ၊ အမျိုးသားဒီမိုကရေစီ အဖွဲ့ချုပ် ပါတီတို့ရှိပါသည်။

လျှပ်စစ်မီးမှာ အိမ်ထောင်စုမှာ၂၆၀ အိမ်ရှိပြီး ၁၈၅အိမ်မှာအစိုးရဓါတ်အားပေးမီစက်မှရရှိပါသည်။ ၄င်းအပြင် ပုဂ္ဂလိကပိုင် ဓါတ်အားပေးစက်ရုံနှင့် မြို့နယ်သမဝါယမမှ ဓါတ်အားပေး စက်ရုံတို့ရှိပါသည်။ ကိုယ်ထူကိုယ်ထ စနစ်ဖြင့် လျှပ်စစ်မီးလင်းရေးကော်မတီမှ ကျေးရွာမီးရရှိပြီး(၂၄) နာရီ မီးရရှိရန် ဆောင်ရွက်နေသည်။

ကိုယ်ပိုင်မီးစက် မီးပေးပါသည်။ ညမှမီးရသည်။ မီးမယူနိုင်သေးသည့် အိမ်များကတော့ ဖယောင်းတိုင်ပဲ သုံးကြရပါသည်။

ပညာရေး

သံပုရာကန်ကျေးရွာတွင် မူလတန်းအဆင့် ကျောင်းတစ်ကျောင်းရှိပြီး ၁၉၈၅ ခုနှစ်ကစတင်ဖွင့်လှစ်ခဲ့ပါသည်။ သင်ကြားသည့်ဆရာ/ဆရာမမှာ (၅) ဦးသာရှိပါသည်။ စုစုပေါင်းကျောင်းသား/ကျောင်းသူ ဦးရေမှာ ၁၄၀ ဦးခန့်ရှိသည်။ ၂၀၁၄-၂၀၁၅ ပညာသင်နှစ်မှာတော့ မူလတန်းလွန်ကျောင်းအဖြစ် လျှောက်ထားခဲ့ပါသည်။ ၅တန်းအောင်မြင်ပြီးသောသူများမှာ စက်ရုံ အထကတွဲကျောင်းသို့ဆက်လက် တက်ရောက်ကြပါသည်။

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ကျေးလက်ဆေးပေးခန်းမရှိပါ။ စက်ရုံတွင်းရှိ ကျန်းမာရေးဌာနကို သွား ရောက်ကြပြီး အရေးကြီးလာလျှင်မင်းလှဆေးရုံ ကိုသွားရောက်ကြသည်။ ၄က်ဖျားရောဂါမှာ ယခင်ထက်ပို များလာပြီး

အဆုတ်ရောင်ရောဂါလည်း အဖြစ်များလာကြသည်။

သယ်ယူပို့ဆောင်ရေး

စက်ရုံမဆောက်မီကအလွန်ခေါင်သောရွာများဖြစ်သည်။ လှည်းလမ်း မျှသာရှိသည်။ စက်ရုံဆောက်ပြီးနောက်ပိုင်း လမ်းပန်းဆက်သွယ်ရေးပိုကောင်းလာ ပါသည်။သံပုရာကန်ကျေးရွာတွင် ဆိုင်ကယ်အများဆုံးအသုံးပြုကြပြီး မော်တော်ကားအနည်းငယ် သုံးဘီးကယ်ရီများ၊ လှည်းယာဉ်များအသုံးပြုကြပါသည်။

ဘာသာရေး

သံပုရာကန်ကျေးရာတွင်ဗရပ်တစ်ဆောင်နှင့်သာသနိကအဆောက်အအုံအဖြစ် ဘုန်းကြီးကျောင်းတစ်ကျောင်း ရှိပါသည်။ ဝါဆိုလပြည့်နေ့နှင့် သီတင်းကျွတ်လပြည့်နေ့များတွင် ရွာလုံးကျွတ်ဆွမ်းကျွေးပွဲကျင်းပကြပါသည်။

ရွာတော်ကျေးရွာ

ရွာတော်ကျေးရွာသည် ရွာတော်ကျေးရွာအုပ်စုတွင် ပါဝင်ပါသည်။ ဂျပန်ခေတ်က ဒီရွာကို ဂျပန်များ မီးရှို့ပြီး တစ်ရွာလုံးထွက်ပြေးခဲ့ရသည်။ အင်္ဂလိပ်နှင့်ပေါင်းပြီးသူလျှိုလုပ်သည်ဟု စွပ်စွဲပြီး မီးရှို့ခံရသည်။ ထိုအချိန်က အိမ်ခြေ ၄၀ကျော်ခန့်သာ ရှိပါသည်။ ကျေးရွာရှိ လူဦးရေမှာ ကျား ၃၆၅ ယောက် နှင့်မ ၃၉၁ ယောက် ရှိပြီး စုစုပေါင်းလူဦးရေမှာ ၇၅၆ယောက် ရှိပါသည်။ အိမ်ထောင်စု အရေအတွက်မှာ ၁၈၁ အိမ်ထောင် နေထိုင်ကြပါသည်။

စီးပွားရေး

ရှေးယခင်က အောက်ပြည်ကို သွားသည့်လှေကြီး ၄ စီးခန့်ရှိခဲ့သည်။ တော်လှန်ရေး ကောင်စီပေါ်လာပြီးနောက် ပျောက်သွားပါသည်။ အောက်ပြည်သို့ ဇီးသီးခြောက်နှင့်ပဲများကို ယူဆောင် ရောင်းချပြီး အောက်ပြည်မှ ဆန်၊ အိုးများကို သယ်ဆောင်လာခဲ့ကြသည်ဟုသိရှိခဲ့ရပါသည်။

ယခုအခါရွာ၏အဓိက စီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပဲအမျိုးမျိုးနှင့် ဝါတို့ကို အဓိကထားစိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧက မှာ (၁၀၈.၁၃)ကျော်ရှိပါသည်။ ကျန်စီးပွားရေးလုပ်ငန်း များမှာ ဈေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ မွေးမြူရေးလုပ်ငန်း ကွမ်းကျင်လုပ်သားအဖြစ် ပန်းရံလုပ်ကိုင်သည့်လုပ်ငန်း၊ လက်သမားလုပ်ငန်းနှင့် ကျပန်းလုပ်ငန်းတို့ဖြစ်သည်။

လူမှုရေး

လူမှုရေးအဖွဲ့မှာ အမျိုးသမီးရေးရာ၊ မိခင်နှင့်ကလေး စောင့်ရှောက်ရေးအဖွဲ့၊ ကျေးရွာစာကြည့်တိုက်ကော်မတီရှိပါသည်။ နိုင်ငံရေးပါတီများအနေဖြင့် ပြည်ထောင်စုကြံ့ခိုင်ရေးနှင့်ဖွံ့ဖြိုးရေးပါတီ၊ အမျိုးသားဒီမိုကရေစီ အဖွဲ့ချုပ် ပါတီတို့ရှိပါသည်။

ပညာရေး

မူလတန်းကျောင်းတစ်ကျောင်းရှိပါသည်။ ဆရာမ (၂)ယောက်ဖြင့် သင်ကြားပြသပေးပါသည်။

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ကျေးလက်ဆေးပေးခန်းမရှိပါ။ အရေးကြီးလာလျှင် မင်းလှဆေးရုံကိုသွားရောက်ကြသည်။

သယ်ယူပို့ဆောင်ရေး

ရွာတော်ကျေးရွာတွင် ဆိုင်ကယ်အများဆုံး အသုံးပြုကြပြီး မော်တော်ကားအနည်းငယ် သုံးဘီးကယ်ရီ များ၊ လှည်းယာဉ်များအသုံးပြုကြပါသည်။

ဘာသာရေး

ရွာအနီးတွင် ၁၅ ဖာခန့် ဘေးမဲ့တော ဘုန်းကြီးကျောင်းတစ်ကျောင်းရှိပါသည်။ ဘာသာရေး ပွဲတော်များ အဖြစ် တပို့တွဲလ၊ တပေါင်းလနှင့် တန်ခူးလများအထိ ၃လစလုံး ကျင်းပပါသည်။

ညောင်ပင်သာကျေးရွာ

ဦးနှလက်ထက်က အိမ်ခြေ (၃၀)ခန့်သာရှိပြီး မူလတန်းကျောင်းလုံးဝမရှိဘဲ ဘုန်းကြီးကျောင်းတွင် သာသင်ကြားရသည်။ ယခုရွာဖြစ်လာရခြင်းသည် အိုးလုပ်ငန်းလုပ်သော ရေပုလဲရွာကြီး (ရွာမြောက်ဖက်) ပျက်သွားပြီးနောက် ရောက်ရှိလာခြင်းဖြစ်သည်။

ကျေးရွာရှိ လူဦးရေမှာ ကျား၅၅၄ ယောက် နှင့်မ ၅၉၀ ယောက် ရှိပြီး စုစုပေါင်းလူဦးရေမှာ ၁၁၄၄ ယောက် ရှိပါသည်။ အိမ်ထောင်စု အရေအတွက်မှာ ၂၉၁ အိမ်ထောင် နေထိုင်ကြပါသည်။

စီးပွားရေး

စီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပဲအမျိုးမျိုးနှင့်ဝါတို့ကို အဓိကထားစိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧကမှာ (၃၀၁.၂၈) ကျော်ရှိပါသည်။ ကျန်စီးပွားရေး လုပ်ငန်းများမှာ စျေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ မွေးမြူရေးလုပ်ငန်း ကျွမ်းကျင်လုပ်သားအဖြစ် ပန်းရံလုပ်ကိုင်သည့် လုပ်ငန်း၊ လက်သမားလုပ်ငန်းနှင့် ကျပန်းလုပ်ငန်းတို့ဖြစ်သည်။

လူမှုရေး

လူမှုရေးအဖွဲ့မှာ အမျိုးသမီးရေးရာ၊ မိခင်နှင့်ကလေးစောင့်ရှောက်ရေးအဖွဲ့ကျေးရွာစာကြည့်တိုက် ကော်မတီ ရှိပါသည်။

နိုင်ငံရေးပါတီများအနေဖြင့် ပြည်ထောင်စုကြံ့ခိုင်ရေးနှင့်ဖွံ့ဖြိုးရေးပါတီ၊ အမျိုးသားဒီမိုကရေစီ အဖွဲ့ချုပ်ပါတီ တို့ရှိပါသည်။

ညောင်ပင်သာကျေးရွာတွင် လျှပ်စစ်မီးသုံးသည့် အိမ်ထောင်စုအများအပြားရှိပြီး မီးမယူနိုင်သည့် အိမ်ထောင် စုမှာ အိမ်(၅၀)ခန့်ရှိပါသည်။ တစ်ချို့မှာ ဆိုလာစနစ်သုံးပါသည်။

ပညာရေး

ညောင်ပင်သာကျေးရွာတွင် မူလတန်းကျောင်းတစ်ကျောင်းရှိပါသည်။ ဆရာမ (၂)ယောက်ဖြင့် သင်ကြား ပြသပေးပါသည်။

ကျန်းမာရေး

ကျန်းမာရေးအနေဖြင့် ကျေးလက်ဆေးပေးခန်းမရှိပါ။ အရေးကြီးလာလျှင် မင်းလှဆေးရုံကို သွားသွားရောက်ကြသည်။

သယ်ယူပို့ဆောင်ရေး

ရွာတော်ကျေးရွာတွင် ဆိုင်ကယ်အများဆုံး အသုံးပြုကြပြီး မော်တော်ကားအနည်းငယ် သုံးဘီးကယ်ရီများ၊ လှည်းယာဉ်များအသုံးပြုကြပါသည်။

ဘာသာရေး

ဘာသာယဉ်ကျေးမှုအနေဖြင့် နှစ်စဉ် သီတင်းကျွတ်၊ သင်္ကြန်ပွဲတော်များတွင် ဘုရားစေတီ ကျောင်းကန်များတွင် ဆွမ်းကျွေးကုသိုလ်ပြုကြပါသည်။

ဥယျာဉ်ကျေးရွာ

ယခင်နှစ် ၁၀၀ ကျော်ခန့်ကပင် ရွာကြီးရှိနေပြီ ဖြစ်သည်။ ကျေးရွာရှိလူဦးရေမှာကျား ၄၆၆ ယောက်နှင့် မ ၄၈၇ ယောက်ရှိပြီး စုစုပေါင်းလူဦးရေမှာ ၉၅၃ ယောက် ရှိပါသည်။ အိမ်ထောင်စု အရေအတွက်မှာ ၁၉၀ အိမ်ထောင်နေထိုင်ကြပါသည်။ ရွာဇာ်အဓိကစီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပအမျိုးမျိုးနှင့် ဝါတို့ကိုအဓိက ထားစိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧကမှာ (၂၅၀) ကျော်ရှိပါသည်။ ကျန်စီးပွားရေးလုပ်ငန်းများမှာ စျေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ မွေးမျူရေးလုပ်ငန်းတို့ဖြစ်သည်။

ချောင်းကောက်ကျေးရွာ

ချောင်းကောက်ကျေးရွာသည် မင်းဘူးမြို့အသွားကားလမ်းဘေးတွင် တည်ရှိပါသည်။ ကျေးရွာရှိ လူဦးရေမှာ ကျား ၃၃၄ ယောက် နှင့် မ ၃၉၀ ယောက် ရှိပြီး စုစုပေါင်းလူဦးရေမှာ ၇၂၄ ယောက် ရှိပါသည်။ အိမ်ထောင်စု အရေအတွက်မှာ ၁၆၀ အိမ်ထောင် နေထိုင်ကြပါသည်။

ရွာဇာ်အဓိကစီးပွားရေးလုပ်ငန်းမှာ တောင်ယာစိုက်ပျိုးရေးဖြစ်ပြီး နှမ်း၊ ပဲအမျိုးမျိုးနှင့် ဝါတို့ကို အဓိကထား စိုက်ပျိုးကြပါသည်။ ကျေးရွာရှိ စုစုပေါင်းစိုက်ပျိုးဧကမှာ (၃၀၀)ခန့်ရှိပါသည်။ ကျန်စီးပွားရေး လုပ်ငန်းများမှာ စျေးဆိုင်ရောင်းချသောလုပ်ငန်း၊ မွေးမြူရေးလုပ်ငန်းနှင့် အခြားကျပန်းလုပ်ငန်းတို့ဖြစ်သည်။

Appendix 42: Emergency Response Plan for Water Pollution

Water pollution can happen due to onshore cleaning and hydrotesting activities, discharging contaminated water, and oil spills and leaks from loading , unloading, shifting and improvised storage of oils and fuels and transportation vessels and barges. Among these activities, oil spills and leaks and hazardous materials spills are the most problematic causes for water pollution and the emergency response plan for water pollution is developed to take effective measures against these accidents. The emergency response plan for water pollution includes mainly two parts: emergency response procedures for land spill (to stop the spill reaching to the water) and emergency response procedures for spills in water course.

Emergency response procedures for land spill

The emergency response procedures for land spill includes the following steps:

1. Assessing the situation & defining a safety perimeter
2. Stopping or controlling the release
3. Confining the spill or containing the product
4. Notification of Authorities and Public
5. Recovering spilled materials
6. Safe disposal of contaminated materials and waste
7. Reporting

1. Assessing the situation and defining a safety perimeter

- ✓ Identify the product (look at labels or other markings)
- ✓ Refer to the product's Safety Data Sheet (SDS) and Material Safety Data Sheet (MSDS)
- ✓ Keeping a safe perimeter, carefully locate the source of the release
- ✓ Assess the source of the release (such as drum, storage tank, pipeline or other container) to assist with the approximation of quantity spilled

2. Stopping or controlling the release

- ✓ Approach the spill site with the wind at the approached person's back
- ✓ Eliminate source of leak/spill by turning off values, taps, faucets or other controls only if the situation is deemed safe to do so
- ✓ Cover grates, drains and/or sewers

3. Confining the spill or containing the product

- ✓ Contain the spilled product in the smallest possible space close to the source
- ✓ Avoid directing the product toward the sewer system or water body

4. Notification of Authorities and Public

If the spill has reached a drain or watercourse and it can no longer be contained then the regional authorities, and other relevant government departments, such as, Fire Brigade Department, Port Authority, Environmental Conservation Department, Police Department and Emergency Response Agencies will be notified for cooperation and necessary assistance. If necessary, the public will also be notified.

5. Recovering spilled materials

- ✓ Recovering the product quickly to limit its spread

6. Safe disposal of contaminated materials and waste

- ✓ Store wastes separately from in-use products
- ✓ Dispose the contaminated materials and waste safely at the designated site

7. Reporting

- ✓ Preparing and submitting a report of incident by the project developer and responsible persons to the authorities and other relevant departments

Emergency response procedures for spills in water course

If the spills or leaks of oil, chemicals and hazardous materials has reached or occurred in a drain or watercourse, the following procedures will be applied.

- ✓ Notification of the regional authorities, and other relevant government departments, such as, Fire Brigade Department, Port Authority, Environmental Conservation Department, Police Department and Emergency Response Agencies for cooperation and necessary assistance
- ✓ If necessary, the public will also be notified
- ✓ Availability and use of human resources (cleaning team, technical personnel), material resources (fire extinguishing equipment, oil dispersants), and medical equipment and supplies as needed
- ✓ On-site investigation of the oil spill and emergency incident by the responsible personnel of the project to obtain relevant information on pollution incidents
- ✓ Evaluating emergency response work based on the findings of on-site investigation
- ✓ Implementing the relevant emergency response work covering cutting off of oil spill sources, the containment and the removal of spilled oil
- ✓ Disposing the recovered oil safely at the designated site
- ✓ Preparing and submitting a report of incident by the project developer and responsible persons to the authorities and other relevant departments.

1. Village profiles (Direct and Indirect Impact by Pipeline Alignment)

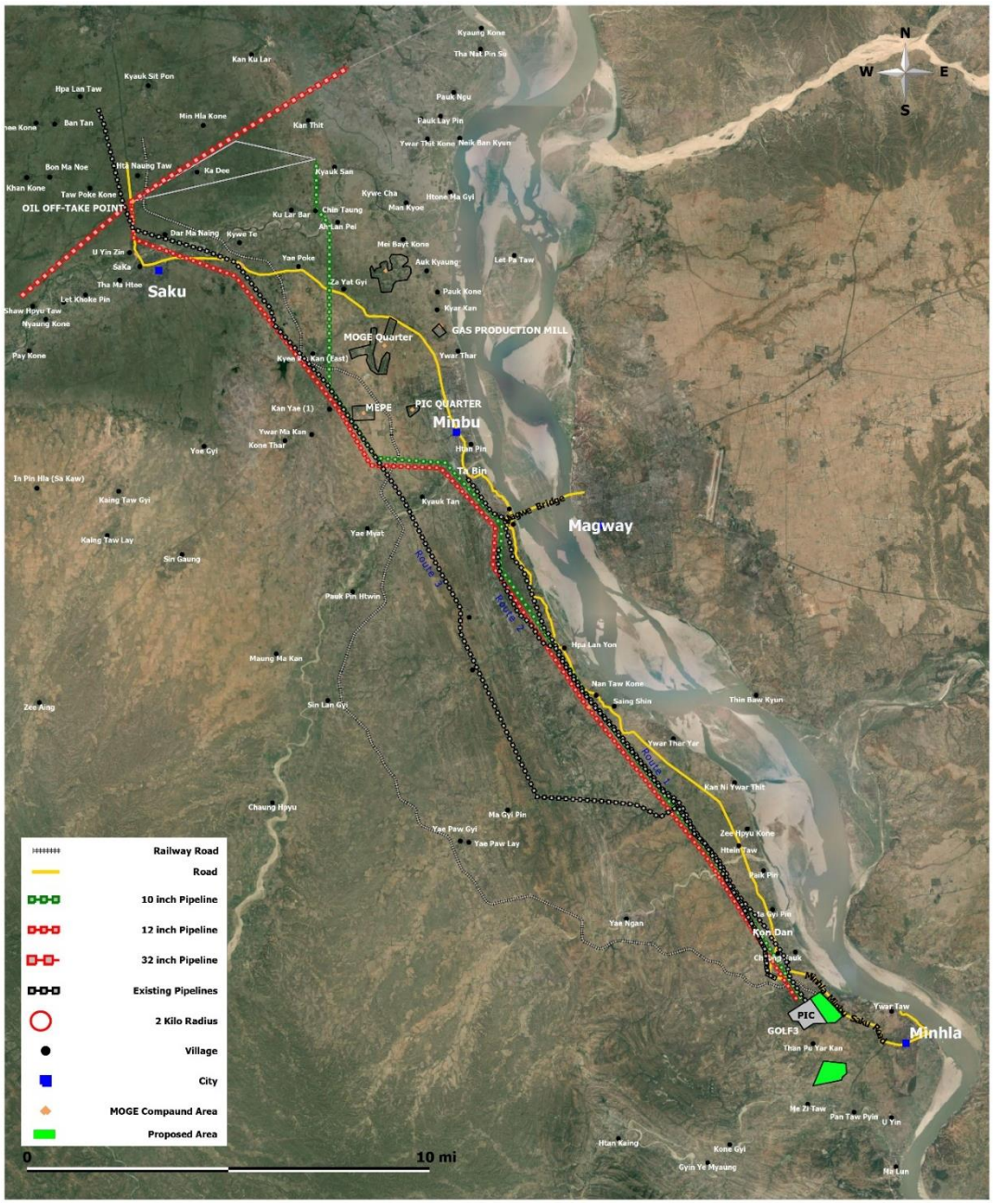


Figure 53: Location map of villages on proposed pipeline ROW

သံပုရာကန်ရေနံချက်စက်ရုံသို့ သွယ်တန်းမည့်လျာထားရေနံပိုက်လိုင်းတလျှောက် လူမှုစီးပွားရေး သက်ရောက်နိုင်မှု လေ့လာဆန်းစစ်ခြင်း

သံပုရာကန် ရေနံချက်စက်ရုံသစ် တည်ရောက်ရန်အတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားရေး သက်ရောက်နိုင်မှု လေ့လာဆန်းစစ်မှုပြုလုပ်ရာတွင် တိုက်ရိုက် အကျိုးသက်ရောက်မှု ရှိမည့် စကုမြို့အနီးရှိ Off-take point မှ သံပုရာကန်ရေနံချက်စက်ရုံ အထိ ရေနံပိုက်လိုင်း ဆွဲမည့် ရာထား ရေနံပိုက်လိုင်း တလျှောက် အနီးအနားရှိ ကျေးရွာများတွင် နေထိုင်ကြသည့် သူများအား လူမှုစီးပွားရေး အခြေအနေများ အပေါ် သက်ရောက်နိုင်မှု နှင့် အဆိုပါ သက်ရောက်နိုင်မှုအတွက် ယင်းတို့၏ သဘောထားများကို လေ့လာ ဆန်းစစ်ပြီ တင်ပြခြင်း ဖြစ်ပါသည်။

ထနောင်းတောရွာ

ထနောင်းတောရွာသည် မြန်မာနိုင်ငံမှ တရုတ်ပြည်ယူနန်နယ်သို့ ရေနံပိုက်လိုင်းနှင့်သဘာဝ ခါတ်ငွေ့ပိုက်လိုင်းဆွဲရာတွင် ရွာအနီးစိုက်ပျိုးမြေများကိုဖြတ်သွားခြင်းခံရသည့် ကျေးရွာဖြစ်ပါသည်။ အဆိုပါ ရွာအနီးရှိ Off-take point မှ သံပုရာကန် နေနံချက်စက်ရုံ သို့ ရေနံပိုက်လိုင်း စတင်ပို့လွှတ်မည် ဖြစ်ပါသည်။ ယူနန်သို့ သွယ်တန်းဖေါက်လုပ်ထားသည့် ရေနံပိုက်လိုင်း၊ သဘာဝခါတ်ငွေ့ ပိုက်လိုင်း ဖြတ်သွားခြင်းနှင့် ပတ်သက်သည့် အတွေ့အကြုံရှိခဲ့သည့် ကျေးရွာဖြစ်ပါသည်။ ထို့ကြောင့် အဆိုပါကျေးရွာ သားများ၏ အတွေ့အကြုံကို သိရှိနိုင်ရန်အတွက် သွားရောက်မေးမြန်းခဲ့ပါသည်။ ထနောင်းတော ကျေးရွာ၏ အခြေခံအချက်အလက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

အိမ်ခြေ - ၁၉၈ ခန့်ရှိပါသည်။

အိမ်ထောင်စု - ၂၁၀ ခန့် ရှိပါသည်။

လူဦးရေ - ၉၄၃ ဦး ရှိပါသည်။ (ကျား - ၄၃၉ ဦး၊ မ - ၅၀၄ ဦး)

ပညာရေး - မူလတန်းကျောင်းရှိပါသည် ။ ဦးသိန်းထွေး မှာ ကျောင်းအုပ်ဆရာကြီးဖြစ်ပါသည်။ ကျောင်းတွင် ဆရာ/ဆရာမ ၅ ဦးရှိပြီး ကျောင်းသား/သူ ၁၂၀ ဦးရှိနေပါသည်။

ကျန်းမာရေး - ဆရာမ - ရှိပါသည်။ ဆေးခန်း - မရှိပါ

အဓိကစိုက်ပျိုးရေး မှာ - စပါး၊ ကုလားပဲ၊ နှမ်း တို့ကို အဓိကစိုက်ပျိုးကြပါသည်။

မွေးမြူရေးမှာ - နွား၊ ဝက်၊ ကြက် တို့ကိုမွေးမြူကြပါသည်။

ပို့ဆောင်ရေး - ရွာတွင် လှည်း ၅၀ စီးခန့်၊ ကား ၁ စီး၊ မြေသယ်ကား ၂ စီး၊ ထော်လာကျီ ၁ စီး၊ ဆိုင်ကယ် ၁၅၀ ခန့် ရှိပါသည်။

ဆက်သွယ်ရေး - တီဗွီ အလုံး ၂၀၀ ခန့် နှင့် ဖုန်း အလုံး ၂၄၀ ခန့်ရှိပါသည်။

လျှပ်စစ်မီး - ဆိုလာပြားသုံး ၁၀၀ ခန့် ရှိ အသုံးပြုနေပါသည်။

ဘုန်းကြီးကျောင်း- (၁) ကျောင်းရှိပါသည်။

ရေရင်းမြစ် - စက်ရေတွင်းသုံး ၁၅၀ ခန့်ရှိပါသည်။

ထနောင်းတောရွာမှ တွေ့ဆုံမေမြန်းခဲ့သူများနှင့် ယင်းတို့၏ သဘောထားများကို အောက်ပါအတိုင်း သိရှိရခဲ့ပါသည်။

၁။ ဦးတင်စိုး၊ အသက် ၄၅ နှစ်

(အုပ်ချုပ်ရေးမှူး၊ ထနောင်းတောရွာ၊ ထနောင်းတောအုပ်စု၊ မင်းဘူး(စကု)မြို့နယ်)

ယခင်တရုတ်ရေနံပိုက်လိုင်း ဆွဲရာတွင် ထနောင်းတောရွာနှင့် ကံစီးရွာတို့မှ လယ်အများဆုံးပါဝင်ပါတယ်။ မြေပါသွားသူတွေဟာ တစ်ဧကအတွက် သီးနှံလျော်ကြေး ၁၂သိန်းနဲ့ ၅နှစ်အတွက် သိန်း၆၀ လျော်ကြေးပေးပြီး မြေလျော်ကြေး တစ်ဧကကို သိန်း(၂၀) စုစုပေါင်း တစ်ဧက သိန်း(၈၀) လျော်ပေးပါတယ်။

၂။ ဦးပေါ၊ အသက် ၇၈ နှစ်

(ရပ်မိရပ်ဖ၊ ထနောင်းတောရွာ)

စုစုပေါင်းလျော်ကြေး တစ်ဧကကို သိန်း(၈၀) တရုတ်ရေနံပိုက်လိုင်းအတွက်လျော်ကြေး ပေးပါတယ်။ ၃နှစ်လောက် အဲဒီပိုက်လိုင်းအနီးနားမှာ ဘာမှစိုက်ပျိုးလို့မရပါဘူး၊ အခုတော့ ရေနံပိုက်လိုင်း အပေါ် ပေ၂၀ ခန့် ချန်လှပ်ပြီး စိုက်ပျိုးလို့ရပါပြီ။ လယ်တွေကတော့ စပါးအဓိကစိုက်ပျိုးပြီး စပါးပြီးရင် ကုလားပဲ ဆက်ပြီးစိုက် ကြပါတယ်။

ယခင်အတွေ့အကြုံအနေနဲ့က ကမ်းနီရေနံပိုက်လိုင်းဟာ လွန်ခဲ့တဲ့ နှစ် ၃၀ ကျော်က ဒီအနားက ဖြတ်သန်းချခဲ့ပါတယ်။ ၄ ပေလောက်မြှုပ်ပြီး လယ်ယာတွေပေါ်မှာ စိုက်ပျိုးခွင့်ပေးခဲ့ပါတယ်။ ဘာလျော်ကြေးမှ မပေးခဲ့ပါ။ ပြဿနာတော့မရှိပါ။ ယခုပိုက်လိုင်းဖြတ်သွားလျှင် သင့်တော်ရာလျော်ကြေး တောင်းကြလိမ့်မယ်လို့ ထင်ပါတယ်။

၃။ - ကိုထွန်းဇော်လင်း၊ ၄၀ နှစ်

(ကျေးရွာကော်မရှင်ဥက္ကဋ္ဌ၊ ထနောင်းတောရွာ)

- **ဦးဝင်းဘို ၊ ၅၀ နှစ်**

(မူလတန်းဆရာ၊ ထနောင်းတောရွာ)

- **ဦးမြင့်ကို၊ ၄၉ နှစ်**

(ဖွဲထောက်ကူ ဥက္ကဋ္ဌ)

ပိုက်လိုင်းဖောက်လျှင် မြေသားများ အထက်အောက်ပြောင်းပြန်ပြန်ဖို့တဲ့ အတွက် ပျက်စီးသွားပြီး အပေါ် မြေပေါ်မှာ စိုက်ပျိုးမရတော့ပါ။ ၂ နှစ်လောက်ကြာမှ ပြန်စိုက်လို့ရပါတယ်။ လက်ရှိလယ်ပေါက်ဈေး အနေနဲ့လယ်တစ်ဧကကို အကောင်းဆုံး လယ်ဟာ သိန်း ၄၀ လောက်အထိပေးရပြီး အညံ့ဆုံးကသိန်း ၂၀ လောက်ရှိပါတယ်။ လယ်ပေါက်ဈေးအရ ချင့်ချိန်ပြီး မျှတတဲ့ လျော်ကြေးရကြလျှင် ကန့်ကွက်ကြမည် မဟုတ်ပါ။

အထက်ပါ ဖြေကြားချက်များအရ ယွင်ဖြတ်သန်းခဲ့သည့် ရေနံနှင့် သဘာဝဓါတ်ငွေ့ ပိုက်လိုင်းများ အတွက် ကြေနပ်မှုရှိကြကြောင်းတွေ့ရပါသည်။ ယှဉ်ပြုလုပ်မည့် စီမံကိန်းအတွက် ဆန့်ကျင် လိုသည့် သဘော ထား အရိပ်အရောင်မတွေ့ရပါ။ ဆက်လက်ပြီး ရာထားရေနံပိုက် လမ်းကြောင်းအနီးတွင် ရှိနိုင်သည့် ကျေးရွာများသို့ သွားရောက်လေ့လာ သိရှိခဲ့ရသည်များကို တင်ပြပါမည်။

ဆက်လက်ပြီး Off take ပွိုင့် မှ မင်းဘူးမြို့အကြား ကျေးရွာများသို့ ကွင်းဆင်းပြီး သက်ဆိုင်ရာ တာဝန်ရှိ သူများနှင့် တွေ့ဆုံ မေးမြန်းခဲ့ပါသည်။ ကျေးရွာများရွေးချယ်ရာတွင် မြန်မာ့ရေနံလုပ်ငန်းမှ ပေးထားသည့် ရေနံပိုက် လိုင်းပြုံသည် ဥပမာ- စကုမြို့သို့ လူနေရပ်ကွက် ပေါ်မှဖြတ်သွားခြင်း၊ စကုမြို့အနီးချောင်းကို တစ်ကြိမ်ထက်ပိုမို ဖြတ်နေခြင်းစသည့် အချက်များကြောင့် လက်တွေ့တွင် အခက်အခဲ အနည်းငယ်ရှိနိုင် သဖြင့် လူနေရပ်ကွက် စသည်တို့ကို ရှောင်ကွင်းပြီး ထိခိုက်မှု အနည်းဆုံး လမ်းကျောင်းကို ရွေးသင့်ပါသည်။ မည်သည့်လမ်းကြောင်းကို ရွေးသည်ဖြစ်စေ ရေနံပိုက်လိုင်း ဖြတ်နိုင်သည့် ကျေးရွာအားလုံးသို့ သွားရောက်မေးမြန်း တင်ပြထားပါသည်။ စကုနှင့် မင်းဘူးအကြား ကျေးရွာများပုံမှာ အောက်ဖေါ်ပြပါ ပုံအတိုင်း ဖြစ်ပါသည်။

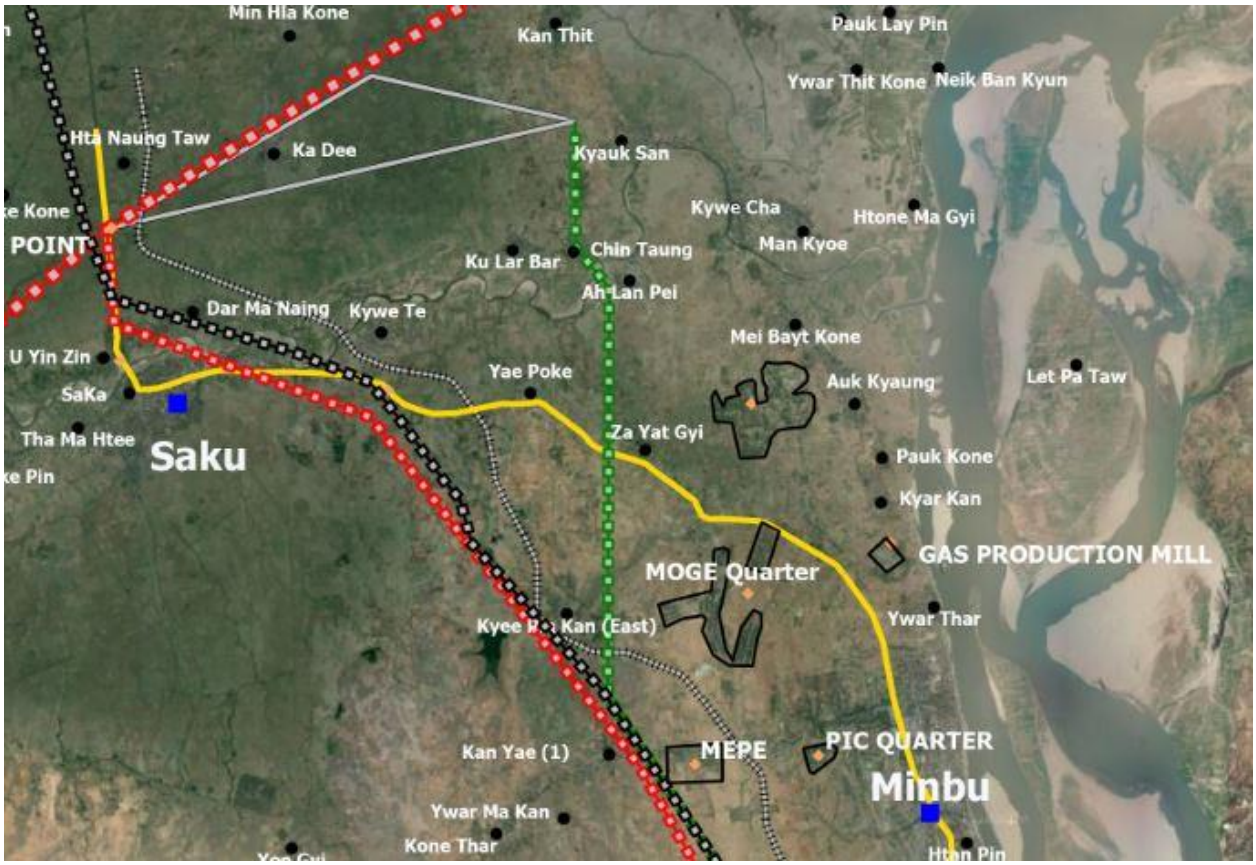


Figure 54: Location map of villages between Saku - Minbu pipeline

စကုနှင့် မင်းဘူးအကြား MOGE ပိုက်လိုင်းအနီးရှိကျေးရွာများပုံ

စကုနှင့် မင်းဘူးမြို့အကြား ကျေးရွာ (၁၁)ရွာသို့ သွားရောက် ခဲ့သည့် ကျေးရွာတို့မှာ-

- ဥယဉ်ဇင်းကျေးရွာ
- ဒါးမနိုင်ကျေးရွာ
- ကျောင်းရွာ
- ကျွဲတဲကျေးရွာ
- ရေပုတ်ကျေးရွာ
- ကျွဲသိုးမြောင်ကျေးရွာ
- ရွှေတပင်မြို့သစ်
- ကျောက်တန်းကျေးရွာ
- ကန်ရေကျေးရွာ
- ရွာမကန်ကျေးရွာ
- ကျီးပင်ကန်ကျေးရွာ - တို့ဖြစ်ကြပါသည်။

ကျေးရွာ အသီးသီး၏ ယေဘုယျ စာရင်းအချက်အလက်များနှင့် တာဝန်ရှိသူများ၏ ဖြေကြား ချက်များကို ဆက်လက်ဖော်ပြပါမည်။

ညယျာဉ်ဇင်းရွာ

အိမ်ခြေ - ၂၃၀ ရှိပါသည်။

အိမ်ထောင်စု - ၂၃၀ နေထိုင်ကြပါသည်။

လူဦးရေ - စုစုပေါင်း ၉၆၉ ဦး ၊ (ကျား- ၄၈၈၊ မ - ၄၈၁)

ညယျာဉ်ဇင်းကျေးရွာ- ၂ ရွာပေါင်း စုစုပေါင်း စိုက်ပျိုးမြေ၂၀၀ ဧကခန့်ရှိ ပါသည်။

ပညာရေး - မူလတန်းကျောင်းရှိ ပါသည်၊ ကျောင်းအုပ်ကြီး ဦးဝင်းသိန်းနှင့် ဆရာမ ၄ ဦးရှိပြီး၊ ကျောင်းသား ၁၁၀ ဦး တက်ရောက်နေပါသည်။

ကျန်းမာရေး - ဆရာမ ၁ ဦးရှိပါသည်။ ဆေးခန်း မရှိပါ။

ဘုန်းကြီးကျောင်း- ၁ ကျောင်းရှိပါသည်။

မွေးမြူရေး - နွား ၂၀၀ခန့်၊ ဆိတ် ၁၂၀ခန့်၊ ဝက် နှင့် ကြက် တနိုင်တပိုင်မွေးမြူထားကြပါသည်။

လျှပ်စစ်မီး - အစိုးရမီးရရှိပါသည်။

ဆက်သွယ်ရေး - တီဗွီ ၂၀၀ ခန့်၊ ဖုန်း ၃၀၀ ခန့် ရှာတွင်ရှိပါသည်။

ပို့ဆောင်ရေး - ကား ၅ စီး၊ ဆိုင်ကယ် ၁၅၀ခန့်၊ လှည်း ၆၀ ခန့်ရှိပါသည်။

ရေ - တုံကင်တွင်း ၂၀၀ ခန့် ရှိ ရှိပါသည်။

စက်မှုလုပ်ငန်း - ဆန်စက် ၃ စက်ရှိပါသည်။

ညယျာဉ်ဇင်းရွာ တာဝန်ရှိသူများ၏ဖြေကြားချက်-

ညယျာဉ်ဇင်းကျေးရွာတွင် အုပ်ချုပ်ရေးမှူး ဦးမြင့်ဌေး၊ တောင်သူ ဦးသံချောင်းတို့နှင့် တွေ့ဆုံ မေးမြန်းခွင့် ရရှိခဲ့ပါသည်။ ဖြေဆိုသူများ၏ သဘောထားများ မှာ အောက်ဖေါ်ပြပါအတိုင်း ဖြစ်ပါသည်။

၁။ ဦးမြင့်ဌေး၊ အသက် ၄၆ နှစ်

(အုပ်ချုပ်ရေးမှူး၊ ညယျာဉ်ဇင်းရွာ)

တရုတ်ရေနံပိုက်လိုင်း ဖြတ်သန်းသွားတုန်းက ဒီရွာက လယ်ပိုင်ရှင် ၂ ဦးသာပါသွားပါတယ်။ တစ်ဖက အတွက် စုစုပေါင်း သိန်း၈၀ လျော်ကြေးရတယ်လို့သိရပါတယ်။ ညယျာဉ်ဇင်းရွာက

စပါးကိုအဓိကထားစိုက်ပျိုး ကြပါတယ်။ ယခင်က နွေစပါးစိုက်ခဲ့ကြသော်လည်း ရေအခက်အခဲကြောင့် နွေစပါးမစိုက်ကြတာ ၂နှစ် လောက်ရှိပါပြီ။ အခုတော့ စပါး၊ ကုလားပဲနဲ့ ရေတွင်းရှိသူတွေက နှမ်းစိုက်ပါတယ်။ နှမ်းစိုက်တဲ့သူ အနည်း ငယ်သာရှိပါတယ်။ ယခုMOGEရေနံပိုက်လိုင်းဖြတ်သွားနိုင်သည့်လမ်းတလျှောက် ဥယျာဉ်ဇင်းရွာသား တွေပိုင် လယ်မြေတွေဖြစ်ပါတယ်။ အဓိက ၂သီးစိုက်ကြပြီး၊ စပါးစိုက်ပြီး ကုလားပဲ စိုက်ပါတယ်။

ကိုင်း/ဥယျာဉ်မှာ သပြေ၊ ခရမ်းချဉ် စိုက်ပျိုးပါတယ်။ လယ်တွေကတော့ တစ်ဧကကို ၆၀/၇၀ တင်းနီးပါး ထွက်ပါတယ်။ ကုလားပဲ တစ်ဧကကို ရာသီကောင်းလျှင် ၂၀ တင်း လောက်ထွက်ပါတယ်။ နှမ်းက ရာသီ ကောင်းရင် ၁၅ တင်းလောက်ထွက်ပါတယ်။ ကုလားပဲ ၁ တင်း ယခုပေါက်ဈေးဟာ ၄၀၀၀ ကျပ်ရှိပါတယ်။ စပါးက တစ်တင်း ၄၀၀၀လောက်ရှိပါတယ်။ လက်ရှိလယ်တစ်ဧကပေါက်ဈေးဟာ အညံ့ဆုံးမှာ သိန်း ၂၀ ခန့်ရှိပြီး အကောင်းဆုံးမှာ ၃၂ သိန်းခန့်ထိ ရှိပါတယ်။

၂။ ဦးသံချောင်း၊ အသက် ၆၇ နှစ်
(တောင်သူ၊ ဥယျာဉ်ဇင်းရွာ)

တရုတ်ရေနံပိုက်လိုင်း ဖြတ်သန်းသွားတုန်းက ကျွန်တော့်မှာ လယ် ၂ဧက ပါသွားတယ်။ လယ်လျော်ကြေး တစ်ဧကကို သိန်း ၂၀ ပေးပါတယ်။ သီးနှံလျော်ကြေးအဖြစ် တစ်နှစ် ၁၂ သိန်း နှုန်းနဲ့ ၅နှစ်စာ သိန်း ၆၀ လျော်ပေးခဲ့တယ်။ ယခုပါသွားတဲ့ ၂ ဧက မှာ ပြန်စိုက်လို့ရတာ ၀.၇၅ ဧကလောက်ပဲ ရှိပါတယ်။

လျော်ကြေးရတာကို အားလုံးကျေနပ်ကြပါတယ်။ ပြန်ပြီးလဲ စိုက်ပျိုးလို့ရပါတယ်။ ယခု MOGE ရေနံပိုက်လိုင်းက ၁၂ လက်မဆိုတော့ တရုတ်ရေနံပိုက်လိုင်းလောက်လည်း မကြီးဘူးဆိုတော့ ပျက်စီးတာလဲ နည်းမှာပါ။ ဒါပေမယ့် သင့်တော်တဲ့လျော်ကြေးရရင်တော့ ကျေနပ်ကြမှာပေါ့။

ဒါးမနိုင်ကျေးရွာ

အိမ်ခြေ	-	၁၂၃ခန့် ရှိပါသည်။
အိမ်ထောင်စု	-	အိမ်ထောင်စု (၁၃၃) စု နေထိုင်ပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၆၅၂ ဦးရှိပါသည်။ (ကျား ၃၁၆၊ မ ၃၃၆)
ပညာရေး	-	အခြေခံမူလတန်းကျောင်းရှိပြီး၊ ဒေါ်ဝင်းမာဦး (ကျောင်းအုပ်)နှင့် ဆရာ/ဆရာမ ၅ ဦး၊ ကျောင်းသား ၉၃ ဦး ရှိပါသည်။
ကျန်းမာရေး	-	ဆရာမ(၁)ဦးရှိပါသည်၊ဆေးခန်းမရှိပါ။
ဘုန်းကြီးကျောင်း	-	ဘုန်းတော်ကြီးကျောင်း၂ကျောင်းရှိပါသည်။
ရေ	-	တုံကင်တွင်း ၆၀ခန့်ရှိပါသည်။
လျှပ်စစ်မီး	-	အစိုးရမီးမရသေးပါ၊ ဆိုလာမီးသုံး အိမ် ၉၀ ခန့်ရှိပါသည်။
ဆက်သွယ်ရေး	-	တီဗွီ ၉၀ခန့် ရှိ ဖုန်း ၁၅၀ ခန့် ရှိပါသည်။
ပို့ဆောင်ရေး	-	ကားမရှိပါ။ သုံးဘီးဆိုင်ကယ် ၁ စီး၊ လှည်း ၅၀ ခန့်ရှိပါသည်။

ဒါးမနိုင်ကျေးရွာ တာဝန်ရှိသူ၏ဖြေကြားချက်-

ဒါးမနိုင်ကျေးရွာမှ ရာအိမ်မှူး ဦးမောင်မောင်ဦးနှင့် တွေ့ဆုံမေးမြန်းခွင့် ရရှိခဲ့ရာ ဦးမောင်မောင်ဦး ၏ ဖြေကြားချက်အကျဉ်းချုပ်မှာ အောက်ဖော်ပြပါအတိုင်း ဖြစ်ပါသည်။


- **ဦးမောင်မောင်ဦး၊ အသက် ၄၁ နှစ်**
  ရာအိမ်မှူး၊ ဒါးမနိုင်ရွာ၊ ဥယျာဉ်ကျေးရွာအုပ်စု

ဒါးမနိုင်ရွာမှာ လယ်ဧက ၇၀ ခန့် ရှိပါတယ်။ ယခုနေရာမှာ ပိုက်လိုင်းဖြတ်သွားလျှင် မိမိတို့ရွာမှ ပိုင်ရှင် ၁၀ ဦးခန့် ရှိတယ်။ အများဆုံးကျောင်းရွာထဲမှ ဖြစ်ပြီး ၃၀ ဦးခန့်ရှိနိုင်ပါသည်။ နွေစပါးမစိုက်တာ ၃နှစ်ခန့်ရှိပါပြီ၊ စီမံကိန်းမြောင်းရေမရလို့ပါ။ အချို့က စပါး/ကုလားပဲ စိုက်ပြီး နှမ်းစိုက် သူကနည်းပါတယ်။ ကိုင်းထဲမှာတော့ သပြေနှင့် ငှက်ပျောစိုက်ပါတယ်။

ယခင်နှစ် ၃၀ခန့်က ကမ်းနီပိုက်လိုင်းဖြတ်သန်းဖူးပါတယ်။ ဘာမှလျော်ကြေးမရခဲ့ပါဘူး။ နောက်ပြီး ရထားလမ်းဖောက်တော့လည်းဘာလျော်ကြေးမှမရခဲ့ပါ။ တရုတ်ပိုက်လိုင်းတုန်းကတော့ ထိုက်ထိုက်တန်တန် လျော်ကြေးရကြပါတယ်။

ယခုပိုက်လိုင်းဖြတ်သန်းခဲ့ရင်သင့်တော်တဲ့လျော်ကြေးတစ်ခုရရင်တော့ ကျေနပ်ကြမှာပါ။ရထားလမ်းအနီးလယ်တွေက တစ်ဧက အကောင်းဆုံးမှာ သိန်း ၃၀ခန့် ရှိပြီး အညံ့ဆုံးမှာ ၁၆ သိန်းခန့် ရှိပါတယ်။

ကျောင်းရွာ

အိမ်ခြေ	-	၄၅၀ခန့် ရှိပါသည်။
အိမ်ထောင်စု	-	၅၀၀ ခန့် ရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၃၂၄၂ ဦးခန့် ၊ (ကျား ဦးရေ ၁၁၃၂၊ မ ဦးရေ ၂၁၁၀)
မီးရရှိမှုအခြေအနေ	-	အစိုးရလျှပ်စစ်မီး ရရှိပါသည်။
ပညာရေး	-	အမက ကျောင်းတစ်ကျောင်းရှိသည်။ ကျောင်းအုပ်မှာ ဦးဝင်းမြင့် ဖြစ်သည်။ ဆရာ/ဆရာမ ၇ ဦးခန့်ရှိပြီး ကျောင်းသား/သူ ဦးရေ ၁၅၀ ခန့်ရှိပါသည်။
ပို့ဆောင်ရေး	-	ဆိုင်ကယ် ၄၀၀ခန့်၊ ထွေလာဂျီ ၃၀၊ ကား ၁၀ စီး၊ နှင့် လှည်း ၅၀
ဆက်သွယ်ရေး	-	တီဗွီ ၄၀၀၊ ဖုန်း ၆၀၀ ခန့်ရှိပါသည်။
သောက်သုံးရေ	-	တုံကင်တွင်း ၄၀၀ ခန့်ရှိပါသည်။
မွေးမြူရေး	-	နွား၊ ဝက်၊ ဆိတ်၊ ကြက်

ကျောင်းရွာကျေးရွာ တာဝန်ရှိသူ၏ဖြေကြားချက်-

ကျောင်းရွာကျေးရွာမှ ရာအိမ်မှူး ဦးသောင်းဌေးနှင့် တွေ့ဆုံမေးမြန်းခွင့် ရရှိခဲ့ရာ ဦးသောင်းဌေး၏ ဖြေကြားချက်အကျဉ်းချုပ်မှာ အောက်ဖေါ်ပြပါအတိုင်း ဖြစ်ပါသည်။

- **ဦးသောင်းဌေး၊ ၅၆ နှစ်**
  ရွာအိမ်မှူး၊ ကျောင်းရွာ

အနှစ် ၆၀ နီးပါးခန့် ကမ်းနီရေနံပိုက်လိုင်း ဖြတ်သန်းခဲ့ပါသည်။ မန်းရေနံမြေမှုယူခဲ့ပါသည်။ ယခုဖြတ်သန်းမည့် ရေနံပိုက်လိုင်းအနီးတွင် ကျောင်းရွာနှင့် ဒါးမနိုင်ရွာငယ်များမှ လယ်များလုပ်ကိုင် စားသောက်သူများ ရှိပါသည်။ ကျောင်းရွာမှ ၂၀ ဦးနီးပါးရှိနိုင်ပါသည်။ အကောင်းဆုံးလယ်မှာ တစ်ဧကလျှင် ၂၈ သိန်းနီးပါးခန့်ရှိပြီး အညံ့ဆုံးမှာ ၁၂ သိန်း ခန့်ရှိပါသည်။

၃ သီးစားစိုက်ပျိုးပါသည်။ စပါးကြီး၊ ကုလားပဲ၊ နှမ်းတို့စိုက်ပါသည်။ နွေစပါးမစိုက်သလဖြင့် နှမ်းစိုက်လာခဲ့ကြခြင်းဖြစ်သည်။ ရထားလမ်းအတွက် နစ်နာကြေးအတွက် လွှတ်တော်တွင် ပြည်သူ့ လွှတ်တော်ကိုယ်စားလှယ် ဦးအေးသူတင်ပြတာ လျော်ကြေးပေးရန်မလုပ်သေးပါ။ မင်းဘူးတွင် ကုလားပဲသီးရင့်သည့် အချိန်တွင်လာရောက်မြေထိုးရှင်းလင်း၍ မကြည်လင်ဖြစ်နေပါသည်။ ရေနံပိုက်လိုင်းကို သင့်တော်သည့် လျော်ကြေးရလျှင်တော့ ကျေနပ်ကြမည်ဖြစ်သည်။

စီမံကိန်းအကောင်အထည်ဖော်လျှင် သီးနှံပျက်ကြေးနှင့်သင့်တော်တဲ့လျော်ကြေးရလျှင် ပို၍အဆင်ပြေပါမည်။

ကျွဲတဲရွာ

အိမ်ခြေ - ၃၈၀ ခန့်ရှိပါသည်။
အိမ်ထောင်စု - ၄၀၆ စုရှိပါသည်။
လူဦးရေ - လူဦးရေ စုစုပေါင်း ၁၆၀၀ ကျော်ခန့် ရှိပါသည်။
စိုက်ပျိုးမြေ - ကျွဲတဲ၊ ကံသာ၊ ညောင်ကိုင်း တစ်အုပ်စုလုံး လယ်ဧက ၅၅၀ ခန့်ရှိ
ပညာရေး - အခြေခံပညာအလယ်တန်း (ခွဲ) ကျောင်း ၁ ကျောင်းရှိပါသည်။
ကျောင်းအုပ် ဦးမောင်မောင်ဝေ၊ ဆရာ/ဆရာမ ၁၀ ဦးခန့်ရှိပြီး ကျောင်းသား/သူများမှာ မူလတန်းမှာ ၁၉၁ ယောက်ရှိ အလယ်တန်းမှာ ၁၅၁ယောက်ရှိပါသည်။
ဘုန်းကြီးကျောင်း - ဘုန်းတော်ကြီးကျောင်း ၂ ကျောင်းရှိပါသည်။

ကျန်းမာရေး - ကျန်းမာရေးဆေးပေးခန်းရှိပါသည်။
လျှပ်စစ်မီး - အစိုးရမီး ရရှိပါသည်။
ဆက်သွယ်ရေး - တီဗွီ ၂၀၀ ခန့်၊ ဖုန်း ၃၀၀ခန့် ရှိပါသည်။
ပို့ဆောင်ရေး - ကား ၅စီး၊ လုပ်ငန်းသုံးကား ၄ စီး၊ ထွေလာ ၅ စီး၊ ဆိုင်ကယ် ၂၀၀ ခန့် နှင့် လှည်း ၆၀ခန့်ရှိပါတယ်။
သောက်သုံးရေ - တုံကင်တွင်း ၂၀၀ခန့်ရှိ
မွေးမြူရေး - နွားကို အဓိကမွေးမြူကြပြီး ဆိတ်၊ ဝက်၊ ကြက်များလည်း မွေးမြူပါသည်။

ကျွဲတဲရွာ တာဝန်ရှိသူများ၏ဖြေကြားချက်-


ဦးဝေဖြိုး၊ ၅၁ နှစ်

အုပ်ချုပ်ရေးမှူး၊ ကျွဲတဲရွာ၊ ကံသာအုပ်စု

ယခု သွယ်တန်းမည့်ပိုက်လိုင်းတလျှောက်မှာ လယ်လုပ်နေသူများကတော့ ညောင်ကိုင်းရွာ၊ ကျွဲတဲတောင်သူတွေအများဆုံး လုပ်ကိုင်စားသောက်နေကြတဲ့ ကွင်းဖြစ်ပါတယ်။

- အများဆုံးက စပါးစိုက်ပြီး ဆောင်းရာသီမှာ ကုလားပဲ စိုက်ကြပါတယ်။ မိုးကြို နှမ်းနက်နှင့် ပဲတီစိမ်းလည်းစိုက်ပျိုးပါတယ်။ ကိုင်းတွေမှာ ကြက်သွန်၊ ငရုပ် စိုက်ပျိုးကြပါတယ်။
- ရေပုတ်ရွာအနီးက ကွင်းတွေမှာ ဥသီး စိုက်ပျိုးပြီး ညောင်ကိုင်းရွာအနီးမှာတော့ ရေရှိတဲ့နေရာတွေမှာ ကြက်သွန်စိုက်ပါတယ်။
- လယ်အကောင်းစား တစ်ဧက သိန်း ၂၀ ထိရှိပြီး အညံ့စားတစ်ဧက ၁၀-၁၅ သိန်းအကြား ရှိပါတယ်။ အညံ့စားကတော့ ရေအခက်အခဲရှိပါတယ်။
- အကယ်၍ ရေနံပိုက်လိုင်းဆွဲလျှင် ကံသာအုပ်စုတွင်းရှိရွာများမှ လယ်ရှင်များနှင့်ညှိနှိုင်း၍ သင့်တော်သော လျော်ကြေးပေးလျှင် သဘောတူနိုင်လိမ့်မည်ဟု မျှော်လင့်ပါသည်။

ရေပုတ်ရွာ

အိမ်ခြေ - ၄၁၀ ရှိပါသည်။
အိမ်ထောင်စု - ၄၁၀ ရှိသည်။

လူဦးရေ	-	လူဦးရေ စုစုပေါင်း ၁၇၃၁ ဦးရှိပါသည်။ (ကျား ၇၂၀ ၊ မ ၁၀၀၁)
ပညာရေး	-	တွဲဖက်အလယ်တန်းကျောင်း ရှိပါသည်။
		ဦးစိုး - ကျောင်းအုပ်ဆရာကြီးနှင့် ဆရာ/ဆရာမ ၁၄ ဦး ရှိပြီး ကျောင်းသား ၂၇၉ ဦး ရှိပါသည်။
ကျန်းမာရေး	-	ကျန်းမာရေးဌာနခွဲရှိပြီး / ဆရာမ ရှိပါသည်။
လျှပ်စစ်မီး	-	အစိုးရမှ ပေးသည့် မီးရရှိပါသည်။
ပို့ဆောင်ရေး	-	ကားလိုင်းဆွဲ ၁ စီး၊ Light Truck ၁ စီး၊ သုံးဘီး ၅ စီး၊ မော်တော် ဆိုင်ကယ် ၄၀၀ ခန့်ရှိပါသည်။
ဆက်သွယ်ရေး	-	ဖုန်း ၄၀၀ ခန့်၊ တီဗွီ ၃၆၀ခန့်ရှိသည်။
ရေ	-	တုံကင်တွင်း ၂၀၀ကျော်ရှိ သည်။
ဘုန်းကြီးကျောင်း-		ဘုန်းတော်ကြီးကျောင်း ၂ ကျောင်းရှိသည်။
မွေးမြူရေးနွား	-	၈၀၀ ကျော်၊ ဆိတ် ၂၀၀ ခန့်၊ သိုး ၃၀၀ခန့် နှင့် ဝက်/ကြက်တို့ကို တနိုင်တပိုင်မွေးမြူ ပါသည်။

ရေပုတ်ရွာ တာဝန်ရှိသူ၏ဖြေကြားချက်-

ရေပုတ်ရွာတွင် အုပ်ချုပ်ရေးမှူး ဦးစန်းလင်းထွန်းနှင့် တွေ့ဆုံမေးမြန်းခွင့် ရရှိခဲ့ပြီး ဖြေကြားချက်များကို အောက်တွင် အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

ဦးစန်းလင်းထွန်း၊ အသက် ၃၈ နှစ်

အုပ်ချုပ်ရေးမှူး၊ ရေပုတ်ရွာ

၂၀၁၂ မှ စတင်၍ ရေပုတ်ရွာအုပ်စု အုပ်ချုပ်ရေးမှူး တာဝန်ယူခဲ့ပြီး လယ်ယာလုပ်ကိုင် ပါသည်။ရွာမှာ တောင်သူ ၂၀၀နီးပါးရှိသည်။ စပါးစိုက်ဧကခြ၀၀ ကျော်ရှိပြီး စပါး၊ ကုလားပဲ၊ နှမ်းကို ရာသီအလိုက်စိုက်ပျိုးသည်။ မိမိတို့ရွာအနီးမှာ ဒုတိယတန်းစားလယ်များဖြစ်ပြီး တစ်ဧက အများဆုံး ၁၅ သိန်းနှင့် အညံ့စားလယ်တစ်ဧက ၁၀ခန့်သာရှိပါသည်။

ယခုပိုက်လိုင်းဆွဲလျှင် မိမိတို့ရွာမှ လယ်ပိုင်ရှင် ၂၀ခန့်ပါဝင်နိုင်မည်ဖြစ်ပြီး သင့်တော်သော လျော်ကြေးပေးပါကသဘောတူညီလိမ့်မည် ထင်ပါသည်။

ကျွဲသိုးမြောင်

အိမ်ခြေ - ၂၁၀ ခန့် ရှိပါသည်။
အိမ်ထောင်စု - ၂၂၅ ခန့် ရှိပါသည်။
လူဦးရေ - ၉၂၈ ဦး ရှိပါသည်။
ပညာရေး - မူလတန်းကျောင်းမရှိပါ။
အနီးရှိထောင်ရှာပင်ကျောင်းသို့သွားတက်ရပါသည်။
ကျန်းမာရေး - ဆရာမ ၁ ဦးရှိပြီး ဆေးခန်းမရှိပါ။
ဘုန်းကြီးကျောင်း - ဘုန်းတော်ကြီးကျောင်း၁ ကျောင်း ရှိပါသည်။
ပို့ဆောင်ရေး - လုပ်ငန်းသုံးကား ၄ စီး၊ သုံးဘီး ၃စီး၊ ထွေလာဂျီ ၂ စီး၊ ဆိုင်ကယ် ၁၅၀ခန့်ရှိပါ သည်။
လျှပ်စစ်မီး - ကိုယ်ထူကိုယ်ထမီးအသုံးပြုပြီး ဒီဇယ်ဖြင့်မောင်းရပါသည်။
ဆက်သွယ်ရေး - တီဗွီ ၁၅၀ခန့်ရှိပြီး ဖုန်းအလုံးရေ ၂၀၀ ကျော်ရှိပါသည်။
ရေ - တုံကင်တွင်း ၁၀၀ ကျော်ရှိပါသည်။

ကျွဲသိုးမြောင်ရွာတာဝန်ရှိသူများ၏ဖြေကြားချက်-

ကျွဲသိုးမြောင်ရွာတွင် အုပ်ချုပ်ရေးမှူး ဦးမြင့်ကို၊ ရာအိမ်မှူး ဦးကိုကိုဦး တို့နှင့် တွေ့ဆုံ မေးမြန်းခွင့် ရရှိခဲ့ပြီး ဖြေကြားချက်များကို အောက်တွင် အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

ဦးမြင့်ကို၊ ၅၂ နှစ်

အုပ်ချုပ်ရေးမှူး၊ ကျွဲသိုမြောင်ရွာ

ထောက်ရှာပင်အုပ်စု

ဦးကိုကိုဦး၊ ရာအိမ်မှူး

ထောက်ရှာပင်အုပ်စုထဲမှာကျွဲသိုမြောင်၊ တပင်၊ ထောက်ရှာပင်နှင့် ရွှေရောင်တော်ရေနံရွာ တို့ ပါဝင်ပါတယ်။

အများအားဖြင့် ယာစိုက်ပျိုးကြပြီး ဥယျာဉ်ခြံထဲမှာ သရက်၊ သြဇာတွေရှိပါတယ်။ လယ်စိုက်သူမရှိပါ။ ယာထဲမှာ နှမ်း၊ ပဲတီစိမ်းကို ဇူလိုင်မှ အောက်တိုဘာအတွင်း စိုက်ပျိုးပြီး နှံစားပြောင်းကတော့ အောက်တိုဘာမှ ဒီဇင်ဘာအတွင်း စိုက်ပျိုးပါတယ်။

ဆားပွက်ချောင်း၏ အရှေ့ဖက်ကမ်းမှစ၍ ထောက်ရှာပင်ရေနံဧ မြဟုသတ်မှတ်ထားပါတယ်။ အစိုးရမှ သိမ်းဆည်းထားခြင်း မရှိသော်လည်း ပုံစံဂ လယ်ယာမြေပိုင်ဆိုင်ခွင့် ကို လျှောက်ထားပါသည်။ သို့သော် ပါမစ်ချမပေးသေးပါ။ ၄င်းပိုင်ရှင်များတွင် ဦးပိုင်ရှိနေသူများ ရှိသည်။

၄င်းဒေသရှိ ပိုက်လိုင်းဖြတ်သန်းသွားမည့်နေရာမှာ တောင်ကုန်းငယ်များ၊ ယူကလစ် စိုက်ခင်းများအဖြစ်နှင့်သစ်တောပိုင်အဖြစ်လည်းရှိသည်။ မြေတစ်ဧကကို ပေါက်စျေးအကောင်းဆုံး ၂၅-၃၀ သိန်းခန့်ရှိနေပြီး အညံ့စား တစ်ဧက ၁၅ မှ ၂၀ သိန်းဝန်းကျင်ရှိပါတယ်။

၂၀၁၅ ခုလပိုင်းခန့်က MPT Cable လိုင်းဆွဲသောအခါ ဘူဒိုဇာဖြင့် ၂ x ၄ ပေ လိုင်းတူးရာ ပြည်သူကို အသိမပေးဘဲလုပ်သဖြင့် ရွာသားများကနိုင်ငံတော်သမ္မတအထိစာတင်ကာ လျော်ကြေး ကိုညှိနှိုင်းပြီးဖြေရှင်းပေးခဲ့ရသည်။ လျော်ဖြူစိုက်ခင်းမှအပင်တစ်ပင်ကို ၃၀၀၀ဝ/နှုန်း အထိပေးလျော် သွားခဲ့ကြပြီး ယာမြေတွင် ပေ ၁၀၀ လျှင် ၃၀၀၀ဝ/-ပေးလျော်ခဲ့သည်။

ယခုရေနံပိုက်လိုင်းသစ်ဖြတ်လျှင်လည်း သင့်တော်သော လျော်ကြေးပေးညှိနှိုင်းလျှင် အဆင် ပြေပါမည်။ တစ်ဧကကို ၄၀ မှ ၅၀ သိန်းအထိ ရှိပါတယ်။

ရွှေတပင်မြို့သစ်

အိမ်ခြေ - အိမ်ခြေ ၁၈၀ခန့် ဆောက်ထားပြီး မနေသူများလည်းရှိပါသည်။

အိမ်ထောင်စု - အိမ်ထောင်စု ၁၅၀ ခန့်၊

လူဦးရေ - လူဦးရေ ၃၀၀ ကျော်ရှိပါသည်။

ပညာရေး - မူလတန်းကျောင်းမရှိပါ။ တပင် အမကတွင် သွားရောက်တက်ရပါတယ်။

ဘုန်းကြီးကျောင်း-မရှိပါ။

ရွှေတပင်မြို့သစ် တာဝန်ရှိသူ၏ဖြေကြားချက်-

ရွှေတပင်မြို့သစ်တွင် ရာအိမ်မှူးဦးစိုးသိန်းနှင့်တွေ့ဆုံမေးမြန်းခွင့်ရရှိခဲ့ပြီး ဖြေကြားချက်များကို အောက်တွင် အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

ဦးစိုးသိမ်း ၆၃ နှစ်၊

ရာအိမ်မျူး၊ ရွှေတပင်မြို့ကွက်သစ်

ကျွန်တော်တို့ ရပ်ကွက်တွင်းက MOGE ပိုက်လိုင်းဖြတ်သွားပါတယ်။ ယခင်ပိုက်လိုင်းမှာ တစ်ဖက်တစ်ချက် ပေ ၅၀ စီအဖြစ် ရေနံပိုက်လိုင်းနယ်ရှိပါတယ်။ ဒါပေမယ့် ရွှေတပင်မြို့သစ်တိုးချဲ့လာသောကြောင့် ယခုအခါ ပိုက်လိုင်း ၅၀ပေတွင်းကျော်ပြီး ပိုက်လိုင်းနှင့်ကပ်လျက် အိမ်တွေ ဆောက်ထားတာတွေရှိပါတယ်။

ယခု အစိုးရသစ် ၅နှစ်အတွင်း အုပ်ချုပ်ရေးမှူးနှစ်ဦးပြောင်းခဲ့ပြီး ၄င်းတို့ကနေရာချထားခဲ့ကြခြင်းဖြစ်သည်။ ဤကွက်သစ်မှာ အငြိမ်းစားဝန်ထမ်း၊ ရေနံ၊ ရဲ၊ စစ်တပ်တို့မှ အများဆုံးနေရာချထားပေးသောကွက်သစ်ဖြစ်ပါတယ်။ လက်ရှိဝန်ထမ်းတွေလည်းနေထိုင်ကြပါတယ်။ ပိုက်လိုင်းအတွက် မြေလျော်ကြေးပေးရန်မလိုပါ။

ကျောက်တန်းရွာ

အိမ်ခြေ	-	၄၈၀ ကျော် ရှိပါသည်။
အိမ်ထောင်စု	-	၅၀၀ ကျော် ရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း၂၅၀၇ ဦး (ကျား ၁၂၀၈၊ မ ၁၂၉၉) ရှိပါသည်။
ပညာရေး	-	တွဲဖက်အလကကျောင်းရှိပါတယ်။
		ကျောင်းအုပ် ဒေါ်အေးအေးဖြစ်ပါတယ်။ ဆရာ/ဆရာမ ၁၂ဦး ရှိပြီး
		အင်္ဂါးဆရာ ၃ဦးရှိပါသည်။ ကျောင်းသား/သူ ၄၂၀ ဦးခန့်ရှိပါတယ်။
ဘုန်းကြီးကျောင်း	-	ဘုန်းတော်ကြီးကျောင်း၂ ကျောင်းရှိပါတယ်။
လျှပ်စစ်မီး	-	အစိုးရမှ မီးပေးပါသည်။
ရေ	-	အိမ်တိုင်းလိုလို တုံကင်တွင်းရှိကြပါတယ်။
ဆက်သွယ်ရေး	-	တီဗွီ ၉၀% ရှိပြီး ဖုန်း ၁၀၀% ခန့်ရှိပါတယ်။

ပို့ဆောင်ရေး - ဆိုင်ကယ် ၃၅၀ ခန့်၊ ကား ၈ စီး

မွေးမြူရေး - သိုး နှင့်ဆိတ်ကို အဓိကမွေးမြူပါသည်။ သိုးကောင်ရေ၂၀၀၀ခန့်ရှိပြီး ဆိတ်ကောင်ရေ ၁၀၀၀ ခန့်ရှိပါတယ်။

ကျောက်တန်းရွာမှ တာဝန်ရှိသူများ၏ဖြေကြားချက်-

ကျောက်တန်းရွာတွင် အုပ်ချုပ်ရေးမှူး ဦးခင်မောင်လွင်၊ စိုက်ခင်းပိုင်ရှင် ကိုချို၀င်းတို့နှင့် တွေ့ဆုံမေးမြန်းခွင့် ရရှိခဲ့ပြီး ဖြေကြားချက်များကို အောက်တွင်အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

ဦးခင်မောင်လွင်၊ ၅၀ နှစ်

အုပ်ချုပ်ရေးမှူး၊ ကျောက်တန်းရွာ

ကိုချို၀င်း၊ ၄၃ နှစ်

စိုက်ခင်းပိုင်ရှင်၊ ကျောက်တန်းရွာ

ကျောက်တန်းရွာသည် ယာမြေဥယျာဉ်ခြံများ အများဆုံးရှိသောရွာဖြစ်ပါတယ်။ ယာမြေတွေက ပဲစဉ်းငုံ၊ ပဲကြီး၊ နှံစားပြောင်းတွေစိုက်ပါတယ်။ ဥယျာဉ်ခြံတွင် ခရမ်းချဉ်သီး၊ ဆူးပုတ်၊ သဘော်သီး၊ ပဲသီးစသည့် သီးနှံများ စိုက်ပျိုးပါတယ်။ စကု မင်းဘူးမြို့နယ်၏ ဥယျာဉ်အရှိဆုံးရွာဟုပင် ပြောနိုင်ပါတယ်။

ကျွန်တော်တို့ရွာအနီးက ရေနံပိုက်လိုင်းဟောင်းဖြတ်သွားပါတယ်။ ဒီရွာမှာမြေဈေးအလွန်ကြီးပါတယ်။ နွေ၊ မိုး၊ ဆောင်း (၃) ရာသီလုံး စိုက်ပျိုး ဖြစ်ထွန်းနေလို့ ဖြစ်ပါတယ်။

ကန်ရေရွာ

အိမ်ခြေ - ၄၄၇ အိမ်ရှိပါသည်။

အိမ်ထောင်စု - ၄၅၀ စုရှိပါသည်။

လူဦးရေ - ၅၂၇ ဦးရှိပါသည်။

ပညာရေး - အလယ်တန်းကျောင်းခွဲရှိပါသည်။
ကျောင်းအုပ် ဦးသန်းဦး ဖြစ်ပြီး ဆရာ/ဆရာမ ၁၀ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၃၀၃ ဦး ရှိသည်။

လျှပ်စစ်မီး - အစိုးရမီး ရရှိပါသည်။

ဆက်သွယ်ရေး	-	တီဗွီ ၃၀၀ခန့်၊ ဖုန်း ၅၀၀ခန့် ရှိပါသည်။
ပို့ဆောင်ရေး	-	Light Track ၃ စီး၊ မြေသယ်ကား ၁စီး၊ ကုန်တင်ယာဉ် ၁ စီး၊ သုံးဘီး ၃၅စီး၊ ဆိုင်ကယ် ၄၀၀ ခန့်၊ လှည်း ၃၀၀ခန့်
ကျန်းမာရေး	-	ဆရာမရှိပါသည်။ ဆေးခန်းမရှိပါ။
ရေ	-	တုံကင်တွင်း ၂၀၀ ခန့်ရှိပါသည်။
ဆန်စက်	-	၂လုံး ရှိပါသည်။
ဆီစက်	-	၁လုံး ရှိပါသည်။
မွေးမြူရေး	-	နွား ၁၀၀၀ခန့်၊ နွားခြံ ၁၀ ခုရှိ၊ ဆိတ်ခြံ ၄ခု ကောင်ရေမှာ ၃၀၀ ကျော်ရှိပါသည်။ ကြက်/ဝက် တနိုင်တပိုင် မွေးမြူပါသည်။

ကန်ရေရွာ တာဝန်ရှိသူများ၏ဖြေကြားချက်-

ကန်ရေကျေးရွာမှ အုပ်ချုပ်ရေးမှူးဦးဝင်းနိုင်၊ သားဖြစ်သူကာလသား ခေါင်းဆောင် ကိုကျော်လင်းထက်တို့နှင့် တွေ့ဆုံမေးမြန်းခွင့် ရခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြထားပါသည်။

ဦးဝင်းနိုင်၊ ၄၆ နှစ်

အုပ်ချုပ်ရေးမှူး၊ ကန်ရေရွာ၊ ကန်ရေကျေးရွာအုပ်စု

ကိုကျော်လင်းထက်၊ ၃၂ နှစ်

ကာလသားခေါင်းဆောင်၊ ကန်ရေရွာ

ရွာအနီးကပ်လျက်မြေရှိ လယ်တွေမှာ စပါးစိုက်ကြပါတယ်။ လယ်ပြီးလျှင် ကုလားပဲ၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ နှမ်း၊ နေကြာများကို ရာသီအလိုက်စိုက်ပျိုးပါတယ်။

အများအားဖြင့် ယခုဖြတ်သန်းသွားမည့် ပိုက်လိုင်းတလျှောက် (အရှေ့တောင်ဖက်)တွင် ယာများသာရှိပြီး ကုလားပဲ၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ နှမ်းတို့ကို အဓိကစိုက်ကြပါတယ်။ ရွာမှ ၂ဖာလုံလောက်အထိ ဥယျာဉ်ခြံတွေရှိပြီး သရက်၊ ငှက်ပျော၊ သနပ်ခါးခင်းတွေ ရှိကြပါတယ်။

လယ်သမားတွေက စပါးနှင့် ကုလားပဲစိုက်ပျိုးပြီး ယာသမားတွေက မိုးဦးကျနှမ်း၊ မိုးနှောင်းမှာ ပဲတီစိမ်း၊ ပဲစင်ငုံ၊ နေကြာ၊ မြေပဲတွေကို စိုက်ပျိုးကြပါတယ်။

နမ်း	-	ဖွန်၊ ဇူလိုင်၊ ဩဂုတ်	၃ လ
ပဲတီစိမ်း	-	စက်တင်ဘာ မှ နိုဝင်ဘာ	၃ လ
ပဲစဉ်းငုံ	-	ဖွန်၊ ဇူလိုင်မှ ဒီဇင်ဘာ	၆ လ
မြေပဲ	-	ဩဂုတ် မှ အောက်တိုဘာ	၃ လ စိုက်ပျိုးကြရပါတယ်။

စပါး	တစ်ဧက	တင်း	(၈၀-၁၀၀)အကြား-	တစ်တင်း	၅၀၀၀/-
ကုလားပဲ	တစ်ဧက	တင်း	(၁၅)ခန့်	တစ်တင်း	၄၀၀၀/-
နမ်း	တစ်ဧက	တင်း	(၁၀)ခန့်	တစ်တင်း	၆၀၀၀/-
ပဲတီစိမ်း	တစ်ဧက	တင်း	(၁၅)ခန့်	တစ်တင်း	၄၀၀၀/-
မြေပဲ	တစ်ဧက	တင်း	(၆၀)ခန့်	တစ်တင်း	၇၀၀/-

ဈေးရပါတယ်။

ယခုလက်ရှိ ယာမြေတစ်ဧကပေါက်ဈေး ၁၀သိန်းမှ ၂၀ အကြား၊ လယ်မြေကတော့ ၁၅သိန်းမှ ၂၅သိန်းကြား ရှိပါတယ်။ ပိုက်လိုင်းဆွဲလာလျှင်တော့ တောင်သူတွေအတွက် သင့်တော်တဲ့ ဈေးရရင်အဆင်ပြေမှာပါ။ လန ၃၉ရရှိထားသူများလည်း ကွင်းထဲတွင် နေထိုင်သူများအတွက်တော့ အခြားနည်းလမ်း တစ်ခုဖြင့် ဖြေရှင်း အပ်ပါတယ်။

ရွာမကံကျေးရွာ

အိမ်ခြေ - ၁၄၀ အိမ်ရှိပါသည်။

အိမ်ထောင်စု - ၁၄၄ စုရှိပါသည်။

လူဦးရေ - စုစုပေါင်း ၆၁၉ ဦးရှိပါသည်။ (ကျား ၃၀၅ဦး၊ မ ၃၁၄ဦး)

ပညာရေး - မူလတန်းကျောင်းရှိပါသည်။ ကျောင်းအုပ် - ဒေါ်အေးမော် နှင့် ဆရာ/ဆရာမ ၅ ယောက်ရှိပြီး ကျောင်းသား/သူ ၆၁ ယောက်ရှိပါသည်။

လျှပ်စစ်မီး - gas turbine ဖြင့်ယခင်ပေးထားသော အစိုးရလျှပ်စစ်မီး ၁၂ အိမ်သာရှိပါသည်။ အခြားသူများမှာ ဆိုလာ၊ ဖယောင်းတိုင်မီး၊ ဘက်ထရီမီးတို့ဖြင့် အသုံးပြုကြပါသည်။

ရေ - စက်ရေတွင်း ၄ ခုရှိပါသည်။

ဆက်သွယ်ရေး - တီဗွီ ၄၀ ခန့်၊ ဖုန်း ၁၅၀ နီးပါးခန့် ရှိပါသည်။

ပို့ဆောင်ရေး - Light Truck ကား ၁ စီး၊ သုံးဘီး ၁ စီး၊ ဆိုင်ကယ်၊ ၈၀ ခန့် နှင့် တောင်သူတွေမှာတော့ လှည်း ၅ စီးရှိပါသည်။

ကျန်းမာရေး - ဆေးပေးခန်းမရှိပါ။ ကျေးရွာအုပ်စု တာဝန်ခံဆရာမရှိပါသည်။

မွေးမြူရေး - နွားကောင်ရေ ၁၀၀ ခန့်ရှိပြီး ဝက်နှင့်ကြက် တနိုင်တပိုင်မွေးကြပါသည်။

ရွာမကံရွာ တာဝန်ရှိသူများ၏ဖြေကြားချက်-

ရွာမကံကျေးရွာမှ ရာအိမ်မှူး ဦးသိန်းဦး၊ ရပ်မိရပ်ဖများဖြစ်ကြသော ဦးလှ နှင့် ဦးဝင်းနိုင် တို့အား မေးမြန်းခွင့်ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြထားပါသည်။

ဦးသိန်းဦး ၊ ၄၃ နှစ်
ရွာအိမ်မှူး၊ ရွာမကံရွာ
ဦးလှ၊ ဂ၅ နှစ်
ရပ်မိရပ်ဖ၊ ရွာမကံရွာ
ဦးဝင်းနိုင်၊ ၆၄ နှစ်
ရပ်မိရပ်ဖ၊ ရွာမကံရွာ

ကျွန်တော်တို့ရွာတွေဟာ ရေရှားပြီး စီးပွားရေးအလုပ်အကိုင် ချို့တဲ့တဲ့ရွာကလေး တစ်ရွာ ဖြစ်ပါတယ်။ စိုက်ပျိုးရေးက ယာစိုက်ပါတယ်။ ထန်းတောလည်းရှိပါတယ်။ အစိုးရကတူးပေးသည့် အဝီစိတွင်း ၄ တွင်းကို မှီခိုနေကြပါတယ်။

ယာတောထဲမှာ ယခင်က ကမ်းနီပိုက်လိုင်းဟောင်းတစ်ခုကို ယခုနှစ်ပြန်လည်ဖော်ပြီးသွားပါပြီ။ ယခု အသစ်ဆွဲမဲ့ ပိုက်လိုင်းဆွဲလာရင်တော့ သင့်တော်တဲ့လျော်ကြေးလေးများပေးရင်တော့ အဆင်ပြေမှာပါ။

ကျီးပင်ကန်ရွာ

အိမ်ခြေ	- ၅၂၁ အိမ်ရှိပါသည်။(ကျီးပင်ကန် ၁+၂)
အိမ်ထောင်စု	- ၅၁၂ စုခန့်ရှိပါသည်။
လူဦးရေ	- ၂၀၁၈ ဦးရှိပါသည်။ (ကျား ၉၅၁၊ မ ၁၀၆၇)
ပညာရေး	- ကျီးပင်ကန် ၁+၂ တွင် အမက ၂ကျောင်းရှိပါသည်။
	- ကျောင်းအုပ် ဦးတင်ဝေနှင့် ကျောင်းအုပ် ဒေါ်တင်တင်အေး တို့ဖြစ်ပါတယ်။
	- ဆရာ/ဆရာမ ၉ ဦးရှိပြီး စုစုပေါင်းကျောင်းသားဦးရေမှာ ၁၉၁ ဦးရှိပါတယ်။
ကျန်းမာရေး	- ဆေးပေးခန်းမရှိပါ။
ပို့ဆောင်ရေး	- ကား ၄ စီး၊ သုံးဘီးဆိုင်ကယ် ၃ စီး၊ ထွေလာဂျီ ၂ စီး၊ ဆိုင်ကယ်၃၁၃ စီး၊

လှည်း ၁၇၀ ရှိပါသည်။

မွေးမြူရေး - နွားကို အဓိကထားမွေးမြူပြီး ကြက်၊ ဝက်၊ ဆိတ်တို့ကိုလည်းမွေးမြူကြပါသည်။

ဘုန်းကြီးကျောင်း - - ဘုန်းတော်ကြီးကျောင်း ၂ ကျောင်းရှိသည်။

ကျီးပင်ကန်ရွာမှ အုပ်ချုပ်ရေးမှူး ဦးဝင်းထွန်း နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

ဦးဝင်းထွန်း၊ အုပ်ချုပ်ရေးမှူး၊

ကျီးပင်ကန်အုပ်စုမှာ ရွာ ၂ ရွာရှိပါသည်။ အများအားဖြင့် လယ်လုပ်ကြပြီး ယာအနည်းငယ်သာ ရှိပါသည်။ ယခုဖြတ်သန်းသွားမည့် MOGEပိုက်လိုင်းတလျှောက်မှာ အများအားဖြင့် ကျီးပင်ကန် တောင်သူလယ် အများဆုံးရှိပြီး ကန်ရေရွာအနီးမှာတော့ ၄င်းရွာသားတွေပိုင် လယ်တွေဖြစ်ပါ သည်။

အများအားဖြင့် စပါးစိုက်ပြီးလျှင် နှမ်းဆက်စိုက်တဲ့လယ်တွေဖြစ်ပါတယ်။ နောက်ပြီး မိုးကြိုနှမ်း စိုက်ကြပါတယ်။ တစ်နှစ်မှာ ၃ သီးစိုက်တဲ့လယ်တွေများပါတယ်။ အများအားဖြင့် လယ်ကွင်းတွေမှာ ၄ လက်မ တုံကင် စက်ရေတွင်းတွေတူးထားပြီး ရေတင်စိုက်ပျိုးကြပါတယ်။

ယာမြေတွေမှာတော့ ဆောင်းရာသီမှာ မြေပဲ၊ ပဲတီစိမ်းစိုက်ပြီး မိုးမှာတော့ နှမ်းစိုက်ကြပါတယ်။ လယ်အကောင်းဆုံးမှာ တစ်ဧက သိန်း ၂၀ခန့်ရှိပြီး အနိမ့်ဆုံး ၁၅ သိန်းခန့်ရှိပါတယ်။ ယာမြေအကောင်းဆုံး တစ်ဧက ၁၅ သိန်းခန့်ရှိပြီး အညံ့ဆုံး ၁၀ သိန်းခန့်ရှိပါတယ်။

ပိုက်လိုင်းချလာရင်တော့ တရုတ်ပိုက်လိုင်း လောက်ပျက်စီးမှာ မဟုတ်တဲ့အတွက် သင့်တော်သော လျော်ကြေး ပေးရင်တော့ လယ်သမားတွေကျေနပ်ကြမှာပါ။

ဆက်လက်၍ မင်းဘူးမြို့နှင့် သံပုရာကန် ရေနံချက်စက်ရုံအကြား ကျေးရွာများကိုသွားရောက်လေ့လာ မေးမြန်းခဲ့ပါသည်။

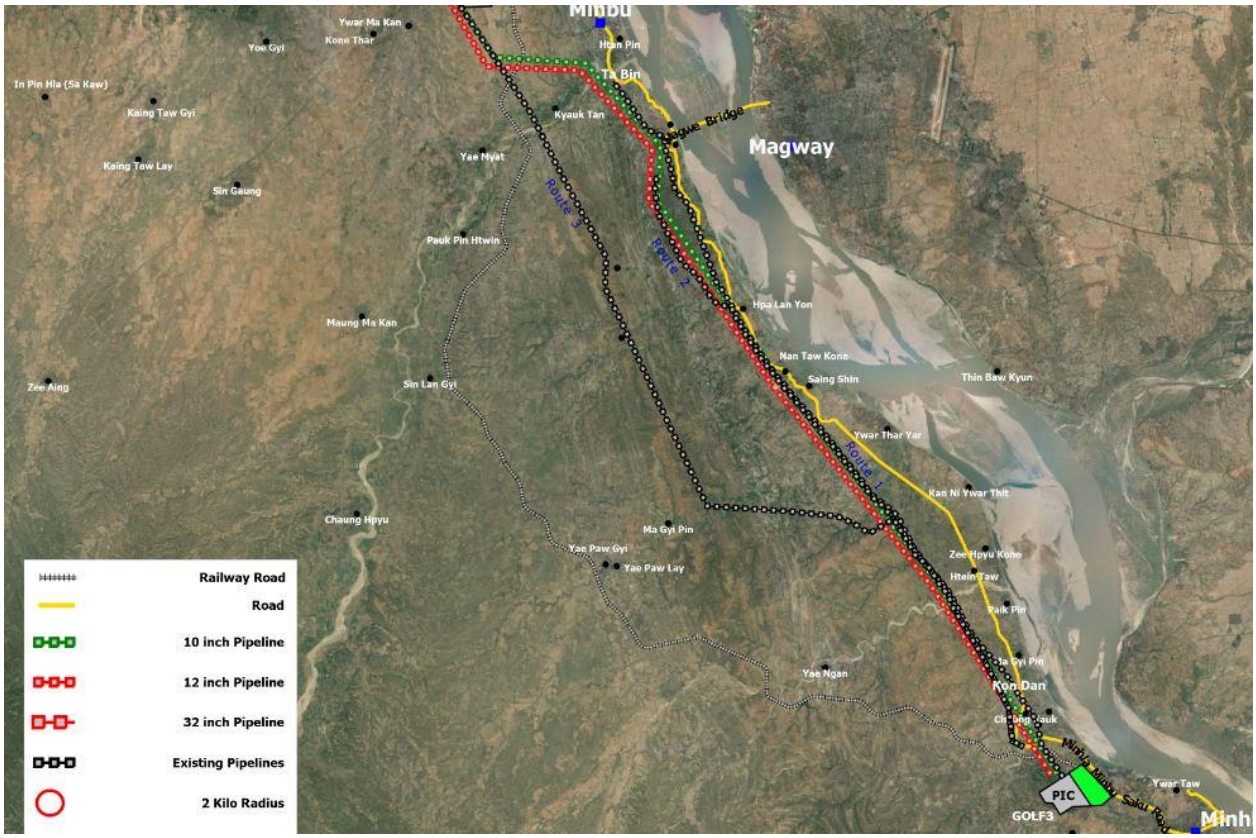


Figure 55: Location map of villages between Minbu - Than Pu Yar Kan pipeline

မင်းဘူးနှင့် သံပုရာကန် အကြား MOGE ပိုက်လိုင်းအနီးရှိကျေးရွာများပုံ

မင်းဘူးနှင့် သံပုရာကန် အကြား ရှိ သွားရောက် လေ့လာ မေးမြန်းခဲ့သည့် ကျေးရွာ (၁၁) ရွာတို့မှာ-

- **ရွာသစ်ကျေးရွာ**
- **ရွာသာယာကျေးရွာ**
- **ဖလရုံကျေးရွာ**
- **ပိုက်သင်းကျေးရွာ**
- **ညောင်ပင်သာကျေးရွာ**
- **နန်းတော်ကုန်းကျေးရွာ**
- **မကျီးပင်ကျေးရွာ**
- **ကုန်းတန်းကျေးရွာ**
- **ကန်းနီကျေးရွာ**
- **ထိန်တောကျေးရွာ**
- **ချောင်းကောက်ကျေးရွာ** တို့ဖြစ်ကြပါသည်။

ကျေးရွာ အသီးသီး၏ ယေဘူယ စာရင်းအချက်အလက်များနှင့် တာဝန်ရှိသူများ၏ ဖြေကြားချက်များကို ဆက်လက်ဖော်ပြပါမည်။

ရွာသစ်ရွာ

အိမ်ခြေ	-	၉၃ အိမ်ရှိပါသည်။
အိမ်ထောင်စု	-	၉၇ စုရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၄၃၅ ဦးရှိပါသည်။ (ကျား ၁၉၂ ၊ မ ၂၄၃)
ပညာရေး	-	မကြီးပင်အလယ်တန်းကျောင်းခွဲသို့ တက်ရောက်ကြပါသည်။
မီးရရှိမှုအခြေအနေ	-	ကိုယ်ထူကိုယ်ထမီး ရှိပါသည်။
ရေရှိမှု	-	အဝီစိတွင်း ပုဂ္ဂလိက ၂၀တွင်း ၊ အစိုးရ ၁တွင်း ရှိပါသည်။
စိုက်ပျိုးဧက	-	ယာ ၅၀၀ ဧကခန့်ရှိပါသည်။
မြေယာတန်ဖိုး	-	ယာကောင်း ၄၀ သိန်း၊ ညံ့ ၂၅ သိန်း ခန့် ပေါက်ဈေးရှိပါသည်။
စိုက်ပျိုးရေး	-	နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး တို့ကို စိုက်ပျိုးကြပါသည်။
မွေးမြူရေး	-	နွား ၁၂၉၊ ဆိတ် ၈၄၊ သိုး ၃၃၄ ခန့် မွေးမြူထားကြပါသည်။
ပို့ဆောင်ရေး	-	ကား ၁၊ ဆိုင်ကယ် ၆၂၊ လှည်း ၃၀
ဆက်သွယ်ရေး	-	တီဗွီ ၃၀ လုံး၊ ဖုန်း ၆၀ ခန့် ရှိပါသည်။
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ မကြီးပင်ကျေးလက် ကျန်းမာရေးဌာနခွဲအောက်
ဘုန်းကြီးကျောင်း	-	ဘုန်းတော်ကြီးကျောင်း ၁ ကျောင်းရှိပါသည်။

ရွာသစ်ရွာမှ အုပ်ချုပ်ရေးမှူး ဦးစန်းလွင်နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြထားပါသည်။

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- **ဦးစန်းလွင်၊ ၅၈ နှစ်**

  အုပ်ချုပ်ရေးမှူး၊ ရွာသစ်ရွာ၊ ရွာပုလဲအုပ်စု

ကျေးရွာ စိုက်ပျိုးမြေဧက အနေဖြင့် ယာ ၅၀၀ ဧကခန့်ရှိပါသည်။ စိုက်ပျိုးသည့် သီးနှံများမှာ နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲနဲ့ ပဲကြီး တို့ ဖြစ်ပါတယ်။ မိုးသီးနှံများအဖြစ် နှမ်း၊ ပဲစဉ်းငုံ၊ ပဲဒီစိမ်း နဲ့ ဝါတို့ကို စိုက်ပျိုးကြပါတယ်။ မြေပဲ နဲ့ ပဲကြီးတို့ ကို ဆောင်းသီးနှံ အဖြစ် စိုက်ပျိုးကြပါတယ်။ မြေယာ တန်ဖိုးအနေဖြင့် ယာကောင်း ၄၀သိန်း၊ ညံ့ ၂၅သိန်းခန့်ပေါက်ပါတယ်။ ပိုက်လိုင်းဖြတ်မည်ဆိုပါက သင့်တော်သော လျော်ကြေးပေးလျှင် သဘောတူကြမည် ထင်ပါသည်။

ရွာသာယာရွာ

အိမ်ခြေ	-	၆၈၄ အိမ်
အိမ်ထောင်စု	-	၆၉၀
လူဦးရေ	-	၃၁၄၇ ကျား ၁၅၂၂ ၊ မ ၁၆၂၅
ပညာရေး	-	အထက်တန်းကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဦးသိန်း၊ ဆရာ/ဆရာမ ၂၅ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၈၀၀ခန့် ရှိ
မီးရရှိမှုအခြေအနေ	-	အစိုးရလျှပ်စစ်မီး
ရေရှိမှု	-	မြေအောက်ရေ အစိုးရ ၄၊ ပုဂ္ဂလိက ၇
စိုက်ပျိုးဧက	-	လယ် ၃၀၊ ယာ ၂၀၀၀၊ ကိုင်း ၁၅
တန်ဖိုး	-	လယ်ကောင်း၂၀ သိန်း၊ ညံ့ ၁၀ သိန်း၊ ယာကောင်း ၂၅သိန်း၊ ညံ့ ၁၅ သိန်း
စိုက်ပျိုးရေး	-	စပါး၊ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ ပဲကြီး၊ ဝါ
မွေးမြူရေး	-	နွား ၂၅၀၊ ဝက် ၂၀၊ ဆိတ် ၄၅၀
ပို့ဆောင်ရေး	-	ကား ၉ စီး၊ ဆိုင်ကယ် ၁၀၂၊ သုံးဘီး ၆၊ လှည်း ၁၆၀၊ ထော်လာကျီ ၂စီး
ဆက်သွယ်ရေး	-	တီဗွီ ၁၄၃ လုံး၊ ဖုန်း ၃၆၀
ကျန်းမာရေး	-	တိုက်နယ်ဆေးရုံ၊ ဆရာဝန် တစ်ဦးရှိ
ဘုန်းကြီးကျောင်း	-	၉ ကျောင်း
အခြားစီးပွားရေးလုပ်ငန်း	-	အိုးလုပ်ငန်း

ရွာသာယာရွာမှ အုပ်ချုပ်ရေးမှူး ဦးလှအောင်၊ ရပ်မိရပ်ဖ ဦးအောင်မြိုင် တို့နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

- **ဦးလှအောင်၊ ၅၃ နှစ်**
  အုပ်ချုပ်ရေးမှူး၊ ရွာသာယာရွာ၊ ရွာသာယာအုပ်စု
- **ဦးအောင်မြိုင်၊ ၇၆ နှစ်**

ရပ်မိရပ်ဖ၊ ရွာသာယာရွာ၊ ရွာသာယာအုပ်စု

ရွာရဲ့ စိုက်ပျိုးဧက အနေဖြင့် လယ် ၃၀၈က၊ ယာ ၂၀၀၀ကနဲ့ ကိုင်း ၁၅ ဧကလောက်ရှိပါတယ်။ စိုက်ပျိုးရေး အနေနဲ့က စပါး၊ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ ပဲကြီးနဲ့ ဝါ ကို စိုက်ကြပါတယ်။ မြေကောင်းလို့ စပါးက တစ်ဧကကို ၉၀ တင်းလောက်ထွက်ပါတယ်။ ကျန်သီးနှံတွေ အနေနဲ့က ဒီဇေသထွက် နှုန်းတွေ အတိုင်းဘဲ ဖြစ်ပါတယ်။ မြေယာ တန်ဖိုး အနေနဲ့ လယ်ကောင်း သိန်း၂၀၊ ညံ့ ၁၀ သိန်း၊ ယာကောင်း ၂၅သိန်း၊ ညံ့ ၁၅ သိန်း လောက် ပါတယ်။ ရွာမှာ မွေးမြူရေးအနေနဲ့ နွား ၂၅၀၊ ဝက် ၂၀၊ ဆိတ် ၄၅၀ လောက်ရှိပါတယ်။ နစ်နာကြေးပေး ပိုက်လိုင်း ဖေါက်မယ်ဆို ယင် အဆင်ပြေမှာပါ။

ဖလံရုံရွာ

အိမ်ခြေ	-	၂၉၇ အိမ် ရှိပါသည်။
အိမ်ထောင်စု	-	၃၁၃ စု ရှိပါသည်။
လူဦးရေ	-	စုစပေါင်း ၁၄၀၈ ဦး (ကျား ၆၉၃ ၊ မ ၇၁၅) ရှိပါသည်။
ပညာရေး	-	မူလတန်းလွန်ကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဦးအေးကို၊ ဆရာ/ဆရာမ ၁၁ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၃၀၀ခန့် ရှိပါသည်။
မီးရရှိမှုအခြေအနေ	-	ပုဂ္ဂလိကမီးသာရှိပါသည်။
ရေရှိမှု	-	အဝီစိတွင်း ၂၀ တွင်း ရှိပါသည်။
စိုက်ပျိုးဧက	-	ယာ ၁၃၀ဧက
တန်ဖိုး	-	ကောင်း ၉၀သိန်း၊ ညံ့ ၆၀ သိန်း
စိုက်ပျိုးရေး	-	နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း
မွေးမြူရေး	-	နွား ၈၉၁၊ ဝက် ၆၀၊ ဆိတ် ၃၀၀
ပို့ဆောင်ရေး	-	ကား ၄ စီး၊ ဆိုင်ကယ် ၂၉၀၊ ထော်လာဂျီ ၁၊ သုံးဘီး ၅၊ လှည်း ၅၀
ဆက်သွယ်ရေး	-	တီဗွီ ၁၁၀ လုံး၊ ဖုန်း ၂၉၀
ကျန်းမာရေး	-	ကျေးလက်ကျန်းမာရေးဌာနခွဲအဆင့်၊ တာဝန်ကျ ဆရာမ ၁ ဦး
ဘုန်းကြီးကျောင်း	-	ဘုန်းတော်ကြီးကျောင်း ၁ ကျောင်း ရှိပါသည်။

ဖလံရုံရွာမှ အုပ်ချုပ်ရေးမှူး ဦးစောနိုင် နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖေါ်ပြထားပါသည်။

- **ဦးစောနိုင်၊ အုပ်ချုပ်ရေးမှူး**
  ဖလံရုံရွာ၊ ဖလံရုံအုပ်စု

ကျေးရွာမှာ စိုက်ပျိုးဧက ယာ ၁၃၀ ဧက လောက်ပဲရှိပါတယ်။ စိုက်ပျိုးတဲ့ သီးနှံတွေကတော့ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း တို့ ဖြစ်ကြပါတယ်။ နှမ်း၊ ပဲစဉ်းငုံ နဲ့ ပဲဒီစိမ်းတို့ ကို မိုးသီးနှံ အဖြစ် စိုက်ပျိုကြပြီး မြေပဲကို ဆောင်းသီးနှံ အဖြစ် စိုက်ကြပါတယ်။ ယာမြေတွေ ဖြစ်လို့ ထွက်နှုန်း အကောင်းကြီးမဟုတ်ပါ။ သို့သော် မြေယာတန်ဖိုး အနေနဲ့က ယာ ကောင်း ၉၀သိန်း၊ ညံ့ ၆၀ သိန်း ခန့် ပေါက်ပါတယ်။ ရွာမှာ မွေးမြူရေးအဖြစ် နွား ၈၉၁၊ ဝက် ၆၀၊ ဆိတ် ၃၀၀ လောက်ရှိပါတယ်။ ပိုက်လိုင်းဖေါက်ဖို့ လျှောက်ကြေးပေးယင် ကြေနပ်ကြမှာပါ။

ပိုက်သင်ရွာ

အိမ်ခြေ	-	၁၁၉ အိမ် ရှိပါသည်။
အိမ်ထောင်စု	-	၁၂၄ စုရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၅၇၈ ဦး (ကျား ၂၆၆ ၊ မ ၃၁၂) ရှိပါသည်။
ပညာရေး	-	မူလတန်းကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဦးအောင်ကိုကိုမြင့်၊ ဆရာ/ဆရာမ ၅ဦးရှိပြီး ကျောင်းသား/ သူ ဦးရေ ၅၂ခန့် ရှိ
မီးရရှိမှုအခြေအနေ	-	ဘုန်းကြီးကျောင်းမှ အင်ဂျင်မီးပေးပါသည်။
ရေရှိမှု	-	မြေအောက်ရေ အစိုးရ၂၊ ပုဂ္ဂလိက ၅
စိုက်ပျိုးဧက	-	ယာ ၇၅၀
တန်ဖိုး	-	ယာကောင်း ၁၂သိန်း၊ ညံ့ ၈ သိန်း
စိုက်ပျိုးရေး	-	နှမ်း၊ ဆောင်းမြေပဲ၊ ဝါ
မွေးမြူရေး	-	နွား ၁၂၀၊ ဝက် ၁၀၊ ဆိတ် ၃၆၀
ပို့ဆောင်ရေး	-	ဆိုင်ကယ် ၉၀၊ သုံးဘီး ၁၊ လှည်း ၄၀
ဆက်သွယ်ရေး	-	တီဗွီ ၈၈ လုံး၊ ဖုန်း ၁၅၀
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ တာဝန်ကျဆရာမရှိ
ဘုန်းကြီးကျောင်း	-	၁ ကျောင်း

ပိုက်သင်ရွာမှ အုပ်ချုပ်ရေးမှူး ဦးအောင်မြင့်၊ ရပ်မိရပ်ဖများဖြစ်ကြသော ဦးပေါက်ခ၊ ဦးတင်ဆွေ တို့နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖေါ်ပြထားပါသည်။

- **ဦးအောင်မြင့်၊ ၄၆ နှစ်**
  အုပ်ချုပ်ရေးမှူး၊ ပိုက်သင်ရွာ၊ ပိုက်သင်အုပ်စု
- **ဦးပေါက်ခ၊ ၆၅ နှစ်**
  ရပ်မိရပ်ဖ၊ ပိုက်သင်ရွာ၊ ပိုက်သင်အုပ်စု
- **ဦးတင်ဆွေ၊ ၇၅ နှစ်**
  ရပ်မိရပ်ဖ၊ ပိုက်သင်ရွာ၊ ပိုက်သင်အုပ်စု

ကျေးရွာရဲ့ စိုက်ပျိုးဇက စုစုပေါင်း ယာ ၇၅၀ ဇကရှိပါတယ်။ စိုက်ပျိုးသီးနှံတွေ အနေနဲ့ နှမ်း၊ ဆောင်းမြေပဲ၊ ဝါ တို့ ကို စိုက်ကြပါတယ်။ ယာမြေဖြစ်လို့ အထွက်နှုန်း သိပ်မကောင်းပါ။ ယာမြေ တန်ဖိုး တွေ အနေနဲ့က ယာကောင်း ၁၂သိန်း၊ ညံ့ ၈ သိန်း လောက်ပေါက်ပါတယ်။ ရွာမှာ မွေးမြူရေး အနေနဲ့ နွား ၁၂၀၊ ဝက် ၁၀၊ ဆိတ် ၃၆၀ မွေးမြူ ထားပါတယ်။ လျှော်ကြေးပေးယင် ကြေနပ်ကြမှာပါ။

ညောင်ပင်သာရွာ

အိမ်ခြေ	-	၂၉၀ အိမ် ရှိပါသည်။
အိမ်ထောင်စု	-	၂၉၀ စုရှိပါသည်။
လူဦးရေ	-	၁၁၅၈ ဦး
ပညာရေး	-	မူလတန်းကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဒေါ်ခင်ဆွေဝင်း ၊ ဆရာ/ဆရာမ ၆ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၁၁၁ ခန့် ရှိပါသည်။
မီးရရှိမှုအခြေအနေ	-	အစိုးရလျှပ်စစ်မီး ရရှိပါသည်။
ရေရှိမှု	-	မြေအောက်ရေ အစိုးရ ၂၊ ပုဂ္ဂလိက ၈၀ တွင်း ရှိပါသည်။
စိုက်ပျိုးဇက	-	ယာ ၆၅၀ဇက၊ ကိုင်း ၃၀ ဇက စိုက်ပျိုးပါသည်။
တန်ဖိုး	-	ယာကောင်း ၅၀ သိန်း၊ ညံ့ ၂၅ သိန်း၊ ကိုင်း ကောင်း သိန်း ၅၀၊ ညံ့ ၂၅ သိန်း ပေါက်ပါသည်။
စိုက်ပျိုးရေး	-	နှမ်း၊ ကုလားပဲ၊ ပဲတီစိမ်း၊ ပဲစဉ်းငုံ၊ ပန်း၊ ကြက်သွန်၊ ဝါ
မွေးမြူရေး	-	နွား ၃၂၀၊ ဝက် ၁၀၊ ဆိတ် ၂၅၀ ခန့် မွေးမြူထားပါသည်။
ပို့ဆောင်ရေး	-	ကား ၂၊ ဆိုင်ကယ် ၂၃၀၊ ထော်လာဂျီ ၂၊ သုံးဘီး ၅၊ လှည်း ၁၀၀
ဆက်သွယ်ရေး	-	တယ်လီ ၁၂၀ လုံး၊ ဖုန်း ၃၀၀
ကျန်းမာရေး	-	ကျေးလက်ဆေးပေးခန်းမရှိပါ။၊ တာဝန်ကျဆရာမရှိသည်။
ဘုန်းကြီးကျောင်း	-	မရှိပါ။

ညောင်ပင်သာရွာ

ညောင်ပင်သာရွာမှ အုပ်ချုပ်ရေးမှူး ဦးကော်အောင်၊ ရပ်မိရပ်ဖများဖြစ်ကြသော ဦးစံမြင့်နှင့် ဦးကျော်မြင့်တို့ နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖေါ်ပြ ထားပါသည်။

- **ဦးကျော်အောင်၊ ၄၄ နှစ်**
  အုပ်ချုပ်ရေးမှူး၊ ညောင်ပင်သာရွာ၊ ညောင်ပင်သာအုပ်စု
- **ဦးစံမြင့်၊ ၆၂ နှစ်**
  ရပ်မိရပ်ဖ၊ ညောင်ပင်သာရွာ၊ ညောင်ပင်သာအုပ်စု
- **ဦးကျော်မြင့်**
  ရပ်မိရပ်ဖ၊ ညောင်ပင်သာရွာ၊ ညောင်ပင်သာအုပ်စု

ကျေးရွာ စိုက်ပျိုးဧက အနေနဲ့က ယာ ၆၅၀ဧက၊ ကိုင်း ၃၀ ဧက လောက်ရှိပါတယ်။ စိုက်ပျိုး တဲ့ သီးနှံတွေကတော့ နှမ်း၊ ကုလားပဲ၊ ပဲတီစိမ်း၊ ပဲစဉ်းငုံ၊ ပန်း၊ ကြက်သွန် နဲ့ ဝါ တို့ ဖြစ်ကြပါတယ်။ မိုးသီးနှ များအဖြစ် နှမ်း၊ ပဲစဉ်းငုံ နဲ့ ဝါ ကို အစိုက်များပါတယ်။ ကျန်တာတွေက ဆောင်းသီးနှံ အဖြစ် စိုက်ကြပါတယ်။ အခြားရွာတွေမစိုက်တဲ့ ကုလားပဲ၊ ကြက်သွန်တို့ ဒီရွာမြေတွေမှာ ဖြစ်ထွန်းပါတယ်။ ကုလားပဲက တစ်ဟက ၁၃ တင်းလောက်ထွက်ပြီး တစ်တင်းကို ၄၄၀၀၀/- လောက်ပေါက်ပါတယ်။ ကြက်သွန်က တစ်ဧက ၁၅၀၀ ပိသာလောက်ရပါတယ်။ တစ်ပိသာ ပေါက်ဈေး ၄၀၀၀/-လောက်ရပါတယ်။ တန်ဖိုးယာ ကောင်း ၅၀ သိန်း၊ ညံ့ ၂၅ သိန်း၊ ကိုင်း ကောင်း သိန်း ၅၀၊ ညံ့ ၂၅ သိန်း လောက် ရပါတယ်။ လျှော်ကြေးရယင် ကန့်ကွက်မယ် မထင်ပါ။

နန်းတော်ကုန်းရွာ

အိမ်ခြေ	-	၄၅၀ အိမ်ရှိပါသည်။
အိမ်ထောင်စု	-	၅၀၂ စုရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၂၃၁၃ဦး (ကျား ၁၁၄၅ ၊ မ ၁၁၆၈) ဦးရှိပါသည်။
ပညာရေး	-	မူလတန်းလွန်ကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဦးအေးကို၊ ဆရာ/ဆရာမ ၁၁ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၃၀၀ခန့် ရှိပါသည်။
မီးရရှိမှုအခြေအနေ	-	ပုဂ္ဂလိကမီး
ရေရှိမှု	-	အဝီစိတွင်း ၃၇၊ အစိုးရ ၁ တွင်း ရှိပါသည်။
စိုက်ပျိုးဧက	-	ယာ ၉၇၉၊ ကိုင်း ၁၀၀
တန်ဖိုး	-	ယာကောင်း ၃၆သိန်း၊ ညံ့ ၂၀ သိန်း၊ ကိုင်း ကောင်း သိန်း ၃၀၊ ညံ့ ၂၅ သိန်း
စိုက်ပျိုးရေး	-	နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ စားတော်ပဲ၊ ပဲကြီး

မွေးမြူရေး	-	နွား ၃၀၀၊ ဝက် ၅၀၊ ဆိတ် ၁၅၀
ပို့ဆောင်ရေး	-	ကား ၂ စီး၊ ဆိုင်ကယ် ၁၅၀၊ သုံးဘီး ၂၊ လှည်း ၇၈
ဆက်သွယ်ရေး	-	တယ်လီဖုန်း ၂၂၅ လုံး၊ ဖုန်း ၄၀၀
ကျန်းမာရေး	-	ကျေးလက်ဆေးပေးခန်းမရှိပါ။ တာဝန်ကျ ဆရာမ ၁ ဦး
ဘုန်းကြီးကျောင်း	-	၁ ကျောင်း

နန်းတော်ကုန်းရွာမှ အုပ်ချုပ်ရေးမှူး ဦးဝင်းသူ၊ ရပ်မိရပ်ဖ ဦးဝင်းမောင်တို့နှင့် မေးမြန်းခွင့်ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

- **ဦးဝင်းသူ၊ ၄၆ နှစ်**
  အုပ်ချုပ်ရေးမှူး၊ နန်းတော်ကုန်းရွာ၊ နန်းတော်ကုန်းအုပ်စု
- **ဦးဝင်းမောင်၊ ၆၀ နှစ်**
  ရပ်မိရပ်ဖ၊ နန်းတော်ကုန်းရွာ၊ နန်းတော်ကုန်းအုပ်စု

ဒီအုပ်စုမှာ စိုက်ပျိုးဧက ယာ ၉၇၉ဧက နဲ့ ကိုင်း ၁၀၀ ဧက လောက်ရှိပါတယ်။ စိုက်ပျိုးတဲ့ သီးနှံတွေကတော့ နှမ်း၊ မြေပဲ၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ စားတော်ပဲ နဲ့ ပဲကြီး တို့ ဖြစ်ပါတယ်။ မိုးဦးမှာ နှမ်း ပဲစင်းငုံ တို့ကို စိုက်ကြပြီး ဆောင်သီးနှံတွေကတော့ မြေပဲ။ ပဲဒီစိမ်း၊ စားတော်ပဲ နဲ့ ပဲကြီး တို့ ဖြစ်ကြပါတယ်။ အထွက်နှုန်းတွေကတော့ တစ်ဧကကို နှမ်း ၁၀တင်း၊ မြေပဲ ၃၅ တင်း၊ ပဲစင်းငုံ ၁၀တင်း၊ ပဲဒီစိမ်း ၁၅ တင်း၊ စားတော်ပဲ ၈ တင်း နဲ့ ပဲကြီး ၁၀ တင်းနှုန်းလောက် ထွက်ပါတယ်။ ယာနဲ့ ကိုင်း ပေါက်ဈေးတွေကတော့ တန်ဖိုး ယာ ကောင်း ၃၆သိန်း၊ ညံ့ ၂၀ သိန်း၊ ကိုင်း ကောင်း သိန်း ၃၀၊ ညံ့ ၂၅ သိန်း နဲ့ ပေါက်ပါတယ်။ နစ်နာကြေးတွေ ဘာတွေ ရယင် သဘောတူကြမှာပါ။

မကြီးပင်ရွာ

အိမ်ခြေ	-	၁၁၀ အိမ်
အိမ်ထောင်စု	-	၁၁၈
လူဦးရေ	-	၅၂၅ ကျား ၂၄၄ ၊ မ ၂၈၁
ပညာရေး	-	အလယ်တန်းကျောင်း ၁ ကျောင်း၊ ကျောင်းအုပ် ဒေါ်မာမာပြုံး၊ ၊ ဆရာ/ဆရာမ ၆ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၁၈၅ ခန့် ရှိ
မီးရရှိမှုအခြေအနေ	-	အစိုးရလျှပ်စစ်မီး

ရေရှိမှု	-	မြေအောက်ရေ စည်ပင် ၁၊ ပုဂ္ဂလိက ၂၂
စိုက်ပျိုးဧက	-	ယာ ၅၀၀
တန်ဖိုး	-	ယာကောင်း ၄၀ သိန်း၊ ညံ့ ၂၅ သိန်း
စိုက်ပျိုးရေး	-	နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး
မွေးမြူရေး	-	နွား ၁၈၀၊ ဝက် ၃၀၊ ဆိတ် ၁၀၅၊ သိုး ၁၅၀
ပို့ဆောင်ရေး	-	ဆိုင်ကယ် ၇၀၊ ထော်လာကျီ ၁၊ လှည်း ၆၀
ဆက်သွယ်ရေး	-	တီဗွီ ၇၅ လုံး၊ ဖုန်း ၇၅
ကျန်းမာရေး	-	ကျေးလက်ကျန်းမာရေးဌာနခွဲရှိ၊ တာဝန်ကျဆရာမရှိသည်။
ဘုန်းကြီးကျောင်း	-	၁ ကျောင်း

မကြီးပင်ရွာမှ အုပ်ချုပ်ရေးမှူး ဦးအေးထွန်း၊ ရပ်မိရပ်ဖ ဦးချစ်ဆွေတို့နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြား ချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

- **ဦးအေးထွန်း၊ ၅၉ နှစ်**
  အုပ်ချုပ်ရေးမှူး(ရွာခွဲတာဝန်ခံ)၊ မကြီးပင်ရွာ၊ ရွာပုလဲအုပ်စု
- **ဦးချစ်ဆွေ၊ ၅၇ နှစ်**
  ရပ်မိရပ်ဖ၊ မကြီးပင်ရွာ၊ ရွာပုလဲအုပ်စု

ကျေးရွာပိုင် စိုက်ပျိုးဧက ယာ ၅၀၀ဧက လောက်ရှိပါတယ်။ စိုက်ပျိုးသီးနှံ များကတော့ နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး တို့ပါဘဲ။ မိုးသီးနှံတွေကတော့ နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ နဲ့ ပဲဒီစိမ်းတို့ပါဘဲ။ ဒီအနီးအနားက ကျေးရွာတွေကတော့ သိပ်မကွာကြပါဘူး၊ စိုက်ချိန် မြေဈေး အဆုံးပါဘဲ။ ဈေးအနေနဲ့က ယာကောင်း တစ်ဧကကို ၄၀ သိန်း၊ ညံ့ ယင် တစ်ဧက ၂၅ သိန်း လောက်အရောင်းအဝယ် ဖြစ် နေကြပါတယ်။ မွေးမြူရေးအနေနဲ့ ရွာမှာနွား ၁၈၀၊ ဝက် ၃၀၊ ဆိတ် ၁၀၅၊ သိုး ၁၅၀လောက်ရှိပါတယ်။ ညှိနှိုင်းဆောင်ရွက်ရင် အဆင်ပြေမှာပါ။

ကုန်းတန်းရွာ

အိမ်ခြေ	-	၆၉ အိမ်
အိမ်ထောင်စု	-	၇၄
လူဦးရေ	-	၃၂၃ ကျား ၁၃၉ ၊ မ ၁၈၄
ပညာရေး	-	မကြီးပင်အလယ်တန်းကျောင်းခွဲသို့ တက်ရောက်ကြပါသည်။

မီးရရှိမှုအခြေအနေ	-	ကိုယ်ထူကိုယ်ထမီး
ရေရှိမှု	-	အဝီစိတွင်း NGO ၁ လှုဒါန်း
စိုက်ပျိုးဧက	-	ယာ ၂၀၀၊ ကိုင်း ၅၀
တန်ဖိုး	-	ယာကောင်း ၄၀ သိန်း၊ ညံ့ ၂၅ သိန်း
စိုက်ပျိုးရေး	-	နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး
မွေးမြူရေး	-	နွား ၉၄၊ ဝက် ၂၅၊ ဆိတ် ၂၀၀
ပို့ဆောင်ရေး	-	ကား ၂၊ ဆိုင်ကယ် ၅၀၊ လှည်း ၁၅
ဆက်သွယ်ရေး	-	တီဗွီ ၂၅ လုံး၊ ဖုန်း ၃၅
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ မကြီးပင်ကျေးလက် ကျန်းမာရေးဌာနခွဲအောက်
ဘုန်းကြီးကျောင်း	-	၁ ကျောင်း

ကုန်းတန်းရွာမှ အုပ်ချုပ်ရေးမှူး ဦးဇော်မင်းထွန်းနှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

- **ဦးဇော်မင်းထွန်း၊ ၃၁ နှစ်**

အုပ်ချုပ်ရေးမှူး(ရွာခွဲတာဝန်ခံ)၊ ကုန်းတန်းရွာ၊ ရွာပုလဲအုပ်စု

ကျေးရွာမှာ စိုက်ပျိုးမြေ ဧက အနေနဲ့ ယာ၂၀၀ဧက၊ ကိုင်း ၅၀ ဧက လောက်ရှိပါတယ်။ စိုက်ပျိုးသီးနှံများကတော့ နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ နဲ့ ပဲကြီး တို့ပါဘဲ။ မိုးဦးကျမှာ နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲဒီစိမ်းတို့ကို စစိုက်ပါတယ်။ အထွက်နှုန်းတွေ အနေနဲ့ ပျှမ်းမျှတစ်ဧကကို နှမ်းက ၁၂ တင်း၊ ပဲစဉ်းငုံက ၁၀ တင်း၊ ပဲဒီစိမ်းက ၁၅ တင်းနဲ့ ဝါက ၆၅၀ ပိသာလောက် ထွက် တတ်ပါတယ်။ လောလောဆယ် ပေါက်ဈေးက နှမ်းနက်တစ်တင်း ၇၀၀၀၀/-၊ နှမ်းဖြူတစ်တင်း ၅၂၀၀၀/-၊ ပဲဒီစိမ်းတစ်တင်း ၄၅၀၀၀/-၊ ဝါတစ်ပိသာ ၁၁၀၀/- ပေါက်ပါတယ်။ ဆောင်းသီးနှံ အဖြစ် မြေပဲနဲ့ ပဲကြီးစိုက်တတ်ပါတယ်။ မြေပဲက တစ်ဧက ၅၀တင်းလောက် ထွက်ပြီး တစ်တင်း ၉၀၀၀/-လောက်ပေါက်ပါတယ်၊ ပဲကြီး (သီးထပ်) ကတော့ တစ်ဧက ၁၅ တင်းလောက်ထွက်ပြီး တစ်တင်းကို ၃၀၀၀၀/-လောက်ဈေး ပေါက်ပါတယ်။ မွေးမြူရေးအနည်းငယ်ရှိပါတယ်။ ရွာမှာ နွား ၉၄၊ ဝက် ၂၅၊ ဆိတ် ၂၀၀ လောက်ရှိပါတယ်။ မြေတန်ဖိုး အနေ နဲ့ ယာကောင်း ၄၀ သိန်း၊ ညံ့ ၂၅ သိန်းလောက် ပေါက်ပါတယ်။ လျှပ်ကြေးပေး ပိုက်လိုင်းဆွဲတာတော့ ကန့်ကွက်စရာ မမြင်ပါ။

ကန်းနီရွာ

အိမ်ခြေ	-	၁၆၀ အိမ် ရှိပါသည်။

အိမ်ထောင်စု	-	၁၇၅ ရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း ၇၆၅ ဦး (ကျား ၃၆၅ ၊ မ ၄၀၀)
ပညာရေး	-	မူလတန်းကျောင်း ၁၊ မူကြိုကျောင်းရှိ မူလတန်းကျောင်းအုပ် ဒေါ်မြစန်း၊ ဆရာ/ဆရာမ ၆ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၈၅ခန့် ရှိ မူကြိုကျောင်းအုပ် ဒေါ်မူမူစန်း၊ ဆရာမ ၃ ဦးရှိပြီး ကျောင်းသား/သူ ၂၇ ဦး
မီးရရှိမှုအခြေအနေ	-	ပုဂ္ဂလိက ဖြန့်ဝေမီး ညနေ ၆း၀၀ မှ ၉း၀၀
ရေရရှိမှု	-	ရေနံပိုက်လိုင်းရေ ၁၊ မြေအောက်ရေ ၃ တွင်း ရှိပါသည်။
စိုက်ပျိုးဧက	-	လယ် ၁၀၀၊ ယာ ၂၀၀
တန်ဖိုး	-	လယ်ကောင်း သိန်း၂၀၊ ညံ့ ၁၅ သိန်း၊ ယာကောင်း ၂၅သိန်း၊ ညံ့ ၂၀သိန်း
စိုက်ပျိုးရေး	-	စပါး၊ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ ဝါ၊ ပဲကြီး
မွေးမြူရေး	-	နွား ၃၀၅၊ ဝက် ၂၀၊ ဆိတ် ၂၇၀
ပို့ဆောင်ရေး	-	ဆိုင်ကယ် ၁၀၀၊ သုံးဘီး ၂၊ လှည်းဝိ၀
ဆက်သွယ်ရေး	-	တီဗွီ ၁၀၀ လုံး၊ ဖုန်း ၁၀၀
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ ရွာသာယာတိုက်နယ်ဆေးရုံ လက်အောက်မှာပါ။
ဘုန်းကြီးကျောင်း	-	၂ ကျောင်း

ကန်းနီရွာမှ အုပ်ချုပ်ရေးမှူး ဦးဝင်းညွှန့်၊ ရပ်မိရပ်ဖ ဦးဝင်းလှိုင်၊ ဦးဌေးညွှန့်. တို့နှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြ ထားပါသည်။

- **ဦးဝင်းညွှန့်၊ ၄၄ နှစ်**
  အုပ်ချုပ်ရေးမှူး၊ ကမ်းနီရွာ၊ ရွာသာယာအုပ်စု
- **ဦးဝင်းလှိုင်၊ ၅၃ နှစ်**
  ရပ်မိရပ်ဖ၊ ကမ်းနီရွာ၊ ရွာသာယာအုပ်စု
- **ဦးဌေးညွှန့် ၄၁ နှစ်**
  ရပ်မိရပ်ဖ၊ ကမ်းနီရွာ၊ ရွာသာယာအုပ်စု

ကျေးရွာပိုင် စိုက်ပျိုးဧက အနေနဲ့ လယ် ဧက၁၀၀ ၊ ယာဧက ၂၀၀ လောက်ရှိပါတယ်။ စပါး၊ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ ဝါ၊ ပဲကြီး တို့ ကို စိုက်ပျိုးကြပါတယ်။ စပါးတစ်ဧက တင်း ၉၀ လောက်ထွက်တယ်၊ ယ္ဒရေပေါင်ဈေး ၅ သိန်းခွဲလောက် ရပါတယ်။ ဝါ နဲ့ ပဲဒီစိမ်းကို မိုးဦးလောက်စစိုက်ပြီး ပဲဒီစိမ်းက

(သီးထပ်)၁၅တင်းနှုန်းလောက်နဲ့ ဝါက ပိသာ ၅၀၀ လောက် တစ်ဂေ ထွက်ပါတယ်။ ပဲဒီစိမ်း တစ်တင်း ပဲဒီစိမ်း တစ်တင်း ၄၀၀၀၀/- လောက်နဲ့ ဝါတစ်ပိသာ ၁၂၀၀/- လောက်ပေါက်ပါတယ်။ ဈေးတွေကတော့ လယ်ကောင်း သိန်း၂၀ လောက်ရှိပြီး လယ် ညံ့ ၁၅ သိန်းလောက်ပေါက်ပါတယ်။ ယာကောင်း ၂၅သိန်း၊ ညံ့က ၂၀ သိန်း လောက် ဈေးခေါ်နေကြပါတယ်။ အထူးကန့်ကွက်မဲ့အနေအထား မရှိလောက်ပါဘူး။

ထိန်တောရွာ

အိမ်ခြေ	-	၁၇၀ အိမ်
အိမ်ထောင်စု	-	၁၇၃
လူဦးရေ	-	၈၂၅ ကျား ၃၄၄ ၊ မ ၄၈၁
ပညာရေး		အလယ်တန်းကျောင်းခွဲ ၁ ကျောင်း၊ ကျောင်းအုပ် ဦးအေးမင်းစိုး၊ ဆရာ/ဆရာမ ၅ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၂၁၉ ခန့် ရှိ
မီးရရှိမှုအခြေအနေ	-	ပုဂ္ဂလိက ဖြန့်ဝေမီး ၊ အိမ်ခြေ ၂၅ အိမ်သာ မီးရှိ
ရေရှိမှု	-	မြေအောက်ရေ ၂၃
စိုက်ပျိုးဧက	-	ယာ ၁၁၈၀
တန်ဖိုး	-	ယာကောင်း ၂၀သိန်း၊ ညံ့ ၁၅ သိန်း
စိုက်ပျိုးရေး	-	ဆောင်းမြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ နှမ်း၊ ဝါ
မွေးမြူရေး	-	နွား ၆၆၀၊ ဝက် ၁၀၊ ဆိတ် ၂၆၀၊ သိုး ၁၅
ပို့ဆောင်ရေး	-	ကား ၁ စီး၊ ဆိုင်ကယ် ၅၂၊ သုံးဘီး ၄၊ ထော်လာကျီ ၁၊ လှည်း ၁၂၀
ဆက်သွယ်ရေး	-	တီဗွီ ၃၄ လုံး၊ ဖုန်း ၁၇၀
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ တာဝန်ကျဆရာမရှိ
ဘုန်းကြီးကျောင်း	-	၂ ကျောင်း

ထိန်တောရွာမှ အုပ်ချုပ်ရေးမှူး ဦးစိုးသိန်းနှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြထားပါသည်။

- **ဦးစိုးသိန်း ၅၆ နှစ်**

  အုပ်ချုပ်ရေးမှူး၊ ထိန်တောရွာ၊ ထိန်တောအုပ်စု

ကျေးရွာ၏စိုက်ပျိုးရေးအနေဖြင့် မြေပဲ၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ နှမ်းနှင့် ဝါ တို့ကို စိုက်ပျိုးကြပါတယ်။ မြေပဲကို ဇူလိုင်လလောက်မှာ စစိုက်ပြီး တဧကကို ၅၀ တင်းလောက်ထွက်ပါတယ်၊ ယွန်းပေါက်ဈေး အနေနဲ့ မြေပဲတတင်းကို ၉၀၀၀/- လောက်ပေါက်ပါတယ်။ ပဲစဉ်းငုံကို မေလလောက်မှာ စစိုက်ပြီးတဧကကို တင်း ၃၀ လောက်ရပါတယ်။ လောလောဆယ် ပေါက်ဈေး အနေနဲ့ တတင်းကို ၄၆၀၀၀/- ပေါက်ပါတယ်။ ပဲဒီစိမ်းကို

လဲ ဇူလိုင်လလောက်မှာ စစိုက်ပြီး တဇက ရတင်းလောက်ရပါတယ်၊ နှမ်းလဲ ဒီလလောက်ပဲစိုက်ကြပါတယ်။ နှမ်းလဲ ၈ တင်းလောက်ထွက်မယ်၊ ပဲဒီစိမ်းက ၄၀၀၀၀/- လောက်ပေါက်ပြီး၊ နှမ်းနက်က တတင်း ၇၀၀၀၀/- နဲ့ နှမ်းဖြူ တတင်း ၅၀၀၀၀/- လောက်ပေါက်ပါတယ်။ ဝါကတော့ တစ်ဧကကို ၄၅၀ ပိသာလောက်ထွက်ပြီး ကာလပေါက်ဈေး တစ်ပိသာကို ၁၂၀၀/- ရှိပါတယ်။ ယာဈေးအနေနဲ့ ယာ ကောင်း ဆို ၂၀သိန်း၊ ညံ့ ၁၅ သိန်းလောက်ပေါက်ပါတယ်။ သင့်တင့် မျှတတဲ့ နစ်နာကြေးပေးပါက အဆင်ပြေမယ် ထင်ပါတယ်။

ချောင်းကောက်ရွာ

အိမ်ခြေ	-	၁၆၈ အိမ်ရှိပါသည်။
အိမ်ထောင်စု	-	၁၆၈ စုရှိပါသည်။
လူဦးရေ	-	စုစုပေါင်း (၇၃၂) ဦး၊ (ကျား ၃၃၈ ဦး ၊ မ ၃၉၄ဦး) ရှိပါသည်။
ပညာရေး	-	မူလတန်းကျောင်း ၁ ကျောင်း၊ မူကြိုကျောင်း ၁ ကျောင်း ရှိပါသည်။ ကျောင်းအုပ် ဒေါ်မြင့်သီတာ၊ ဆရာ/ဆရာမ ၃ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၉၅ ခန့် ရှိပါသည်။ မူကြိုကျောင်းအုပ် ဒေါ်ဇာဇာ၊ ဆရာ/ဆရာမ ၃ ဦးရှိပြီး ကျောင်းသား/သူ ဦးရေ ၄၀ ခန့်ရှိပါသည်။
မီးရရှိမှုအခြေအနေ	-	အစိုးရလျှပ်စစ်မီး ရှိထားပါသည်။
ရေရှိမှု	-	အဝီစိတွင်း တုံတင် ၅၀တွင်းရှိပါသည်။
စိုက်ပျိုးဧက	-	ယာ ၃၀၀ ဧကခန့်လုပ်ကိုင်နေကြပါသည်။
တန်ဖိုး	-	ယာကောင်း ၄၀ သိန်း၊ ညံ့ ၂၅ သိန်း ပေါက်ဈေးရှိပါသည်။
စိုက်ပျိုးရေး	-	နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး တို့ကို စိုက်ပျိုးကြပါသည်။
မွေးမြူရေး	-	နွား ၁၆၀၊ ဝက် ၁၀၀၊ ဆိတ် ၅၀၀ ခန့် မွေးမြူထားပါသည်။
ပို့ဆောင်ရေး	-	ကား ၄၊ ဆိုင်ကယ် ၁၀၀၊ သုံးဘီး ၁၊ လှည်း ၃၀
ဆက်သွယ်ရေး	-	တီဗွီ ၁၀၀ လုံး၊ ဖုန်း ၁၀၀ခန့်ရှိပါသည်။
ကျန်းမာရေး	-	ဆေးပေးခန်းမရှိပါ။ မကြီးပင်ကျေးလက် ကျန်းမာရေးဌာနခွဲအောက် ဖြစ်ပါသည်။
ဘုန်းကြီးကျောင်း	-	၁ ကျောင်းရှိပါသည်။

ချောင်းကောက်ရွာမှ အုပ်ချုပ်ရေးမှူး ဦးလှပိုနှင့် မေးမြန်းခွင့် ရရှိခဲ့ရာ ဖြေကြားချက်များကို အောက်တွင် ဖော်ပြထားပါသည်။

- **ဦးလှပို၊ ၄၇ နှစ်**

အုပ်ချုပ်ရေးမှူး(ရွာခွဲတာဝန်ခံ)၊ ချောင်းကောက်ရွာ၊ ရွာပုလဲအုပ်စု

ချောင်းကောက်ကျေးရွာ ပိုင်မြေများမှာ ယာမြေများဖြစ်ကြပါသည်။ မိုးရရှိမှု အခြေအနေပေါ် မူတည်ပြီး နှမ်း၊ ပဲစဉ်းငုံ၊ ဝါ၊ ပဲတီစိမ်း၊ မြေပဲ၊ ပဲကြီး စသည့် သီးနှံများ စိုက်ပျိုးကြပါသည်။

ဖွန်၊ ဇူလိုင်လတွင် မိုးနှမ်း၊ ပဲစဉ်းငုံ၊ ဝါနှင့် ပဲတီစိမ်းတို့ကို စတင် စိုက်ပျိုးကြပါသည်။ ယင်းသီးနှံများ ရိပ်သိမ်းအပြီး သြဂုတ်လနှင့် စက်တင်ဘာလတို့တွင် မြေပဲနှင့် ပဲကြီးတို့ကို စိုက်ပျိုးတတ်ကြပါသည်။ တစ်ဖက အထွက်နှုန်းအနေဖြင့် နှမ်း ၁၂ တင်း၊ ပဲစဉ်းငုံ ၁၀ တင်း၊ ဝါ ၆၅၀ ပိသာ၊ ပဲတီစိမ်း ၁၅ တင်း၊ မြေပဲ ၅၀တင်းနှင့် ပဲကြီး (သီးညှပ်) ၁၅ တင်းခန့် ရှိပါသည်။ ယခုနှစ် သီးနှံပေါက်ဈေးများမှာ နှမ်းနက်တစ်တင်းလျှင် ၇၀၀၀/-၊ ဝါတစ်ပိသာ ၁၁၀၀/-၊ ပဲတီစိမ်းတစ်တင်း ၄၅၀၀၀/-၊ မြေပဲ တစ်တင်း ၉၀၀၀/- နှင့် ပဲကြီးတစ်တင်း ၃၀၀၀၀/- ခန့် ပေါက်နေပါတယ်။

မွေးမြူရေးအဖြစ် တိရိစ္ဆာန်တိုင် နွား၊ ဝက် နှင့် ဆိတ်တို့မွေးမြူကြပါသည်။ မြေဈေးအနေဖြင့် ယာကောင်းလျှင်ကျပ် ၄၀ သိန်းခန့်ပေါက်ဈေး ရှိပြီး၊ မြေညံ့ ၂၅ သိန်းခန့် ပေါက်ဈေးရှိပါသည်။ ပေါက်ဈေးအရ ချင့်ချိန်ပြီး မျှတတဲ့ လျှော်ကြေးရကြလျှင် ကန့်ကွက်ကြမည်မဟုတ်ပါ။

ချောင်းကောက်ကျေးရွာ အရှေ့ဘက်တွင် ရေနံပိုက်လိုင်းဖြတ်သန်းသွားသော်လည်း မိမိနေထိုင်သည့် ကာလတလျှောက်တွင် ရေနံယိုစိမ့်ခြင်း၊ ပိုက်လိုင်းပေါက်ကွဲမှုဖြစ်စဉ်များ မကြုံတွေ့ခဲ့ရ ဘူးပါ။

ရေနံပိုက်လိုင်းကြောင့် ဒေသခံများအပေါ် သက်ရောက်နိုင်မှု လေ့လာခြင်း

စကုမြို့နယ်မှ သံပုရာကန် ရေနံချက်စက်ရုံသို့ ရေနံပိုက်လိုင်း သွယ်တန်းရာတွင် ဒေသခံများ၏ လယ်၊ ယာ နှင့် ကိုင်း စိုက်ကွင်းတို့ကို ဖြတ်သန်း ဖေါက်လုပ်ရမည် ဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ ဒေသခံတို့၏ စိုက်ပျိုးသီးနှံများ အတွက် ပျက်စီးဆုံးရှုံးမှုများ ဖြစ်ပေါ်နိုင်ပါသည်။ ယင်းတို့နှင့် ဆက်စပ်၍ စီမံကိန်း မစတင်မီ အချိန်နှင့် စတင်ချိန်ကာလများအတွင်း ဒေသခံများ နစ်နာမှုများအတွက် အောက်ဖေါ်ပြပါ အခြေအနေ တို့ ဖြေရှင်းပေးရန် လိုအပ်မည် ဖြစ်ပါသည်။

- လယ်၊ ယာ နှင့် ကိုင်းစိုက်ခင်းများအတွက် နစ်နာကြေးများ တောင်းဆိုလာနိုင်ပါသည်။
- နစ်နာဆုံးရှုံးမှုများအတွက်ညှိနှိုင်းမှုမပြေလည်ပါကရုံးရင်းဆန်ခတ်ပြဿနာအထိကြီးထွားနိုင်ပါသည်။
- စီမံကိန်းမစတင်မီ နှင့် စီမံကိန်းကာလအတွင်း စိုက်ခင်းများ တူးဆွရသဖြင့် သီးနှံအထွက်များ ထုတ်လုပ်မှု ရှိမည် မဟုတ်သဖြင့် ဒေသအတွင်း ကုန်ဈေးနှုန်းတက်နိုင်ပါသည်။
- စိုက်ခင်းဖကယာယီလျှော့နဲစဉ်အတွင်း ဒေသခံတို့ အလုပ်ထိခိုက်နိုင်ပါသည်။
- စက်ယန္တယားကြီးများကြောင်းဌင်း ဖြစ်ပေါ်လာနိုင်သည့်ဖုန်သဲတို့ကြောင့်ဌင်း ဒေသခံတို့ ကျန်းမာရေး ထိခိုက်နိုင်ပါသည်။
- ရေနံပိုက်လိုင်း သွယ်တန်းပြီးနောက် ပိုက်လိုင်းတလျှောက် ရေနံယိုစိမ့်မှုဖြစ်ခြင်း နှင့်မီးလောင် ပေါက်ကွဲမှုတို့ ဖြစ် ပေါ်နိုင်ပါသည်။

သို့သော် အခြားတစ်ဖက်တွင်လည်း ရေနံပိုက်လိုင်းစီမံကိန်းကြောင့် ဒေသခံများသည် အောက်ဖေါ်ပြပါ အကျိုးများခံစားနိုင်ပါသည်။

- အလုပ်အကိုင်အခွင့်အလမ်းများ ရရှိစေနိုင်ပါသည်။

- စီမံကိန်းကာလအတွင်း လာရောက်လုပ်ကိုင်သူများနှင့် ဆက်စပ်၍ လိုအပ်ချက်များအတွက် ဝန်ဆောင်မှု (ဥပမာ - ဆံပင်ညှပ်၊ စားသောက်ဆိုင်လုပ်ငန်းများ) ဒေသခံများ ဝင်ငွေတိုးနိုင်ပါသည်။
- နိုင်ငံတော်အတွက်လည်း အဓိကသွင်းကုန် လောင်စာဆီ အစားထိုးနိုင်ရေးအတွက် သို့မဟုတ် နိုင်ငံခြားငွေ သက်သာစေမည် ဖြစ်ပါသည်။

မယ်ဇလီတော

ဦးမြင့်စိုး - (၄၂ နှစ်)

အုပ်ချုပ်ရေးမှူး၊ မယ်ဇလီတောကျေးရွာ၊ မင်းလှမြို့နယ်။

ရွာအိမ်မှူးအဖြစ် ၂၀၁၃ခုနှစ်၊ ဖေဖော်ဝါရီလမှစ၍ ထမ်းဆောင်ခဲ့ပါသည်။ စက်ရုံသစ်ကြီးဆောက်မည့် သတင်းကို ယခင်သိမ်းခံထားရသော မြေသိမ်းခံသူများ အားကန့်ကွက်စာတင်၍ ခေါ်ယူသည့် မြို့နယ်အုပ်ချုပ် ရေးမှူးအကြောင်း သိရှိခဲ့ရပါသည်။

အားလုံးစုစုပေါင်း (၈) ဦးခန့်ရှိမည်ထင်ပါသည်။ ၎င်းတို့မှာ-

၁။ ဦးမြင့်သိန်း
၂။ ဦးမြမောင်
၃။ ဦးသန်းအောင်
၄။ ဦးတင်မြင့်
၅။ ဒေါ်မြန
၆။ ဦးအေးလှိုင်
၇။ ဦးထွန်းကြိုင်
၈။ ဦးဖိုးသောင်း တို့ဖြစ်ကြပါသည်။ စသိမ်းခဲ့စဉ်က သီးနှံလျော်ကြေးအဖြစ်ပေးခဲ့သည်ဟု သိရပါသည်။ အတိအကျကိုတော့ မသိပါ။

ယခုစက်ရုံမှထွက်လာသောစွန့်ပစ်ရေကြောင့်လမ်းကြောင်းတလျှောက်စိုက်ပျိုးရေးကောင်းသည်မှာ ကောင်းကျိုးတစ်ခုဖြစ်သည်။ သို့ရာတွင်နေ့စဉ်ထွက်နေသောစက်ရုံခေါင်တိုင်မီးတောက်ကြီး တော့နစ်ကြာလာသည့်အခါ ရွာသားများစိုးရိမ်ပူပန်လာကြသည်။ မီးတောက်ကြီးကို မမြင်ရရင်တော့ပို၍ လုံခြုံရှိမည်ထင်ပါသည်။

ရေနံအနှံအသက်ကတော့ မိမိတို့ရွာဖက်ကိုတော့ မရောက်ပါ။ယခင်စက်ရုံဟောင်းကို စတင်စဉ်တွင် အလုပ်ဝင်ရောက်သူများပြားခဲ့ကြသည်။ သို့ရာတွင် လစာနည်းသောကြောင့် အားလုံးအကုန်နီးပါး ထွက်ခဲ့ကြသည်။ ယခုမိမိတို့ရွာမှ ဝန်ထမ်းခန့်မှန်းခြေ ၂၅မှ ၃၀ဦးအထိရှိမည်ထင်ပါသည်။ သို့ရာတွင် Permanment ဝန်ထမ်းများမရှိပါ။

ကျပန်းအဖြစ်သာ သွားရောက်လုပ်ကိုင်နေသူများပါသည်။ စက်ရုံသစ်ကြီး ပေါ်လာလျှင် အကယ်၍ နိုင်ငံခြားသားများ ပါလာလျှင်လည်း ဆက်ဆံရေးထိခိုက်မှု မရှိနိုင်ပါ။ စက်ရုံကြီး မဆောက်ခင်က လုံခြုံရေး မကောင်းပါ။ စက်ရုံသစ်တွေဆောက်ရင် ပို၍အချင်းချင်း ဆက်ဆံရေးက အစပို၍ ကောင်းလာနိုင်မည် ထင်သည်။

မိမိတို့တစ်ရွာထဲတွင် ၁၀ တန်းအောင်၊ ဘွဲ့ရတော်တော်များများရှိပါသည်။ အလုပ်မရှိ၍ ကပစ တပ်သို့ ဝင်သူပင် ၄၀ ဦးနီးပါးရှိပါသည်။ တစ်အုပ်စုလုံးတွင် တပ်ထဲသို့ဝင်သူ ၂၀၀ နီးပါးရှိမည်။

မိမိတို့ရွာမှ ထိုင်း၊ မလေး သွားသူမရှိသလောက်ပါ။ ရန်ကုန်တွင်ပင် သွားရောက်လုပ်သူ ၁၀ဦးခန့်ပင် ရှိမည်။ ရွာမှာပိုပြီးပျော်တယ်။

မြေပါသွားသည့် ရွာသားများကလည်း သိမ်းပြီးမြေဖြစ်၍သင့်တော်သောအခကြေးငွေပေးလျှင်လည်း ကျေနပ်မည်ဟုထင်သည်။

အလုပ်အကိုင် အခွင့်အလမ်းပို၍ ရအောင်အတွက် စက်ရုံကြီးမဆောက်မီကပင်သင်တန်းများပေးလျှင်တော့ အလုပ်အကိုင်အတွက်ပို၍ ရွာသားများရကြမည်ဖြစ်သည်။

ဦးထွန်းမြိုင် - အသက် (၈၅ နှစ်)

ရပ်မိရပ်ဖ၊ (ဥက္ကဋ္ဌဟောင်း၊ မင်းလှမြို့နယ်လယ်စည်းရုံး)၊ မယ်ဇလီတောကျေးရွာ၊ မင်းလှမြို့နယ်။

ယခင်ဖဆပလခေတ်ကပင် မြေယာကော်မတီဥက္ကဋ္ဌလုပ်ကိုင်ခဲ့ဖူးပါသည်။ မဆလခေတ်တွင် မင်းလှမြို့နယ်လယ်စည်းရုံးဥက္ကဋ္ဌ အဖြစ်လုပ်ခဲ့ဖူးပါသည်။ ယခင်က မယ်ဇလီတောရွာဟောင်းသည် အနောက်ဖက်တွင် ရှိပြီး အိမ်ခြေ ၄၅ အိမ်ခန့်သာရှိပါသည်။

မြန်မာသက္ကရာဇ် (၁၃၁၅) ခုနှစ်တွင် ပြောင်းခဲ့ပါသည်။ ယခုအခါ အိမ်ခြေ ၅၀ ခန့်ရှိပါပြီ ရွာပြောင်းပြီး မိမိလူကြီး (၂၁)နှစ်ခန့် လုပ်ခဲ့ပါသည်။

ရွာအနီးအနားတွင်သန်း၊ ဒဟတ်သစ်တောကြီးအထူအထပ် ရှိနေပါသည်။ သစ်တော်များခုတ်၍ ရွှေ့ပြောင်းအိမ်ယာလုပ်ခြင်းကြောင့် တောပြုန်းခဲ့ရပါသည်။ ယခင်က ရွာထဲသို့ ဆိတ်ကိုပင် ဝင်ဆွဲသော ကျားများရှိခဲ့သည်။ သမင်၊ ဖွတ်၊ ပတတ်၊ ဂျီ၊ ဒရယ်များ ရှိခဲ့ပါသည်။ ၄င်းအချိန်တွင်ပန်းတော်ပြင်ချောင်း က ရေကို ရွာသာများ နွေ၊ မိုး၊ ဆောင်း (၃) ရာသီ သောက်ကြရသည်အထိ ရေရှိပါသည်။

ကပစပေါ်လာပြီးချောင်းကောက်မှ ရေအပေါ်မှယူပြီး ချောင်းကောသွားခဲ့ရသည်။ နောက်တစ်ချက်တစ်ခုကတော့ ရာသီဥတုပူနွေးလာခြင်းနှင့် လည်း ပတ်သက်နိုင်ပါသည်။

၁၉၇၈ခုနှစ် ရေနံချက်စက်ရုံဆောက်ရန် မြေသိမ်းခဲ့စဉ်က မိမိသည်ပြည်သူ့ကောင်စီတွင်တာဝန်ဖြင့် ရှိနေခဲ့ပါသည်။တစ်ဇကာကို ပဲ ၇တင်းနှုန်းဖြင့် ၃နှစ်စာ ငွေ ထိုက်ထိုက် တန်တန်ပေးခဲ့ပါသည်။ လ/န(၃၉)ဖြင့် လုပ်ငန်းလုပ်ဆောင်ရန် အစိုးရသိမ်းခဲ့ပါသည်။ အစိုးရမှဦးပိုင်ပေါက်လျက် အခွန်ဆောင်နေရပါသည်။ ယခင်ဈေးနှုန်း တစ်ဇကာကို၂၀၀၀/- ခန့်ရရှိခဲ့ပါသည်။ ၄င်းဈေးမှာအထူးတန်ဖိုးရှိသောငွေဖြစ်ပါသည်။ ၁၉၈၈ခု အရေးအခင်းတွင်မြို့နယ်မြေစာရင်းရုံးကို မီးရှို့ခံခဲ့ရပြီး အားလုံးပါသွားပြီး ပြန်လည်မြေပုံဆွဲခဲ့ရပါသည်။

ကပစများပေါ်လာတာကောင်းပါသည်။ သစ်တောများကို စနစ်တကျထိန်းသိမ်းထားခြင်းကြောင့် ၄င်းတို့နယ်မြေများအတွင်း သမင်၊ ဂျီများ အကောင်ကြီးများဖြစ်၍ ရှိနေသည်ဟု ပြောသံကြားနေရပါသည်။

မြေယာဥပဒေအရ အစိုးရမှအဆောက်အဦး ဆောက်လုပ်ခြင်းလုပ်ငန်းလုပ်ရန် နှစ်အကန့်အသတ်နှင့် သိမ်းယူခဲ့ရသည်။ နှစ်ပြည့်လျှင် (သို့မဟုတ်) လုပ်ငန်းမလုပ်လျှင် ပြန်လည်၍ ပြုလုပ်ရန်ဖြစ်သောကြောင့် ကန့်ကွက်လိုသူများ ကန့်ကွက်နိုင်ကြောင်း မြို့နယ်မှစာထုတ် ရခြင် းဖြစ်သည်။

စက်ရုံအသစ်ကြီးဆောက်လာလျှင် မိမိတို့ရပ်ရွာအတွင်း အလုပ်အကိုင် အခွင့်အလမ်းများ ရသွားရန်ရှိပြီး သိမ်းထားပြီးသောမြေတွင် ဘာမှမလုပ်ဘဲထားမည့်နည်းတူ ပို၍ကောင်းမွန်လာပြီး တောင်သူများဖက်မှ အထူးအထွေ နစ်နာသွားရန် အကြောင်းမရှိပါ။

ဦးအေးထွန်း (၄၅ နှစ်)

မူလတန်းကျောင်းအုပ်၊ မယ်ဇလီတောကျေးရွာ၊ မင်းလှမြို့နယ်။

ကျွန်တော်လုပ်သက် ၂၀ကျော်ကျွမ်းကျင်ရွာမှာ ရှိနေပါပြီ။ယခုစက်ရုံသစ်ဆောက်မည့်သတင်းကို ယခင် (၂)နှစ်လောက်ကပင် ကြားခဲ့ပါသည်။ စက်ရုံအသစ်ဆောက်လျှင် ကျေးရွာသားများအတွက် အလုပ်အကိုင် အခွင့်အလမ်း ပို၍ရနိုင်မည်ဟု မျှော်လင့်ပါသည်။

သို့ရာတွင်အလုပ်နှင့်ပတ်သက်သည့် သင်တန်းများမရှိ၍ ကျွမ်းကျင်မှုသင်တန်းများရွာသားများကို လာရောက်ပေးနိုင်မည့် သူရှိပါက ပို၍ အလုပ်အကိုင်ရကြမည်ဟု မျှော်လင့်နေမိသည်။

ရွာတွင်ဘွဲ့ရလူငယ် ၆၀ ဦးခန့် ပင်ရှိမည်ထင်ပါသည်။ ယခင်ကတော့ ကပစစက်ရုံတွင် ဝင်လုပ်နေကြပါသည်။ နှစ်စဉ် ၁၀ တန်းအောင်သူဒီရွာမှာ (၁၀) ဦးခန့် ရှိနေပါသည်။ မလွန်၊ မင်းလှ အထက သို့ သွားရောက်အထက်တန်းကို တက်ပြီးအောင်မြင်သူရှိပါသည်။

ပညာရေးကို အလေးပေးသောရွာဖြစ်ပါသည်။ သို့ရွာတွင် အလုပ်လက်မဲ့များဖြစ်နေကြသည်မှာ စိတ်မကောင်းဖြစ်စရာပင်ဖြစ်သည်။

ဦးသိန်းဝင်း - (၃၇ နှစ်)

NAG-INGO အဖွဲ့တာဝန်ခံ၊ မယ်ဇလီတောကျေးရွာ၊ မင်းလှမြို့နယ်။

ဇာတိချက်မြုပ်ဖြစ်ပါသည်။ စက်ရုံအသစ်ဆောက်မည့် သတင်းကိုမနှစ်ကပင် ကြားမိပါသည်။ ယခင်အစိုးရလက်ထက်ကပင်သိမ်းထားသောမြေများပေါ်တွင် စက်ရုံသစ်ကို ဆောက်မည်ဖြစ်၍ အထွေအထူး ပြဿနာရှိမည်မထင်ပါ။

သို့ရာတွင် ထိုက်သင့်သော အလုပ်အကိုင် အခွင့်အလမ်းကိုတော့ ရွာသားများအတွက် ရစေချင်ပါ သည်။ စက်ရုံမှထွက်လာမည့် ကာဗွန်ဒိုင်အောက်ဆိုဒ်ကိုတော့ စနစ်တကျ ထိန်းသိမ်းရန်လိုပါသည်။ ရေဆိုးတွင်စပါးများ ကောင်းနေသော်လည်း မည်သည့်ဓါတ်ပါဝင်နေသည်ကို မသိရှိနိုင်ကြပါ။ စက်ရုံကိုစနစ်တကျ ထိန်းသိမ်းလည်ပတ်ပေးရန်လိုပါသည်။ တစ်ခုသောဆိုးကျိုးများ မတော်တဆ ပေါ်လာပါက ဒေသခံများမှာ နစ်နာကြရမည်ဖြစ်ပါသည်။ ဒါကြောင့်ထိုက်သင့်သောရပိုင်ခွင့်ကိုတော့ အစိုးရအနေဖြင့် ပေးစေချင်ပါသည်။ ၁၉၈၀ ခန့်လောက်က စက်ရုံသစ်ကြီးတည်ပြီး ဝန်ထမ်းခန့်ထားရာတွင် မိမိတို့ရွာသားများ အရည်အချင်းနည်းသောကြောင့် လုံခြုံရေးအစောင့်သာရပါသည်။ အားလုံးမည်သည့်အခွင့်အလမ်းမှ မရ၍ ထွက်ကုန်ကြသည်။

ယခုတော့ရွာမှ အလုပ်လက်မဲ့ဘွဲ့ရများကိုစဉ်းစားပေးစေလိုပါသည်။ ပဲစိုက်ထားသောသူများ ရှိသော်လည်းမိုးရေမရ၍ ဖြစ်ဖြစ်မြောက်မြောက်မဟုတ်ပါ စက်ရုံမှထွက်ရှိသော ရေဆိုးမှာလည်း စိုက်ပျိုးရေးအတွက် အလွန်ကောင်းသည်ကို တွေ့ရှိရပြီး အန္တရာယ်ရှိမည်မထင်ပါ။ စက်ရုံသစ်ကြီးကို အများကအားလုံးကြိုဆိုပါ သည်။

ဦးအုန်းမြင့် အသက် (၅၄)နှစ်

မီးလင်းရေးကော်မတီ၊ မယ်ဇလီတောကျေးရွာ၊ မင်းလှမြို့နယ်။

လုပ်လက်မဲ့များစွာရှိနေပါသည်။ စက်ရုံကြီးဆောက်ရင်တော့ အလုပ်ရချင်ပါတယ်။ အလုပ်ရဖို့အတွက် သင်တန်းတွေ ဖွင့်ပေးစေချင်ပါတယ်။

ယခုအချိန်မှာ ရာသီဥတုမကောင်းပိုဖြစ်လာ၍ တောင်သူများဝင်ငွေရောပါသည်။ တဖြေးဖြေးပို၍ ဆင်းရဲလာပါသည်။ ယခုစက်ရုံသစ်ဆောက်လျှင်လည်း ကျပန်းလုပ်သားများပို၍ ရနိုင်မည်ဟု မျှော်နေကြပါသည်။

ဦးဝင်းညွန့် - ၄၈ နှစ်

ဒီချုပ်အဖွဲ့ဝင်တာဝန်ခံ၊ မီးလင်းရေးကော်မတီဥက္ကဋ္ဌ၊ သံပုရာကန်

မိသားစု (၆) ဦးရှိပါသည်။ တောင်သူလုပ်ငန်း ဖြင့်အသက်မွေးနေပါသည်။ စက်ရုံဟောင်းကြီး ဆောက်လုပ်စဉ်က ဆိုးကျိုးကြီးဖြစ်လာမည်ကို တစ်ရွာလုံးအထူးစိုးရိမ်နေခဲ့ကြသည်။

ပညာရှင်များ၏စနစ်တကျ ထိန်းသိမ်းလုပ်ကိုင်ခဲ့မှုကြောင့် မည်သည့် ပြဿနာထိခိုက်မှုများ မရှိခဲ့ပါ။

ယခုစက်ရုံသစ်ဆောက်လျှင် ဒီထက်ပိုကောင်းသောနည်းပညာဖြင့် ဆောက်လုပ်ပေးစေချင်ပါတယ်။ ရွာဖွံ့ဖြိုးဖို့အတွက် ဝန်ထမ်းများခန့်ပေးစေချင်ပါတယ်။

မိမိတို့ရွာရှိဘွဲ့ရ(၁၀)တန်းအောင် အလုပ်လိုချင်သူများကို လုပ်ငန်းခွင်သင်တန်းများ ပေးနိုင်ပါကခန့်ထားရာတွင်ပိုကောင်းပါမည်။ မဟုတ်လျှင် ဒေသခံမဟုတ်သူများကိုသာ အလုပ်ထဲပါသွားသည်။ ဒေသခံရွာသားများ၏ အလုပ်အကိုင်ရရှိမှုကို အစိုးရကပို၍ ဦးစားပေးစဉ်းစားစေချင်ပါသည်။

ဦးကျော်အောင် - အသက် (၄၃) နှစ်

အုပ်ချုပ်ရေးမှူး၊ ညောင်ပင်သာရွာ၊ မင်းလှမြို့နယ်။

ရေနံချက်စက်ရုံသစ်ကြီး တစ်ခုဆောက်မည့် လုပ်ငန်းစီမံကိန်းကို မနှစ်လောက်ကပင် ကြားသိပြီးဖြစ်သော်လည်း တိတိကျကျတော့ မသိသေးပါ။ယခင် ရေနံချက်စက်ရုံဟောင်းမှာ မိမိတို့ (၁၂)နှစ်သားခန့် လောက်ကပင် ဆောက်ပါသည်။

၄င်းစက်ရုံမှာမကြာခဏအတွင်းတွင် မီးလောင်မှုအသေးတွေ နှစ်စဉ်လိုပင် ဖြစ်နေခဲ့ပါတယ်။ ရေနံသိုလှောင်တင် အလုံးဝိုင်းကြီး ယခင် (၁)နှစ် ခန့်လောက်က ရေနံခိုးသူများကြောင့် ပေါက်ခဲ့ရာ လူ(၄)ဦး သေဆုံးခဲ့ပါတယ်။

မိမိတို့ရွာမှာ သိုလှောင်ကန်နှင့် တမိုင်ခွဲခန့်လောက်ပင် ဝေးပါသည်။ စက်ရုံဝန်ထမ်း မိမိတို့ရွာမှာ(၁) ဦးသာရှိပါသည်။ မိမိတို့ရွာမှာ ဘွဲ့ရ ပညာတတ် (၁၅)ဦးရှိသည်။ စက်ရုံတွင်အလုပ်ခေါ်သော် လည်း လျှောက်သည့်အခါမရပါ။

စက်ရုံဆောက်စဉ်က ရွာသားများစိုးရိမ်ပူပန်ခဲ့ကြသည်။ ယခုတော့အနေကြာသွားကြပြီးပူပန်မှုမရှိတော့ပါ။ ယခုစက်ရုံသစ် ဆောက်မည့် နေရာတွင်လည်း မိမိတို့ရွာမှဝင်ရောက်လုပ်ကိုင်နေသူများ ရှိပါသည်။

ယခင်ကအဆိုးဆုံးမှာ ရွာပိုင်ယာမြေဈက ၆၀၀ကျော်ကပစမှ အသုံးခံခဲ့ရပြီးမည်သည့်လျော်ကြေးမှ မပေးခဲ့ပါ။ ယခုလုပ်ကိုင်စားသောက်မြေ ၃၁၁ဈကသာ ကျန်ပါတော့သည်။

စက်ရုံသစ်ဆောက်လာလျှင် အလွန်ကောင်းပါသည်။ အလုပ်အကိုင်အခွင့်အလမ်းများ ရလာမည်ဟု မျှော်လင့်ပါသည်။ နည်းပညာကောင်းကောင်းနှင့် ဆောက်မည့်စက်ရုံသစ်ကြီးအဖြစ်ရရင် ကောင်းပါသည်။ ယခုစက်ရုံကြီးမှာ အိုဟောင်း နေပြီဖြစ်၍ စိုးရိမ်နေရသည့် အဆင့်ရှိပါသည်။

ယခင်ရေနံပိုက်လိုင်းမိမိတို့ရွာအနီးမှ ဖြတ်သန်းသွားခဲ့ပြီး။ယခုအခါ ၄င်းပိုက်လိုင်းပေါ်မှာ ကျူးကျော်အိမ် (၁၃) အိမ်ရှိပါသည်။ ယခင်လူကြီးများက ဆောက်ခွင့်ပေးထားခဲ့ခြင်းဖြစ်သည်။ ကျွန်တော်လက်ထက်မှာ လာရောက်၍ ဖယ်ရှား ခိုင်းခဲ့ပါသည်။ သက်ဆိုင်ရာအုပ်ချုပ်ရေးမှူးများ မိမိလက်ထက်တွင်အမုန်းခံ၍ ဖယ်ရှားခြင်းမပြုလိုကြောင်း တင်ပြ ထားပြီးဖြစ်ပါသည်။

၁။ TV - ၁၅လုံး

၂။ Sky net - ၂ လုံး

၃။ လျှပ်စစ် သုံးအိမ် - ၁၀၂ အိမ်

၄။ မီးစက် - (၃)လုံးရှိ

၅။ တယ်လီဖုန်း - ၂၅၀ခန့်

- မီးမယူနိုင်သူ (၅၀)ဦးခန့်ရှိ
- ဆိုလာသုံးသူများလည်းရှိ
- လုံးဝဖုန်းမရှိသူ (၃၀) ဦးခန့်ရှိ
-

ဦးတင်အောင် - အသက် (၇၁) နှစ်

ရပ်မိရပ်ဖ၊ ညောင်ပင်သာရွာ၊ မင်းလှမြို့နယ်။

မိမိအသက် (၂၀)ခန့် ဦးနှလက်ထက်က အိမ်ခြေ (၃၀)ခန့်သာရှိပြီး မူလတန်းကျောင်းလုံးဝ မရှိဘဲ ဘုန်းကြီး ကျောင်းတွင်သာ သင်ကြားရသည်။ ယခုရွာဖြစ်လာရခြင်းသည် အိုးလုပ်ငန်း လုပ်သောရေပုလွဲရွာကြီး (ရွာမြောက်ဖက်) ပျက်သွားပြီးနောက် ရောက်ရှိလာခြင်းဖြစ်သည်။

ရွာအနီးအနားတွင် သစ်တောကြီးများမှာ တစ်ရွာနှင့်တစ်ရွာ ကူးချမရအောင်ပင် တောအုပ်များ ရှိပါသည်။ ခွေးအများလည်း အလွန်ပေါပါသည်။ ဂျီ၊ ဒရယ်များ လည်းရှိခဲ့သည်။ ယခုတော့လုံးဝ မရှိတော့ပါ။ သို့ရာတွင် စက်ရုံအနီး သတ်မှတ်နယ်မြေ ထဲတွင်တော့ ဂျီများရှိသေးသည်ဟုသိရပါသည်။

စက်ရုံကြီးဆောက်ပြီးနောက် ပို၍လုံခြုံရေးကောင်းလာခဲ့ပါသည်။ ဦးနှခေတ်က မကြာခဏဓါးပြတိုက်ခံ ခဲ့ရသည်။

စက်ရုံကြီးဆောက်မည့်သတင်းကို ကြားချိန်မှစ၍ သာမိပါသည်။ ဒေသခံများ အလုပ်အကိုင်အခွင့်အလမ်းရကြမည်ဖြစ်ပြီး တိုးတက်လာမည်။ သို့ရာတွင်စက်ရုံမှ မိမိတို့အနီးအနားရွာသားအများကို ဦးစားပေးခန့်ကြပါ။ လျှို့ဝှက်ချက်တစ်ခုတော့ရှိနေပါသည်။ စက်ရုံဝန်ထမ်းများ အားလုံးလိုတော့ ချမ်းသာသွားကြသည်မှာတော့ စိတ်ဝင်စားစရာဖြစ်သည်။ စက်ရုံဆောက်ပြီးနောက် ညောင်ပင်သာရွာအတွက် ဘာအခွင့်အရေးမှ မရရှိခဲ့ပါ။ လူငယ်ပညာတတ်များ အလုပ်အကိုင်ရစေချင်ပါသည်။

ဘာသာယဉ်ကျေးမှုအနေဖြင့် နှစ်စဉ် သီတင်းကျွတ်၊ သင်္ကြန်ပွဲတော်များတွင် ဘုရားစေတီကျောင်းကန်များတွင် ဆွမ်းကျွေးကုသိုလ်ပြုကြပါသည်။

ဒေါ်ခင်ဆွေဝင်း - (၅၀ နှစ်)
မူလတန်းကျောင်းအုပ်- ညောင်ပင်သာရွာ

စက်ရုံသစ်ကြီးဆောက်လာမည်ကိုကြိုဆိုပါသည်။ယခင်စက်ရုံဟောင်းကြီးမှာ အလွန်ပင်စုတ်ပြတ် ဟောင်းနွမ်း နေပြီဖြစ်၍ မကြာမကြာစက်ပျက်ပြီး အခက်အခဲပင်ရှိ နေကြောင်း သိနေရပါသည်။ လုံခြုံမှု ရှိစေချင်ပါသည်။

နောက်မြို့နယ်ဆရာဝန်ကြီးမှစက်ရုံမှအင်ဂျင်များကြောင့် မြို့နယ်တွင် အနီးတဝိုက်မှ ကလေးများအဆုတ်ရောဂါပိုး၍တိုးလာနေသည်ဟု ပြောပြပါသည်။ ဟုတ်မဟုတ်တော့မသိရပါ။ နောက်ကျောက်ကပ်ရောဂါ အဖြစ်များလာသည်ဟု အထူးကုဆရာဝန်ကြီး ပြောပြသည်။ စက်ရုံသစ်ဆောက်လာလျှင် မိမိဒေသမှ ဘွဲ့ရပညာတတ်များကို ဦးစားပေး အလုပ်ခန့်ထားပြီး၊ သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုလျော့နည်းတဲ့ စက်ရုံသစ်ကြီး တစ်ခုဖြစ်ပါစေလို့ ဆန္ဒပြုပါတယ်။

ဒေါ်ခင်သန္တာမော် - (၂၃ နှစ်)
မူလတန်းပြ - ညောင်ပင်သာရွာ

ကျွန်မတို့ဒေသခံတွေကတော့ အလုပ်ရဖို့ အတွက် မျှော်လင့်ပြီး စက်ရုံသစ်ကြီးကိုကြိုဆိုပါတယ်။စက်ရုံသစ်ကြီး ရရင် နိုင်ငံအတွ ကဲ့ရဲ့ရပ်ရွာအတွက် နှစ်ဖက်မျှတ တိုးတက်ဖို့ လိုအပ်ပါတယ်။

ပန်းတော်ပြင်
ဦးလှိုင်သန်းမြင့် အသက်(၅၈)နှစ် ဖုန်း- ၀၉၃၃၂၅၅၇၁၁၅
ဒီဇျုပ်တာဝန်ခံ၊ ပန်းတော်ပြင်ရွာ၊ မင်းလှမြို့နယ်

ရေနံချက်စက်ရုံသစ်ကြီးတစ်ခုကို ထပ်မံတည်ဆောက်မည့်သတင်းကို မနှစ်ကပင်သိရှိခဲ့ပါသည်။ နဂိုအဝိုင်းအဝန်းစက်ရုံဟောင်းမှာ ယခင် နှစ်၃၀ခန့် က တောင်သူများထံမှသိမ်းယူပြီး သီးနှံလျော်ကြေးကို အစိုးရမှပေး ခဲ့ပြီးဖြစ်သည်။ ယခုအခါမြေအတွင်းလုပ်ကိုင်နေသူ တောင်သူ များက ထပ်ပြီး ကန့်ကွက်စာတင်ထားခဲ့သည်။ ယခင်စက်ရုံတုန်း ကျပန်ကုမ္ပဏီနှင့် မြန်မာအစိုးရ စာချုပ်ချုပ်၍ စနစ်ကျ လက်မှတ်ထိုး ပြီးလုပ်ဆောင်ခဲ့သည့် စက်ရုံ ဖြစ်သည်။ ယခုပါရှိသွားသော မြေတွင် စုစုပေါင်း ၁၀ဦး ခန့်ပဲစိုက်၍ရှိကြမည်ဟုထင်သည်။ သိသလောက်မှာ-

(၁) ဦးလှသိန်း၊ (၂) ဦးမြင့်သိန်း (ဥက္ကဋ္ဌ)၊ (၃) ဦးဖိုးသိန်း၊ (၄) ဦးဦးညီ၊ (၅) ဦးလှကြည်၊ (၆) ဦးအောင်သန်း၊ (၇) ဦးခင်စော၊ (၈) ဦးထွန်းတင်၊ (၉) ဒေါ်တင်တင်ကျော်၊ (၁၀) ဦးကျော်လှိုင်၊ (၁၁) ဦးသန်းတင်၊ (၁၂) ဦးမောင်ဝင်း တို့အပြင်နောက်ကျန်ပါသေးသည်။ စက်ရုံသို့သွားရောက်၍ အခကြေးငွေမပေးရပါ။

ရေနုံချက်စက်ရုံ၊ ကပစ (၂)နှင့်(၁၀)တို့မရောက်ရှိမီက လမ်းပန်းဆက်သွယ်ရေး လူနေမှုအလွန်နိမ့်ကျနေသောနေရာ ရွာတစ်ရွာဖြစ်ပါသည်။ ၄င်းတို့ပေါ်လာပြီးမှ အနီးအနားရွာတိုင်း တိုးတက်ဖွံ့ဖြိုးလာခဲ့သည်။

သို့ရာတွင်လူနေထူထပ်လာခြင်း တောခုတ်၊ ထင်းခုတ်၊ မီးသွေးဖုတ်ခြင်းကြောင့်တောပြောင်းသွားခဲ့သည်။ ယခင်တုန်းက တောဝက်၊ ကျီ၊ ယုန်၊သမင်ပေါများစွာရှိခဲ့သည်။ ယခင်ပန်းတော်ပြင်ချောင်းထဲတွင် ငါးခုံးမ၊ ငါးဇင်ရိုင်း၊ ငါးရန့်များရှိသော်လည်း ထူးခြားမှုမှာ စက်ရုံရေကျရာတစ်လျောက် ၄င်းငါးများ လုံးဝမရှိဘဲ စိုက်ပျိုးရေးစပါး ပဲပြောင်းခင်းများအလွန်ကောင်းနေပါသည်။

ဦးသန်းဦး

ပြည်ခိုင်ဖြိုးပါတီဘဝန်ခံ၊ ပန်းတော်ပြင်ရွာ၊ မင်းလှမြို့နယ်

စက်ရုံဆောက်မည်ကိုကြိုဆိုပါတယ်။ သို့ရာတွင်ရွာမှ အလုပ်လက်မဲ့များမှာ ကျပန်းအဖြစ်ဖြင့်သာ လုပ်ကိုင်နေကြရပါသည်။ စက်ရုံအတွက်အလုပ်ခန့်လျှင် မင်းလှမြို့ ဘက်မှ လူများကိုသာဦးစားပေးခန့်မည်ဟုသိရှိရ။ မိမိတို့ရွာမှ အလုပ်လက်မဲ့များ ကို ဦးစားပေးခန့်ထားစေချင်။

မိမိတို့ရွာသားများမှာ မိဘရိုးရာတောင်သူအလုပ်သာ လုပ်စားနေကြရ။ အချို့မှာ ကပစတပ်ထဲ သို့ဝင်သွားသူများရှိနေကြ။ နိုင်ငံခြားသို့သွားရောက်အလုပ်လုပ်သူအလွန်ပင်နည်းသည်။

ကိုယ်ပိုင်စီးပွားရေးလုပ်သူ ဈေးဆိုင် ၅ဆိုင်ခန့်ရှိ။ တကိုင်းဒဟတ်ပြင်ရွာများသို့ ရေနုံလက်ယက်တွင်း သွားရောက်တူးသူများလည်း ရှိကိုယ်ပိုင်တွင်းတူးသူ ၃ဦးခန့်ရှိစက်ရုံကြီးပေါ်လာ၍ရေအလွယ်တကူ ရလျှင်စိုက်ပျိုးရေးမြေများတွင်ပဲ၊ ပြောင်း၊ နှမ်း၊ ဝါ စိုက်လျှင်အထူးအောင်မြင် နိုင်ပါသည်။ တောင်သူများ လည်း စီးပွားပို၍ ကောင်းလာနိုင်ပါသည်။

ဦးမြင့်သိန်း

အသက် ၆၀နှစ် ဖုန်း ၀၉၄၀၁၆၆၈၁၈၈

ရွာအိမ်မှူး၊ ပန်းတော်ပြင်ရွာ၊ မင်းလှမြို့နယ်

ယခင်နှစ်ကပင် စက်ရုံသစ်ကြီးဆောက်မည်ဟု ကြားသိရပါသည်။ မြေစာရင်းအဖွဲ့ကိုခေါ်ယူပြီး ၎တ်များစိုက်ကြသည်။ မိမိတို့ ရွာ တောင်သူ ၉ဦးခန့် ၄င်းနေရာတွင် ဝင်ရောက်၍ ပဲစိုက်နေကြ သည်။

မြို့နယ်မှမြေပိုင်ရှင်များကန့်ကွက်စာတင်နိုင်သည်ဟု စာထွက်သောကြောင့် ကန့်ကွက်လွှာတင်ကြားကြသည်။ မြို့နယ်အုပ်ချုပ်ရေးမှူး၊ မြို့နယ်မြေစာရင်းမှူးဦးစီး တို့ခေါ်ယူ၍ မေးမြန်းကာ မြေသမိုင်း အကြောင်းကို စစ်ဆေးပြီး ဖြစ်သည်။ ယခုအထိတော့ အဖြေမထွက်သေး။ မြေယာပိုင်ရှင်စာရင်းများ ကွဲလွဲမှုရှိနေသည်။ စက်ရုံမှ ယခင်စာရင်းနှင့် ယခုစာရင်းကွဲ နေသည်။ ယခင်က မိမိတို့၏ မိဘဘိုးဘွားပိုင် စာရင်းဖြစ်ပြီး ယခုအခါ သားသမီးများ လုပ်ကိုင်စားသောက် နေကြသည်။

စက်ရုံကြီးဆောက်ပြီး ၃၊ ၄နှစ်ခန့် စက်ရုံသို့ တစ်ဇကလျှင် ပဲခစိတ်ခန့်ပေးရသည်။ သီးနှံစိုက်ပျိုးမှု အောင်၊ မအောင်အပေါ်တွင် မူတည်၍ ပေးကြရ။ နောက်ပိုင်းတွင်လုံးဝ အခမပေးကြရတော့ပါ။

မဆလခေတ်မှ နဝတခေတ် စစနောက်ပိုင်းအထိမြေစာရင်းမှ ၄င်းရွာသားများ မြေခွန်ပြေစာများထွက်လာ၍ မိမိပင်စိုက်ပြီး ငွေသွင်းခဲ့ရပါသေးသည်။ ၁၉၉၀အထိရှိမည်ထင်ပါသည်။ မြေစာရင်း သို့ပေးသွင်းရငွေ တစ်ရွာလုံး အတွက် ၅၀၀၀ခန့်ရှိမည်ထင်ပါသည်။ အခွန်ပြေစာများမှာအားလုံး ပျက်စီးပျောက်ဆုံး သွားပြီး ဖြစ်သည်။

တစ်ဦးလျှင်ပေးရငွေမှာအနည်းငယ်ဖြစ်သောကြောင့် ကျွန်တော်သည် ၄င်းပြေစာကို ပိုင်ရှင်လက်ထဲသို့ မပေးမိပါ။ ကျွန်တော်အိမ်တွင်သာ သိမ်းဆည်းထားပြီး ပျက်စီးကုန်ပါသည်။ ယခင်အစိုးရလက်ထက်တွင် မြေယာကို အစိုးရက သိမ်းပြီးရန်နှင် ဥပဒေရှိသော်လည်း အစိုးရလုပ်မလုပ်ဖြစ်လျှင် ပိုင်ရှင်သီးစား လုပ်နေသူများကို ပြန်ချထားပေးရသည့် ဥပဒေရှိပါသည်။ ၄င်းဥပဒေကို အကောင်အထည်မဖော်ခဲ့ကြပါ။

ယခုစက်ရုံသစ်ဆောက်လျှင် မြေပိုင်ရှင်များကို ထိုက်သင့်သောလျော်ကြေးပေးသင့်ပါသည်။

စက်ရုံသစ်ကြီးဆောက်လာလျှင်

(၁) သဘာဝပတ်ဝန်းကျင်ဆိုးကျိုးကြီးမားစွာမထိခိုက်အောင် ဆောက်လုပ်ပေးစေချင်ပါသည်။

(၂) လက်ရှိ ၄င်းနေရာတွင် စိုက်ပျိုးလုပ်ကိုင်စားသောက်နေသူများ ကို ဘဝမပျက်အောင် ထိုက်သင့်သော် နစ်နာကြေးပေးရန်လိုအပ်။

(၃) မိမိနယ်မြေအနီးရွာသားများ အလုပ်လက်မဲ့များ အခွင့်အလမ်းရရှိမည်ဆိုလျှင် ကန့်ကွက်ရန်အကြောင်း မရှိပါ။

ယခုစက်ရုံဟောင်းကြီးမှာ ကြံ့ခိုင်မှုမရှိတော့ဟုသိရှိရပြီး အထိအခိုက်တော့ ကြီးကြီးမားမား ဘာမှမရှိသေးပါ။ စက်ရုံတွင် မိမိတို့၏ရွာမှရွာသား ၅ဦးခန့်သာ အလုပ်အကိုင်ရရှိနေပြီး ကျပန်းအလုပ်လုပ်ရသူများ သာရှိသည်။

မိမိတို့ရွာမှာဘွဲ့ရ ၁၀၀ခန့်ပင်ရှိမည်ထင်ပါသည်။ အစိုးရအလုပ်မရနိုင်လောက် အောင်ပင်အသက်များကြီး ကုန်ပါ ပြီ။

နိုင်ငံတော်အတွက်လည်း ပိုကောင်း၊ ကျေးရွာများအတွက်လည်းပို၍ ဖွံ့ဖြိုးလာမည်ဟုထင်ပါသည်။ ရွာသားများ အားလုံးက ကြိုဆိုပါသည်။

ဦးလှဖြိုး အသက် ၇၈နှစ်

ရွာမိရွာဖ၊ ပန်းတော်ပြင်ရွာ၊ မင်းလှမြို့နယ်။

ယခင်က(မဆလ)ခေတ် ရွာလူကြီးလုပ်ခဲ့ပါသည်။ မိသားစု (၇)ဦးရှိပါသည်။ စစအရေးအခင်းပြီးနောက် ရွာလူကြီးများကို မလေးစားသည့် အပြုအမူများကြောင့် ရပ်ရွာအရေးများတွင် ဝင်ရောက်မလုပ်တော့ပါ။

စက်ရုံသစ်ကြီးပေါ်လာလျှင် ရပ်ရွာအတွက်ကောင်းပါသည်။ အလုပ်အကိုင်၊ ဗဟုသုတ လမ်းပန်းဆက်သွယ်ရေး လုံခြုံရေး ကအစ ပို၍ကောင်းလာပါမည်။ ရွာတွင် အလုပ်လက်မဲ့ ဘွဲ့ရများစွာ ရှိသည်။

ဘွဲ့ရကျောင်းပြီးစက်ရုံတွင် အလုပ်လျှောက်သော်လည်း မရပါ။ မိမိတွင် ကပစ (၂) စက်ရုံကြောင့် လုပ်စားနေသည့် မြေ ဇက ၈ ဇကခန့်အားလုံး

ပါသွားသည်။ လျော်ကြေးလုံးဝမရရှိခဲ့ပါ။ သားသမီး ၅ ဦး ပညာသင်နေခိုက်အထူးစိတ်ထိခိုက်ခဲ့ ရပြီး စိတ်ကိုမရှူးအောင်မနည်းပင်ထိန်းခဲ့ရပါသည်။ စိတ်ဓါတ်အလွန် ကျပြီး လူ့လောကပင် ရပ်တည်ဖို့ပင်ခက်ခဲခဲ့ ရသည်။

ယခင်မဆလခေတ်စိုက်ပျိုးမွေးမြူရေးသင်တန်းအတွက်မြေ ၂၂ဇက ပါသွားပြီး ယခုအထိ အကောင်အ ထည် လည်းမပေါ်နိုင်၍ ပြည်သူကိုလည်းလည်းပြန်မပေးနိုင်ခဲ့ဘဲ မိမိတွင်ဂုဇကခန့် ပါသွားခဲ့ပါသေးသည်။ မြေစာရင်း တွင်လည်းအတိအကျရှိမည်မထင်၊ ပိုင်ရှင်လယ်သမားများ ယခုအထိအခက်အခဲရှိနေသည်။

စနစ်တကျပွင့်လင်းမြင်သာစွာ ဆောင်ရွက်နိုင်တဲ့ စက်ရုံတစ်ခုဖြစ်လာစေချင်ပါတယ်။

မိမိတို့ရွာသည် အိမ်ခြေ၃၀၀ ခန့်တွင် ဘွဲ့ရ ၅၀ခန့် အလုပ်လက်မဲ့များ ရှိနေပါသည်။ သို့သော်စက်ရုံတွင် ၁၀ဦး ခန့်သာ အလုပ်အကိုင်ရနေကြသည်။ နောင်လာမည့် စက်ရုံသစ်အတွက် အလုပ်အကိုင်အခွင့် အလမ်းသစ် များ ပို၍ရနိုင်ပါကအဆင်ပြေပါမည်။ ကျပန်းအလုပ်များဖြင့်သာ လုပ်ကိုင်နေကြရပါသည်။

စက်ရုံကြီး၏ ခိုင်ခံ့မှုကအလွန်ပင်အရေးကြီး၍ တာဝန်ယူမှုရှိရန်လိုအပ်ပါသည်။

ဒေါ်သင်းသင်းခိုင် (၃၂)နှစ် ဖုန်း ၀၉၄၀၁၆၃၈၁၉

သားဖွားဆရာမ၊ ပန်းတော်ပြင်ရွာ မင်းလှမြို့နယ်။

ရွာရောက်သည်မှာ (၁)နှစ်ခန့်သာရှိပါသည်။ ယခင်က အခြားရွာ များတွင် အလုပ်တာဝန် ထမ်းဆောင်နေပါ သည်။ ကျန်းမာရေးအနေနဲ့ အများအားဖြင့် သွေးတိုးရောဂါပို၍အဖြစ်များလာပါသည်။ ယခင်နှစ်ဖွန်၊ ဇူလိုင်လမှာ မျက်မှေးရောင်ရောဂါများ ဖြစ်ခဲ့ကြသည်။ ဒူးနာ၊ ဒူး ကိုက် ရောဂါများမှာ သွေးတိုးဖြစ်သူများတွင် အများဆုံးပိုခံစားရ ပါသည်။ သံပုရာကန်တွင် ခြင်ပိုကိုက်လာသည်ဟု သိရသည်။ သံပုရာကန်တွင် ပိုက်ရေကို လှောင်၍သုံးရသောကြောင့် ပို၍ယခင်ထက် ခြင်ပိုများ လာသည်ဟုထင်ပါသည်။ ရေကိုစနစ်တ ကျမလှောင်လျှင် ခြင်ပို၍ ပေါက်များတတ် ပါသည်။ မိုးဦးရာသီမှာ သွေးလွန်တုပ်ကွေးအထိဖြစ်တတ်ကြသည်။

ဆေးခန်းအဆောက်အဦလုံးဝမရှိပါ။ မိမိအိမ်မှာဖြစ်သလို ဖွင့် ထားရပါ သည်။ Sub Centre တစ်ခုတော့ ရှိသင့်ပါသည်။

စက်ရုံသစ်ကြီးဆောက်လာလျှင်ပိုကောင်းသည်။ဘွဲ့ရအလုပ်လက်မဲ့များအတွက် မျှော်လင့် ချက်တော့ရှိလာ ပါသည်။ ဒီရွာတွေမှာ အမျိုးသမီးကလေးတွေပိုပြီးမွေးတာဟာ ထူးခြားမှုတစ်ခုပါပဲ။

ဦးဇန္ဒိ(သက်တော် ၄၀နှစ်) ၀၉၄၃၀၅၅၃၃၃၃
ပန်းတော်ပြင်ဘုန်းတော်ကြီး

ယခုရွာမှာကျောင်းထိုင်နေတာ ၁၅နှစ်ခန့်ရှိပါပြီ။
စက်ရုံသစ်ကြီးပေါ်လာမည်ကိုယခင်တစ်နှစ်ခန့်ကပင်ကြားမိ သည်။
ရွာသားများကတော့ အလုပ်အကိုင်အခွင့်အလမ်း ပို၍ရလာလျှင် ကောင်းပါသည်။ အနီးအနားကျေးရွာ အားလုံးပို၍ ဖွံ့ဖြိုးလာပါ မည်။

ဒေါ်ရီရီဝင်း ၃၂နှစ် ဖုန်း ၀၉၂၅၆၁၅၄၀၂
အလယ်တန်းပြဆရာမ| ပန်းတော်ပြင် အ.မ.က (ခွဲ)

စက်ရုံသစ်ကြီးဆောက်မည့်သတင်းကိုကြားခဲ့သည်မှာ ၁နှစ်ခန့်ရှိပါပြီ။စက်ရုံသစ်ကြီးတစ်ခုပေါ်လာလျှင်အ လုပ်အကိုင်အခွင့်အလန်းများ တော့ရလာတတ်ပြီး ပို၍ကောင်းပါသည်။ စက်ရုံကြောင့် လေထုကိုညစ်ညမ်စေခြင်း ဘယ်လောက်ထိခိုက်မည်ကို တော့ကျွန်မတို့မသိနိုင်ပါ။ ထွက်လာတဲ့အညစ်အကြေးစနစ်တကျ စွန့်ပစ် နိုင်တဲ့စက်ရုံဖြစ်ဖို့တော့လိုအပ်ပါတယ်။အငွေ့များကို မီးရှို့လို့ ထွက်လာတဲ့ ကာဗွန်ဒိုင်အောက်ဆိုဒ်ဟာ လေထုကိုမညစ်ညမ်းစေရန်တော့ နည်းလမ်း ရှာရမှာ စက်သုံးဆီ အလွယ်တကူဝယ်ယူရရှိပြီး အားလုံး အဆင်ပြေကြမှာ ဟု ထင်သည်။

စုစုပေါင်းကျောင်းသားဦးရေ ၃၀၀ နီးပါးရှိပါတယ်။ ၅တန်းမှ ၇တန်းထိ ကျောင်းသား ၁၀၀ကျော်ရှိပါတယ်။ စုစုပေါင်း ဆရာ ၈ဦးရှိပါတယ်။ စက်ရုံသစ်ကြီး တွေ့ပေါ်လာရင် အားလုံးဘက်စုံ တိုးတက်လာမှာပါ။

ဦးစန်းဌေး အသက်(၄၆) Ph:0933257229 အုပ်ချုပ်ရေးမှူး|သံပုရာကန်ရွာ ရေနံချက်စက်ရုံကြီး

တစ်ခုဆောက်မယ်လို့သတင်းကို ယခင်
(၁)နှစ်ကပင်ကြားသိရပါသည်။ယခင် သိမ်းထားသည့် မြေနေရာတွင် မိမိတို့ သံပုရာကန်မှ ရွာသား(၁၈)ဦးခန့်ပဲ စိုက်ပျိုးလျက်ရှိ ကြပါသည်။ ၎င်း တို့ထဲတွင်(၁၀)ဧက ခန့် ရှိနေသူများမှာ

(၁) ဦးစန်းဌေး
(၂) ဦးသောင်းဝင်း
(၃) ဦးစံမြင့်
(၄) ဦးသာနိုး တို့ဖြစ်ပြီး

ကျန်(၁၄)ဦးမှာ(၅)ဧက- အောက်ရှိသူများမှာ ၎င်းတို့မှာ

(၁) ဦးတင်မြင့်
(၂) ဦးအောင်ကြိုင်
(၃) ဦးသောင်းလှိုင်
(၄) ဦးငွေစိုး

(၅) ဒေါ်စန်းလှ

(၆) ဒေါ်ခင်အေး

(၇) ဒေါ်အေးခင်

(၈) ဦးခင်မောင်

(၉) ဦးတင့်ရွှေ

(၁၀) ဒေါ်ဆေးငြိမ်း

(၁၁) ဦးအေး

(၁၂) ဒေါ်ဝင်းကြည် နှင့် အခြား (၂) ဦးရှိမည်ထင်ပါသည်။

ယခင်လုပ်ခဲ့သော (၃)လ ခန့်က မြို့နယ်အုပ်ချုပ်ရေးမှူး မှကန့်ကွက် လျှောက်လွှာတင်ခိုင်း၍ အားလုံး သွားရောက်တင်ထားဆဲဖြစ်ပါသည်။ မြေသိမ်းစဉ်က သီးနှံလျော်ကြေး (၃)နှစ်စာ ကို လက်ခံရရှိခဲ့ပါသည်။ (၁၉၇၈) ခုနှစ်ကဖြစ်ပါသည်။ မြေလျော်ကြေးမရကြသောကြောင့် ယခုစက်ရုံသစ်ဆောက်လျှင် ထိုက်သင့်တဲ့လျော်ကြေး ကို ရရှိလိုပါသည်။

သီးနှံစိုက်ခ စက်ရုံကို မနှစ်ကထိစောင်းပေးနေခဲ့ရပါသည်။ ၁၀၀၀၀/ကျပ် အထိတိုးပြီး တစ်ဇက အတွက်ပေးရတယ်။ ဒီစိုက်ခင်းတွေမစိုက်ရတော့ဘူးဆိုရင်တော့ အခက်အခဲရောက်သွားမဲ့လူတွေပါတယ်။

စက်ရုံဟောင်းတုန်းကလည်း အလုပ်အကိုင် အတွက်အနီးအနားရွာကလူတွေ ကျဘန်း အလုပ်လုပ်ကိုင်ကြပါသည်။ အမြဲတမ်း၍ ဝန်ထမ်း(၃၀) ယောက်ခန့်သာရှိနေပါတယ်။ ယခုစက်ရုံသစ် ပေါ်လာရင်တော့ ကျွန်တော်တို့ရွာက ဘွဲ့ရတွေ အလုပ်ရစေချင်ပါတယ်။ ဘွဲ့ရအလုပ်လက်မဲ့တွေ အများကြီးဘဲ ရွာမှာရှိနေပါတယ်။ ဒီလူတွေအလုပ်ရသွားရင်တော့ရွာသားတွေပျော်မှာပါ။

ဦးသောင်းဝင်း

အသက်(၅၀)

မီးလင်းရေးကော်မတီဥက္ကဋ္ဌ/ နွားစာစဉ်းစက်ပိုင်ရှင်

သံပုရာကန်ရွာ

ဒီရွာဇာတိပါ။ စက်ရုံသစ်ဆောက်မယ်လို့ ပြောတာ ကိုတော့ကြားရတယ်။ စက်ရုံသစ် ဆောက်ရင် ရွာအ တွက် အလုပ်အကိုင် အခွင့် အလမ်းတွေ ပိုရရှိလာ မယ်လို့ ရွာသားတွေကြိုဆိုနေကြပါသည်။ ဒီရွာမှာစက် ရေတွင်း တူးရင် ဖန်တဲ့ရေပဲရလာပါတယ်။ ယခု ကျွန်တော့်အိမ်ကတွင်းဟာ ပေ၂၃၂ ပေနက်ပါတယ်။ နွားတောင်မသောက် ပါဘူး၊ ဖွတ်၊ လျှော်၊ ရေချိုး ဒါပဲ လုပ်လို့ ရပါသည်။ သောက်ရေကို စက်ရုံကပိုက်နဲ့ ပေးတဲ့ ရေ ကိုပဲ မှီခိုနေရပါတယ်။ ပေ ၆၀၀ လောက် ထိတူးရင်တော့ သောက်လို့ ရတဲ့မေတွေ့ မယ်လို့ ထင်ပါတယ်။ စက်ရုံအသစ်ပေါ်လာရင် ရေရှားလာမယ်လို့ တော့ တစ်ချက်စိုးရိမ်မိပါတယ်။

ဒေါ်ခင်နုယဉ် (PH- 09401555330)

အ.လ.ပြ၊ အ.မ.က သံပုရာကန်

မင်းလှမြို့နယ်

ရေနံချက်စက်ရုံသစ်ကြီးဆောက်လာရင်ကောင်းပါတယ်။အဓိက ကတော့ အလုပ်အကိုင် အခွင့်အ လမ်းတွေ ပိုကောင်းလာဘို့ပါပဲ။ ပညာတတ်လာပြီးရင် အလုပ်အကိုင် မရသူတွေ ဒီနယ်မှာ အများကြီးပါ။

ကျွန်မတို့ကျောင်းမှာ ကျောင်းသား စုစုပေါင်း(၁၄၀) နီးပါးရှိပါတယ်။ ဆရာ(၅)ဦးနဲ့ အထွေထွေ လုပ်သား(၁)ဦးပါ။ ဒီနေ့ ပိတ်ရက်ဆိုတော့ ဆရာမကြီးဒေါ်မိုးမိုးခိုင်မလာပါဘူး။ ဆရာမကြီးဖုန်းက 09401638250 ပါ။ ကျောင်းက 1958ခုနှစ်က စဖွင့်တယ်လို့သိရပါတယ်။

မူလွန်ရဘို့အတွက် 2014/2015 ပညာသင်နှစ်မှာ တင်ထားပါတယ်။ ယခု(၅) တန်းအောင်ပြီး ရင်တော့ စက်ရုံ ရှိ တွဲ အ.ထ.က ကိုသွားပြီးတက်ကျရတယ်။

ဦးဝင်းကြိုင် အသက်(၅၀)နှစ် 09401633911

ကားပိုင်ရှင်၊ သံပုရာကန်ရွာ

မင်းလှမြို့နယ်

မိသားစု(၅)ယောက်ရှိပါတယ်။ကျွန်တော်တို့ စီးပွားရေး ကိုင်တိုင်လုပ်နေရပါသည်။ စက်ရုံသစ်ကြီး ဆောက်မည် ကိုဝမ်းသာပါတယ်။ သားသမီးတွေ ဘွဲ့ရပြီးအလုပ်အကိုင်းရမည်ဟုမျှော်လင့်ကြပါသည်။ အနီးဆုံးရွာမှ အလုပ်လက်မဲ့များကို ပို၍ ဦးစားပေးခန့်ထားပေးစေချင်ပါတယ်။

ဦးကိုလတ် အသက်(၄၈)နှစ် Ph:092015630/ 09401572324

သံပုရာကန် NLD တာဝန်ခံ နှင့် မင်းလှမြို့နယ်သတင်းပြန်ကြားရေးတာဝန်ခံ

သစ္စာရောင်ခြည်စာကြည့်တိုက်(သံပုရာကန်)တာဝန်ခံ

စက်ရုံကြီးဆောက်မည့် သတင်းကို ကြားတာ(၂)နှစ်ခန့် ရှိပါပြီ။ စက်ရုံ(ယခု) ဆောက်ပြီးနောက်မှ ကျွန်တော်တို့ရပ်ရွာများလမ်းပန်းဆက်သွယ်ရေးပိုကောင်းလာပါတယ်။ ယခင်စက်ရုံ သိမ်းထားမြေများကို အနှစ်(၃၀)ပြည့်ပြီးဖြစ်ပြီး ပြန်လည်၍ အစိုးရက ဂရမ်လုပ်ရမည်ဖြစ်သောကြောင့် ကန့်ကွက်မည့်သူများ လာရောက်ကန့်ကွက်နိုင်ကြောင်းမြို့နယ်အုပ်ချုပ်ရေးမှူးကစာထုတ်ခဲ့ပြီး သွားရောက် ကန့်ကွက်ထားခဲ့ကြပါ သည်။ မြို့နယ်မှ ပေးပို့သည့် စာကို ရွာသားများ သိရှိခဲ့ရပါ ဤရွာနောက်ကျမှ သိခဲ့ရပါသည်။

စက်ရုံဟောင်းလာဆောက်စဉ်က ပွင့်လင်းမြင်သာမှုမရှိခဲ့ပါ။ စက်ရုံမြေတွင် ပါဝင်နေသော မြေပိုင်ရှင် များ တစ်နည်းစက်ရုံအတွက် မသုံးဘဲ ထားမြေကို ပြန်လည်၍ ရွာသားများရရှိနိုင်ရေး အတွက် အထက်နှင့် ညှိနိုင်း ဆောင်ရွက်နေပါသည်။

မင်းလှမြို့နယ်NLDဥက္ကဋ္ဌနှင့် ညှိနိုင်းပြီး နှစ်ဦးနှစ်ဖက် အဆင်ပြေအောင်စီစဉ်နိုင်ရန် အတွက် ဆွေး နွေးထားရှိပါသည်။

ကျေးရွာနှင့် စက်ရုံဖက်ပြဿနာကို မဖြစ်စေချင်ပါ။ စက်ရုံသစ်ကြီးပေါ်လာလျှင်ငှင်းတွက် စိုက်ပျိုးနေ သူများအားသင့်တင့်သောလျော်ကြေးကိုတော့ ပေးစေချင်ပါသည်။ထို့ပြင်စက်ရုံတွင် ဝန်ထမ်းများကိုဝင်ရောက် လုပ်ကိုင်လိုကြပါသည်။ ရွာတွင်ဘွဲ့ရ တော်တော်များများရှိကြပါသည်။ (၂၀)ဦးခန့်ပင်ရှိမည်ဖြစ်သည်။

စက်ရုံဟောင်းတုန်းက ကျေးရွာတွင် စာပေတတ်သူမရှိ၊ အမြင်မကျယ်မှု ကြောင့် အလုပ်မဝင်ခဲ့ ကြ ပါ။ ဤရွာမှ စက်ရုံဝန်ထမ်း(၅)ဦးခန့်သာရှိသည်။

စက်ရုံကြီးများဆောက်လျှင် နိုင်ငံပို၍တက်လာမည်ဟုယူဆပါသည်။ သို့ရာတွင် ဆိုးကျိုးများကို နိုင် သလောက် လျော့ချအောင်အတွက် ဆောင်ရွက်သင့်ပါသည်။

စက်ရုံကြီးများမရှိလျှင်ရပ်ရွာဖွံ့ဖြိုးမှုမဖြစ်နိုင်ပါ။ ကျေးရွာတွင် သစ္စာရောင်ခြည်စာကြည့်တိုက်ကို ကျွန်တော် ဦးစီးထူထောင်ထားပါသည်။

ကိုအောင်ကျော်ဆန်း အသက်(၆၈နှစ်)

တောင်သူ(မြေပါသွားသူ)

သံပုရာကန်ရွာ

အစိုးရသိမ်းထားမြေတွင် ၂ဧကခန့်ပါသွာပါသည်။ မိမိ စုစုပေါင်း စိုက်ဧကမှာ(၁၀)ခန့်ရှိသည်။ တစ်နှစ်ထက် တစ်နှစ်အထက် လျော့လာခဲ့ပါသည်။ ၎င်းနေရာတွင်ပင် လုပ်ကိုင်စားသောက်နေသူများတွင်ပါသွားလျှင် စားစရာမရှိဖြစ်သွားနိုင်ပါသည်။

သို့ရာတွင် စက်ရုံအသစ်ဆောက်မည် ဆိုလျှင် တော့ ရွာအတွက် အလုပ်အကိုင် အခွင့်အလမ်းများပို ၍ရလာလျှင်တော့ကောင်းပါသည်။

အသိမ်းခံတာရမြေများဂရမ်လုပ်လာရာတွင် ကန့်ကွက်လို သူများ ကန့်ကွက် နိုင်ကြောင်း ကျေးရွာသို့အသိပေးစာကို ကျေးရွာ အုပ်ချုပ်ရေးမှူးက စာကို အချိန်မီမပြ ခဲ့၍ နောက်ကျပြီးမှ မြို့နယ်အုပ်ချုပ်ရေးမှူးရုံး သို့ကန့်ကွက်စာတင်ခဲ့ကြရပါသည်။

ဦးသောင်းလှိုင် အသက်(၆၈)နှစ်

မြေပါသွားသူ

သံပုရာကန်ရွာ

အိမ်ထောင်စုဝင်ဦးရေ(၁၂)ဦးရှိပါသည်။ ယခင် စုစုပေါင်းတောင်ယာစိုက်ဧက(၁၁)ဧကရှိခဲ့ပြီး အသိမ်းခံရ ၍ ယခုမှာ (၃)ဧကခန့် ၎င်းမြေပေါ်တွင် စိုက်ပျိုးနေခဲ့ပါသည်။ ကန့်ကွက်နိုင်ကြောင်း စာကို မိမိတို့အားလာရောက် မပြ၍မသိရှိခဲ့ရပါ။

၁၉၇၈ခုနှစ် မှစ၍ အသိမ်းခံခဲ့ရပြီး ၁ဧက ကို (၁၀၀၀/)ထုတ်ပေးပါသည်။ ပြီးတော့ သီးနှံကြေး (၃)နှစ်စာလျော်ခဲ့တယ်ဟုသိရ။ ယခင်(၁၀)နှစ် ခန့် က စက်ရုံမူး ဦးကျော်ဆွေ ခန့်ခဲ့စဉ်ကပင် ၁ဧကကို (၃၀၀၀/) ကပေးသွင်းခဲ့ရပြီး နောက်ပိုင်း တစ်ဖြေဖြေး တိုးလာကာ (၁၀၀၀၀/) အထိပေးခဲ့ရသည်။ တစ်နှစ်တွင် (၂)သုတ် ခွဲပြီးကောက်ခံခဲ့ကာ မနှစ်ကမှ ၎င်းသွင်းရငွေရပ်သွားခဲ့သည်။ ရွာသားများစုပြီး စက်ရုံ ကို သွားပေးခဲ့ရသည်။

မိမိတို့ ငယ်စဉ်က ဂျီ၊ ယုန် များပေါများစွာရှိပြီး ဒေါင်းများပင်ရှိပါသည်။ တဖြေးဖြေးလူနေထူထပ်လာပြီး တောများ ကို ခုတ်သောကြောင့် သတ္တဝါများ ပါပျောက်သွားခဲ့ပါသည်။

ကိုသိန်းဇော်ဦး (၃၀နှစ်) 0931824032

ပြည်ခိုင်ဖြိုးပါတီကိုယ်စားလှယ်

သံပုရာကန်ရွာ

မင်းလှမြို့နယ်

မိသားစုရှိပါသည်။ တောင်သူအလုပ် ပဲ၊ နမ်းဝါ စိုက်ပျိုးပါတယ်။ စက်ရုံသစ်ကြီးတစ်ခုပေါ် လာမည်ကို ပြောသံကြားနေပါသည်။ ကြိုဆိုပါသည်။ နိုင်ငံတော် အတွက် အကျိုးရော ပြည်သူတွက်ပါရှိမည်။

အဓိကဖြစ်စေချင်သည်မှာ မိမိ တို့ ၏ ရွာမှ ဘွဲ့ရများရှိ၍ ပို၍ဦးစားပေးခန့်ထားစေချင်ပါသည်။ ဒါမှ ကျေးရွာများလည်းပို၍ဖွံ့ဖြိုးတိုးတက်လာပါမည်။

ဦးငွေစိုး အသက်(၈၃)နှစ်

ရပ်မိရပ်ဖ၊ သံပုရာကန်ကျေးရွာ

ကျွန်တော့်ဇာတိရွာဖြစ်ပါတယ်။ မိသားစု(မြေးများနှင့်နေ) စုစုပေါင်း(၆)ဦးရှိပါတယ်။ စက်ရုံဟောင်းဆောက်တုန်းက မိမိ တွင်လယ်မြေ အများဆုံးပါခဲ့- သီးနှံလျှော်ကြေး နည်းနည်းပါးပါး သာရရှိခဲ့။ ဇက (၄၀)ခန့် သိမ်းဆည်ရာတွင်ပါသွားခဲ့။ မိမိတို့ရွာသားများ လျော်ကြေးများများ မရရှိဘဲ့ အခြားရွာသားများသာအများအပြား ရရှိခဲ့သည်။ ယခင်အခါတုန်းကစက်ရုံ မဆောက်မီ အိမ်ခြေ ၁၀၀ခန့်သာရှိသည်။ ယခုအခါ (၃၀၀)ကျော် တိုးလာပါသည်။ အခြားပြင်ပ မှ ရွာသားများ ပြောင်းလာခြင်း စက်ရုံဝန်ထမ်းများ အခြားမှ လာပြီးအခြေချခြင်း များရှိလာ သည်။

စက်ရုံဟောင်းနေရာတွင် သိမ်းထားမြေများကို ကြားမှရောင်းစား သူ၊ ပြန်ဝယ်နေသူများ ရှိနေပါသည်။ အနီးရှိ ကပစ တပ်မှမြေများ သိမ်းခံထားရပြီး လျော်ကြေးလုံးဝမပေးပါ။

မိမိတို့တွင်ဗမာလူမျိုး(ဗုဒ္ဓဘာသာ)များအဓိကလုပ်ကိုင်နေထိုင်ကြပါသည်။ တောင်သူပဲစိုက်သူများ နှင့်ကျဘန်း လုပ်သူများအဓိကရှိနေသည့် ရွာဖြစ်ပြီးရွာ၏ စီးပွားရေးမှာ ပဲစိုက်ခြင်းဖြစ်သည်။ ကျဘန်းလုပ်သူများက ရေနံချက်စက်ရုံအတွင်း နှင့် ဝန်ထမ်းများမှ နေ့စဉ်ခေါ်ယူခိုင်းစေခြင်းလုပ်ငန်းဖြစ်သည်။

တစ်ဦးလျှင် ၃၀၀၀/မှ ၅၀၀၀/ အထိ နေ့တွက်ပေးတတ်ကြသည်။ စိုက်ပျိုးရေးတောင်သူများမှာ ပဲ၊ နှမ်း၊ ဝါစိုက်ပျိုးပြီး စပါးစိုက်ပျိုးသူ အလွန်နည်းသည်။

လမ်းပန်းဆက်သွယ်ရေး/ကျန်းမာရေး၊ ပညာရေး

စက်ရုံမဆောက်မီကအလွန်ခေါင်သောရွာများဖြစ်သည်။ လှည်းလမ်း မျှသာရှိသည်။ စက်ရုံဆောက်ပြီး နောက်ပိုင်း လမ်းပန်းဆက်သွယ်ရေးပိုကောင်းလာပါသည်။ လမ်းပန်းဆက်သွယ်ရေးကောင်းလာခြင်းကြောင့် ကျန်းမာရေး အတွက် အလွယ်တကူသွားရောက်နိုင်ပါသည်။ စက်ရုံတွင်းရှိ ကျန်းမာရေးဌာနကို သွားရောက်ကြပြီး အရေးကြီးလာလျှင် မင်းလှဆေးရုံ ကိုသွားရောက်ကြသည်။ ပညာရေးအတွက်လည်း ပို၍ကောင်းလာကာ (၁၀)တန်းအောင်ဘွဲ့ရများများရှိလာကြသည်။

အလုပ်အကိုင်အခွင့်အလမ်း

ဘွဲ့ရများစာရှိသော်လည်း စက်ရုံတွင် ဝန်ထမ်း မိမိတို့ရွာမှ အနည်းငယ်သာရှိပါသည်။ စက်ရုံသစ်ကြီး ဆောက်လာလျှင် မိမိတို့ရွာရှိ ဘွဲ့ရများ ကို ပို၍ ဦးစားပေးခန့် ထားစေလိုပါသည်။ ရွာသား အားလုံးက စက်ရုံ သစ်ကြီး ဆောက်လာလျှင် အလုပ်အကိုင် အခွင့်အလမ်း ရဘို့ကို မျှော်လင့်နေကြသည်။

သောက်သုံးရေ

ယခင်က ရေအလွန်ရှားခဲ့သည်။ ယခုအခါ စက်ရုံမှ သောက်ရေကို ရွာသို့ပိုက် ဖြင့် သွယ်ပေး ခဲ့ခြင်းကြောင့် ရွာသားများရေမငတ်တော့ပါ။ သို့ရာတွင် စက်ရုံမှ အစောင့်များ နှင့် အဆင်ပြေအောင် နေရပါသည်။ ရေမပေးလျှင် ဒုက္ခရောက်ပါမည်။ ယခင်ရောက်ရှိခဲ့ ယခုအခါ ရေကန် ခန်းသွားပြီးဖြစ်။

ရွာတွင်အဝီစိတွင်း(၃)တွင်းခန့်ရှိသည်။ ပေ(၄၀၀)ကျော်တူးရပြီး သောက်ရေမထွက်ပါ။နွားသောက်ရေ၊ လျော်ဖွတ်၊ ရေချိုးအဆင့်သာရရှိပါသည်။

လျှပ်စစ်မီး

ကိုယ်ထူကိုယ်ထ စနစ်ဖြင့် လျှပ်စစ်မီးလင်းရေးကော်မတီမှ ကျေးရွာမီး ရရှိပြီး(၂၄) နာရီ မီးရရှိ ရန်ဆောင်ရွက်နေသည်။

ကိုယ်ပိုင်မီးစက် မီးပေးပါသည်။ ညမှမီးရသည်။ မီးမယူနိုင်သေးသည့် အိမ်များကတော့ ဖယောင်းတိုင်ပဲ သုံးကြရပါသည်။

တိရိစ္ဆာန်၊ သစ်ပင်

ယခင် ရှားတောကြီး၊ ဝါးတောများ၊ မကျည်း၊ အင်ကြင်း စသည့်သစ်ပင်များ ထူထပ်စွာ ပေါက်ရောက်နေပြီး မိမိတို့ ဒေသကို ဖုံးလွှမ်းထားခဲ့။

စက်ရုံနေရာတွင် စက်ရုံ ဆောက်ပြီး နောက်တောပြုန်းသွားခဲ့ပြီး၊ အခြားနေရာများတွင် လူများကလောင်စာထင်း၊ မီးသွေးဖုတ်ရန် ဝင်ရောက်ခုတ်ထွင်ပီး လူများလာသည်နှင့် သစ်ခုတ်မှုကြောင့် တောပြုန်းခဲ့ရသည် ဟုထင်မိ၊ ယခုအခါ မကျည်း၊ ထနောင်း၊ တမာ ပင်များသာကျို့တို့ကျဲတဲရှိနေ။

စက်ရုံမဆောက်မီက သမင်၊ ဂျီ စသည်များရှိခဲ့ပြီး ယခုအခါလုံးဝ မရှိတော့သလောက် ပျောက်ကွယ်သွားခဲ့။

မိမိတို့ ငယ်ငယ်တုန်းက ကျားပင်ရှိခဲ့ပြီး အိမ်က နွားကို လာရောက်ဆွဲခဲ့ဖူးကြောင်းသိရှိခဲ့ရ။ မြွေပွေး၊ မြွေဟောက်၊ ပတတ်များမှာ ယခုထိရှိနေသေးကြောင်း။

လုံခြုံရေး

စက်ရုံမဆောက်မီ၊ ကျေးရွာလုံခြုံရေး အထူးပင် စိုးရိမ်းနေကြရ။ ခါးပြတိုက်ခံဘူးကြပါသည်။ မကြာမကြာ ပင်ဖြစ်သည်။ စက်ရုံဆောက်ပြီးလုံခြုံရေး ပိုကောင်းလာပါသည်။

အထွေထွေ

စက်ရုံအသစ်ကြီး ဆောက်လာမည်ဟု ပြောသံကြားနေရသည်။ ရွာသားအားလုံး မျှော်လင့်နေကြသည်။ မိမိတို့ ရွာပို၍ အလုပ်အကိုင် ကောင်းလာကြမည်ဟုမျှော်လင့်နေကြသည်။

တစ်ခါတစ်ရံ စက်ရုံမှ နေနံ အနံ့ရတတ်ပါသည်။ အထူးသဖြင့် နွေသီးပေါက် မတ်လနှင့်ဧပြီ လတွင်ဖြစ်ပါသည်။စက်ရုံမှ မိမိတို့ရွာမှ အရှေ့တောင်ဘက်တွင် ရှိသောကြောင့် ဒီရာသီမှာ လေသင့်၍ ရေနံ အနံ့များ ရရှိတတ်ပါသည်။

စက်ရုံရေဆိုး ထွက်ပေါက် အနီးစိုက်ခင်း လယ်များမှ အထူးပင်မြေဩဇာကောင်း၍ စိုက်ပျိုးဖြစ်ထွန်းပါသည်။ နွေရာသီတွင် ပါ(၂) သီးစိုက် ၍ ရသောကြောင့် အကျိုးရှိသည်။



(၁) **ဦးအောင်ဇော်ဝင်း - ၄၂ နှစ်**

ရွာအိမ်မျူး၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။

ဇာတိရွာဖြစ်သည်။ ရေနံချက်စက်ရုံနှင့် (၃)မိုင်နီးပါးသာ ဝေးပါသည်။၄င်းနေရာတွင် အလုပ်လုပ်နေသူ မရှိပါ။ ရေနံချက်စက်ရုံသစ်ကြီး ဆောက်လုပ်မည့်သတင်းကို ယခင်နှစ်ကပင်ကြားသိရပါသည်။ ရွာတွင်ဘွဲ့ရ ၂၅ဦး မှ ၃၀ ဦးအထိရှိပါသည်။ သို့ရာတွင် ရွာသားများက ဤသတင်းကိုအများမသိရသေးပါ။

PIC နှင့် အဆက်အစပ်နည်းပါသည်။ ဈေးတွင်ဤရွာမှ (၄)ဦးခန့် သွားရောက်ရောင်းချနေပါသည်။ ရွာသားများ အလုပ်အကိုင်သစ်များရလာမည်ဟု မျှော်လင့်ပါသည်။ မိမိနယ်မြေတွင် စက်ရုံသစ်ကြီးများ ထပ်မံပေါ်လာလျှင် နယ်မြေဒေသဖွံ့ဖြိုးလာပါမည်။

(၂) **ဦးအောင်သိန်း - အသက် (၆၅)နှစ်**

စာရေးကြီးဟောင်း - ရပ်မိရပ်ဖ

ဥယျာဉ်ရွာ၊ မင်းလှမြို့တယ်။

ယခင်နှစ် ၁၀၀ကျော်ခန့် ကပင် ရွာကြီးရှိနေပြီ ဖြစ်သည်။ လက်နက်စက်ရုံ (ကပစ)များကြောင့်သစ်တော်များထဲမှ တောကောင် ဂျီဒရယ်များ ပျောက်သွားခဲ့သည်။

မလွန် ကစလ (လယ်ယာသုံးထွန်စက် စက်ရုံ)မဆောက်မီတွင် ကျားသစ်များပင်ရှိခဲ့ပါသည်။ ယခုအခါယုန်၊ မြေခွေးများ မရှိတော့ပါ။ စက်ရုံသစ်ကြီးဆောက်မည်ကို ကြိုဆိုပါသည်။ အလုပ်အကိုင် အခွင့်အလမ်းရှိလာမည်ဖြစ်သည်။

(၃) **ဦးသန်းထွန်း - (၅၀)နှစ်**

ရပ်မိရပ်ဖ၊ ဥယျာဉ်ရွာ၊ မင်းလှမြို့နယ်။

စက်ရုံဟောင်းနှင့် (၂)မိုင်ခန့်ဝေးမည် ထင်ပါသည်။ စက်ရုံဟောင်းပိတ်ပြီး ဆေးကြောကာစွန့်ပစ်ရေမြောင်းတွင် ရေနံပုတ်နံနံတတ်ပါသည်။ ၄င်းရေဆိုးမှာ ရေကန်မှတဆင့် ဥယျာဉ်ရွာအရှေ့ဘက် ဇရပ်တီမြစ်ထဲ အထိ စီးဆင်းတတ်ပါသည်။

ရေလမ်းတလျှောက်မှာတော့ စိုက်ပျိုးခင်းအားလုံး လှပကောင်းမွန်စွာ အထွက်ကောင်းပါသည်။ စနစ်တကျ ရေကိုသန့်ရန်တော့ လိုအပ်မည်ထင်ပါသည်။

(၄) **ဦးအေးဝင်း - ၅၀ နှစ်**

ရပ်မိရပ်ဖ၊ ဥယျာဉ်ရွာ၊ မင်းလှမြို့နယ်။

ရေနံချက်စက်ရုံသစ်အဆင့်မှီဖို့တော့ လိုမည်ထင်ပါသည်။ ရေနံချက်စက်ရုံဟောင်းမှာ လည်းကြာမြင့်နေပြီဖြစ်သောကြောင့်အနီးအနားနေထိုင်သူများ အန္တရာယ်မရှိနိုင်အောင်တော့ ထိန်းထားရန် လိုအပ်မည် ထင်မိပါသည်။ စက်ရုံသစ်ကြီးတစ်ခု ပေါ်လာမည့်အတွက် အားလုံးဝမ်းသာနေကြပါသည်။

အိမ်ခြေ 200 ခန့်ရှိ
မူလတန်းကျောင်း၊ ဘုန်းကြီးကျောင်းတစ်ကျောင်းရှိ
စာကြည့်တိုက်ရှိ
ကား(၁)စီး၊ သုံးဘီးဆိုင်ကယ် (၃)စီး
မော်တော်ဆိုင်ကယ် အစီး(၁၀၀)ခန့်
တီဗွီ အလုံး ၁၀၀၊Sky Net ၃ လုံး၊ Radio ၁၀လုံး ရှိ
ရွာပိုင်စိုက်ဧက ၁၅၀ခန့်သာရှိ
အများစုမှာ ကျပန်းလုပ်
မင်းလှနှင့်မလွန်သို့သွားရောက်လုပ်ကိုင်ကြရ
ကျား/မ (၆၀)ခန့် ကျပန်းလုပ်ကိုင်
အဓိကစီးပွားရေးမှာ တောင်သူ ၊နှမ်းစိုက်

၁။ ဦးအေးလှိုင် (၆၇ နှစ်)

ရွာတော်ကျေးရွာ ရာအိမ်မှူး၊ မင်းလှမြို့နယ်။

၂၀၁၃ခုနှစ်၊ဇန်နဝါရီလမှစတင်၍ ရွာအိမ်မှူးလုပ်ခဲ့ပါသည်။ မိသားစု ၈ ယောက်ရှိပါသည်။ သားသမီး (၈) ဦး၊ မြေးတစ်ဦးနှင့်အတူ နေထိုင်ပါသည်။ စက်ရုံကြီး၏မြောက်ဘက် ယခုသိမ်းဆည်းမြေထဲတွင် ၁.၅ဧကခန့် ပါရှိသည်။ မြေကျန် ၆.၅ ဧကရှိသည်။ အများအားဖြင့် နှမ်းစိုက်ပါသည်။ တစ်ဧကကို စက်ရုံသို့ တစ်နှစ်အ တွက် ၁၀၀၀၀/-ပေးရပါသည်။စက်ရုံမှ သိမ်းပြီးနောက်က စပြီးမြေခွန်ပေးလုပ်ရပါသည်။

စက်ရုံဆောက်မည့်သတင်းကို ကြားရသည်မှာ တစ်နှစ်ခန့်ရှိပါပြီ။ စက်ရုံဟောင်းအတွက် မြေသိမ်းစဉ်က သီးနှံလျော်ကြေး (၃) နှစ်စာအတွက် ၁ဧကကို ၃၀၀၀/-ရခဲ့ပါသည်။ သို့ရာတွင် ရွာသားတော်တော်များများစိတ်မကောင်း ဖြစ်ခဲ့ရပါသည်။

ရေနံချောင်းသားဇာတိ စက်ရုံမှူး ဦးအုံးမြင့်လက်ထက်တွင် ဝင်ရောက်သီးနှံ စိုက်ပျိုးတောင်သူများကို အခွန်ငွေလုံးဝမပေးဆောင်ရပါ။ နောက်စက်ရုံမှူးများပြောင်းလာပြီး တဖြေးဖြေးသီးနှံကြေးတိုးဆောင်လာခဲ့ရ ပါသည်။

သားသမီးများ ပညာတတ်ဖြစ်လာသောကြောင့် အားလုံးက စက်ရုံသစ်ကြီးကို ဆောက်စေချင်သည်။ ဒါမှ အလုပ်တွေရကြ အားလုံးမိသားစုနှင့် မခွဲမကွာနေချင်ကြသည်။ ဘာသာရေးပွဲတော်၊ ရွာဘုရား ပွဲတော်များ အဖြစ် တပို့တွဲလ၊ တပေါင်း၊တန်ခူးအထိ (၃)လစလုံးပွဲလမ်းများရှိပါသည်။ ရွာတွင် ဘုန်းကြီးကျောင်း တစ်ကျောင်းရှိပါသည်။

ရွာတော် ကျေးရွာ၏ အချက်အလက်များ

၁။	TV	-	၁၅၀ခန့်
၂။	Sky net	-	၆ လုံး
၃။	ရေဒီယို	-	၁၅ လုံး
၄။	တယ်လီဖုန်း	-	၁၇၀ လုံး
၅။	ကား	-	၁၃ စီး
၆။	သုံးဘီးဆိုင်ကယ်	-	၁ စီး
၇။	မော်တော်ဆိုင်ကယ်	-	၁၅၀ခန့်
၈။	လှေကျည်ဆိုင်	-	မရှိ
၉။	အရက်ဆိုင်	-	၂ ဆိုင်
၁၀။	ဘိလိယက်ခုံ	-	၁ခု
၁၁။	ကုန်စုံဈေးဆိုင်	-	၈ ဆိုင်

စာကြည့်တိုက်ရှိပါသည်။ ဆေးခန်းနှင့် ကျန်းမာရေးဆရာမ လုံးဝမရှိပါ။

၂။ ဦးမြ (၅၉) နှစ်

ရေနံချက်စက်ရုံ ဝန်ထမ်း၊ ရွာတော်ကျေးရွာ၊ မင်းလှမြို့။

လုပ်သက် အနှစ် (၃၀) ရှိပါပြီ။ နောက်နှစ်တွင် သက်ပြည့်ပင်စင်ယူရပါတော့မည်။ သားသမီး ၃ ဦးရှိပါ သည်။ စက်ရုံတွင်အကြီးအကျယ် accident (၁) ကြိမ် ဖြစ်ဖူးပါသည်။ လွန်ခဲ့သော (၁၀) နှစ်ခန့်ကရှိမည် ။ စက်ရုံ၏ ဆိပ်ကမ်းဘေးလုံးလျောင်ကန်ကြီးထဲမှ ဆီခိုသူများကြောင့် မီးလောင်ပြီး ထပေါက်ကွဲကာ လူ ၄ ဦး သေဆုံးပါသည်။

စက်ရုံအသစ်ကြီးတစ်ခုထပ်ဆောက်စေချင်ပါသည်။ စက်ရုံအဟောင်းမှာနှစ် ၃၀ကျော်လာပြီး အလွန်ပင် အခက်အခဲများဖြင့် ရင်ဆိုင်နေရပါသည်။ သမီးတစ်ဦးရှိပြီး ဝိဇ္ဇာဘာသာတွဲဖြင့်ဘွဲ့ရထားသည်။ စက်ရုံမှ အလုပ် ခေါ်သည့်အခါ လျှောက်၍မရပါ။ အားလုံးအလုပ်အကိုင် အဆင်ပြေ ဖြစ်စေချင်ပါသည်။

၃။ ဦးအောင်စိ (၇၈ နှစ်)

ရပ်မိရပ်ဖ၊ ရွာတော်ကျေးရွာ၊ မင်းလှမြို့။

ဤဇာတိဖြစ်ပါသည်။အသက်၈ နှစ်ဂျပန်ခေတ်က ဒီရွာကို ဂျပန်များမီးရှို့ပြီး တစ်ရွာလုံးထွက်ပြေးခဲ့ရ သည်။ အင်္ဂလိပ်နှင့်ပေါင်းပြီး သူလျှိုလုပ်သည်ဟု စွပ်စွဲပြီးမီးရှို့ခံရသည်။ ဖခင်နှင့်အကို အဖမ်းခံခဲ့ရပြီး စကား ပြန်ဇ မာအချင်းချင်း အသိဖြစ်ကာ ပြန်လည်လွတ်မြောက်ခဲ့သည်။ ထိုအချိန်ကအိမ်ခြေ ၄၀ကျောခန့်သာရှိ မည်။ အငှားဆရာဖြင့် စာသင်ရသည်။

မိမိတို့ငယ်စဉ်ကအောက်ပြည်ကို သွားသည့်လေ့ကြီး ၄ စီးခန့်ရှိခဲ့သည်။ တော်လှန်ရေး ကောင်စီပေါ် လာပြီးနောက် ပျောက်သွားပါသည်။ အောက်ပြည်သို့ ဇီးသီးခြောက်နှင့်ပဲများကို ယူဆောင် ရောင်းချပြီး အောက်ပြည်မှ ဆန်၊ အိုးများကို သယ်ဆောင်လာခဲ့ကြသည်။

နောက်ပိုင်းပဲ့ထောင်စက်လှေများ ပေါ်လာပြီးနောက် ပျောက်ကွယ်သွားခဲ့ကြသည်။ ရွာအနီးတွင် ၁၅ ဇက ခန့် ဘေးမဲ့တော ဘုန်းကြီးကျောင်းတစ်ကျောင်းရှိပါသည်။

အနီးအနားတွင် ယခင်ကကျီ၊ သမင်၊ တောကြောင်များရှိခဲ့ကြပြီး၊ ကပစ စက်ရုံကြီးများ ပေါ်လာပြီးနောက် အားလုံးပျောက်ကွယ်သွားခဲ့ကြသည်။ ယခုအခါ ယုန်နှင့် ကြောင်များသာ တွေ့နေရသည်။

စက်ရုံသစ်ကြီးဆောက်လာမည်ဟု ပြောသံကြားနေရသည်။ အလုပ်အကိုင် အခွင့်အလမ်းကောင်း လာမည်ဟု မျှော်လင့်နေကြပါတယ်။

၄။ ဦးမျိုးမြင့်မောင် - ရွာတော်ဇာတိ

ဒုဦးစီးမှူး၊ ရွေးကောက်ပွဲကော်မရှင်၊ မင်းလှမြို့။

ရွာတော်ဇာတိဖြစ်သည်။ မိသားစု ၃ဦးရှိသည်။ ပြည်ခိုင်ဖြိုးတာဝန်ခံ လုပ်ခဲ့ပါသည်။ စက်ရုံသစ်ကြီး ဆောက် မည်ဟု သိရှိနေပါသည်။ စက်ရုံအနီးရှိကျေးရွာများမှ အလုပ်လက်မဲ့ ဘွဲ့ရများစွာ ရှိပါသည်။ ၄င်းတို့ကို စက်ရုံ သစ်ကြီးတွင်ခန့် ထား နိုင်ပါကပို ၍အဆင်ပြေပါမည်။ မိဘမြေများ လည်း သိမ်းခံခဲ့ရသည်။ ၃နှစ်စာ သီးနှံ ပျော်ကြေးကိုမိဘများ ရရှိခဲ့သည်ဟုသိရှိရသည်။ ဘယ်လောက်ရ သည်ကိုတော့ မသိခဲ့ရပါ။

၅။ ဒေါ်နှင်းသီဂီဝင်း - မူလတန်းပြဆရာမ

မူလတန်းကျောင်း၊ ရွာတော်ကျေးရွာ၊ မင်းလှမြို့။

ကျွန်မလုပ်သက် ၁၀နှစ်ခန့်ရှိပါပြီ ။ ကချင်ပြည်နယ်၊ ရွှေဂူမြို့ဇာတိဖြစ်ပါသည် ။ မိသားစုရှိပါသည်။ အမျိုးသားက PIC ဝန်ထမ်းဖြစ်သည်။ စက်ရုံသစ်ကြီး တစ်ခုဆောက်လုပ်စေချင်ပါသည်။ လူငယ်များ အလုပ်အကိုင်အခွင့်အလမ်း များ မျှော်မှန်း၍ရလာသည်။ စက်ရုံအဟောင်းတွင် မတော်တဆဖြစ်မှု ကြီးကြီးကျယ်ကျယ် ပြောသံကြားခဲ့ခြင်းမရှိပါ။

ဦးသန်းအောင် (သား) | ဦးမြမောင် - ပိုင်ရှင်

မယ်ဇလီတောကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဒီရွာမှာ အဖေတို့က မွေးကတည်းကနေတာပါ။ သိမ်းခံရတာ၅ ဇက။ နှမ်း၊ ဝါ စိုက်တယ်။ အကြွေးရှိတယ်၊ စိုက်ဘဏ်ကပေါ့ ယာထဲ၊ စားသောက်စရိတ်နဲ့အလုပ်သမား ငှားခတွေကုန်တာပေါ့။ သီးနှံလျော် ကြေးအနေနဲ့ ၁ဇက ၂၅၀၀/-နှုန်းရတယ် အဲခေတ်အနေနဲ့ အဖေတို့ အလှူအတန်းလေးလုပ်ရတယ်။ လိုအပ်တာက စားဝတ် နေရေးပေါ့ အဖေတို့နဲ့အတူနေညီမကို အလုပ်အကိုင်ရစေချင်တယ်။

ရက်စွဲ	၂၃-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးမြမောင်၊ ဦးမြမောင်အမည်ပေါက်
ဖြေဆိုသူ	ဦးသန်းအောင် (သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၃ ဦး ကျား - ၁၊ မ - ၂
ကျေးရွာ	မယ်ဇလီတောရ၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဖုန်းနံပါတ်	-
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ ထရံကာ၊ ပျဉ်ခင်း (၃)ပင်အိမ်
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ ရေဒီယို၊ တီဗွီ၊ ဗီဒီယိုပြစက်၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်မီးဖို၊ မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၃၀ x ၅၀ ပေ
သင့်ယာမြေကဘယ်လောက်ရှိသလဲ	ယာဧက (၅) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ဝါ
သင့်မြေကဘယ်လောက်ပါသွားလဲ	ယာ ၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ ဝင်ငွေမရှိ၊ ရှာသူကတစ်ယောက်ထဲရှိ
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်၊
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ။ (စုစုပေါင်းဘယ် လောက်လဲ) ဘယ်မှာသုံးခဲ့တာလဲ။	လယ်ယာစိုက်ပျိုးရေးဘဏ်နှင့် (၁၂၀၀၀၀)ကျပ် ယာထဲ၊ စားသောက်စရိတ်၊ အလုပ်သမားခ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	သားအိမ်ရဲ့ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာ တွေလိုမလဲ။ (သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ဆေးဝါး အစုံ

သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖေါ်ဖြစ်စေချင်သလား	**မပြောတတ်ပါ။**
ဘာလို့လဲ	**ဖော်လဲမတတ်နိုင်ပါ။ အလုပ်လဲဆက်မလုပ်နိုင်တော့လေ**
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	**မထင်ပါ**
ဘာဖြစ်လို့လဲ	**မထူးတော့ပါ**
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**ရပြီးပြီ ၊ ၁ ဧက ၂၅၀၀/-၊ အလှူအတန်းလုပ်တယ်**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	**စားဝတ်နေရေးအတွက် အလုပ်အကိုင်ရှိဖို့**

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တော် စပ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	အခြေချနေထိုင်သည့်ကာလ (နှစ်ပေါင်း)	သင်ကြားထားသည့်အဆင့်	အသက်မွေးဝမ်းကြောင်းအလုပ်	မှတ်ချက်
1	ဦးမြမောင်	ကျား	၅၅	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုရိ		
2	ဒေါ်လှရင်	မ	၅၄	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုရိ		
3	ဒေါ်ဌေးဌေးဝင်း	မ	၃၅	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၄ တန်း	ကျပန်း		

ဦးမြင့်သိန်း - ပိုင်ရှင် (ဦးမင်းဆောင်ဆီမှ ပြန်ဝယ်ထားတယ်)

မယ်ဇလီတောကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဒီမှာ မွေးကတည်းက နေတာပါ။ အဘက ဦးပြုံးကြောင် (ဦးမင်းဆောင်) ဆီမှ ပြန်ဝယ်ထားတာ (၁၀)နှစ်ရှိပြီ အသိမ်းခံမြေ ၅ ဧကပေါ့။ နှမ်း၊ ပဲစဉ်းငုံ စိုက်တယ်။ အကြွေးရှိတာပေါ့ စိုက်ဘဏ်နဲ့ ရပ်ရွာထဲက ယူရတာလေ။ စိုက်ပျိုးရေးထဲထည့် မီးသွေးလဲ လုပ်လိုက်သေးတယ်။

ရက်စွဲ	၂၂-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးမြင့်သိန်း ၊ ဦးမင်းဆောင်အမည်ပေါက်
ဖြေဆိုသူ	ဦးမြင့်သိန်း (ဦးမင်းဆောင်ဆီမှဝယ်)
အိမ်ထောင်စုဝင်လူဦးရေ	၂ ဦး ကျား - ၁ ၊ မ - ၁

ကျေးရွာ	မယ်ဇလီတော၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဖုန်းနံပါတ်	09 401677685
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ်၊ ဝါးကပ်
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၃၀ x ၄၅ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၅) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစုအရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ပုံမှန်ပါ
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်၊ လယ်ယာဒစိုက်ပျိုးရေးဘဏ်နှင့် ရပ်ရွာထဲမှ (၃၂၀၀၀၀)ကျပ်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ) ဘယ်မှာသုံးခဲ့တာလဲ။	စိုက်ပျိုးရေးထဲ၊ မီးသွေးလုပ်လိုက်သေး
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	မကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမ်ကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မပြောတတ်ပါ။
ဘာလို့လဲ	-

သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မြေယာမဲ့ဘဝဖြစ်မှာစိုးတယ်
ဘာဖြစ်လို့လဲ	ဒေသခံတွေအတွက်တော့ ပြုပြင်ပြောင်းလဲမှုဖြစ်လာနိုင် တယ်
သင်နှင့်သင့်မိသားစုလျော်ကြေး ရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘ ယ်လို သဘောထားလဲ။	-
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့ အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	-

မှာ	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနဲ့ဆို တဲ့စံသံ	အိမ်ထောင်ရေးအခြေ အနေ	ဘိုးဘွား	ဘာသာ	အမြဲသုံးတဲ့ဆက်သွယ်ရေးခဲ့ ပုံ	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အခြေ အနေ	မှတ်ချက်
1	ဦးမြင့်သိန်း	ကျား	၆၂	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	တောင်သူ		
2	ဒေါ်တင်ပု	မ	၅၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုးမိုး		

U Phoe Thaung

ဦးဖိုးသောင်း - ပိုင်ရှင်

မယ်ဇလီတောကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

အဘတို့မွေးကတည်းကနေတာ၊စက်ရုံသိမ်းမြေမှာ ၃.၅ဧကပါသွားတယ်။ ကြက်သွန်နဲ့ အစေ့ထုတ်ပြောင်း (ပဲပြောင်း)ပေါ့ အဲတာစိုက်တယ်။ အကြွေးက စိုက်/ဘဏ်နဲ့ သ/မမှာရှိတယ်။ ယာထဲပြန်ထည့်ပေါ့။ လျော်ကြေးက ၁ဧက ၂၅၀၀/- နှုန်းနဲ့ရတယ်။

ရက်စွဲ	၂၃-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးဖိုးသောင်း
ဖြေဆိုသူ	ဦးဖိုးသောင်း
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၃ ၊ မ - ၁
ကျေးရွာ	မယ်ဇလီတော၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဖုန်းနံပါတ်	09 332 57172
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်ကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ ရေဒီယို၊ တီဗွီ၊ ဗီဒီယိုပြစက်၊ လျှပ်စစ်ထမင်းအိုး၊ ရေစုပ်စက်၊
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၀ x ၆၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၁၂) ဧက၊ ကိုင်း (၃)ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ကြက်သွတ်၊ ပန်ပြောင်း

သင့်မြေကဘယ်လောက်ပါသွားလဲ	ယာ ၃.၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	လုပ်ပါသည်။ ပြင်ဦးလွင်လမ်းပေါ်မှာ အိမ်ဆိုင်ဖွင့်ထားပါသည်။
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျသွားပါသည်။ ရာသီဥတု မကောင်းလို့ သီးနှံအထွက် ကျလို့မကောင်းတာပါ။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်၊
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ) ဘယ်မှာသုံးခဲ့တာလဲ။	လယ်ယာစိုက်ပျိုးရေးဘဏ်နှင့် သမဝါယမဘဏ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	ကိုယ့် ယာမှာပဲ ကိုယ်လုပ်ကိုင်စားသောက်ခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါတယ်
ဘာဖြစ်လို့လဲ	ထိုက်ထိုက်တန်တန်ပေးရင်ပြောင်းလဲသွားနိုင်ပါသည်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီ လား။ ဘယ်လောက်ရလဲ။ အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ ၊ ၁၈၈ ကို ၂၅၀၀ နဲ့ရခဲ့ပါသည်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ရေးအခြေအနေ	အိမ်ထောင်စုဝင်အရေအတွက်	တိုင်း	ကောင်	ပြည်သူ့ဝန်ဆောင်မှုဌာနအမည်	ဆွေးနွေးသည့်အကြောင်းအရာ	အသေးစိတ်ဆွေးနွေးချက်များ	မှတ်ချက်
၁	ဦးဖိုးသောင်း	ကျား	၇၃	ဦးစီး	-	ဗမာ	ဗုဒ္ဓ	-	-		
၂	ဦးကျော်မင်းထွန်း	ကျား	၂၆	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ		
၃	ဒေါ်နုနယဉ်	မ	၃၅	သမီး	-	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ		
၄	ကိုကျော်ကျော်ခိုင်	ကျား	၁၂	သား	-	ဗမာ	ဗုဒ္ဓ	၆တန်း	ကျောင်းသား		

U Than Aung

ဦးသန်းအောင် - ပိုင်ရှင်

မယ်ဇလီတောကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဦးတို့ဒီမှာမွေးတည်းကနေတာပေါ့။ စက်ရုံသိမ်းယာက ၁၀၈က ပါသွားတယ်။ စိုက်တာက နှမ်း၊ ဝါ၊ ပြောင်း၊ ပဲစဉ်းငုံ ပေါ့ အကြွေးက စိုက်/ဘဏ် နဲ့ NAG မှာချေးတယ်။ လုပ်ငန်းသုံးတယ်။ အိမ်ဆောက်တဲ့ထဲ ပါသွားတယ်။ ငွေရေးကြေးရေး၊ ရင်နှီးလုပ်ကိုင်စားဖို့လိုတယ်။

ရက်စွဲ	၂၃-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးသန်းအောင် (ဦးမြမောင်အမည်ပေါက်)
ဖြေဆိုသူ	ဦးသန်းအောင်
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၂၊ မ - ၂
ကျေးရွာ	မယ်ဇလီတော၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဖုန်းနံပါတ်	09 401542963
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်ကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ ရေဒီယို၊ တီဗွီ၊ ဒီဒီယိုပြစက်၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်မီးဖို၊ မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၅၀ x ၆၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၁၆) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ၊ ဝါ၊ ပြောင်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၁၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ

သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာတယ်၊ လက်မှုပညာ၊ ယာလေးလဲရှိတော့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်၊
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ။ (စုစုပေါင်းဘယ် လောက်လဲ) ဘယ်မှာသုံးခဲ့တာလဲ။	လယ်ယာစိုက်ပျိုးရေးဘဏ်နှင့် NAG (၂၂၀၀၀)ကျပ် လုပ်ငန်းထဲသုံး၊ အိမ်ဆောက်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မပြောတတ်ပါ။
ဘာလို့လဲ	ဖြစ်စေချင်တော့လည်းကိုယ့်ယာပါသွား၊ ကိုယ်ယာကိုယ် ပြန်ရရင်ကောင်းတာပေါ့
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါတယ်
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင်ပေးရင်တော့အဆင်ပြေတာပေါ့
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ ၊ မသိပါ အဖေလက်ထက်ကဆိုတော့
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	လုပ်ကိုင်စားဖို့ငွေကြေးအရင်းအနှီး

အမှတ်	အမည်	ကျား/မ	အသက်	အဆင့်မြင့်ပညာရေး	အဆင့်နိမ့်ပညာရေး	ဘာသာ	ဘွဲ့	အလုပ်အကိုင်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
1	ဦးသန်းအောင်	ကျား	၅၅	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
2	ဒေါ်မြလင်း	မ	၅၄	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	လှည်းဘီးပညာ		
3	မောင်ဇော်သန်းဝင်း	ကျား	၃၅	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	စက်မှု/လက်မှု	ပညာ	
4	မလဲ့လဲ့ဝင်း	မ	၂၁	သမီး	အပျို	ဗမာ	ဗုဒ္ဓ	B.A (Geog)	ဝန်ထမ်း	ကပစ(၁၀)	

ဦးတင်မြင့် - (ပိုင်ရှင်) မယ်ဇလီတောကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဦးတို့ကမွေးကတည်းကနေတာ၊ ဟိုးရင်တုန်းက အခွန်ဆောင် ရတယ်၊ စက်ရုံသိမ်းယာမြေက ၁၉.၅ဧကပါသွားတယ်။ နမ်း၊ ဝါ၊ပဲစဉ်းငုံ ပဲစိုက်တယ်။ အကြွေးရှိတယ်။ စိုက်/ဘဏ်နဲ့သမမှာ ယာထဲပြန်ထည့် လိုက်တာကုန်တာပေါ့။ လျော်ကြေးရပြီးပြီ။ သီးနှံလျော်ကြေး ၁ဧကကို ၂၅၀၀/-ကျပ်နှုန်းနဲ့ လိုအပ်တာ ကတော့ အလုပ်အကိုင်ပါပဲ။

ရက်စွဲ	၂၂-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးတင်မြင့်
ဖြေဆိုသူ	ဦးတင်မြင့်
အိမ်ထောင်စုဝင်လူဦးရေ	၆ ဦး ကျား - ၂ ၊ မ - ၄
ကျေးရွာ	မယ်ဇလီတော၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဖုန်းနံပါတ်	09 3337 8588
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ်၊ ဝါးကပ်
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗီ၊ ဗီဒီယိုပြစက်၊ ဖုန်း
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၈၀ x ၈၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၂၄.၅) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နမ်း၊ ပဲစင်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ၁၉.၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	တူးပါသည်။ကိုယ်ပိုင်တူပါသည်။အရှုံးပါသည်။
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ပြန်ကောင်းလာပါသည်။သားသမီး များကျောင်းပြီးသွားလို့ကျောင်းစရိတ်သက်သာသွားလို့ အခြေအနေကောင်းလာပါသည်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်၊ စိုက်ပျိုးရေးဘဏ်နှင့် သမဝါယမ (၃၀၀၀၀၀)ကျပ်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ) ဘယ်မှာသုံးခဲ့တာလဲ။	စိုက်ပျိုးရေးထဲ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း၊ ဆေးပဲလိုအပ်ပါသည်။

သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	**မဖြစ်စေခြင်ပါ။**
ဘာလို့လဲ	**ဒီ ယာ မှာ လုပ်ကိုင်စားသောက်ရလို့ မလုပ်စေခြင်ပါ။**
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	**ထင်ပါသည်။**
ဘာဖြစ်လို့လဲ	**သူတို့ထောက်ပံ့ရင်တော့ ပြောင်းလဲနိုင်ပါသည်။ အလုပ်အကိုင်နေရာပေးရင်တော့ ကောင်းပါသည်။**
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီ လား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**ရပြီးပြီး။ ၁၈က ကို ၂၅၀၀ နဲ့ ရရှိခဲ့ပါသည်။**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	**အလုပ်အကိုင်လိုအပ်။**

အမှတ်	အမည်	ကျား/မ	အသက်	ဆွေမျိုးတော်စပ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	ပညာအရည်အချင်း	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
၁	ဦးတင်မြင့်	ကျား	၅၂	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ	
၂	ဒေါ်အေးတင်	မ	၅၂	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ	
၃	ကိုအောင်ကျော်မိုး	ကျား	၂၉	သား	-	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	တောင်သူ/ကျပန်း	
၄	မသွန်အား	မ	၂၆	သမီး	-	ဗမာ	ဗုဒ္ဓ	B.Sc(Che)	ဆရာမ	မူလတန်းပြ
၅	မအေးမွန်	မ	၂၃	သမီး	-	ဗမာ	ဗုဒ္ဓ	B.A(Gro)	ဆရာမ	မူလတန်းပြ
၆	သက်ဖူးဝေ	မ	၁၃	သမီး	-	ဗမာ	ဗုဒ္ဓ	၇တန်း	ကျောင်းသူ	

ဦးမိုး - ပိုင်ရှင် (ဦးလှဒင် (ဖခင်) - အမည်ပေါက်)ညောင်ပင်သာအရှေ့၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းမြေမှာယာ ၁၅ကေပါသွားတယ်။ ၂ကေကျန်တာကိုပဲ လုပ်ကိုင်စားရတာပေါ့။ နှမ်း၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း စိုက်တယ်လေ။ သိမ်းထား တဲ့ယာမြေကို ပြန်လုပ်ကိုင်ခွင့်မရပါဘူး။ အကြွေး ကတော့ရှိတာပေါ့။ မီးလိုင်းထဲပါသွားတယ်၊ စိုက်ပျိုးရေးစရိတ်တွေ ကုန်ကျတာပေါ့။ လျော်ကြေး အနေနဲ့ သီးနှံပျက်လျော်ကြေးဆိုပြီး ၂၀၀၀၀/-ကျော်ရတယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးမိုး ၊ ဦးလှဒင် အမည်ပေါက်
ဖြေဆိုသူ	ဦးမိုး (သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၆ ဦး ကျား - ၂ ၊ မ - ၄
ကျေးရွာ	ညောင်ပင်သာအရှေ့၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သက်ကယ်၊ ပျဉ်ကာ၊ ကြမ်းခင်း (သုံးပင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	-
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၂၀ ဇက
သင့်ယာမြေဇကဘယ်လောက်ရှိသလဲ	ယာဇက (၂) ဇက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း
သင့်မြေကဘယ်လောက်ပါသွားလဲ	ယာ ၁၅ ဇက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ အရင် ၄/၅နှစ်က မကျန်းမာလိုက်လို့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	ရွာထဲ မိတ်ဆွေ၊ သမဝါယမ အဖွဲ့ ၊ မြစိမ်းရောင် (၇၁၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	မရှိပါ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ရွာရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာ တွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ယင်လုံအိမ်သာတစ်ခုလို
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	နိုင်တော်ကောင်းဖို့ပဲဖြစ်စေချင်သည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မပြောတတ်ပါ။
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင်အခွင့်အလမ်း ရရင်ကောင်းမယ်
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ၂၀၀၀၀/-ကျော် မဆိုးပါဘူးအဲခေတ်နဲ့တော့ ရောင်းမယ့်ယာတော့ မရှိတော့ပါ။ ဝယ်မရပါ။

သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	**ငွေ၊ ကျန်းမာရေး**

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်သွယ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ပညာ	ဘာသာ	ဝင်ငွေအဓိကရှာဖွေပုံ	အလုပ်ပြောင်းလဲမှုအကြိမ်ရေ	မှတ်ချက်
1	ဦးမိုး	ကျား	၆၀	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	တောင်သူ		
2	ဒေါ်တင်မွေး	မ	(၅၇)	ဇနီး	-	ဗမာ	ဗုဒ္ဓ	ဘက	ကွယ်လွန်		
3	မန္တ	မ	၃၄	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၄ တန်းအောင်	ပန်းရောင်း		
4	မောင်သိန်းဇော်	ကျား	၂၈	သား	အပို	ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	ကျပန်း		
5	မခင်စုလှိုင်	မ	၂၄	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၉ တန်းအောင်	ကျပန်း		
6	မခင်ဇာထွန်း	မ	၂၀	သမီး	လူပို	ဗမာ	ဗုဒ္ဓ	၈ တန်းအောင်	ကျပန်း		

ဦးကျော်လှ - ပိုင်ရှင်

ညောင်ပင်သာအရှေ့၊ မင်းလှမြို့နယ်။

ကျွန်တော်ဒီရွာမှာ၁၉၄၀ ခုနှစ်တည်းကနေတာပါ။ ယာမြေ ၁၁ဧကနဲ့ ကိုင်း ၃ဧကပါသွားတယ်။အခုပြန်လုပ်ကိုင် စားခွင့် ပေးတာက ၇ဧက ပါ။ ဒါပေမယ့် လုပ်စားမရတဲ့တောတွေက များပါတယ်။ ယာမြေမှာက မိုးတွင်းဆို နှမ်းတို့ပဲစဉ်းငုံတို့ စိုက် တယ်။အကြွေး လည်းရှိတာပေါ့ မပြေလည် တော့ စားတဲ့ထဲပါ။ မျိုးစေ့ဝယ်တာ၊ စိုက်ပျိုးရေးစရိတ်တွေ ဖြစ်တာပေါ့။ အဲဒီတုန်းကလူကြီးတွေကြည့်စီစဉ်မယ်လို့ပြောပြီး သီးနှံပျက် လျော်ကြေး၉၀၀၀/-ကျပ်ရပါ တယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးကျော်လှ အမည်ပေါက်
ဖြေဆိုသူ	ဦးကျော်လှ
အိမ်ထောင်စုဝင်လူဦးရေ	၅ ဦး ကျား - ၃ ၊ မ - ၂
ကျေးရွာ	ညောင်ပင်သာအရှေ့၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	၁၉၄၀ ခုနှစ်က
ဖုန်းနံပါတ်	09 79624675
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံကာ ၊ ပျဉ်ခင်း (သုံးပင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	.၂၅ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၁၁) ဧက၊ ကိုင်း (၃)ဧက

သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစဉ်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၁၁ ဧက၊ ကိုင်း ၃ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ပြန်လုပ်စားခွင့်ရှိတာကနည်းတယ်၊ ရာသီ ဥတုကလည်းမမှန်ဘူး
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မိတ်ဆွေ၊ မြစိမ်းရောင်၊ သမဝါယမအဖွဲ့ (၁၅၁၀၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ကျန်းမာရေးကောင်းဖို့၊ အမယ်ကြီးလမ်းသွားနိုင်ဖို့
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	-
ဘာလို့လဲ	တိုင်းပြည်စီးပွားရေးကောင်းဖို့အများအကျိုးကြည့်တာပေါ့၊ မိသားစုကတော့ဒီနေရာမှမရရင်နောက်ထပ်နေရာရှာရ တာပေါ့
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မပြောတတ်ပါ
ဘာဖြစ်လို့လဲ	အကြောင်းတရားတွေရှိသေးတော့ပြောမရပါ
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ၉၀၀၀/-
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	ငွေရေးကြေးရေး၊ အလုပ်အကိုင်အခွင့်အလမ်းပိုမိုရစေချင်

စဉ်	အမည်	အသက်	ကျား/မ	ပညာအရည်အချင်း	အဓိကလုပ်ငန်းအမျိုးအစား	ဘာသာ	ဗဟိုဌာန	ရာထူး	လုပ်ငန်းတာဝန်	အလုပ်အတွေ့အကြုံ	ဖုန်း

1	ဦးကျော်လှ	ကျား	၇၀	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ		
2	ဒေါ်သန်းစိန်	မ	၆၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	မိုးမိ		
3	မခင်မျိုးဇင်	မ	၂၅	သမီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၇ တန်း	ပန်းရောင်း		
4	ဦးသန်းနိုင်ဌေး	ကျား	၃၀	သားမက်	ရှိ	ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	TV ပြုပြင်ရေး		
5	မောင်ရဲထွန်း	ကျား	၃၀	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ		

ဦးဝင်းမြင့် (သား) ဦးမြမောင် (ဖခင်) ပိုင်ရှင်
ညောင်ပင်သာအရှေ့၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းမြေမှာ ၁၁ ဧက ပါသွားတယ် ။ လက်ရှိသိမ်းကျန် ၃ ဧကနဲ့လုပ်ကိုင် စားသောက်နေတာပေါ့။ နှမ်း၊ပဲစည်းငုံစိုက် တယ် မိုးကောင်းရင်ဒေ တာ့အထွက်ကောင် းတာပေါ့။ ပါသွားတဲ့ ယာမှာတော့ ပြန်လုပ်စားခွင့် မရတော့ဘူး။ သူတို့က သူများကို လုပ်ခွင့်ပေးတယ်။ ယာသိမ်းပြီးတော့ ယာရှင်သား သမီးတွေကိုစက်ရုံ ကအလုပ်မပေးပါ။ အဲတာကိုတော့ ဘဝင်မကျဖြစ်တယ်။ စက်ရုံနဲ့နီးစပ်တဲ့လူတွေပဲ အလုပ်ရတာပေါ့။ လျော်ကြေးကတော့ ၃၀၀၀၀/-ကျပ် ကျော်ရတယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးဝင်းမြင့် ၊ ဦးမြမောင်အမည်ပေါက်
ဖြေဆိုသူ	ဦးဝင်းမြင့် (သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၅ ဦး ကျား - ၂ ၊ မ - ၃
ကျေးရွာ	ညောင်ပင်သာအရှေ့ ၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံကာ၊ ပျဉ်ခင်း (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယိုပြုစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	.၂၅ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၃) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစည်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၁၁ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလည်းမတိုးကျလည်းမကျ၊ သားသမီးကအဝေးသွား စရိတ်က သူတို့ဘာသာအလုပ်လုပ်ရှာပေါ့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်

အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မြစိမ်းရောင်၊ သမဝါယမအဖွဲ့၊ မိတ်ဆွေ (၈၁၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ရွာရေတွင်းမှ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာ တွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ကျေးလက်ဆေးပေးခန်းဖွင့်ရင်ကောင်း
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်ပါသည်
ဘာလို့လဲ	ကိုယ့်သားသမီးတွေအလုပ်အကိုင်ရစေချင်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	ကိုယ့်သားသမီးတွေအလုပ်ရရင်ကိုယ့်ကိုပြန်ပြီး ကည့် နိုင်တာပေါ့
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ (၃၀၀၀၀/-)ကျော် ၊ ယာပြန်ဝယ်ရတာရှားတယ်
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	ယာမြေတွေ၊ သားသမီးတွေအလုပ်ရစေချင်

အမှတ်	အမည်	ကျား/မ	အသက်	ဆွေမျိုးတော်စပ်ပုံ	ဆွေမျိုးထဲတွင်ပါဝင်မှုအဆင့်	ဘာသာ	လက်ရှိလုပ်ငန်းအမျိုးအစား	အသက်မွေးဝမ်းကြောင်းလုပ်ငန်း	အလုပ်အကိုင်အခွင့်အလမ်းရရှိမှုအခြေအနေ	ပညာအရည်အချင်း
1	ဦးဝင်းမြင့်	ကျား	၄၈	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ		
2	ဒေါ်ခင်ယု	မ	၄၇	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	မှီခို		
3	မောင်သန့်ဇင်	ကျား	၂၇	သား		ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	တပ်မတော်သား	တပ်ကြပ်	
4	မခိုင်ခိုင်ဦး	မ	၂၀	သမီး		ဗမာ	ဗုဒ္ဓ	တတိယနှစ်	ရန်ကုန်မှာ		
5	မသူဇာလင်း	မ	၁၆	သမီး		ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	ကျောင်းသူ		

ဦးပေါက်စ - ပိုင်ရှင်

ညောင်ပင်သာအရှေ့ ၊ မင်းလှမြို့နယ်။

ယာဧ ဇကမှ ၄ဇကလောက်စက်ရုံကသိမ်းတဲ့ထဲ ပါသွားတယ်။ အမည်ပေါက်ပြီးသားအရင်က ၁ဇကကို ၃/-၊ ၅/-ကျပ်ဆောင် ရတယ်၊ ပဲ၊ နှမ်း၊ပဲစဉ်းငုံစိုက်တာ။ အကြွေးရှိတယ်။ မြစိမ်းရောင်ငွေစု ငွေချေးအသင်းနဲ့ သ/မမှယူတာ ယာထဲမှာပြန်သုံးတယ်၊ မျိုးစေ့ဝယ်၊ လုပ်အားခစရိတ်တွေကုန်တာပေါ့။ လျော်ကြေးအနေနဲ့ နစ်နာကြေး၆၀၀၀/-ကျပ် ရတယ်။ ယာတွေပြန်မဝယ်နိုင်ဘူး။ စားသောက်စရိတ်ထဲ ပါသွားတယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးပေါက်စ (၈၂နှစ်)
ဖြေဆိုသူ	ဦးပေါက်စ
အိမ်ထောင်စုဝင်လူဦးရေ	၃ဦး ကျား -၂ ၊ မ - ၁
ကျေးရွာ	ညောင်ပင်သာ ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ် အခင်း၊ ပျဉ် အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	ဝ.၂၅ ဇက
သင့်ယာမြေဇကဘယ်လောက်ရှိသလဲ	ယာ (၈) ဇက၊ ကိုင်း(၃)ဇက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ ၊ ပြောင်း၊ သရက်
သင့်မြေဇကဘယ်လောက်ပါသွားလဲ	၁၁ ဇက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလား၊သလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ရာသီဥတု မကောင်း၊ သီးနှံအထွက်မကောင်း
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မြစိမ်းရောင်၊ သမ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာ	

တွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖေါ်ဖြစ်စေချင်သလား	ဖြစ်စေချင်ပါသည်။
ဘာလို့လဲ	အဲ့ဒီယာတွေမှာ စိုက်ပျိုးလို့မရမယ့် အတူတူအလုပ်အကိုင် အခွင့်အလမ်းများရနိုင်သောကြောင့် လုပ်စေခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင် အခွင့်အလမ်းများရမယ်လို့ထင်ပါသည်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ နှစ်နာကြေး ၁၈က ကို ၆၀၀၀ နဲ့ပေးခဲ့ပါသည်။ ယာပြန်မဝယ်နိုင်ပါ။အသားအသောက်ထဲပြန်ပါသွားပါသည်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

မှာ	အမည်	အရေ	အသက်	အိမ်ထောင်ရေးအခြေအနေ	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	အလုပ်အကိုင်အမျိုးအစား	လက်ရှိလုပ်ကိုင်နေသည့်အလုပ်အကိုင်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
၁	ဦးပေါက်စ	ကျား	၈၂	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-		
၂	ဦးဝင်းဆွေ	ကျား	၄၀	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	GTI	တောင်သူ	
၃	ဒေါ်နွယ်အေး	မ	၄၈	သမီး	လူပျို	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ	

ဦးတင်ရှိန် (သား) (ဦးသိမ်းမောင် (ဖခင်) - ပိုင်ရှင်)

ညောင်ပင်သာအရှေ့ ၊ မင်းလှမြို့နယ်။

ဘိုးဘွားပိုင်မြေတွေပါပဲအကုန်လုံး။ အရင်မသိမ်းခင်တုန်းက အခွန်ဆောင်ရတယ်။စက်ရုံသိမ်းယာ က ၁၅၈က ပါသွားတာပေါ့။ နှမ်း၊ မြေပဲ၊ ပဲစဉ်းငုံစိုက်တယ်။ အကြွေးရှိတယ်။ မြစိမ်းရောင်၊ သ/မ၊ နဲ့ မိတ်ဆွေတွေ ဆီကချေးထားတယ်။ ရေတွင်းတူးလိုက်လို့ စပါး ပါ အကြွေးတင်သွားတယ်၊ နောက်စိုက်ပျိုးရေးထဲပါ သွားတာပေါ့။ လျော်ကြေးက ၆၀၀၀/-ကျပ်ရတယ်။ လိုအပ်တာကတော့ အလုပ်အကိုင် အခွင့်အလမ်းပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅

အိမ်ထောင်ဦးစီးအမည်	ဦးသိမ်းမောင်
ဖြေဆိုသူ	ဦးတင်ရှိန်(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၅ဦး ကျား -၂ ၊ မ - ၃
ကျေးရွာ	ညောင်ပင်သာ ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	၀၉ ၄၀၁ ၆၃၈ ၀၃၉
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ် အခင်း၊ ပျဉ် အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗွီ၊ ဒီဒီယိုပြစက်၊ ဖုန်း၊ ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၂၅ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၁၈) ဧက၊ ဥယျာဉ်(၁)ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ မြေပဲ၊ ပဲစင်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၁၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ၊ ခိုင်းနွား(၅)ကောင်
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ကျောင်းသား စရိတ်ကြီး
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မြစိမ်းရောင်၊ သမ၊ မိတ်ဆွေ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ရေတွင်းရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ကျေးလက်ဆေးခန်း၊ စိတ်ကျန်းမာရေးဆရာဝန်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်ပါသည်။
ဘာလို့လဲ	ဒေသဖွင့်ဖြိုးရေးအတွက် လုပ်စေခြင်ပါတယ်။ ဒါပေမယ့်ဝန်ထမ်းနည်းပါး။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	စက်ရုံရှိလို့မီးရပါတယ်။ကောင်းသောပြောင်းလဲခြင်းလို့ထင်ပါတယ်။

သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**ရပြီးပြီ၊ နှစ်နာကြေး ၁၈က ကို ၆၀၀၀ နဲ့ပေး ခဲ့ပါသည်။ နှမ်းရိတ်ခါနီးမှာ စီမံကိန်းလုပ်လို့ အဲ့ဒီနှစ် က နှမ်းများ ဆုံးရှုံးသွားပါသည်။ ဘိလပ်မြေဖျော်စက်တည်သောနေရာ။**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	**အလုပ်အကိုင်အခွင့်အလမ်း**

အမှတ်	အမည်	ကျား/မ	အသက်	အဆင့်ထိပညာသင်ကြားခဲ့	အိမ်ထောင်ရှိမရှိ	ဘာသာ	ကိုးကွယ်သည့်ဘာသာ	ပြည်တွင်းအလုပ်အကိုင်ရှိမရှိ	နိုင်ငံခြားအလုပ်အကိုင်ရှိမရှိ	မှတ်ချက်
၁	ဦးတင်ရှိန်	ကျား	၅၈	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၉တန်း	တောင်သူ		
၂	ဒေါ်ခင်မာ	မ	၅၆	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	မိုးမိုး		
၃	ဒေါ်နိုင်နွယ်ဝင်း	မ	၃၂	သမီး		ဗမာ	ဗုဒ္ဓ	၇တန်း	တောင်သူ		
၄	သန့်ဇော်မင်း	ကျား	၃၃	သားမက်		ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
၅	မလွဲလွဲဇင်နင်း	မ	၂၀	သမီး		ဗမာ	ဗုဒ္ဓ	B.Com	မိုးမိုး		

ဒေါ်ထွေးလှ - သမီး (ဦးအောင်သန်း (ဖခင်) - ပိုင်ရှင်)

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

အသိမ်းခံရတာလဲမမှတ်မိဘူး။စက်ရုံနဲ့လွတ်တဲ့နေရာမှာတော့ ယာပြန်လုပ်ခွင့် ရကြတယ်။ သ/မနဲ့မိတ်ဆွေ တွဆီက အကြွေးယူတယ် ယာလုပ်ငန်းထဲပြန်ပါသွားတာပေါ့။ လျော်ကြေး ရပြီးပြီ။ မမှတ်မိပါ။ လိုအပ်တာကတော့ အလုပ်အကိုင်ပေါ့။ အခုယာအငှား လိုက်လုပ်နေတယ်။

ရက်စွဲ	၂၃-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးအောင်သန်း
ဖြေဆိုသူ	ဒေါ်ထွေးလှ
အိမ်ထောင်စုဝင်လူဦးရေ	၅ ဦး ကျား - ၃ ၊ မ - ၂
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ထရံကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ

သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ဝါ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျသွားတယ်။ သူများစီမှ နွားများကိုငှားလုပ်ရလို့ အရှုံးပေါ်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ	သမဝါယမ/မိတ်ဆွေ(၃သိန်း)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်အဝီစိရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ရွာမှာ သားဖွားဆရာမ (၂)ဦး ရှိပါတယ်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	အလုပ်အကိုင် အခွင့်အလမ်း တွေရမယ်ဆိုရင်တော့ ပိုကောင်းပါတယ်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မပြောတတ်ပါ
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ မမှတ်မိပါ။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့ အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အလုပ်အကိုင် အခွင့်အလမ်း

အမှတ်	အမည်	ကျား/မ	အသက်	ပညာအရည်အချင်း	အိမ်ထောင်ရှိမရှိ	ကိုးကွယ်မှု	ဘာသာ	အိမ်ထောင်စုအတွင်းတွင်ဆောင်ရွက်ရသည့်တာဝန်	လက်ရှိလုပ်ကိုင်နေသည့်အလုပ်	အလုပ်အကိုင်အခွင့်အလမ်းများ	မှတ်ချက်
၁	ဦးမောင်မြင့်	ကျား	၄၈	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	ဆေးသုတ်		
၂	ဒေါ်ထွေးလှ	မ	၄၉	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၂တန်း	တောင်သူ/ကျပန်း		

၃	မရီမာဝင်း	မ	၂၅	သမီး	အပျို	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ/ကျပန်း		
၄	မောင်ဟိန်းမင်းထက်	ကျား	၁၅	သား	-	ဗမာ	ဗုဒ္ဓ	၈တန်း	ကျောင်းသား		
၅	မောင်ညီရဲထက်	ကျား	၇	သား	-	ဗမာ	ဗုဒ္ဓ	၁တန်း	ကျောင်းသား		

ဒေါ်တင်ဝင်း (သမီး) (ဦးညီ (ဖခင်) ပိုင်ရှင်)

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံစီမံကိန်းထဲ ၇ဧကပါသွားတယ်။ အမွေဆိုင်ပေါ့ ပြန်လုပ်စားခွင့်အနေနဲ့ ပိုက်ဆံ မပေးရပါ။ သိမ်းပြီးတော့ နှမ်း ၁ တင်းပေးရသေးတယ်၊ အဲနောက်ပိုင်းတော့ ပိုက်ဆံမပေးရတာ နှစ်ကြာနေပြီ။ နှမ်း၊ ပဲစဉ်းငုံစိုက်တယ်။အကြွေးရှိ တယ် တစ်နှစ်တစ်ခါတော့ စိုက်ပျိုးရေးဘဏ်က ထုတ်ချေးတယ်။ သ/မနဲ့ ရပ်ရွာထဲကလည်း ချေးတယ်။ မိုးခေါင်တော့ ယာတွေရှုံး၊ ထွန်စက်ဖိုးတို့ မျိုးခတွေရှုံးတယ်။ လျော်ကြေးတော့မမှတ်မိပါ။ လိုအပ်နေတာကတော့ အလုပ်အကိုင်တွေပေါ့။

ရက်စွဲ	၂၂-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးကျော်အေး ၊ ဦးညီ ပိုင်ဆိုင်
ဖြေဆိုသူ	ဒေါ်တင်ဝင်း (သမီး)
အိမ်ထောင်စုဝင်လူဦးရေ	၄ဦး ကျား -၂ ၊ မ - ၂
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ + သစ်သား၊ ပျဉ်ခင်း (သုံးပင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၇) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၇ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ (၃)နှစ်လောက်မိုးခေါင်နေတာ အရင်ကတော့ရပါတယ်၊ သမီးကလည်းသူတယောက်တည်း မလောက်လို့ အိမ်မှပြန်ပေးရ။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။

အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ (စုစုပေါင်းဘယ် လောက်လဲ	သမဝါယမအဖွဲ့၊ ရပ်ရွာထဲမှ (၄၀၀၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာ တွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ရွာမှာ သားဖွားဆရာမ (၂)ဦး ရှိပါတယ်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	ယာကအခုလုပ်နေလို့ရသေးတယ်၊ ယာမလုပ်ရမှာ စိုးရိမ်တယ်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင်အခွင့်အလမ်း ရမယ်ဆိုအဆင်ပြေ၊ ယာဆက်မလုပ်တော့အဆင်မပြေ
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံပျက်လျော်ကြေး မမှတ်မိပါ၊ မပြောတတ်ပါ
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အလုပ်အကိုင် အခွင့်အလမ်း

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တော်စပ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	လူမျိုး	ကိုးကွယ်သည့်ဘာသာ	အမြင့်ဆုံးပညာရည်အရည်အချင်း	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အခွင့်အလမ်းအားနည်းရခြင်း	မှတ်ချက်
1	ဦးကျော်အေး	ကျား	၄၄	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
2	ဒေါ်တင်ဝင်း	မ	၅၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
3	မအိအိသိမ့်	မ	၂၁	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	B.A (ဘွဲ့ရ)	ဆရာမ	နေ့စားလပေး	
4	မောင်ကိုကိုလွင်	ကျား	၁၇	သား	လုပို	ဗမာ	ဗုဒ္ဓ	၉တန်း	တောင်သူ		

ဦးလှသိန်း - ပိုင်ရှင်

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းမြေမှာ ဂဧကပါသွားတယ်။ ဝါရယ်၊ နှမ်းရယ်စိုက်တာပေါ့။ အကြွေးရှိတယ်၊ မိတ်ဆွေတွေဆီက စိုက်/ဘဏ်နဲ့သ/မကလည်း ချေးတယ်။ ယာထဲပြန်သုံးလိုက်တာပေါ့။ လျော်ကြေးက သီးနှံလျော်ကြေးပေါ့ ၄.၅ ဧကစာပေါ့ ၆၀၀/-နှုန်းနဲ့။ လိုအပ်နေတာက အများကြီးဆိုတော့ မပြောတတ်ဘူး။

ရက်စွဲ	၂၂-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးလှသိန်း(ဂျနှစ်)
ဖြေဆိုသူ	ဦးလှသိန်း
အိမ်ထောင်စုဝင်လူဦးရေ	၄ဦး ကျား -၂ ၊ မ - ၂
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်+ သစ်သား၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ရေစုပ်စက်၊ တီဗွီ၊ ဗီဒီယိုပြစက်၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်မီးဖို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၇) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၇ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ။ ခိုင်းနွား(၂ကောင်)
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ သီးနှံအထွက်နည်း။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ	စိုက်ဘဏ်၊ သမဝါယမအဖွဲ့၊ ရပ်ရွာထဲမှ (၃၀၀၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း

သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ရွာမှာ သားဖွားဆရာမ (၂)ဦး ရှိပါတယ်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	အလုပ်အကိုင်ရမယ်ဆိုရင်တော့ဖြစ်စေခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင်အခွင့်အလမ်းရမယ်ဆိုအဆင်ပြေ၊ နှစ်နာကြေးရရင်ပြောင်းလဲနိုင်ပါသည်။ အခဲ့ဒါတွေမရပါကပိုဆိုးသွားနိုင်ပါသည်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံပျက်လျော်ကြေး မမှတ်မိပါ၊ မပြောတတ်ပါ
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

မှာ	ဘွဲ့	ဒဂုံ/	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့	ဘွဲ့
၁	ဦးလှသိန်း	ကျား	၇၅	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း			
၂	ဦးမြင့်သောင်း	မ	၅၁	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	၉တန်း	တောင်သူ		
၃	မမှန်း	မ	၄၈	ချွေးမ	အပို	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
၄	မောင်ဇော်ဇော်ထွန်း	ကျား	၃၀	မြေး	ရှိ	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	တောင်သူ/ကျပန်း		
၅	မတင်လေးနွယ်	မ	၃၀	မြေးချွေးမ	ရှိ	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	တောင်သူ/ကျပန်း		
၆	မောင်နိုင်းနိုင်းဇော်	ကျား	၁၂	မြစ်		ဗမာ	ဗုဒ္ဓ	၅တန်း	ကျောင်းသား		

ဦးမြင့်သိန်း (သား) (ဦးလှိုင်မြင့်-ဖခင် ပိုင်ရှင်)

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

သိမ်းထားတဲ့ယာ ၃.၆၀ဧက အဖွဲ့ယာပေါ့။ အလုပ်ဆက်လုပ်နေတယ်။ မိုးဦးမှာ နှမ်း၊ မိုးနှောင်းမှာ ပဲစဉ်းငုံ၊ ဝါ စိုက်တယ်။ အကြွေးတော့ မရှိဘူး။ လျော်ကြေးက သီးနှံနစ်နာကြေး ဆိုပြီးတော့ ၁ဧကကို ၁၅၀၀/- နှုန်းရတယ်။ စီးပွားရေးအဆင်ပြေဖို့ အလုပ်အကိုင် အခွင့်အလမ်းရှိဖို့ လိုပါတယ်။

ရက်စွဲ	၂၃-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးမြင့်သိန်း ၊ ဦးလှိုင်မြင့် အမည်ပေါက်
ဖြေဆိုသူ	ဦးမြင့်သိန်း
အိမ်ထောင်စုဝင်လူဦးရေ	၆ဦး ။ ကျား - ၄ ၊ မ - ၂
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်ကာ၊ ပျဉ်ခင်း (တိုက်ခံအိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ မီးစက်၊ ဖုန်း၊ တီဗီ၊ ဗီဒီယိုပြစက်၊ ရေခဲသေတ္တာ၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်ပေါင်းအိုး၊ မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၁၂.၅) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ၊ ဝါ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၃.၆၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ဖိဖိစီးစီးမလုပ်နိုင်တော့ ယာတစ်ကွက်ပြုတ်၊ မိုးလည်းခေါင် တယ်လေ။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	မရှိပါ
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ	-
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်အဝိစိရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ရွာမှာ သားဖွားဆရာမ (၂)ဦး ရှိပါတယ်

သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	ပတ်ဝန်းကျင်လူထု၊ တိရိစ္ဆာန်လေးကအစ စဆိုးကျိုးမရှိဘူး ဆိုရင် လက်ရှိမြေပေါ်မှာ လုပ်ကိုင်စားသောက်နေတဲ့ တောင်သူတွေအတွက် နစ်နာကြေးနဲ့ အလုပ်အကိုင် အခွင့်အလမ်းတွေရစေချင်ပါတယ်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မပြောတတ်ပါ
ဘာဖြစ်လို့လဲ	လုပ်တတ်တဲ့သူကတော့ပြောင်းလဲမှာပေါ့၊ အကုန်သိမ်း သွားရင်တော့ တခုခုလုပ်ရမှာပေါ့
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံပျက်လျော်ကြေး ၁ ဧက ၁၅၀၀/- နှုန်း ကစားတတ်တဲ့လူအဖို့ရာမဆိုးပါ၊ မကစားတတ်တဲ့လူ အဖို့ရာ ငွေပိုက်ထားပြီး ကုန်တာပေါ့။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	စီးပွားရေး အဆင်ပြေဖို့ အလုပ်အကိုင် အခွင့်အလမ်း

အမှတ်	အမည်	ကျား/မ	အသက်	ပညာအရည်အချင်းအဆင့်	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	အလုပ်အကိုင်	ဝင်ငွေ (ကျပ်)	မှတ်ချက်
1	ဦးမြင့်သိန်း	ကျား	၆၀	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၉ တန်း	တောင်သူ	
2	ဒေါ်အေးရွှေ	မ	၅၆	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	မူလတန်း	မိုးမိုး	
3	မောင်အေးမင်းထက်	ကျား	၂၈	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	B.A (Psy)	တမ်မတော်သား	ကပစ (၂)
4	မရွှေညည်ဝင်း	မ	၂၅	ချွေးမ	ရှိ	ဗမာ	ဗုဒ္ဓ	၉တန်းအောင်	မိုးမိုး	
5	မောင်ဘာဏ်ထက်သူ	ကျား	၁၃	မြေး	-	ဗမာ	ဗုဒ္ဓ	၈တန်း	ကျောင်းသား	
6	မောင်ဘာဏ်ရည်မင်း	ကျား	၃	မြေး	-	ဗမာ	ဗုဒ္ဓ	-	-	

ဦးမောင်ဝင်း (သား) (ဦးဖိုးလုံး (ဖခင်) - ပိုင်ရှင်)

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံစီမံကိန်းမြေမှာယာ ၃ဧကပါသွားပါတယ်၊ ကိုင်း ၁ကွက် တော့ ကျန်ခဲ့တယ်။ ယာမှာတော့နှမ်းပဲစဉ်းငုံစိုက်တာပေါ့။ ဒီနှစ် တော့မစိုက် နိုင်ဘူး၊ ကိုင်းအလုပ်ဖြစ်တဲ့ ခရမ်းချဉ်သီးနှင့် ပြောင်း တို့ပဲစိုက်တယ်။ အကြွေးရှိတာပေါ့၊ ရွာထဲကမိတ်ဆွေတွေဆီ ကပေးတယ်လျော်ကြေး

ရပြီးပြီ ပမာဏကိုတော့မသိဘူး၊ အဖေ လက်ထက်က ဆိုတော့။ အလုပ်အကိုင်အခွင့်လမ်း များများရှိရင် ကောင်းတာပေါ့။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးဖိုးလုံး
ဖြေဆိုသူ	ဦးမောင်ဝင်း(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၁ ၊ မ - ၃
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ထရံကာ၊ပျဉ်ခင်း/ဝါးခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	စက်ဘီး၊ ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယိုပြစက်၊ လျှပ်စစ် ထမင်းအိုး၊ လျှပ်စစ်ပေါင်းအိုး။
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၃၀ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၃) ဧက၊ ကိုင်း (၁) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစဉ်းငုံ၊ ခရမ်းချဉ်သီးပြောင်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၃ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာတယ်။ အရင်ကထက်စာရင်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	ရပ်ရွာထဲကပဲ ၃၀၀၀၀၀/-ပါ။
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ယောကျ့မရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	ကိုယ့်နိုင်ငံတိုးတက်စေချင်လို့ပါ။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	မပြောတတ်ပါ။

သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ဘယ်လောက်ဆိုတာမသိပါ။အဖေလက်ထက်ကဆိုတော့။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အလုပ်အကိုင်အခွင့်အလမ်းများများရှိစေချင်တယ်။

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်သွယ်	အိမ်ထောင်ဖက်နေထိုင်မှု	ပညာ	ဘာသာ	အခြေခံလုပ်ငန်းဆောင်တာ	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အခြေအနေ	မှတ်ချက်
1	ဦးမောင်ဝင်း	ကျား	၄၅	ဦးစီး		ဗမာ	ဗုဒ္ဓ	၈ တန်း	လက်သမား		
2	ဒေါ်နွဲ့	မ	၄၄	ဇနီး		ဗမာ	ဗုဒ္ဓ	၁ တန်း	တောင်သူ		
3	မနန္ဒာထွန်း	မ	၁၅	သမီး		ဗမာ	ဗုဒ္ဓ	၉ တန်း	ကျောင်းသူ		
4	မအိမ်မှူးငယ်	မ	၇	သမီး		ဗမာ	ဗုဒ္ဓ	၁ တန်း	ကျောင်းသူ		

ဦးသန်းလှိုင် (သား) (ဦးညီ - ဖခင် - ဝိုင်ရှင်) ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းယာကသုံးဦးပိုင်အမွေဆိုင်ပေါ့ ၈.၉၅ ကို သုံးဦးခွဲတာ ၂.၆၀ ဖကလောက်ပါသွားတယ် ။ ဝါ၊ ပဲကြီး၊ နှမ်းစိုက်တာ ပေါ့။ လျော်ကြေးရပြီးပြီ၊ ၁ ဖက ၆၀၀/- နှုန်းနဲ့ (၃)နှစ်စာ။ လိုအပ်တာကတော့ အလုပ်အကိုင်ပေါ့။

ရက်စွဲ	၂၂-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးညီ
ဖြေဆိုသူ	ဦးသန်းလှိုင်(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၃ ဦး ကျား - ၂ ၊ မ - ၁
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ်ခင်း/အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ရေဒီယို၊ တီဗီ၊ ဗီဒီယိုပြစက်၊လျှပ်စစ်ထမင်းအိုး၊

	လျှပ်စစ်ပေါင်းအိုး၊ လျှပ်စစ်မီးပူ၊ဖုန်း၊ PST စလောင်း
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၃) ဧက၊ ဥယျာဉ်(၂.၆၀) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲကြီး၊ ဝါ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၃ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာတယ်။ သားသမီးတွေထောက်ပံ့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	မရှိပါ
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	သားသမီးတွေအလုပ်ကိုင်ရနိုင်၊ အလုပ်အကိုင်အခွင့် အလမ်းများ ကိုလည်း ပေးစေခြင်းပါတယ်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါတယ်။
ဘာဖြစ်လို့လဲ	စိုက်ပျိုးရေး လုပ်လို့မရတော့ရင် ဝင်ငွေလျော့သွား နိုင်ပါသည်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အလုပ်အကိုင် အခွင့်အလမ်းများ

မှာ	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်စပ်	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	ကျောင်းတက်ခဲ့ဖူးသည့်	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အခြေအနေ	မှတ်ချက်
1	ဦးသန်းလှိုင်	ကျား	၅၆	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၆တန်း	တောင်သူ		
2	ဒေါ်ကြည်ဝင်း	မ	၅၂	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
3	ကိုတင်ဝင်းလှိုင်	ကျား	၂၉	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	၁၀တန်း အောင်	ရွှေခြေသုံ့မှာ စိုက်ပျိုးရေး ပစ္စည်းရောင်း		

ဦးသန်းရွှေ (သား) (ဦးဖိုးသိန်း - ဖခင် - ပိုင်ရှင်)

ပန်းတော်ပြင်ကျေးရွာ၊ ပန်းတော်ပြင်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

အရင်ကယာခွန်ပြေစာနဲ့စောင်ရတယ်၅ ကျပ်၊ ၆ကျပ်ပေါ့။ စက်ရုံသိမ်းမြေမှာယာ ၆ဧကပါသွားတယ်။နှမ်း၊ ပဲဝါ၊ ပဲစဉ်းငုံ စိုက်တယ် ။ သိမ်းပြီးတော့ အရင်နှစ်ကနှမ်းပေးရတယ်လေ။ လျော်ကြေးက မြန်မာ့ဆိုရှယ်လစ်လမ်း စဉ် ပါတီခေတ်က ဧကရှိသလောက်မပေးဘူး စိုက်ထားတဲ့ ဖိုးပဲပေးတယ် ၆၀၀၀/-ကျပ်ရတယ်။စားဝတ်နေရေးနဲ့တည်တည်ငြိမ်ငြိမ်လေး ဖြစ်စေချင်တယ်။ အမေက အသက်ကြီးပြီလေ။ ဥပုလ်၊ သီတင်း မှန်မှန်စောင့်ပြီး အေးအေးဆေးဆေး နေစေချင်တယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးဖိုးသိန်း
ဖြေဆိုသူ	ဦးသန်းရွှေ(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၁ ၊ မ - ၃
ကျေးရွာ	ပန်းတော်ပြင်၊ ပန်းတော်ပြင်အုပ်စု၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	09 401649492/ 09 33462660
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်ကာ၊ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	စက်ဘီး၊ ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဒီဒီယိုပြစက်၊ လျှပ်စစ် ထမင်းအိုး၊ လျှပ်စစ်ပေါင်းအိုး။
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၆ x ၆၆ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၆) ဧက၊ ဥယျာဉ်(၂.၅၀) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲ၊ ဝါ၊ ပဲစဉ်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၆ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ

သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ပုံမှန်ပါပဲ။ ယာချောင်းကတော့သိပ်မရဘူး၊ ဝန်ထမ်းသားသမီးကထောက်ပံ့နေတယ်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	မရှိပါ
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	ကိုယ်ပိုင်ရေတွင်း
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖေါ်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	ကိုယ့်ဒေသမှာခေါင်းပါးတော့ ဒေသခံတွေအလုပ်အကိုင် ရစေချင်တယ်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	ဒေသခံအတွက်ပြုပြင်ပြောင်းလဲမှုတွေဖြစ်လာနိုင်တယ်
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ ၆၀၀၀/- မြန်မာ့ဆိုရှယ်လစ်လမ်းစဉ်ပါတီခေတ်က၊ အဲဒီခေတ်ငွေကြေးအနေနဲ့က များမှာပေါ့။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	စားဝတ်နေရေးအဆင်ပြေချင်တယ်၊ ကျန်းမာရေးလည်း ကောင်းစေချင်တယ် အမေတို့အရွယ်က ဥပုလ်သီတင်း မှန်မှန်စောင့်ပြီး အေးအေးချမ်းချမ်းဖြစ်စေချင်တယ်။

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တဲ့ဆက်ဆံရေး	အိမ်ထောင်ဦးစီးအခြေအနေ	ပညာ	ဘာသာ	ပြည်သူ့ကျန်းမာရေးဆိုင်ရာပြဿနာများ	အလုပ်အကိုင်အခြေအနေ	မှတ်ချက်
1	ဒေါ်စမ်း	မ	၈၈	ဦးစီး		၈မာ	ဗုဒ္ဓ	ဘက	နှိုး	
2	ဒေါ်ဖွားအေး	မ	၃၈	သမီး		၈မာ	ဗုဒ္ဓ	၁၀ တန်း	သကြားစက်	

3	ဦးဝင်းရွှေ	ကျား	၃၆	သား		ဗမာ	ဗုဒ္ဓ	၇ တန်း	တောင်သူ		
4	မယဉ်ထွေး	မ	၃၄	သမီး		ဗမာ	ဗုဒ္ဓ	၆ တန်း	ဒိုရို		

ဦးသောင်းဝင်း(သား) (ဒေါ်လှတင်- မိခင် - ဝိုင်ရှင်)

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ယာ ၈ ဧကပါသွားတယ်။ အမှန်တကယ် ပါသွားတာက ၁၀ဧက ပုံစံ ၇ထွက်တော့ ၈ ဧက ပဲထွက်တယ်။ အရင်ကအခွန်အနေနဲ့ ၇၀၀၀/-ဆောင်ရတယ် စက်ရုံကို၊ အခု ၁ဧကကို ၁၀၀၀၀/-နှုန်းဆောင်ရတယ်။ အဓိကစိုက်ပျိုးတာက မိုးဦးမှာ နမ်း၊ မြေပဲ နဲ့ဆောင်းမှာ ဝါ၊ ပဲကြီး စိုက်တယ်။ လျော်ကြေးရပြီးပြီ ၃ နှစ်စာ သီးနှံလျော်ကြေး။ စက်ရုံမဆောက်ရင်အနှစ်၃၀ကြာလျှင် ပြန်ပေးမယ်ကြားတယ်။ မိဘတွေဆီက ကြားတာပါ။ မြေက ဘိုးဘွားပိုင်မြေပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဒေါ်လှတင်
ဖြေဆိုသူ	ဦးသောင်းဝင်း(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၈ဦး ကျား -၃ ၊ မ -၅
ကျေးရွာ	သံပုရာကန် ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းကနေ
ဖုန်းနံပါတ်	၀၉ ၂၅၆ ၂၂၁ ၄၀၉
အိမ်အမျိုးအစား	သွပ်မိုး၊ ကြမ်း ခင်း၊ အုတ် အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၅ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၁၀) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နမ်း၊ မြေပဲ၊ ပဲကြီး
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၈ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ။ ခိုင်းနွားငှါး(၄)ကောင်တော့ရှိ။
သင်ရေနံတူးသလား	
အရောင်းအဝယ်လုပ်ပါသလား	
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ၂၀၁၄ ထက်ကျလာတယ်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ	
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ

သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	အစ်မ က ဆီးချို၊ သွေးချို ရှိသောကြောင့် ၄၅,၀၀၀ ကျပ်တစ်လကုန်ကျပါသည်။
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	အများကောင်းစားရေးအလုပ်ဆိုရင်အနစ်နာခံလို့ရပါတယ်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ။ မှိုခိုပြီးတော့မပြောင်းလဲပါ။ သားကလဲသူ့အလုပ်နဲ့သူဆိုတော့။အရင်းအနှီးမရှိရင်ဒေတာ့ပြောင်းသွားနိုင်ပါသည်။
ဘာဖြစ်လို့လဲ	စက်ရုံမှ အလုပ်ပေးရင်တော့ကောင်းပါမည်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီ လား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	၃နှစ်စာ သီးနှံလျော်ကြေးရပါသည်။ စက်ရုံမဆောက်ဖြစ်ပါက အနှစ် ၃၀ကြာ ရင် ပြန်ပေးမယ် လို့ ကြားထားပါသည်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

ဖွဲ့	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနဲ့ဆိုင်	အိမ်ထောင်သည်နှစ်အရေအတွက်	ပညာ	ဘာသာ	ပြည်ပသွားခဲ့ဖူးလား	အလုပ်အကိုင်	မှတ်ချက်
၁	ဒေါ်လှတင်	မ	၇၄	ဦးစီး	မရှိ	ဗမာ	ဗုဒ္ဓ	-		
၂	ဦးသောင်းဝင်း	ကျား	၅၂	သား	လူပျို	ဗမာ	ဗုဒ္ဓ			
၃	ဒေါ်ခင်ပြမ်း	မ	၅၁	ဇနီး	ကွယ်လွန်	ဗမာ	ဗုဒ္ဓ		တောင်သူ	
၄	ဒေါ်လှသိန်း	မ	၅၆	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၄တန်း		
၅	ဦးခိုင်ဇော်	ကျား	၃၁	မြေး	ရှိ	ဗမာ	ဗုဒ္ဓ	B.A(Eco)	ကားမောင်း	
၆	ဒေါ်ရီအေး	မ	၃၀	မြေး(ချွေးမ)	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	ဆရာမ	ဆင်မတောင်ရွာ
၇	ဒေါ်ခင်မို့	မ	၂၉	မြေး	မရှိ	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	တောင်ယာ	
၈	ဒေါ်နှင်းယုအောင်	မ	၁၆	မြေး	မရှိ	ဗမာ	ဗုဒ္ဓ	MSC	ဆရာမ	တောင်ဦးရွာ
၉	ရွှေဘုန်းအောင်	ကျား	၃	မြစ်		ဗမာ	ဗုဒ္ဓ			

ဒေါ်စမ်းညွန့် (သမီး) (ဒေါ်ခင်စော - မိခင် - ပိုင်ရှင်)

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းမြေမှာဘယ်လောက်ပါသွားလဲမသိပါ။ အခုလက်ရှိ ဝ.၁ဧကအပိုင်ရှိတယ်။ အဲဒီယာလေးပဲလုပ်စားနေတာ။ မိုးဆို နှမ်းစိုက်တယ်၊ မိုးနှောင်းဆိုရင် ဝါစိုက်တယ်။ နောက်ပြီး နွားစာကျွေးဖို့ပြောင်းစိုက်တယ်။ မိုးကောင်း ရင်တော့ ဝင်ငွေပိုတာပေါ့ ။ အကြွေးကရပ်ရွာထဲမှာ ချေးတာ ရှိတယ်။ ယာစိုက်တဲ့ထဲပါသွားတယ်။ ပေါင်းထိုးတာတို့ နှမ်းနှုတ်တာက သူများကိုငှားရတာပေါ့ အဲတာတွေ ကုန်တာပါ။ လျော်ကြေးရမရမသိပါ။ သမီးအတွက်အလုပ်အကိုင်လိုအပ်တယ်။ အကြွေးတွေလည်း ဆပ်ချင်ပါတယ်။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးလှသောင်း ၊ ဒေါ်ခင်စော
ဖြေဆိုသူ	မစမ်းညွန့်
အိမ်ထောင်စုဝင်လူဦးရေ	၉ ဦး ကျား - ၄ ၊ မ - ၅
ကျေးရွာ	သမ္ဘရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံကာ ၊ ပျဉ်ခင်း (သုံးပင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ရေဒီယို၊ တီဗွီ၊ ဒီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	-
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၀.၁) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ဝါ၊ နွားကျွေးဖို့ပြောင်းစိုက်
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	မသိပါ
မွေးမြူရေးလုပ်ငန်း	တနိုင်တပိုင် လုပ်ပါသည်။
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ဝါက အရင်ပိသာ ၅၀၀ လောက်ရတယ်၊ အခုရာသီဥတုအခြေအနေကြောင့်မရတော့ပါ ။ အမေတွေလက်ထက်က နှမ်းလည်း ၃၀ တင်းလောက်ရတယ် ယခု မရတော့ပါ။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	ရပ်ရွာထဲမှ (၅၀၀၀၀၀/-) ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေပိုက်ကရ

သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	မရှိပါ
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	-
ဘာလို့လဲ	အများဆန္ဒအတိုင်းပေါ့
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	အဆင်ပြေမယ်ထင်ပါတယ်
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ မသိပါ
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အလုပ်အကိုင်အခွင့်အလမ်း၊ သမီးအတွက်လိုအပ်အကြွေးဆပ်စေချင်တယ်

အမှတ်	အမည်	ထူး/ဓ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တော်စပ်ပုံ	အိမ်ထောင်အခြေအနေ	ဘိုးအို	ဘာသာ	ပြည်သူ့ကျန်းမာရေးဝန်ထမ်းဆိုသည်ကို သိသလား	ပြည်သူ့ကျန်းမာရေးဝန်ထမ်းများ	မှတ်ချက်
1	ဦးလှသောင်း	ကျား	၅၀	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ		
2	မစန်းညွှန့်	မ	၄၁	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-	ကျပန်း		
3	ဒေါ်ခင်စော	မ	၇၆	ယောကျ်မ	မရှိ	ဗမာ	ဗုဒ္ဓ	-	မိုးမိုး		
4	မမိုးမိုးစံ	မ	၁၆	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၈ တန်း	ကျပန်း		
5	မစိမ်းမို့မို့	မ	၁၃	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၇ တန်း	ကျောင်းသူ		
6	မောင်ဇင်မောင်မြင့်	ကျား	၁၁	သား	လူပို	ဗမာ	ဗုဒ္ဓ	-	-		ဥာဏ်ရည်မမီ
7	မခင်ယွန်းစံ	မ	၆	သမီး		ဗမာ	ဗုဒ္ဓ	သူငယ်တန်း	ကျောင်းသူ		
8	မောင်ဟိန်းဝေယံ	ကျား	၃	သား		ဗမာ	ဗုဒ္ဓ		-		
9	မောင်ဝေယံမိုး	ကျား	၁-၃	သား		ဗမာ	ဗုဒ္ဓ		-		

ဒေါ်တင်ကြည် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းယာမြေက ၂ ဧကပါသွားတယ်။ ကပစ(၁၀)က လည်း ၁ဧကသိမ်းသွားတယ်။ မိုးဦးမှာ နှမ်း၊ ဝါရယ် အဓိက စိုက်ပျိုး ပါတယ်။ အကြွေးရှိတယ်။ မြစိမ်းရောင်နဲ့စိုက်ဘဏ် ကယူတယ်။ ယာထဲစရိတ်တွေ ဝင်တာပေါ့ ပေါင်းထိုး၊ လူငှား တဲ့စရိတ်တွေပေါ့။ လျော်ကြေးကရပြီးပြီ ၁၀၀၀၀/-ရတယ်။ ကျန်းမာရေးကောင်းဖို့နဲ့ အဆင်ပြေဖို့ပေါ့။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဒေါ်တင်ကြည်
ဖြေဆိုသူ	ဒေါ်တင်ကြည် နှင့် မောင်လင်းအောင် (တူသား)
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၁ ၊ မ - ၃
ကျေးရွာ	သမ္ဘရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ ပျဉ်ခင်း (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၁ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	-
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၂ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလား သလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ပုံမှန်ပါပဲ၊ ကလေးမရှိ၊ လူကြီးတွေများတော့ ကုန်ကျစရိတ် သိပ်မရှိ
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မြစိမ်းရောင်ငွေစုငွေချေး၊ စိုက်ပျိုးရေးဘဏ် (၂၅၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း

သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	မလိုအပ်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ
ဘာလို့လဲ	ကိုယ့်ယာတော့အသိမ်းမခံချင်ပါ ယာမြေနဲ့လုပ်စားနေရ တာ လျော်ကြေးတန်ရာတန်ကြေးလေးပေးရင်တော့ လိုချင်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	ရွာထဲကလူအတွက် စက်ရုံထဲမှာအလုပ်မရှိ ဘာမှထူးခြား စွာ မခံစားရပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ၁၀၀၀၀/-ကျပ်ရတယ်
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	ကျန်းမာရေးကောင်းဖို့၊ အဆင်ပြေဖို့ပါပဲ

စဉ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ပြုနိုင်ငံတော်သား	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	ပညာအရည်အချင်းနှင့်တက်ရောက်ခဲ့သည့်ကျောင်းအမည်	သင်ကြားသည့်အဆင့်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
1	ဒေါ်တင်ကြည်	မ	၈၅	ဦးစီး	မရှိ	ဗမာ	ဗုဒ္ဓ	-	မိုနို		
2	ဒေါ်စောမီ	မ	၇၀	ညီမ	မရှိ	ဗမာ	ဗုဒ္ဓ	-	မိုနို		
3	ဒေါ်ကြည်စိန်	မ	၆၇	ညီမ	မရှိ	ဗမာ	ဗုဒ္ဓ	-	မိုနို		
4	မောင်လင်းဇော	ကျား	၃၂	တူ	လူပျို	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ		

ဦးအောင်ကြိုင် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

သိမ်းတဲ့ထဲပါသွားတဲ့ယာက ၈ ဧက။ နှမ်းနဲ့ဝါ အဓိက စိုက်ပျိုးတာပေါ့။ အကြွေးရှိတယ် အစိုးရဘက်အပြင် မြစိမ်းရောင်နဲ့ သ/မက ချေးတယ်။ လျော်ကြေးမရပါ။ လိုအပ်ချက်ကတော့ ထောက်ပံ့ကြေးနဲ့ အလုပ်အကိုင်ရမယ်ဆိုရင်လုပ်ချင်တယ်။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးအောင်ကြိုင်
ဖြေဆိုသူ	ဦးအောင်ကြိုင်
အိမ်ထောင်စုဝင်လူဦးရေ	၇ဦး ကျား -၃ ၊ မ - ၄
ကျေးရွာ	သံပုရာကန် ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	၀၉ ၂၅၆ ၃၃၅ ၂၀၈
အိမ်အမျိုးအစား	သွပ်မိုး၊ သစ်သားအခင်း၊ သစ်သားအကာ၊
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗွီ၊ ဖုန်း
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၁၄၅ X ၁၀၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	လယ် ၁.၅ ဧက၊ ယာ (၈) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၈ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ။ ခိုင်းနွားငါး(၆)ကောင်ရှိပါသည်။
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ။
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာတယ်။ သီးနှံအထွက်တိုးလာတယ်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	အစိုးရဘဏ်၊ မိတ်ဆွေ၊ မြစိမ်းရောင်၊ သမ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	ဦးအောင်ကြိုင်တွင် သွေးချို ရောဂါရှိပြီး ဆေးခန်း ပြပါက ၈၀,၀၀၀ ကျပ်ခန့် ကုန်ပါသည်။
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	အလုပ်အကိုင်အခွင့် အလမ်း ရမယ်ဆိုရင်တော့ ဖြစ်စေခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	-

သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**မရပါ။**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	**ယာအတွက်နှစ်နာကြေး နှင့် အလုပ်အကိုင် လိုအပ်ပါသည်။**

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်သွယ်ပုံ	အိမ်ထောင်ဦးစီးနှင့်အဓိပ္ပာယ်ဖွင့်ဆိုချက်	ဘာသာ	လူမျိုး	အဖြစ်အပျက်ဖြစ်ပွားချိန်တွင် ဘယ်နေရာတွင်ရှိခဲ့သနည်း	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
၁	ဦးအောင်ကြိုင်	ကျား	၆၉	ဦးစီး		ဗမာ	ဗုဒ္ဓ		တောင်သူ		
၂	ဒေါ်တုတ်	မ	၆၄	ဇနီး		ဗမာ	ဗုဒ္ဓ				
၃	မသန်းရွှေ	မ	၁၃၂၉	သမီး		ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ		
၄	ကိုသန်းဝိုး	ကျား	၁၃၄၃	သား		ဗမာ	ဗုဒ္ဓ	၈တန်း	တောင်သူ		
၅	ဇော်မျိုးအောင်	ကျား	၁၃၄၆	သား		ဗမာ	ဗုဒ္ဓ	ဒုတိယနှစ်	တောင်သူ		
၆	အေးအေးအောင်	မ	၁၃၅၄	သမီး		ဗမာ	ဗုဒ္ဓ	၈တန်း	တောင်သူ		
၇	မခိုင်	မ	၁၅	ရွေးမ		ဗမာ	ဗုဒ္ဓ	၈တန်း	တောင်သူ		

ဒေါ်စမ်းလှ - သမီး (ဦးအေး (ဖခင်) - ပိုင်ရှင်)

သံပုရာကန်ကျေးရွာ၊ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဒီမှာနေတာ နှစ်(၂၀)လောက်ရှိပြီပေါ့ ။ ယာ(၈)ယာကျေါက်ကွင်းမြေ ဖြစ်သွားတယ်။ လက်ကျန် ၁.၅ဧကမှာပဲ နှမ်း၊ ဝါးပဲစဉ်းငုံ ၊ ပြောင်း စိုက်တယ်။ အကြွေးရှိတယ်၊ အသိမိတ်ဆွေဆီကယူတယ်။ တောင်ယာ ထဲ ပြန်သုံး တာပေါ့။ လျော်ကြေးမရပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	**ဦးအေး အမည်ပေါက်**
ဖြေဆိုသူ	**ဒေါ်စမ်းလှ (သမီး)**
အိမ်ထောင်စုဝင်လူဦးရေ	**၄ ဦး ကျား - ၂၊ မ - ၂**
ကျေးရွာ	**သပ္ပာရကန်ကျေးရွာ၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။**
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	**နှစ် ၂၀ လောက်ရှိပြီ**

ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ ကြမ်းခင်း (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	-
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၄၀ x ၆၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	၁.၅ ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ဝါ၊ ပဲစဉ်းငုံ၊ နံစားပြောင်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၈ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ မိုးလေဝသမကောင်းလို့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	အသိမိတ်ဆွေတွေဆီက (၂၅၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေး ကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ
ဘာလို့လဲ	ယာတွေပါသွားတော့ ယာပဲလုပ်စားတတ်တော့မဖြစ် စေချင်ပါ
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်
ဘာဖြစ်လို့လဲ	စက်ရုံမှာ အလုပ်ပေးရင်ကောင်းတယ်။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	လျော်ကြေးမရသေးပါ။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	-

အမှတ်	အမျိုးအမည်	ယူနစ်	အရေအတွက်	အိမ်ထောင်စုဦးစီးနှင့်ဆက်သွယ်ခံ	အိမ်ထောင်စုဦးရေ	ဘာသာ	ဘာသာရေး	လက်ရှိသောက်သုံးရေရင်းမြစ်	သောက်သုံးရေအရည်အသွေး	မှတ်ချက်
1	ဦးအေး	ကျား	၇၇	ဦးစီး	မရှိ	ဗမာ	ဗုဒ္ဓ		မိုးရေ	
2	ဦးတင်ညွန့်	ကျား	၄၉	သား		ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ	
3	ဒေါ်စမ်းလှ	မ	၅၁	သမီး		ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ	
4	မတင်ထွေး	မ	၃၉	သမီး		ဗမာ	ဗုဒ္ဓ	၅ တန်း	-	

ဦးခင်မောင် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဒီမှာမွေးကတည်းကနေတာပါ။ အသိမ်းခံတာကယာ၄ဧက။ အခုသူများ လယ်မှာအငှားလုပ်နေရတယ်။ နှမ်းနဲ့ ပဲတီစိမ်း စိုက်တယ်။ အကြွေး ကတော့ မြစိမ်းရောင်၊ သ/မ အပြင် ၁၀တိုးနဲ့ချေးထားတာ ရှိတယ်။ ယာမှာပြန်သုံးလိုက်လို့ပါ။ သင့်တင့်တဲ့လျော်ကြေးရလိုပါတယ်။ မပြောတတ်တော့ပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးခင်မောင်
ဖြေဆိုသူ	ဦးခင်မောင်
အိမ်ထောင်စုဝင်လူဦးရေ	၄ဦး ကျား -၂ ၊ မ - ၂
ကျေးရွာ	သံပုရာကန် ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းကနေ
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ကြမ်း ခင်း၊ ထရံကာ အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၁ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၈) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၄ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ။ ခိုင်းနွားငှား(၄)ကောင်တော့ရှိ။
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ သီးနှံမထွက်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။

အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ (စုစုပေါင်းဘယ် လောက်လဲ) ။	မြစိမ်းရောင်၊ သ/မ၊ အပေါင်းအသင်းထံ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	ဆေးဝါး။
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖေါ်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	အသက်ကြီးလို့ အလုပ်မလျော်လင့်ပါ။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင် အခွင့် အလမ်း ကို စက်ရုံမှ မမျှောင်လင့်ပါ။ အသက်ကြီးနေလို့အလုပ်မရနိုင်ပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။ ။	သင့်တင့်တဲ့လျော်ကြေးရလိုပါသည်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	-

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်စပ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ပညာ	ဘာသာ	အခြေခံလုပ်ငန်းကိုင်သည့် ဆုံးဖြတ်ချက်ချသူ	လက်ရှိအလုပ်အကိုင်	အလုပ်အတွင်းအဆိုးအကောင်း	မှတ်ချက်
၁	ဦးခင်မောင်	ကျား	၇၃	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-			
၂	ဦးဝင်းလှိုင်	ကျား	၄၈	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ		
၃	မအေးသွယ်	မ	၄၂	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ		
၄	မယဉ်ငြေး	မ	၄၀	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ		

ဦးငွေစိုး - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

သိမ်းခံရတာ ၂၅ / ၃၀ ဧကလောက်ရှိတယ်။ အဓိကစိုက်ပျိုးတာ နှမ်းနဲ့ပဲ၊ ရှိတဲ့လယ်မှာတော့ နွေစပါးစိုက်တယ်။ အကြွေးရှိတယ် ၊ မိတ်ဆွေနဲ့ ဆွေမျိုး တွေကချေးပေးတယ်။ ကုန်တာကလုပ်အားခတွေ နွား(၂)ရှဉ်း အတွက် ကုန်ကျ စရိတ်တွေပေါ့ ထင်သလောက်လည်း မမြတ်တော့ လည် နေတာပေါ့။ လိုအပ်နေ တဲ့အဓိကအကြောင်းအရာကတော့ယာမြေကို ကိုယ့်ငွေနဲ့ကိုယ်လုပ် ချင်တယ်။ ကိုယ်ပိုင်လည်းကြိုးစားနေပါတယ် ကြိုး စားနိုင်သလောက်ပေါ့။ စက်ရုံ ဆောက်လို့ အလုပ်အကိုင် အခွင့်အလမ်း တွေလည်း မျှော်လင့်ပါတယ်။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးငွေစိုး အမည်ပေါက်
ဖြေဆိုသူ	ဦးငွေစိုး နှင့် သမီးဒေါ်မြင့်မြင့်ဌေး
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၁ ၊ မ - ၃
ကျေးရွာ	သမ္ဘရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ သစ်သား
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယို၊ လျှပ်စစ်ပေါင်းအိုး၊ လျှပ်စစ် မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၁ ဧကခန့်
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	၃၀ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	စပါး၊ ပဲတီစိမ်း၊ ပဲစဉ်းငုံ၊ နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၂၅-၃၀ ဧက ခန့်
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုး လားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ မိုးလေဝသပေါ်မူတည်လုပ်အားခနဲ့မကိုက် စရိတ်ကလဲကြီးတယ်၊ အလုပ်ပေါလို့တောင်သူအလုပ် မလုပ်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မိတ်ဆွေ၊ ဆွေမျိုးတွေ (၃၀၀၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ

သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကိုအထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	အများကောင်းစားရေးအတွက်ဆိုရင်ဖြစ်စေချင်ပါတယ်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံပျက်လျော်ကြေး၊ မမှတ်မိပါ
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	ယာမြေကို ကိုယ့်ငွေနဲ့ကိုယ်လုပ်ချင်တယ်၊ ကိုယ်ပိုင် ကြိုးစား နေပါတယ်၊ ကြိုးစားနိုင်သလောက်၊ စက်ရုံဆောက်လို့အလုပ်အကိုင်အခွင့်အလမ်းလေးတွေလဲ မျှော်လင့်

အမှာ	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဖက်နှင့်ဆက်ဆံရေး	အိမ်ထောင်ဖက်ဆုံးရှုံးခြင်းအခြေအနေ	ဘာသာ	လူမျိုး	ပညာအရည်အချင်းဆင့်ကဲ	ပညာအရည်အချင်း	အလုပ်အကိုင်
1	ဦးငွေစိုး	ကျား	၈၄	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုရိ	
2	ဒေါ်ညွှန့်	မ	၇၈	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုရိ	
3	ဒေါ်မြင့်မြင့်ဌေး	မ	၄၃	သမီး		ဗမာ	ဗုဒ္ဓ	B.Sc (Chem)	တောင်သူ	
4	ဒေါ်သိန်းသိန်းဇော	မ	၃၉	သမီး		ဗမာ	ဗုဒ္ဓ	M.Sc (Maths)	ကျူရှင်ဆရာမ	

ဦးစန်းဌေး - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံမြေထဲမှာ ယာဧက ၂၀ ပါသွားတယ်။ ၁ ဧကကို တစ်နှစ်စာ ၁၀၀၀၀/နှုန်း နဲ့အခွန်ဆောင်ရတယ်။ ယာမှာအဓိကစိုက်ပျိုးတာက နှမ်း၊ ပဲတီစိမ်း ရယ်၊ ဝါရယ်ပေါ့။ အကြွေးကို အမေနဲ့ မောင်နမတွေဆီကယူတယ်။ သီးနှံသုံမပေါ်ခင် ကာလမှာ ပျိုးမျိုးစေ့ဝယ်တယ်၊ ဝါကနေပဲပိုက်ဆံ နည်းနည်းပဲ ပြန်ရတယ်။ လျော်ကြေးကရပြီးပြီ သီးနှံလျော်ကြေး (၃)နှစ်စာ ၁ ဧကကို ၁၈၀၀ နဲ့ လျော်တယ်။ ရွာမှာ ဆေးရုံဆေးခန်းမရှိဘူး၊ မူလတန်း ကျောင်းတော့ရှိတယ်။ ရေရှားနေတော့ ရေကောင်းရေသန့်ရရှိရန်လိုအပ် ပါတယ်။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးစန်းဌေး (ဥက္ကဋ္ဌ)
ဖြေဆိုသူ	ဦးစန်းဌေး
အိမ်ထောင်စုဝင်လူဦးရေ	၇ဦး ကျား -၃ ၊ မ - ၄
ကျေးရွာ	သံပုရာကန် ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	၀၉ ၃၁၂၅ ၇၂၂၉
အိမ်အမျိုးအစား	သွပ်မိုး၊ သစ်သားအခင်း၊ သစ်သားအကာ၊ ၄ပင်အိမ်
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	စက်ဘီး၊ ဆိုင်ကယ်၊ တီဗွီ၊ ဒီဇယ်ပြုစက်၊ ဖုန်း၊ ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၃၀ ဧက
သင့်ယာမြေကဘယ်လောက်ရှိသလဲ	ယာဧက (၂၀) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ ၊ ပြောင်း၊ သရက်
သင့်မြေကဘယ်လောက်ပါသွားလဲ	၂၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	လုပ်ပါသည်။ အိမ်ဆိုင် ဖွင့်ထားပါသည်။ ထိုဆိုင်ကလေးမှ အိမ်စရိတ်ကာမိပါသည်။
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာတယ်။ ကျောင်းစရိတ် တစ်ယောက်လျှော့။ ကျောင်းပြီးတဲ့ ကလေး က အလုပ်လုပ်လို့ အိမ် ကို ပိုက်ဆံ ပြန်ပေး။ ယာလုပ်ငန်းမှာ လဲ မိုးခေါင်တာတောင် အထွက်တိုးလာတယ်။ ဝါ ကနေပိုက်ဆံနည်းနည်းပိုရ
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။ ပျိုးပင်၊ ပျိုးစေ့ များဝယ်ရန် အသုံးချပါသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	အမေ (၁၀,၀၀၀,၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း၊ ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	

သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	အားလုံး အတွက် ဆို ကောင်းပါတယ်၊ မြေယာ ပါသွားတဲ့လူအဖို့တာမကောင်းတာပါ။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည် စီးပွားရေးပြောင်းသွားနိုင်ပါသည်။
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင် အခွင့်အလမ်း ရမယ်ဆို အဆင်ပြေနိုင်ပါတယ်။ ချမ်းသာမယ်လို့တော့ မထင်ပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံလျော်ကြေး ၃နှစ်စာ ၁ဧက ကို ၁၈၀၀ ကျပ်နဲ့ ရထားပါသည်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	ရေကောင်းရေသန့်ရရှိရန်လိုအပ်။

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ရေးအခြေအနေ	အိမ်ထောင်ရေးအခြေအနေပြောင်းအောင်	မြို့နယ်	ကထက	ပြီးဆုံးခဲ့သည့်ပညာရေးအဆင့်	အသိအမှတ်ပြုကျောင်းအမည်	မှတ်ချက်
၁	ဦးစန်းဌေး	ကျား	၄၉	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-		
၂	ဒေါ်အုန်းဌေး	မ	၄၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	-		
၃	ကိုရဲဝင်းနောင်	ကျား	၂၃	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	B.Sc(Che)	Company ဝန်းထမ်း	
၄	မသိမ့်သိမ့်နွေး	မ	၁၉	သား	အပျို	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	စျေးရောင်း	
၅	မပြိမ့်ပြိမ့်နွေး	မ	၁၅	သမီး	အပျို	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	ကျောင်းသူ	
၆	မအေးဝတ်ရည်လှိုင်	မ	၁၄	သမီး	အပျို	ဗမာ	ဗုဒ္ဓ	ဂတန်း	ကျောင်းသူ	
၇	လျှမ်းထက်အောင်	ကျား	၈	သား	လူပျို	ဗမာ	ဗုဒ္ဓ	၃တန်း	ကျောင်းသား	

ဒေါ်တင်ညို (ဇနီး) / ဦးစံမြင့် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

သိမ်းတဲ့ထဲ ယာ၁၀ဧကပါသွားတယ်။ အဲမှာ နှမ်း၊ ဝါ အဓိကစိုက်တယ်။ ၁ဧက ၁၀၀၀၀/-နှုန်း တစ်နှစ်တစ်ခါ စက်ရုံကိုသွင်းရတယ်။ အကြွေး ရှိတယ်။ ဝန်ထမ်းအိမ်ယာကပဲ ချေးထားတယ်။ စိုက်ပျိုးစရိတ်၊ လူငှား ခ၊ ထွန်ငှားခ၊ ပေါင်းနှုတ်အတွက် အလုပ်သမားခတွေရော ကုန်တာ ပေါ့။ (၂)ကြိမ်တောင်အသိမ်းခံရတာ ကပစ(၁၀) ကလည်း သိမ်း တယ် အခွန် ၁ ဧက နှမ်း ၁တင်းနှုန်းနဲ့ကိုယ်စရိတ်ကိုယ် ခဏခဏ ပူရ လွန်းတယ်၊ ဒီစက်ရုံသိမ်းမြေထဲလဲပါ။ အသိမ်းခံရလို့ထူပူနေပြီ ၊ ခံစား ချက်တောင်မရှိတော့ဘူး။ လျော်ကြေးတော့ရပြီးပြီ မမှတ်မိတော့ဘူး၊

အဓိကလိုနေတာ ကတော့စားဝတ်နေရေး၊ တပ်ပြန်သိမ်းရင် သင့်တော် တဲ့လျော်ကြေး၊ အသက်လည်းကြီးနေပြီဆိုတော့သနားတဲ့ အနေနဲ့ လျော်ကြေးပေးရင် လိုချင်တာ ပေါ့။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးစံမြင့် အမည်ပေါက်
ဖြေဆိုသူ	ဒေါ်တင်ညို (ဇနီး)
အိမ်ထောင်စုဝင်လူဦးရေ	၅ ဦး ကျား - ၂ ၊ မ - ၃
ကျေးရွာ	သမ္မာရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	09 31824027
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ သစ်သား (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဖုန်း၊ တီဗွီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၃ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ ၁၇ ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၁၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ မိုးကလည်းမကောင်း၊ သီးနှံဈေးကလည်း မကောင်း၊ အဓိကယာပဲလုပ်တတ်တယ်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	ဝန်ထမ်းအိမ်ယာမှ (၅၀၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	မင်းလှသွားတက်ရတယ် ဆေးရုံကို၊ ပိုက်ဆံရှိဖို့ပါပဲ၊ အသွားများတယ်၊ ၂၄ နာရီဆရာဝန်တွေတော့ရှိပါတယ်။
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမ်ကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မပြောတတ်ပါ
ဘာလို့လဲ	သိမ်းတာက ကပစ (၁၀)လည်းသိမ်း၊ စက်ရုံလည်းသိမ်း (၂)ကြိမ်လောက်ဆိုတော့ အသိမ်းခံရလို့ထူပူနေပြီ ခံစားချက်မရှိတော့ပါဘူး

သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	**မထင်ပါ**
ဘာဖြစ်လို့လဲ	**အိုမှပြောင်းလဲတာကံတရားပေါ့ အခုလည်းအခွန်ပေး လုပ်စားရတယ်**
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**ရပြီးပြီ၊ ရေနံချက်စက်ရုံကသီးနှံလျော်ကြေး မမှတ်မိ ကပစ (၁၀)ကတော့ သိမ်းတာ ၁တင်းတောင်လျော်ပေး ရသေးတယ်**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	**စားဝတ်နေရေး၊ ထပ်ပြန်သိမ်းရင်သင့်တော်တဲ့လျော်ကြေး ရ ချင်တယ်၊ အသက်လည်းကြီးနေပြီဆိုတော့ သနားတဲ့ အနေနဲ့လျော်ကြေးပေးရင်လိုချင်တာပေါ့**

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်သွယ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	ကျောင်း	ပညာအရည်အချင်းအဆင့်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
1	ဦးစံမြင့်	ကျား	၆၄	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅ တန်း	တောင်သူ		
2	ဒေါ်တင်ညို	မ	၅၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅ တန်း	တောင်သူ		
3	မင်းဆွေဦး	ကျား	၃၈	သား		ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	တောင်သူ		
4	အေးစန္ဒာ	မ	၂၉	သမီး		ဗမာ	ဗုဒ္ဓ	B. Tech	ကျောင်းသူ		
5	ဇာဇာဖြိုး	မ	၁၉	သမီး		ဗမာ	ဗုဒ္ဓ	၈ တန်းအောင်			

ဒေါ်ဇီးကွက် (ဇနီး) / ဦးသောင်းလှိုင် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

အဒေါ်တို့က ဒီမှာ မွေးတည်းကနေတာလေ။ စက်ရုံးသိမ်းတဲ့ထဲ ပါသွားတာက ယာ ဂဇကပါတယ်။ ယာမှာ အဓိကစိုက်ပျိုးတာက ဝါ၊ နှမ်း၊ ပဲကြီး၊ ပဲစဉ်းငုံ စိုက်တယ်။ ၁ဇကကို ၁၀၀၀၀/-နှုန်းအခွန်ဆောင်ရ တယ် စက်ရုံကို၊ မိတ်ဆွေတွေဆီမှာ အကြွေးရှိပါတယ်။ စားသောက်စားရိတ်နဲ့ အလုပ်သမား စရိတ်တွေကုန်တာပေါ့။ လျော်ကြေးရပြီးပြီ၊ ခုနှစ်တော့မမှတ်မိပါ။ မကျေနပ်ပါ၊ ရူးမတတ်ခံစားရတယ်၊ ရင်တွေထူပူပြီးတော့ ကလေးတွေကလည်း ငယ် သေးတယ်လေ။ စားရေးသောက်ရေး၊ နေရေးထိုင်ရေး၊ ယာသိမ်းပြီး အလုပ် ပေးလျှင် ကောင်းမယ်။ နို့မို့ဆို အလုပ်လက်မဲ့ဖြစ်ကုန်ကျမယ်။

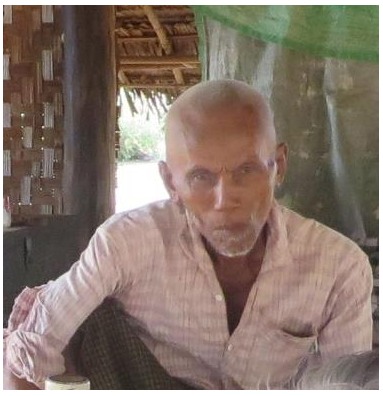
ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	**ဦးသောင်းလှိုင် အမည်ပေါက်**

ဖြေဆိုသူ	ဒေါ်ဇီးကွက် (ဇနီး)
အိမ်ထောင်စုဝင်လူဦးရေ	၁၀ ဦး ကျား - ၃ ၊ မ - ၇
ကျေးရွာ	သမ္မာရကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ သစ်သား (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗွီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၁ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	၇ ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း၊ ပဲကြီး၊ ပဲစဉ်းငုံ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၇ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်၊ ဒီနှစ်က မိုးတွေခေါင်တယ်၊ ယာပဲလုပ်ကိုင် စားတတ်တော့၊ ဒီပြင်ဟာမလုပ်တတ်ပါ
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မိတ်ဆွေတွေ (၅၀၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	စက်ရုံထဲမှာတော့ နပ်စ်တွေရှိတယ်၊ ဆေးဝါးတော့ မလုံလောက်ပါ။
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ
ဘာလို့လဲ	ယာအကုန်ပါသွားတဲ့အတွက်ကြောင့်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်
ဘာဖြစ်လို့လဲ	အဓိကက အလုပ်အကိုင်အခွင့်အလမ်းတွေ
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ မမှတ်မိပါ၊ ခုနှစ်လည်းမမှတ်မိ မကျေနပ်ပါ၊ ရူးမတတ်ခံစားရတယ်၊ ရင်တွေပူထူ၊ အတွေ့အကြုံမရှိ သေးတော့၊ ကလေးတွေလဲငယ်သေး

သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	**စားရေးသောက်ရေး နေရေးထိုင်ရေး၊ ယာသိမ်းပြီး အလုပ် ပေးလျှင်ကောင်း၊ နောက်မို့ဆိုအလုပ်လက်မဲ့ဖြစ်ကုန်မယ်**

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တော်စပ်ပုံ	အိမ်ထောင်တည်ဆဲအရေအတွက်	ဘာသာ	လူမျိုး	အခြေခံလုပ်ငန်းအမျိုးအစား	အလုပ်အကိုင်အခွင့်အလမ်းများ	အခက်အခဲများ	မှတ်ချက်
1	ဦးသောင်းလှိုင်	ကျား	၆၇	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၃ တန်းအောင်	တောင်သူ		
2	ဒေါ်ဇီးကွက်	မ	၆၃	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၃ တန်းအောင်	မှီခို		
3	မောင်ကျော်ကြီး	ကျား	၃၅	သား		ဗမာ	ဗုဒ္ဓ	၆ တန်း	တောင်သူ		
4	မအေးသန်း	မ	၃၀	သမီး		ဗမာ	ဗုဒ္ဓ	၅ တန်း	တောင်သူ		
5	မသီတာအေး	မ	၂၈	သမီး		ဗမာ	ဗုဒ္ဓ	၅ တန်း	တောင်သူ		
6	မသီတာဌေး	မ	၂၆	သမီး		ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	-		
7	မသီတာမွေး	မ	၂၄	သမီး		ဗမာ	ဗုဒ္ဓ	၁၀တန်း	-		
8	မအေးအေး	မ	၂၂	သမီး		ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	-		
9	ဖိုးလပြည့်	ကျား	၉	မြေး		ဗမာ	ဗုဒ္ဓ	ကျောင်းမနေ	-		
10	မဟာမာန်	မ	၇	မြေး		ဗမာ	ဗုဒ္ဓ	၁ တန်း	ကျောင်းသူ		

ဦးသာနိုး - ပိုင်ရှင်



သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းမြေထဲမှာကဝဖကပါသွားတယ်။ ယာမြေမှာဝါနဲ့နှမ်းကိုအဓိက စိုက်ပျိုးတယ်။ အကြွေးကတော့ စိုက်/ဘဏ်ရယ်၊ မြစိမ်းရောင်းရယ်၊ မိတ်ဆွေ တွေဆီကတော့အတိုး ၅% နှုန်းနဲ့ယူတယ်။ ကုန်တာကတော့ စားစရိတ်နဲ့ သီးနှံပြန်ဝယ်စိုက်တာ လူမှုရေးနဲ့ဘာသာရေးထဲ ပါတာ ပေါ့။ လျော်ကြေးတော့ရပြီးပြီ ၂၄၀၀၀/-ရတယ်။ သက်ကြီးပိုင်းတွေ အတွက်က ရေရှားတာပေါ့ မခပ်နိုင်လို့ ဝယ်သုံးရတယ် တစ်ပေပါကို ၁၀၀၀/-နဲ့။ ကိုယ်ပိုင်ရေတွင်းလေးလိုချင်တယ်။ အကြွေးတွေပြန်ဆပ်ချင်တယ်။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးသာနိုး
ဖြေဆိုသူ	ဦးသာနိုး
အိမ်ထောင်စုဝင်လူဦးရေ	၃ ဦး ကျား - ၁၊ မ - ၂

ကျေးရွာ	သမ္ဘရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	-
အိမ်အမျိုးအစား	သွပ်မိုး၊ ဝါးထရံ၊ ပျဉ်ခင်း (ပျဉ်ထောင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၅ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ ၁၀ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	ဝါ၊ နှမ်း၊ မြေပဲ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၁၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ရပ်နေတယ်၊ လုပ်မည့်သူမရှိလို့သူရင်းငှားနဲ့ လုပ်တော့ အရင်းအနှီးကအရင်ကထက် ပိုကုန်ကျတယ်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မြစိမ်းရောင်ငွေစုငွေချေး၊ စိုက်ပျိုးရေးဘဏ် ၊ မိတ်ဆွေတွေ ဆီက(၈၅၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	မလိုအပ် ၊ မျက်စိမှုန်လို့အမြင်ကြည်ရန်ပဲလိုအပ် ပိုက်ဆံ လို
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မပြောချင်ပါ
ဘာလို့လဲ	ငွေကြေးထိုက်ထိုက်တန်တန်ရလျှင် မြေနေရာဝယ်လို့ရ
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်
ဘာဖြစ်လို့လဲ	မြေကြီးသူများဆီဝယ်လျှင် မြေနေရာမရှိပိုက်ဆံရှိလျှင် လည်း နေရာရှား၊ မရှိပါတော့ပါ
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ၂၄၂၀၀/-ကျပ်ရတယ်

သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	အကြွေးပြန်ဆပ်ချင်တယ်၊ မီးဝယ်ထင်းဝယ်ပေါ့ကိုယ်ပိုင် ရေတွင်းလေးလဲလိုချင်

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်စီးပွားဖွံ့ဖြိုးရေးဆိုင်ရာ အခန်းကဏ္ဍ	အိမ်ထောင်စုတွင်းရာထူး	ဘာသာ	အိမ်ထောင်စုတွင်းဆက်ဆံရေး	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အခွင့်အလမ်းများ	မှတ်ချက်
1	ဦးသာနိုး	ကျား	၆၅	ဦးစီး	မရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	မိုးရိ	
2	ဒေါ်ဒေါင်း	မ	၆၉	အစ်မ	မရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	အိမ်အလုပ်	
3	ဝင်းစန္ဒာ	မ	၂၄	တူမ	မရှိ	ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	တောင်သူ	မိသားစုအလုပ်ကူ	

ကိုသိန်းလွင် (သား) / ဦးသာဆောင် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းစိမံကိန်းမှာပါသွားတာ ယာ ၁၅ဧက ပါသွားတယ်၊ အဓိက စိုက်ပျိုးတာက သရက်ပင်က ၁၀ပင် ရှိတယ်၊ ပြောင်းစိုက်တယ်၊ စက်ရုံမှူး လူကြီးပြောင်းတိုင်း အခွန်ပေးနှုန်းပြောင်းတယ်။ အခု ၁ဧကကို ၁၀၀၀၀/-နှုန်းဆောင်ရတယ်။ အကြွေးရှိတယ်၊ မိတ်ဆွေ အပေါင်းအသင်းတွေဆီကပဲ ယူတယ်။ ယာထဲမှာပြန်သုံးလို့ပါ။ လျော်ကြေးကပေးတော့ပေးတယ်၊ ဒါပေမယ့် တစ်နှစ်ပေးရငွေနဲ့ဆိုပေးတဲ့ လျော်ကြေးကနည်းပါတယ်။ လိုအပ်နေတာ ကတော့ စားဝတ်နေရေးနဲ့အလုပ်အကိုင်ပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးသာဆောင်
ဖြေဆိုသူ	ကိုသိန်းလွင်(သား)
အိမ်ထောင်စုဝင်လူဦးရေ	၅ဦး ကျား -၃ ၊ မ - ၂
ကျေးရွာ	သံပုရာကန် ကျေးရွာ၊ ၊ မင်းလှ
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	၀၉ ၃၃၃၇ ၈၈၄၂
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ် အခင်း၊ အုတ် အကာ
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	စက်ဘီး၊ ဆိုင်ကယ်၊ တီဗွီ၊ ဒီဒီယိုပြစက်၊ ဖုန်း၊ ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၁ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာဧက (၁၅) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ ၊ ပြောင်း၊ သရက်
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၁၅ ဧက

မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ရာသီဥတု မကောင်း၊ ကျောင်းသားတွေလဲရှိလို့ ပိုက်ဆံကုန်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	အပေါင်းအသင်းထံမှ (၁,၀၀၀,၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ယင်လုံအိမ်သာ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	စက်ရုံရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအ နေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	တောင်သူဆိုတော့ ကိုယ်ယာ ကိုယ်ပဲ လုပ်ခြင်တာပေါ့။ယာတွေကို ထိုက်သင့်တဲ့ လျော်ကြေး ပေးစေခြင်ပါတယ်။မလုပ်ပါနဲ့လို့တော့တားပိုင်ခွင့်မရှိပါ။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါသည်
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင် အခွင့်အလမ်း ရမယ်ဆို အဆင်ပြေနိုင်ပါတယ်။ ချမ်းသာမယ်လို့တော့ မထင်ပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ ဒါပေမယ့် တစ်နှစ်ဝင်ငွေနဲ့ ဆိုရင် ပေးတဲ့ငွေက နည်းပါတယ်။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	စားဝတ်နေရေး၊ အလုပ်အကိုင် အခွင့်အလမ်း

အမှာ	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးမှုပုံစံ	အိမ်ထောင်ရေးအခြေအနေ	ပညာ	ဘာသာ	ကြွေးတင်ထားသည့်ပမာဏ	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
၁	ဦးသာဆောင်	ကျား	၇၄	ဦးစီး	ရှိ	၈မာ	ဗုဒ္ဓ	-			
၂	ဒေါ်လှတုတ်	မ	၆၆	ဇနီး	ရှိ	၈မာ	ဗုဒ္ဓ	-			
၃	ကိုသိန်းလွင်	မ	၄၇	သား	လူပျို	၈မာ	ဗုဒ္ဓ	၈တန်း	တောင်သူ		

၄	ကိုကိုမင်း	ကျား	၂၂	သား	လုပ်ဖူ	ဗမာ	ဗုဒ္ဓ	B.Sc(Bio-C)	-		အလုပ်မရသေး
၅	မသန်းသန်းနွယ်	မ	၃၁	သမီး	အပျိုဖူ	ဗမာ	ဗုဒ္ဓ	ဂုတန်း	တောင်သူ		

ဦးတင်မြင့် - ပိုင်ရှင်

သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းတဲ့မြေက ၂၂ ဧကပေါ့။ ပန်းတော်ပြင်ကပြန်ဝယ်ထားတာပါ။ အရင်က တစ်ဧကကို နှမ်းတပြည်ခွဲ ဆောင်ရတယ်။ အဓိက စိုက်တာက နှမ်း၊ ပဲ၊ ဝါ၊ နှမ်းကိုပိုစိုက်တယ်။ ဒီနှစ်မိုးမကောင်းတော့ အဆင်မပြေဘူး။ ရေနံ အရင်တုန်းက တူးဖူးသေးတယ် ။ အကြွေးရှိတယ်။ မိတ်ဆွေတွေနဲ့ ဆွေမျိုး တွေဆီမှာ ယူတယ်။ ယာစိုက်တဲ့ထဲပါတယ်။ အလုပ်သမားခတွေ၊ စားသောက်စရိတ်ထဲပါတယ်။ အဓိကလိုအပ်နေတာကတော့ ငွေနဲ့ အလုပ် အကိုင်ပါ။

ရက်စွဲ	၂၀-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးတင်မြင့် ၊ ပြန်ဝယ်ထားသောယာ
ဖြေဆိုသူ	ဦးတင်မြင့်
အိမ်ထောင်စုဝင်လူဦးရေ	၄ ဦး ကျား - ၃ ၊ မ - ၁
ကျေးရွာ	သမ္ဘရာကန်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	၁၉၉၀ ခုနှစ်က
ဖုန်းနံပါတ်	09-258017775
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်ကာ၊ အုတ်/သစ်သားခင်း (အုတ်တိုက်ခံ)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	စက်ဘီး၊ ဆိုင်ကယ်၊ ဖုန်း၊ ရေဒီယို၊ တီဗွီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၀.၁ ဧက
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၂၂) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲ၊ ဝါ
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၂၂ ဧက
မွေးမြူရေးလုပ်ငန်း	တနိုင်တပိုင် လုပ်ပါသည်။
သင်ရေနံတူးသလား	အရင်ကတော့တူးပါသည်၊ ယခုမတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ် ၊ ရာသီသုတုမကောင်းလို့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မိတ်ဆွေတွေ၊ ဆွေမျိုးတွေ (၄၅၀၀၀၀၀/-) ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း

သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	**စက်ရုံမှရေ**
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	**သင့်**
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	-
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	-
ဘာလို့လဲ	**ကိုယ့်မြေပါသွားမှာဖြစ်တဲ့အတွက်နည်းနည်းတော့ စိတ်ဘဝင်မကျပါ။**
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	**ပြောင်းလဲမပြောင်းလဲမှာတွေ တထစ်ရှပြောလို့မရပါ။ ယာမြေပါသွားတော့အလုပ်အကိုင်အခက်အခဲတော့ရှိ**
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**မရသေးပါ**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	**အဓိကကငွေ၊ အလုပ်အကိုင်အခွင့်အလမ်း**

အမှတ်	အမည်	ကျား/မ	အသက်	ပညာအရည်အချင်းအဆင့်	ကျောင်းတက်ခဲ့ဖူးမှု	ဘာသာ	ဝင်ငွေ	အလုပ်အကိုင်	အခြားအလုပ်အကိုင်	မှတ်ချက်
1	ဦးတင်မြင့်	ကျား	၅၆	ဦးဗီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၃ တန်း	တောင်သူ		
2	ဒေါ်အေးမြ	မ	၅၉	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၂ တန်း	မိုးမိ		
3	ကျော်မင်းထွန်း	ကျား	၃၁	သား	မရှိ	ဗမာ	ဗုဒ္ဓ	၆တန်းအောင်	တောင်သူ/ကျပန်း		
4	ဉာဏ်လင်းထွန်း	ကျား	၂၃	သား	မရှိ	ဗမာ	ဗုဒ္ဓ	၆တန်းအောင်	တောင်သူ/ကျပန်း		

ဒေါ်ခင်မြင့် - ပိုင်ရှင်

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းတဲ့ထဲ ယာ ၂.၅ ဧကပါသွားတယ်။ နှမ်း အဓိက စိုက်တယ်။ ၁နှစ်မှာ ၁ ဧက ၁၀၀၀၀/-သွင်းပြီးလုပ်ရတယ်။ အကြွေးရှိတာပေါ့ ရပ်ရွာထဲကရော၊ သ/မ ကရော၊ စိုက်/ဘဏ်ကရောယူရတယ်။ ယာထဲမှာပဲ လုံးပမ်းနေတာလေ။ စိုက်ပျိုးစရိတ် တွေလည်း ဝင်လိုက်၊ ထည့်လိုက် ပြန်ချေးလိုက် သံသရာလည်နေတာပေါ့။ လျော်ကြေးက ၁၀၀၀၀/-လောက်ရတယ်။ အိမ်တစ်လုံးထဲ မီးကွက်လောင်လို့ အိမ်ပြန်ဆောက်ရတာပေါ့။ အဓိကလိုအပ်တာကငွေပေါ့။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးအောင်ခိုင် ၊ ဒေါ်ခင်မြင့်
ဖြေဆိုသူ	ဒေါ်ခင်မြင့်
အိမ်ထောင်စုဝင်လူဦးရေ	၇ဦး ကျား -၃ ၊ မ - ၄
ကျေးရွာ	ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
ဖုန်းနံပါတ်	09 791477471 ၊ 09 401618834
အိမ်အမျိုးအစား	သွပ်မိုး၊ အုတ်/ထရံကာ ၊ ပျဉ်ခင်း (တိုက်ခံအိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗီ၊ ဗီဒီယိုပြစက်၊ ရေခဲသေတ္တာ၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်မီးဖို၊ မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၅၀ x ၁၀၀ ပေ
သင့်ယာမြေကဘယ်လောက်ရှိသလဲ	ယာစက (၃.၅) စက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း
သင့်မြေကဘယ်လောက်ပါသွားလဲ	၂.၅ စက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျလာတယ်။ ယာကသိပ်မထွက်ကျောင်းစားရိတ်သိပ် မရှိတော့
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	စိုက်ပျိုးရေးဘက်၊ သမဝါယမအဖွဲ့၊ ရပ်ရွာထဲမှ (၃၆၀၀၀၀/-)
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ဆေးခန်းရှိစေချင်တယ်၊ မြို့ထဲသွားရလို့
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစိမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်
ဘာလို့လဲ	စည်ပြိုးတာကောင်းတာပေါ့
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	အဆင်ပြေမယ်ထင်ပါတယ်

သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	**ရပြီးပြီ၊ ၁၀၀၀/- အိမ်တစ်လုံးထဲမီးကွက်လောင်လို့ ပြန်ဆောက်ရ**
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	**ငွေရေးကြေးရေး**

ဖွဲ့	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနဲ့ ဆက်သွယ်	အိမ်ထောင်ဖွဲ့နေ အေးခြေနေ	လူမျိုး	ဘာသာ	အဓိကအလုပ်အကိုင်	အလုပ်အကိုင် အမျိုးအစား	မှတ်ချက်
1	ဒေါ်ခင်မြင့်	မ	၈၀	ယောကျ မ	ရှိ	ဗမာ	ဗုဒ္ဓ		မိုးမိ	
2	ဦးအောင်ခိုင်	ကျား	၆၉	သားမက်	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	တောင်သူ	
3	ဒေါ်မြင့်မြင့်သိန်း	မ	၆၀	သမီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	တောင်သူ	
4	ဒေါ်ခင်ဝေ	မ	၄၅	သမီး		ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	ဆရာမ	မူလတန်းပြ
5	ဦးအေးရွှေ	ကျား	၃၅	မြေးသားမက်		ဗမာ	ဗုဒ္ဓ	၄တန်း	သဘော်သား	ပြည်တွင်းပုဂ္ဂလိက
6	ဒေါ်အိအိခိုင်	မ	၃၂	မြေး		ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ	
7	မောင်ဇေယျာမင်းထက်	ကျား	၇	မြစ်		ဗမာ	ဗုဒ္ဓ	၁ တန်း	ကျောင်းသား	

ဒေါ်ခင်စန်း - ပိုင်ရှင်

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

အကြီးတို့မွေးတည်းကဒီမှာနေတာပါ။ အမည်ပေါက်ပါပဲ။ ဘိုးဘွားပိုင်မြေပါ။ စက်ရုံသိမ်းတော့ ၄ဧကပါသွားတယ်။ လက်ရှိတော့ နှမ်းပဲစိုက်နေတယ်။ မိုး ခေါင်တော့ အလုပ်မဖြစ်ဘူး။ စက်ရုံကနေယာ၄ဧကပြန်ငှားပြီးလုပ်ရတာပေါ့။ အကြွေးရှိတယ်မိတ်ဆွေတွေဆီမှာ ယာထဲပါ သွားတာပေါ့။ လျော် ကြေးအနေနဲ့ ကတော့ ၁ဧက ၄၀၀/-ကျပ်နှုန်းပေါ့ ။ ပြန်ရောင်းမယ့် လူမရှိတော့ဘူး ရှားသွားပြီ။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	**ဒေါ်ခင်စန်း**
ဖြေဆိုသူ	**ဒေါ်ခင်စန်း**
အိမ်ထောင်စုဝင်လူဦးရေ	**၆ဦး ကျား -၂၊ မ - ၄**
ကျေးရွာ	**ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။**
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	**မွေးကတည်းက**
ဖုန်းနံပါတ်	065 45563 ၊ 09 401 638 239
အိမ်အမျိုးအစား	**သွပ်မိုး၊ အုတ်ခံ သစ်သား/ထရံကာ**

အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗီ၊ ဗီဒီယိုပြစက်၊ ရေခဲသေတ္တာ၊ လျှပ်စစ်ထမင်းအိုး
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၆၀ x ၁၀၀ ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ(၄) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	၄ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ပုံမှန်ပါပဲ။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်။
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	မိတ်ဆွေထံမှပါ
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေ
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ။
ဘာလို့လဲ	သိမ်းမြေဖြစ်ပြီးသားဆိုတော့ ကန့်ကွက်လို့မရတော့ပါ။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ။
ဘာဖြစ်လို့လဲ	
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ ၁ဧက ကို ၉၀၀ ပေးထားပါတယ်။ဒါပေမယ့် အဲ့ဒီခေတ် က ယာပြန်ရောင်းမည့်သူမရှိပါ။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

မှာ	အမျိုး	ကား/ဖ	အသက်	အိမ်ထောင်ပြုမီးနှင့်တွဲတဲ့	အိမ်ထောင်ရေးအခြေအနေ	ပညာ	ဘာသာ	အခြေခံလုပ်ငန်းတွဲတည်ထောင်ခဲ့ဖူးသည်	လက်ရှိလုပ်ငန်းအမျိုးအစား	ရောင်းဝယ်လုပ်ငန်းအမျိုးအစား	မှတ်ချက်

၁	ဒေါ်ခင်စန်း	မ	၆၈	ဦးစီး	-	ဗမာ	ဗုဒ္ဓ		ဝိုဝို		
၂	ဦးလှဌေး	ကျား	၄၀	သားမက်	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	တောင်သူ		
၃	ဒေါ်ကြည်မြင့်	မ	၄၅	သမီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ		
၄	မအောင်မေကြည့်	မ	၃၂	သမီး		ဗမာ	ဗုဒ္ဓ	၁၀တန်း	တောင်သူ		
၅	မောင်ဘက်ထက်လင်း	ကျား	၁၃	မြေး	-	ဗမာ	ဗုဒ္ဓ	၇တန်း	ကျောင်းသား		
၆	မရီရီဝင်း	မ	၁၀	မြေး		ဗမာ	ဗုဒ္ဓ	၅တန်း	ကျောင်းသား		

ဒေါ်သန်းမြင့် - ပိုင်ရှင်

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းတဲ့ထဲ လယ် ၃ဧကနဲ့ ယာ ၂ဧကပါသွားတယ်။ အဓိကစိုက်တာက စပါးရယ်၊ နှမ်းရယ်။ စက်ရုံကိုအခွန်ဆောင်ရတယ်။ အကြွေးက စိုက်/ဘဏ်၊ နီးစပ်ရာနဲ့ သ/မ တို့မှာယူတယ်။ ယာထဲပါသွားတာပေါ့ ။ လျော်ကြေးရ မရတော့ မသိပါ၊ ယောကျ်မလက်ထက်ကဆိုတော့ ဒေါ်ကြီးလဲမသိဘူး။ လောလောဆယ် တော့အဆင်ပြေနေသေးတယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဒေါ်သန်းမြင့်
ဖြေဆိုသူ	ဒေါ်သန်းမြင့်
အိမ်ထောင်စုဝင်လူဦးရေ	၇ဦး ကျား -၂ ၊ မ - ၅
ကျေးရွာ	ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းကနေ
အိမ်အမျိုးအစား	သွပ်မိုး၊ ထရံကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	တီဗွီ၊ ဗီဒီယိုပြစက်
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၅၀ x ၁၀၀ပေ
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၈) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပြောင်း
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၂ ဧက ၊ လယ် ၃ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ရာသီဥတုမကောင်း၊ လုပ်အားခစျေးကြီး
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	နီးစပ်ရာဆွေမျိုး၊ စိုက်ပျိုးရေးဘဏ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေ (အုတ်ကန်တစ်လုံးကို ၂၀၀၀ ကျပ်ပေးရ)

သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်ပါသည်။
ဘာလို့လဲ	အလုပ်လုပ်နိုင်တဲ့အရွယ်တွေ စက်ရုံမှာ အလုပ်ရစေခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ
ဘာဖြစ်လို့လဲ	လောလောဆယ်တော့အဆင်မပြေပါ။
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ မသိပါ။ ယောကျ္ဍမလက်ထက်ကမို့လို့
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်တော်စပ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	လူမျိုး	ပညာအရည်အချင်း	အလုပ်အကိုင်အခြေအနေ	မှတ်ချက်
၁	ဒေါ်သန်းမြင့်	မ	၇၁	ဦးစီး	-	ဗမာ	ဗုဒ္ဓ	-	မှီခို	
၂	ဦးဆန်းမြင့်ဦး	ကျား	၄၅	သားမက်	ရှိ	ဗမာ	ဗုဒ္ဓ	-	တောင်သူ	
၃	မပြိုး	မ	၃၅	သမီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ	
၄	မကဲ	မ	၂၀	မြေး	-	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	အထည်ချုပ်(ရန်ကုန်)	
၅	မလုံးလုံး	မ	၁၈	မြေး	-	ဗမာ	ဗုဒ္ဓ	၁၀တန်း	အထည်ချုပ်(ရန်ကုန်)	
၆	မောင်ထွန်းထွန်း	ကျား	၁၀	မြေး	-	ဗမာ	ဗုဒ္ဓ	၄တန်း	ကျောင်းသား	
၇	အိမ်ဖိုးသူ	မ	၄	မြေး	-	ဗမာ	ဗုဒ္ဓ	-	-	

ဦးအေးလှိုင် - ဝိုင်ရှင်

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းလိုက်တာ ယာ ၁.၅ဧကပါသွားတယ်။ ၁.၅ ဧကမှာပဲ ပဲနှမ်း၊ ပဲစဉ်းငုံ၊ ပဲတီစိမ်း၊ စိုက်တယ်ပေါ့။ အကြွေးရှိတယ်၊ စိုက်/ဘဏ်နဲ့ သ/မ ကယူတယ်။ ယာထဲစရိတ်ဖြစ်လုပ်ငန်းခွင်ထဲထည့်ရတာပါ။ လျော်ကြေး က ၁၉၈၀ ခုနှစ် လောက်ကထင်တယ် သီးနှံလျော်ကြေး ၉၀၀၀/-ကျပ်ရတယ်။ ဘယ်လိုမှ မနေပါဘူး၊ အိမ်ပြင်ဆောက်ခဲ့တယ်။ လိုအပ်တာကတော့ ပညာတတ်တွေ အတွက် အလုပ်အကိုင်အခွင့်အလမ်းတွေလိုတယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	**ဦးအေးလှိုင် အမည်ပေါက်**
ဖြေဆိုသူ	**ဦးအေးလှိုင်**
အိမ်ထောင်စုဝင်လူဦးရေ	**၈ ဦး ကျား - ၄ ၊ မ - ၄**
ကျေးရွာ	**ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။**
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	**မွေးကတည်းက**
အိမ်အမျိုးအစား	**သက်ကယ်၊ ပျဉ်ကာ၊ ပျဉ်ခင်း**
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	**ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယို၊ လျှပ်စစ်ပေါင်းအိုး၊ လျှပ်စစ် မီးပူ**
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	**.၆၀ ဧက**
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	**ယာဧက (၈) ဧက**
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	**နှမ်း၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ ပဲကြီး**
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	**ယာ ၁.၅ ဧက**
မွေးမြူရေးလုပ်ငန်း	**မလုပ်ပါ**
သင်ရေနံတူးသလား	**မတူးပါ**
အရောင်းအဝယ်လုပ်ပါသလား	**မလုပ်ပါ**
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	**ပုံမှန်ပါ၊ ကျောင်းသားတွေကျောင်းပြီးလို့စရိတ်သက်သာ**
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	**ရှိပါသည်**
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	**စိုက်ပျိုးရေးဘဏ်၊ သမဝါယမ အဖွဲ့ (၃၅၀၀၀၀/-)ကျပ်**
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	**ရေလောင်း ယင်လုံ**
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	**မြစ်ရေဝယ်သုံး**
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	**ကောင်း**

သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	မြို့နဲ့နီးတဲ့နေရာသွားလို့
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	နိုင်ငံတော်အတွက်ဖြစ်စေချင်တယ်၊ လုပ်ကိုင်ရမယ့် မြေနေရာနည်းသွားမှာလည်းစိုးတယ်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ။
ဘာဖြစ်လို့လဲ	သူတို့ကအလုပ်မပေးနိုင်ပါ၊ ဘွဲ့ရသားသမီးတွေအလုပ်ပေးမယ်ဆိုရင်တော့
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ရပြီးပြီ၊ သီးနှံပျက်လျော်ကြေး ၉၀၀၀/- ရ အိမ်ပြင် ဆောက်ခဲ့တယ်၊ ဘယ်လိုမှမနေ
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်း အရာတွေကဘာတွေလဲ။	ပညာတတ်တွေအတွက် အလုပ်အကိုင်အခွင့်အလမ်းတွေ

စဉ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးသူနှင့် ပတ်သက်ခြင်း	အိမ်ထောင်ဖက်အနေအထား	ဘာသာ	ကထား	အခြေခံပညာပညာအရည်အချင်း	အလုပ်အကိုင်	အလုပ်အကိုင်အခွင့်အလမ်းများ	မှတ်ချက်
1	ဦးအေးလှိုင်	ကျား	၆၇	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဂုတန်း	တောင်သူ		
2	ဒေါ်သန်းလှ	မ	၆၅	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	မှီခို		
3	ဒေါ်သဲရီ	မ	၄၀	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၃တန်းအောင်	တောင်သူ		
4	ဒေါ်ယုမာ	မ	၃၇	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	၆ တန်း	တောင်သူ		
5	ဒေါ်သန္တာစိုး	မ	၃၄	သမီး	အပို	ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	တောင်သူ		
6	ဦးကိုကိုအောင်	ကျား	၃၀	သား	လူပို	ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	အစိုးရဝန်ထမ်း		ရန်ကုန်မှာ
7	ဦးနေလင်းအောင်	ကျား	၂၄	သား	လူပို	ဗမာ	ဗုဒ္ဓ	ဘွဲ့ရ	တောင်သူ		
8	ဦးဟိန်းထက်အောင်	ကျား	၁၅	သား	လူပို	ဗမာ	ဗုဒ္ဓ	၈ တန်း	ကျောင်းသား		

ဦးကျော်ဆွေ (သား) -ဦးမြသောင်း (ဖခင် - ပိုင်ရှင်)
ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံသိမ်းလိုက်တာ လယ် ၁.၅ ဧကနဲ့ ယာ၂.၅ဧက သိမ်း လိုက်တယ်။အခု စက်ရုံကို ၁၀၀၀၀/- နှုန်းဆောင်ရတယ်။ နှမ်းနဲ့ ပဲကြီးပေါ့အဓိကစိုက်တာ။ အကြွေးက စိုက်/ဘဏ်နဲ့ သ/မ ဆီကယူတယ်။ ယာထဲ အရင်းအနှီး လုပ်တာပေါ့။ ယာကလျော်ကြေးရတယ် ၁၄၀၀၀/-ရတယ်။ လယ်အတွက် မရဘူး။ သားသမီးတွေ အလုပ်အကိုင် ရစေချင်တယ်။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးမြသောင်း
ဖြေဆိုသူ	ဦးမြသောင်း
အိမ်ထောင်စုဝင်လူဦးရေ	၅ ဦး ကျား - ၃ ၊ မ - ၂
ကျေးရွာ	ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ ထရံကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယို၊ လျှပ်စစ်ထမင်းအိုး၊ရေဒီယို
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၇၀ X ၄၀ ပေ
သင့်ယာမြေကဘယ်လောက်ရှိသလဲ	ယာ (၆) ဧက၊ လယ်(၄)ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ ပဲကြီး
သင့်မြေကဘယ်လောက်ပါသွားလဲ	ယာ ၂.၅ ဧက ၊ လယ် ၁.၅ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	တူးပါသည်။ သူများစီမှာ တူးတာပါ။
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလား သလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	ကျပါသည်။ ရာသီဥတုမကောင်း။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	စိုက်ပျိုးရေးဘဏ်၊ သမဝါယမ အဖွဲ့ (၉၀၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေဝယ်သုံး
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာက အရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	သားသမီးတွေကို အလုပ်ရစေခြင်းပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	ထင်ပါသည်။
ဘာဖြစ်လို့လဲ	အလုပ်အကိုင်အခွင့်လမ်းတွေရမယ်လို့မျှော်လင့်ပါသည်
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား ။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လို သဘောထားလဲ။	ယာ အတွက်သာလျော်ကြေးရပြီး လယ်အတွက်လျော်ကြေးမရသေးပါ။
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	ပညာတတ်တွေအတွက် အလုပ်အကိုင်အခွင့်အလမ်းတွေ

အမှတ်	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်သွယ်ပုံ	အိမ်ထောင်ရေးအခြေအနေ	လူမျိုး	ဘာသာ	အခြေခံပညာအဆင့်အထိ	လက်မှုပညာအတွက်	အသက်မွေးဝမ်းကြောင်း	မှတ်ချက်
၁	ဦးမြသောင်း	ကျား	၈၉	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ				
၂	ဦးကျော်ဆွေ	ကျား	၅၈	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ		
၃	ဒေါ်အေးမြင့်	မ	၅၈	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	-		
၄	မောင်အောင်မျိုးကျော်	ကျား	၂၃	မြေး	ရှိ	ဗမာ	ဗုဒ္ဓ	B.A(Gro)			
၅	မနန္ဒာမျိုး	မ	၁၉	မြေးချွေး	ရှိ	ဗမာ	ဗုဒ္ဓ	၁၀တန်း			

ဦးဝင်းရွှေ (သားမက်) – ဦးပြားကြီး (ယောကျွမ - ပိုင်ရှင်)

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

ဦးက ၁၉၉၀ခုနှစ်မှ ဒီရွာကိုရောက်လာတာ။ စက်ရုံသိမ်းမြေထဲ မှာတော့ ယာ ၂ဧကနဲ့ လယ် ၂ဧကပါသွားတယ်။ လယ်မှာတော့ နွေစပါးစိုက်တယ်၊ ယာမှာ တော့ မိုးဆိုရင် နှမ်းစိုက်တာပေါ့။ ဒီယာကယောကျွမပိုင်တာပါ။ အခု ဦးတို့က လက်ဆင့်ကမ်း လုပ်ကိုင်နေတာပေါ့။ အကြွေးကတော့ရှိတာပေါ့။ နီးစပ်ရာ ဆွေမျိုးနဲ့ စိုက်/ဘဏ်ကယူတယ်။ စားတဲ့ထဲပါပေါ့၊ ယာထဲလဲထည့်၊ ဒီပြင်လုပ်ငန်း ရေနံတွင်းတူးသေးတယ်အရှုံးပေါ်လို့ ပြန်လာရတာ။ လျော်ကြေး ကရပြီးပြီ ယောကျွမလက်ထက်က ဆိုတော့မသိဘူး။အဓိက လိုအပ်တာကငွေ နဲ့ နောင်လာ နောင်သား တွေအတွက် အလုပ် အကိုင် အခွင့်အလမ်းတွေပေါ့။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးဝင်းရွှေ ၊ ဦးပြားကြီးအမည်ပေါက်
ဖြေဆိုသူ	ဦးဝင်းရွှေ
အိမ်ထောင်စုဝင်လူဦးရေ	၇ဦး ကျား - ၄ ၊ မ - ၃
ကျေးရွာ	ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	၁၉၉၀ ခုနှစ်က
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ်ကာ၊ ပျဉ်ခင်း (နှစ်ပင်အိမ်)
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ တီဗွီ၊ ဒီဒီယိုပြုစက်၊ လျှပ်စစ်ထမင်းအိုး
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၅၀ x ၆၀ပေ
သင့်ယာမြေကဘယ်လောက်ရှိသလဲ	ယာဧက (၇) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	စပါး၊ နှမ်း
သင့်မြေကဘယ်လောက်ပါသွားလဲ	ယာ ၂ ဧက ၊ လယ် ၂ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	နဲနဲတော့ကျတယ်၊ ကြွေးမီရှိတယ်
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိသည်

အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	နီးစပ်ရာဆွေမျိုး၊ စိုက်ပျိုးရေးဘဏ် (၃၀၆၀၀၀၀/-)ကျပ်
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေ (တိုကင်)
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	သင့်
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက်ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	ဆေးပေးခန်း
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	မဖြစ်စေချင်ပါ
ဘာလို့လဲ	ကိုယ့်လယ်လေးတွေရှိသေးလို့၊ စပါးစိုက်လို့ရသေးတယ်
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	မထင်ပါ
ဘာဖြစ်လို့လဲ	နောက်စက်ရုံကလဲ ဒီနားမှာပဲဆိုတော့
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	ရပြီးပြီ၊ မသိပါ၊ ယောကျ္ဍမလက်ထက်ကမို့လို့
သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့ အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	ငွေကြေး၊ အလုပ်အကိုင်အခွင့်အလမ်း၊ နောင်လာနောင်သားတွေအတွက်

မှာ	အမည်	ဦး/ခ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဆက်ဆံပုံ	အိမ်ထောင်ဖက်အခြေအနေ	ဘာသာ	ကလာ	အလုပ်အကိုင်အမျိုးအစား	လက်ရှိအလုပ်အကိုင်	အလုပ်အကိုင်အမျိုးအစား	မှတ်ချက်
1	ဦးဝင်းရွှေ	ကျား	၅၄	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၁၀ တန်း	တောင်သူ		
2	ဒေါ်လှမြင့်အေး	မ	၅၄	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄ တန်း	မှီခို		
3	သန်းထိုက်အောင်	ကျား	၂၅	သား	မရှိ	ဗမာ	ဗုဒ္ဓ	၉တန်း	တောင်သူ		
4	မောင်နိုင်ကြီး	ကျား	၂၈	သားမက်	ရှိ	ဗမာ	ဗုဒ္ဓ	ဘက	။		
5	မလဲ့ယဉ်ဝင်း	မ	၂၈	သမီး	ရှိ	ဗမာ	ဗုဒ္ဓ	ဒုတိယနှစ်	။		
6	မဇူးဇူးမောင်	မ	၆	မြေး	-	ဗမာ	ဗုဒ္ဓ	၁ တန်း	ကျောင်းသူ		
7	ငြိမ်းပြည့်အောင်	ကျား	၃	မြေး	-	ဗမာ	ဗုဒ္ဓ	-	-		

ဦးသန်းအောင် - ပိုင်ရှင်

ရွာတော်ကျေးရွာ၊ ရွာတော်ကျေးရွာအုပ်စု၊ မင်းလှမြို့နယ်။

စက်ရုံဟောင်းစီမံကိန်းမြေမှာ ယာ ၂၀ ဧကပါသွားပါတယ်၊ ယာမှာတော့ အဓိက နှမ်း၊ ပဲတီစိမ်း၊ မြေပဲ စိုက်တယ်။ ရေနံချက်စက်ရုံမှာ အလုပ်လုပ်ဖူးတယ် ၁၉၈၀ ကနေ ၁၉၈၇ အထိလုပ်ခဲ့တယ်။ အကြွေးရှိတယ် ယူတာကတော့ စိုက်/ဘဏ်နဲ့ သ/မက ယူတာ။ ယာစိုက်ပျိုးရေးထဲပါသွားတယ်။ ယာသိမ်းပြီး ၃နှစ်နေမှ လျော်ကြေးရတယ်။ ၉၀၀၀/-ရတယ်။ မိသားစုလိုအပ်နေတာ ကတော့ အလုပ် အကိုင်အခွင့်အလမ်းပေါ့။

ရက်စွဲ	၂၁-၂-၂၀၁၅
အိမ်ထောင်ဦးစီးအမည်	ဦးသန်းအောင်
ဖြေဆိုသူ	ဦးသန်းအောင်
အိမ်ထောင်စုဝင်လူဦးရေ	၉ ဦး ကျား - ၆ ၊ မ - ၃
ကျေးရွာ	ရွာတော်၊ ရွာတော်အုပ်စု၊ မင်းလှမြို့နယ်။
ဒီနေရာမှာနေတာဘယ်လောက်ကြာပြီလဲ	မွေးကတည်းက
အိမ်အမျိုးအစား	သွပ်မိုး၊ ပျဉ်ကာ၊ ပျဉ်ခင်း
အိမ်သုံးပစ္စည်းပိုင်ဆိုင်မှု	ဆိုင်ကယ်၊ ဖုန်း၊ တီဗွီ၊ ဗီဒီယို၊ လျှပ်စစ်ထမင်းအိုး၊ လျှပ်စစ်ပေါင်းအိုး၊ လျှပ်စစ်မီးပူ
သင့်နေတဲ့အိမ်ရဲ့မြေကွက်ဘယ်လောက်ကျယ်လဲ	၅တောင်ပတ်လည် ၃၁၆်
သင့်ယာမြေဧကဘယ်လောက်ရှိသလဲ	ယာ (၂၆) ဧက
သင့်ရဲ့ယာမြေမှာဘာတွေအဓိကထားစိုက်လဲ	နှမ်း၊ ပဲစင်းငုံ၊ ပဲတီစိမ်း၊ ပဲကြီး
သင့်မြေဧကဘယ်လောက်ပါသွားလဲ	ယာ ၂၀ ဧက
မွေးမြူရေးလုပ်ငန်း	မလုပ်ပါ
သင်ရေနံတူးသလား	မတူးပါ။
အရောင်းအဝယ်လုပ်ပါသလား	မလုပ်ပါ
သင်တို့မိသားစု အရင်(၃)နှစ်ကထက်စီးပွားရေးတိုးလားသလား/ကျသလား။ ဘာကြောင့်လဲဖြေပါ။	တိုးလာပါသည်။ ကျောင်းသာတွေမရှိတော့ စရိတ်သက်သာလာပါသည်။ အလုပ်အကိုင်ရလာပြီး အိမ် ကို ပြန်ထောက်ပံ့လို့အဆင်ပြေပါသည်။
ဒီအိမ်ထောင်စုမှာအကြွေးရှိလား	ရှိပါသည်
အကြွေးရှိတယ်ဆိုရင်ဘယ်သူ့ဆီမှာရှိသလဲ ။ (စုစုပေါင်းဘယ် လောက်လဲ)	စိုက်ပျိုးရေးဘဏ်၊ သမဝါယမ အဖွဲ့
ဒီအိမ်ထောင်စုမှာဘယ်လိုအိမ်သာမျိုးသုံးလဲ	ရေလောင်း ယင်လုံ
သောက်ရေ၊ သုံးရေကိုအဓိကဘယ်ကရသလဲ	မြစ်ရေဝယ်သုံး(တစ်လ ၂၀၀၀ကျပ်)
သင့်အိမ်ထောင်စုရဲ့ယေဘူယျကျန်းမာရေးအခြေအနေကိုပြောပြပေးပါ	ကောင်း
သင့်အိမ်ထောင်စုကျန်းကျန်းမာမာနေနိုင်ဖို့အတွက် ဘာတွေလိုမလဲ။(သင့်ရဲ့ကျန်းမာရေးအတွက်ဘာကအရေးကြီးသလဲ)	
သင်အနေနဲ့မင်းလှရေနံချက်စက်ရုံစီမံကိန်းကို အထောင်အထည်ဖော်ဖြစ်စေချင်သလား	ဖြစ်စေချင်သည်။
ဘာလို့လဲ	ရွာမှ ကလေးတွေ ကို အလုပ်ရစေခြင်ပါသည်။
သင့်ဘဝပြောင်းလဲသွားမယ်ထင်သလား	-
ဘာဖြစ်လို့လဲ	-
သင်နှင့်သင့်မိသားစုလျော်ကြေးရပြီးပြီလား။ ဘယ်လောက်ရလဲ။အဲဒီလျော်ကြေးအပေါ်ဘယ်လိုသဘောထားလဲ။	သိမ်းပြီး ၃နှစ်ကြာ မှ လျော်ကြေး ရပါသည်။ ၁ဧက ကို ၃၀၀၀ နဲ့ပေးပါသည်။၃ဧကစာ ရပါသည်။

သင်နှင့်သင့်မိသားစုလိုအပ်နေတဲ့အဓိကအကြောင်းအရာတွေကဘာတွေလဲ။	

မှာ	အမည်	ကျား/မ	အသက်	အိမ်ထောင်ဦးစီးနှင့်ဖွဲ့ဝင်	အိမ်ထောင်ရေးအခြေအနေ	ဘာသာ	ဌာနေ	ပြီးဆုံးခဲ့သည့်ပညာအရည်အချင်း	သင်တန်းအတွေ့အကြုံအကြောင်း	ဖုန်းနံပါတ်
၁	ဦးသန်းအောင်	ကျား	၅၇	ဦးစီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၅တန်း	တောင်သူ	
၂	ဒေါ်ခင်ညို	မ	၅၈	ဇနီး	ရှိ	ဗမာ	ဗုဒ္ဓ	၄တန်း	မိုးမိုး	
၃	ဒေါ်ညွန့်မေ	မ	၇၆	အဒေါ်	-	ဗမာ	ဗုဒ္ဓ		-	
၄	ဦးဘဇော်	ကျား	၇၃	ဦးလေး	-	ဗမာ	ဗုဒ္ဓ			
၅	ကိုအောင်သန်းထွန်း	ကျား	၃၀	သား	ရှိ	ဗမာ	ဗုဒ္ဓ	၉တန်း	ကားမောင်း	
၆	မခင်အေးဝင်း	မ	၃၀	ချွေးမ	ရှိ	ဗမာ	ဗုဒ္ဓ	-	ဈေးရောင်း	
၇	ပြည့်စုံအောင်	ကျား	၁၄	သား		ဗမာ	ဗုဒ္ဓ	၉ တန်း	ကျောင်းသား	
၈	မောင်အောင်မင်းသူ	ကျား	၂၈	သား	-	ဗမာ	ဗုဒ္ဓ	၁၀တန်း အောင်	တပ်ကြပ်ကြီးစာရေး (BEတပ်)	
၉	မောင်အေးမင်းသူ	ကျား	၂၂	သား	-	ဗမာ	ဗုဒ္ဓ	B.Sc (Maths)	ခိုင်သဇင် လက်ဖက်ခြောက်	

Public Consultation တက်ရောက်သူများစာရင်း (မင်းလှမြို့)

စဉ်	အမည်	အဖွဲ့အစည်း	ဖုန်းနံပါတ်
၁။	ဝိုလ်မှူးကြီးအောင်သူချမ်း	တပ်နယ်မှူး (ကပစ-၂)	09 5360490
၂။	ဦးဇော်လင်း	မြို့နယ်ရဲတပ်ဖွဲ့မှူး	
၃။	ဦးပေါက်ကျော်	မြို့နယ်အုပ်ချုပ်ရေးမှူး	09 444023190
၄။	ဒေါက်တာအောင်မြင့်	ဥက္ကဋ္ဌ မြို့နယ်ဖွံ့ဖြိုးမှုအထောက်အကူပြုအဖွဲ့	
၅။	ဦးသန်းရွှေ	စည်ပင်	09 401618836
၆။	ဦးလှမြင့်	မြို့နယ်အထောက်အကူပြု	09 259165988
၇။	ဦးအောင်ကျော်ထွန်း	ဆက်သွယ်ရေး	09 440226952
၈။	ဦးအုန်းကျော်	မြို့နယ်မီးသတ်	065- 45502
၉။	ဦးမျိုးဇော်ထွန်း	မြို့နယ်မီးသတ်	09 256453559
၁၀။	ဦးအေးငြိမ်း	စိမ်း/စို	09 418131950
၁၁။	ဦးကျော်မျိုးသူ	သစ်တော	09 253524645
၁၂။	ဦးသန်းဝင်း	စိုက်ပျိုးရေးဦးစီးမှူး	09 401536174
၁၃။	ဦးရဲလွင်	စည်ပင်ကော်မတီ	09 5342762
၁၄။	ဒေါ်တင်အေး	မြို့နယ်သ/မဦးစီးဌာန	09 256582668
၁၅။	ဒေါ်ဝါဝါလွင်	ပြန်/ဆက်ဦးစီးဌာန	09 401523776

၁၆။	ဒေါ်ဝါဝါအောင်	မွေးမြူရေးနှင့်ကုသရေးဦးစီးဌာန	09 259567674
၁၇။	ဒေါ်စန္ဒာဦး	မြန်မာ့လယ်ယာဖွံ့ဖြိုးရေးဘဏ်	09 421090623
၁၈။	ဒေါ်ငွေးငွေးရီ	အ.ထ.က မင်းလှကျောင်းအုပ်	09 401631135
၁၉။	ဒေါ်တင်တင်ငွေး	မြန်မာ့စီးပွားရေးဘဏ်	09 796919397
၂၀။	ဦးနေဝင်း	ဖွံ့/ဆောက်ကော်မတီ	09 401637925
၂၁။	ဦးကျော်စည်သူ	ဥပဒေ	
၂၂။	ဦးမောင်မောင်	ပညာရေး	065 45520
၂၃။	ဦးသောင်းလှိုင်	မြို့နယ်စာရေးဆရာအသင်း	
၂၄။	ဦးကြည်ခင်	ပညာရေး	09 401584684
၂၅။	ဦးအောင်သိန်းဦး	အမှတ် (၅)	065 45398
၂၆။	ကိုညီညီအောင်	အမှတ် (၄)	09 401561419
၂၇။	ဦးသက်နိုင်	မြို့မရဝ်ကွက်အုပ်ချုပ်ရေးမှူး	09 43042477
၂၈။	ဦးလှဝင်း	အဖွဲ့ဝင်	09 796885440
၂၉။	ဦးသန်းအောင်	ရပ်ကွက်အုပ်ချုပ်ရေးမှူး	09 33256677
၃၀။	ဦးမြင့်ဆွေ	အဖွဲ့ဝင်	09 796919651
၃၁။	ဦးခင်မောင်ဇော်	အဖွဲ့ဝင်	09 33256622
၃၁။	ဦးဇော်မင်းဦး	ရပ်ကွက်အုပ်ချုပ်ရေးမှူး	09 333788744
၃၂။	ဦးရွှေမန်း	အဖွဲ့ဝင်	09 33378546
၃၃။	ဦးထွန်းမြင့်	အဖွဲ့ဝင်	09 33256504

Public Consultation တက်ရောက်သူများစာရင်း ညောင်ပင်သာရွာ၊ မင်းလှမြို့နယ်

စဉ်	အမည်	အဖွဲ့အစည်း	ဖုန်းနံပါတ်
၁။	ဦးကျော်အောင်	ဥက္ကဋ္ဌ - အုပ်ချုပ်ရေးမှူး	09 401522566
၂။	ဦးလှကျော်	ရွာမိရွာဖ	
၃။	ဦးစံမြ	ရွာမိရွာဖ	
၄။	ဦးဟံမြင့်	တောင်သူ	09 401537255
၅။	ဦးဝင်းမြင့်	။	09 33256344
၆။	ဦးအောင်မင်း	။	09 794620118
၇။	ဦးဝင်းလှိုင်	။	09 401556367
၈။	ဒေါ်ခင်ဆွေဝင်း	မူလတန်းကျောင်းအုပ်၊ အမကညောင်ပင်သာ	09 33256931
၉။	ဒေါ်ခင်သန္တာမော်	မူလတန်းပြ၊ အ မ က ညောင်ပင်သာ	09 401618821
၁၀။	ဦးဝင်းလှိုင်	တောင်သူ	09 401556367
၁၁။	ဦးအောင်မြင့်သိန်း	။	09 253400598
၁၂။	ဦးတိုက်လှိုင်	။	09 33256373
၁၃။	ဦးရဲဝင်းလှိုင်	။	-

၁၄။	ဦးမြင့်သိန်းဌေး	။	09 33462921
၁၅။	ဦးတင်အေး	။	09 33256371
၁၆။	ဒေါ်မြကြည်	။	-
၁၇။	ဒေါ်ညွန့်စိန်	။	-
၁၈။	ဦးမြင့်စိုး	။	09 401538041
၁၉။	ဦးဌေးဝင်း	။	09 30255997
၂၀။	ဦးဝင်းဇော်	။	-
၂၁။	ဦးကျော်မြင့်	။	09 256459112
၂၂။	ဦးမြအောင်	တောင်သူ	09 258009786
၂၃။	ဒေါ်ယဉ်ရွှေ	။	-

မကွေးတိုင်းဒေသကြီး၊ မင်းလှမြို့နယ်၊ ရေနံဓာတုဗေဒစက်ရုံ (သံပရာကန်) အနီးတွင်တည်ဆောက်မည့် ရေနံချက်စက်ရုံအသစ် စီမံကိန်း၏ အတွက်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment EIA SIA) အစီရင်ခံစာအပေါ်

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ ကနဦးစိစစ်သုံးသပ်ချက်နှင့်အကြံပြုချက်များကို ဖြေကြားခြင်း (ပြင်ဆင်ချက်ဇယား)

၃၀-၀၄-၂၀၂၀

စီမံကိန်းနောက်ခံအကြောင်းအရာ

ရေနံချက် စက်ရုံသစ်ကို မကွေးတိုင်း ဒေသကြီး မင်းလှ မြို့နယ် သံပရာကန်ရွာတွင် တည်ရှိသော လက်ရှိ ရေနံဓာတုဗေဒ စက်ရုံရှေ့ ကပ်လျက် ၁၃၂.၆၁ ဧက ရှိရာနေရာတွင် တည်ဆောက်ရန် သတ်မှတ်ထားပါသည်။ ရေနံသိုလှောင်ကန်နှင့် စက်ရုံ ဆက်စပ် အဆောက်အအုံ များအတွက် တောင်ဘက်တွင် ရှိသည့် စက်ရုံ ပိုင်မြေ ၂၁၁ ဧက ကို အသုံးပြုရန် ဖြစ်သည်။ သို့ဖြစ်၍ စက်ရုံသစ် မြေနေရာ အကျယ် အဝန်းသည် စုစုပေါင်း ၃၄၃. ၆၁ ဧက ရှိ၏။ ထို့ ပြင် ၂၅ မိုင်ခန့် ရှည်လျားသည့် ရေနံပိုက်လိုင်း တစ်ခုလည်း အပါအဝင် ဖြစ်သည်။ ၎င်းသည် စကုမြို့ အနီးရှိ မှ အစပျိုး၍ စက်ရုံသစ်နေရာအထိ အရှေ့တောင်အာရှ ရေနံပိုက်လိုင်းဖြင့် သယ်ယူလာသော နိုင်ငံခြား ရေနံစိမ်းကို စက်ရုံသစ်သို့ သယ်ယူရန် ဖြစ်ပါသည်။

ရေနံချက် စက်ရုံသစ်ကို ၃နှစ်အတွင်း တည်ဆောက်မည်ဖြစ်ပြီး တစ်နှစ်လျှင် ရေနံစိမ်းတန်ချိန် ၃.၂ သန်း (တစ်ရက်လျှင် ၇၈,၄၈၄,၈၄ စည်) ချက်လုပ်မည် ဖြစ်သည်။ နိုင်ငံခြားရေနံစိမ်းတို့မှာ ကူဝိတ် ရေနံစိမ်း ၅၀ %၊ ဆော်ဒီရေနံစိမ်းပေါ့ ၂၅ နှင့် ဆော်ဒီ အလတ်တန်းစား ရေနံစိမ်းကို ဥရောပစံနှုန်း အဆင့် ၄ ရှိသော ရေနံထွက် ပစ္စည်း များအဖြစ် ပြောင်းလဲ ချက် လုပ်ပါမည်။

ရေနံချက် စက်ရုံအသစ်ကို နိုင်ငံတကာ စံချိန်မီ အဆင့် အမျိုး အစားအဖြစ် တည်ဆောက်ပြီး အဓိက ချက်လုပ်မှု အဆင့် ၉ ဆင့် ပါ စနစ်ဖြင့် လည်ပတ်မည် ဖြစ်ပါသည်။ ဤစက်ရုံတွင် ရေဆိုးထိန်းစနစ်နှင့် မီးတောက်စနစ်တစ်ခုလည်း ပါဝင်ပါသည်။

စဉ်	စိစစ်တွေ့ရှိချက်များ	သုံးသပ်အကြံပြုချက်များ	လိုက်နာဆောင်ရွက်ချက်များ (ပြင်ဆင်ချက်များ)
	အစီရင်ခံစာအကျဉ်းချုပ်(Executive Summary)		
(၁)	အကျဉ်းချုပ် အစီရင်ခံစာတွင် သက်ဆိုင်ရာ Map များထည့်သွင်းထားဖော်ပြထားခြင်းမရှိကြောင်း တွေ့ရှိရသည်။	အကျဉ်းချုပ်အစီရင်ခံစာတွင် သက်ဆိုင်ရာ Mapများ သက်ဆိုင်ရာအခန်းအလိုက် ထည့်သွင်း ဖော်ပြရန်။	အကျဉ်းချုပ်အစီရင်ခံစာတွင် သုံးသပ်အကြံပြုချက် အတိုင်း ပြင်ဆင်ဖော်ပြထားပါသည်။
	မူဝါဒ၊ ဥပဒေနှင့်အဖွဲ့အစည်း ဆိုင်ရာ မူဘောင်		
(၂)	အောက်ပါ Policy , Strategy များကို ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။ 1. Framework for Economic and Social Reforms 2. Myanmar Economic Policy 3. National Sustainable Development Strategy 4. Myanmar National Environment Policy (1984) 5. National Land Use Policy 6. Myanmar Forest Policy 7. National Biodiversity Strategy and Action Plan (NBSAP)	-အဆိုပါ Policy Strategy များကို တစ်စုတစ်စည်းတည်း ဖော်ပြရန်၊ -အချို့ Policy Strategyများကို update ပြုလုပ်ပေးရန်၊ -အဆိုပါ Policy Strategy များသည် အဆိုပြုစီမံကိန်း နှင့် ဆက်စပ်မှုကို ထည့်သွင်း သုံးသပ်ဖော်ပြရန်။ - 2.4 တွင် ဖော်ပြထားသည့် နိုင်ငံတကာသဘောတူညီချက်များနှင့် စာချုပ်များ၊ ကွန်ဗင်းရှင်းများကို စီမံကိန်းနှင့် ဆက်စပ်မှုကို ထည့်သွင်းဖော်ပြရန်။	မူဝါဒ၊ ဥပဒေ နှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင် အခန်းနှင့် ပတ်သက်၍ သုံးသပ်အကြံပြုချက်အတိုင်း ပြင်ဆင်ဖြည့်စွက်ဖော်ပြထားပါသည်။

	8. Myanmar Industrial Policy 9. National Energy Policy and National Energy Security Steategy 10. National Health Policy		
(၃)	အခြားဥပဒေ ၊ နည်းဥပဒေ များကို ထည့်သွင်းဖော်ပြထားသည်ကို စိစစ် တွေ့ရှိရပါသည်။	-အဆိုပါဥပဒေများ တစ်ခုချင်းအလိုက် စီမံကိန်းအဆိုပြုသူမှ အဓိက လိုက်နာဆောင်ရွက်သွားရမည့် ပုဒ်မ၊ ပုဒ်မခွဲ၊ အပိုဒ်များကို ထည့်သွင်း ဖော်ပြ၍ လိုက်နာဆောင်ရွက်သွားမည် ဖြစ်ကြောင်း ထည့်သွင်းဖော်ပြရန်။ -အဆိုပါ ဥပဒေများကို update ပြုလုပ်၍ ထည့်သွင်းဖော်ပြရန်။	မူဝါဒ၊ ဥပဒေ နှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင် အခန်းနှင့် ပတ်သက်၍ သုံးသပ်အကြံပြုချက်အတိုင်း ပြင်ဆင်ဖြည့်စွက် ဖော်ပြထားပါသည်။
(၄)	အဆိုပြုစီမံကိန်းမှ efficient emission standard နှင့် ပက်သက်၍ EGEG အား ထည့်သွင်းဖော်ပြထားသော်လည်း အခြား လိုက်နာဆောင်ရွက်မည့် အဓိက စံချိန် စံညွှန်း၊ လမ်းညွှန်ချက် စသည်တို့ကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	-အဆိုပြုစီမံကိန်းမှ လိုက်နာဆောင်ရွက်သွားမည့် အဓိကစံချိန်စံညွှန်းလမ်းညွှန်ချက်ကို သီးသန့် အခန်းဖြင့် ဖော်ပြပေးရန်။ -အခြား စံချိန်စံညွှန်း/ လမ်းညွှန်ချက်များကို လေ့လာ၍ ထည့်သွင်း ဖော်ပြ ရန်၊ (international or national)	အဆိုပြုစီမံကိန်းမှ လိုက်နာ ဆောင်ရွက်သွားမည့် အဓိက စံချိန်စံညွှန်းလမ်းညွှန်ချက်များကို မူဝါဒဆိုင်ရာအခန်းနှင့်.နောက်ဆက်တွဲ တို့တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
	စီမံကိန်း အကြောင်းအရာဖော်ပြချက်		

(၅)	အခန်း (၃.၃.၉.၃)၊ Utilization and disposal of solid and liquid wastes ဖော်ပြချက်တွင် total capacity 150000 m^3 ရှိသည့် Solid Waste Landfill တစ်ခု တည်ဆောက်မည်ဖြစ်ကြောင်း ဖော်ပြထားသော်လည်း Landfill မှ ဓာတ်ငွေ့ စွန့်ပစ်ရည် စိမ့်ထွက်မည့် အလားအလာကို ကန့်သတ်ရန် Landfill၏ Design Feature ကို ထည့်သွင်း ဖော်ပြထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရသည်။	-အဆိုပြုထားသည့် Landfill နှင့် ပက်သက်၍ Design information ကို ပြည့်စုံစွာ ဖော်ပြပေးရန်။ -အဆိုပြုထားသည့် Landfill ပြုလုပ်မှုအား စောင့် ကြည့် စစ်ဆေးမည့် အစီအစဉ်များ ထည့်သွင်း ဖော်ပြပေးရန်၊	အဆိုပြုထားသည့် စီမံကိန်းတွင် Landfill facility နှင့် ပတ်သက် ၍ စာမျက်နှာ ၁၀၈ အခန်း ၃.၃.၁၀.၄ တွင် အဆိုပြုဖြည့်စွက်ဖော်ပြထားပါသည်။ Design information နှင့် ပတ်သက်၍ EPC contractorကို စီမံကိန်းပိုင်ရှင်မှ အပြီးသတ်ရွေးချယ်ပြီး နောက်ပိုင်းတွင် ရရှိလာမည့် အသေးစိတ် ဒီဇိုင်းကို ဖြည့်စွက်ဖော်ပြပါမည်။
(၆)	3.4.1 Off -Take Point အကြောင်းအရာကို ထည့်သွင်း ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။ Off -Take Point မှ Ein Ma Resevoir, irrigation network, Saku စသည်တို့နှင့် အကွာ အဝေးများကို ထည့်သွင်းဖော်ပြထားပါသည်။	-Off-take Point ၏ Location ကို Coordinate ဖြင့် ဤအခန်းတွင် ထည့်သွင်း ဖော်ပြရန်။ - Off-take Point မှ အကွာအဝေးများကို မြေပုံဖြင့် ထည့်သွင်းဖော်ပြရန်။ - Off-take Point ၏ water, energy, usage, worker, function, areas, photo များကို ထည့်သွင်း ဖော်ပြရန်။	Off-take Point ၏ Location **နှင့်** အကွာအဝေးများကို စာမျက်နှာ ၁၁၁ မှ ၁၁၂ တွင်ဖြည့်စွက် ဖော်ပြထားပါသည်။ Off-Take Point စီမံခန့်ခွဲမှု**ကို** CNPC South-East Asia Pipeline Co Ltd မှ စီမံခန့်ခွဲပါသည်။
(၇)	အခန်း (၃. ၅.၁) ၊ Timeline ဖော်ပြချက်တွင် Project duration သည် ၃-နှစ်ဖြစ်ကြောင်း၊ အဆိုပြုစီမံကိန်းအား အဆင့် ၃ဆင့် ဖြင့် ဆောင်ရွက်မည် ဖြစ်ကြောင်း ဖော်ပြထားသော်လည်း stage	စီမံကိန်း အဆင့် တစ်ခုချင်း အလိုက် အသုံးပြုမည့် ခန့်မှန်း အင်အား အပါအဝင်Project Schedule ကို အသေးစိတ် ဖော်ပြပေးရန်။	စီမံကိန်း အဆင့် တစ်ခုချင်းအလိုက် အသုံးပြုမည့် ခန့်မှန်း အင်အားအပါအဝင် Project Schedule **ကို အခန်း ၃.၆** Project development and implementation time schedules စာမျက်နှာ ၁၃၅ မှ ၁၃၆ ထိတွင် အချိန်ဇယား အကျဉ်းချုပ်ကိုဖော်ပြထားပြီး စီမံကိန်းတွင်သုံးမည့် ခန့်မှန်းအင်

	တစ်ခုချင်းဆီ အတွက် Activities ကို ယေဘုယျသာ ဖော်ပြထားကြောင်း စိစစ် တွေ့ရှိရသည်။		အား ကို Appendix 18 တွင် Project Employment ခေါင်းစဉ်ဖြင့် ဖော်ပြထားပါသည်။
(၈)	3.6.1 Comparison and Selection of Alternatives တွင် မြန်မာဘာသာဖြင့် ဖော်ပြထားသည်ကိုစိစစ်တွေ့ရှိရပြီး ၎င်း အကြောင်းအရာသည် Refinery Site နေရာနှင့် ပက်သက်၍ Alternative အဖြစ်ထည့်သွင်း ဆန်းစစ်ထားသည်ဟု သုံးသပ်ရရှိသည်။	၎င်းအကြောင်းအရာအား အခြား အကြောင်းအရာများ နှင့်လိုက်လျောညီထွေစွာ အင်္ဂလိပ်ဘာသာသို့ ပြင်ဆင် ဖော်ပြပေးရန်။	Comparison and Selection of Alternatives တွင် မြန်မာဘာသာဖြင့် ဖော်ပြထားသည်ကို အင်္ဂလိပ်ဘာသာဖြင့် စာမျက်နှာ ၁၃၇-၁၃၉ အခန်း ၃.၇.၂ **တွင်** ပြင်ဆင်ဖော်ပြထားပါသည်။
(၉)	အခန်း (၃..၇.၃) ၊ Road Transport Option ဖော်ပြချက်တွင် ရေနံစိမ်း (Crude Oil) အတွက် Transport Option ကိုသာ ဖော်ပြထားပြီး Refined Product အတွက် Transport Option များ ဖော်ပြထားခြင်း မရှိကြောင်း တွေ့ရှိရပါသည်။	-Refined Product အတွက် Transport Option များ ဖော်ပြ၍ ၎င်းတို့ အနက် Preferred Option ကို alternate အခန်း တွင် ဖော်ပြရန်။ -၎င်း Refined Product အတွက် Preferred Option ကို Project Description ခေါင်းစဉ် အောက်တွင်လည်း ထည့်သွင်း ဖော်ပြပေးရန်။	Refined Product Transportation **ကို** စာမျက်နှာ ၁၄၀ အခန်း ၃.၇.၃ တွင် Refined product Transportation ဖြင့်၎င်း၊ စာမျက်နှာ ၉၉ တွင် အခန်း ၃.၃.၆ Refined product transportation အနေဖြင့်လည်ကောင်း ဖော်ပြထားပါသည်။
(၁၀)	အခန်း 139အခန်း 3.8တွင်Pipeline Construction အကြောင်းကို ထည့်သွင်းဖော်ပြထားသည်ကို စိစစ် တွေ့ရှိရပြီး 3.4.2 Tentative Pipeline suggested by MPE ခေါင်းစဉ်အောက်တွင် ထည့်သွင်းဖော်ပြသင့် ကြောင်း သုံးသပ်ရရှိသည်။	အဆိုပါ အခန်းတစ်ခုလုံး (3.8) ကို 3.4.2 Tentative Pipeline suggested by MPE ခေါင်းစဉ်အောက်တွင် ထည့်သွင်းသင့် မသင့် သုံးသပ်၍ ပြင်ဆင်ဖော်ပြရန်။	Pipeline Construction အကြောင်းကို အခန်း ၃.၅ စာမျက်နှာ ၁၃၀ မှ ၁၃၅ ထိတွင် ပြောင်းရွေ့ဖော်ပြထားပါသည်။

(၁၁)	အခန်း (၃.၈.၃) Hydrostatic Testing ဖော်ပြချက်တွင် Hydrotest Water ရယူမည့် နေရာနှင့် စွန့်ပစ်မည့် နေရာနှင့် စပ်လျဉ်း၍ "Hydro-test water will only be taken from and disposed of at pre- approved locations "ဟုဖော်ပြထားကြောင်း စိစစ်တွေ့ရှိရသည်။	Hydrotest Water ရယူရန် အလားအလာရှိသောနေရာနှင့် disposedလုပ်ရန် အလားအလာရှိသောနေရာတို့၏ informationကို ပြည့်စုံစွာ ဖော်ပြပေးရန်။ -ရယူသုံးစွဲမည့် Hydrotest Water ၏ ခန့်မှန်းပမာဏ (Estimated Volume) နှင့် စွန့်ပစ်မည့် ပမာဏတို့ကို ထည့်သွင်းဖော်ပြပေးရန်။ -Hydrotest Water ရယူမည့် နေရာ၊ စွန့်ပစ်မည့် နေရာတို့အား ရွေးချယ်ရာတွင် Other user များအပေါ် သက်ရောက်မှုများအား ဆန်းစစ်လေ့လာ ဖော်ထုတ်၍ Chemical Criteria သတ်မှတ် ဖော်ပြပေးရန်။	Hydrotest water လိုအပ်ချက်ကို Hydrostatic Testing အခန်း ၃.၅.၃၊ စာမျက်နှာ ၁၃၄တွင် ဖော်ပြထားပါ သည်။
(၁၂)	-Tentative ROW (MPE) -Existing Gas Pipeline -Alternative ROW -Existing Oil Pipeline (KS-R) စသည်တို့ ပါဝင်သော Map များကို ဖော်ပြထားသော်လည်း Pipeline လမ်းကြောင်းအချို့မှာမထင်ရှားကြောင်း စိစစ်တွေ့ရှိရပါသည်။	အဆိုပါ Map များတွင် Pipeline လမ်းကြောင်းရှင်း လင်းစွာ ပြင်ဆင်ဖော်ပြရန်။ (မှတ်ချက်- Existing Oil Pipeline ကို အစိမ်းရောင်အစားအခြားအရောင်ဖြင့်ဖော်ပြရန်အကြံပြုပါသည်။)	Pipeline လမ်းကြောင်း မြေပုံဖော်ပြချက်များတွင် သက်ဆိုင်ရာလမ်းကြောင်းကိုသာ သိသာထင်ရှားအောင် ဖော်ပြထားခြင်းဖြစ်ပါသည်။ လမ်းကြောင်းအားလုံးပါသောမြေပုံကို ပိုမိုထင်ရှားအောင် ပြင်ဆင်ဖော်ပြထားပါသည်။ အစိမ်းရောင်အစားအ**ပြာ**ရောင်ဖြင့် ပြောင်းလဲဖော်ပြထားပါသည်
	အနီးပတ်ဝန်းကျင်အကြောင်းအရာများဖော်ပြချက်		

(၁၃)	4.1 General environment ကို ဖော်ပြထား သော်လည်း စီမံကိန်းနေရာများနှင့် ဆက်စပ်မှုကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ကြောင်းသုံးသပ်ရရှိ ပါသည်။	-4.4 Climateအချက်အလက်များအရစီမံကိန်း ဧရိယာ၏ Climateကို သုံးသပ်မှုကို ထည့်သွင်း ဖော်ပြရန်။ -4,5 Earthquake, Table 16ပါ Magway Region တွင်လှုပ်ခတ်ခဲ့သော ငလျင်မှတ်တမ်း များအရစီမံကိန်းဧရိယာသည် ငလျင်အန္တရာယ် ရှိ-မရှိ သုံးသပ်မှုကို ထည့်သွင်းဖော် ပြရန်။	စီမံကိန်းဧရိယာ၏ Climate ကို Climate and Meteorology နှင့် Climatic Conditions သုံးသပ်မှုကို စာမျက်နှာ ၁၈၀ -၁၈၈ အခန်း ၄.၄ တွင်ငင်း၊ Magway Region အတွင်း Earthquake လှုပ်ခတ်မှုအနေအထားကို မိုးလေဝသ နှင့် ဇလဗေဒ မှရရှိသော ၂၀၁၃ - ၂၀၁၆ အချက် အလက်များကို အခြေခံ၍ Google Map ဖြင့် လှုပ်ခတ်မှု ဒေသကို ဖော်ပြပေး ထားပါသည်။
(၁၄)	4.6 Cultural and Historical Heritage တွင် project site အနီးတွင် cultural heritage site မရှိသော်လည်း စေတီ/ ပုထိုးများရှိကြောင်း ဖော်ပြ ထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။	4,6 Cultural and Historical Heritage တွင် Refinery site နေရာ၏ 3km အတွင်းနှင့် ပိုက်လိုင်းလမ်းကြောင်းအနီးရှိရွေ;ဟောင်းယဉ် ကျေးမှုအမွေ အနှစ် နေရာ/ စေတီ/ ပုထိုး/ သာသနာ အဆောက်အအုံ များကို ထည့် သွင်း ဖော်ပြရန်။	စာမျက်နှာ ၁၈၈ နှင့် ၁၈၉ တွင် ရေနံချက်စစ်ရုံ နှင့် ဝန်ကျင်ရှိ ရွေ့ဟောင်းအဆောက်အဦးနေရာများကို မြေပုံနှင့်တကွ ဖော်ပြ ထားပါသည်။
(၁၅)	5,1.2 Justification of selecting the present site ကိုထည့်သွင်းဖော်ပြ ထားသည်။	အဆိုပါ ဖော်ပြချက်အား 3.6.1 Comparison and Selection of Alternatives တွင် ဖော်ပြ သင့်ကြောင်း အကြံပြုပါသည်။	Justification of selecting the present site ကို အခန်း ၃.၇ စာမျက်နှာ ၁၃၈ တွင် ပြင်ဆင်ဖော်ပြထားပါသည်။
(၁၆)	Page -165 “Myanmar Survey Research’s survey team selected the locations for Baseline Data Collection for soil samples, ground water samples, river water samples, surface water samples and ambient air quality	အဆိုပါSurvey များ ကောက်ယူသည့် အချိန်ကာလကို ခုနှစ် ၊ လ၊ ရက် စသည်ဖြင့် ထည့်သွင်း ဖော်ပြရန်။။	Soil Sample Collection နေရာများနှင့် အချိန်ကာလတို့ကို စာမျက်နှာ ၁၉၂၊ အခန်း ၅.၁.၃.၁ တွင်ဖြည့်စွက်ဖော်ပြထားပြီး၊ Water sampling ကို စာမျက်နှာ ၂၀၂၊ အခန်း ၅.၁.၄ တွင်လည်းကောင်း၊ Air quality test နေရာများကို စာမျက်နှာ ၂၁၀၊ အခန်း၅.၁.၅ တွင်ဖြည့်စွက်ဖော်ပြထားပါ သည်။

	and noise pressure test points" ဟု ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရ ပါသည်။		
(၁၇)	အခန်း (၅.၁.၁.၄) ၊ Air Quality Survey Method ဖော်ပြချက်တွင် လေအရည်အသွေးအား ၄ နေရာ တွင်ကောက်ယူခဲ့ကြောင်း၊Sampling ကောက်ယူမှု ကို ၂၄ နာရီ အခြေခံ၍ ကောက်ယူထားကြောင်း ဖော်ပြထားရာ အဆိုပါ ၄ နေရာ အား ၂၄ နာရီ အတွင်း ကောက်ယူမှု အဖြစ် ဖော်ပြထားသည်ကို သုံးသပ် ရရှိသည်။	-Air Quality Sampling ကောက်ယူသည့် Method နှင့်အချိန်ကာလ (Timing)တို့ကို ရှင်းလင်းစွာဖော်ပြပေး ရန်။	Air Quality Sampling ကောက်ယူခြင်းကို အခန်း ၅.၁.၅ တွင် ပြည့်စုံစွာဖြည့်စွက်ဖော်ပြထားပါသည်။
(၁၈)	5.2 Biological Environment "Main focus area for the biological impact assessment is the project site and ecological aspect observed inside and one to three kilometers range of outside the project site" စသောနေရာများတွင် Biological Survey ကောက်ယူခဲ့ကြောင်း ဖော်ပြ ထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။	-အဆိုပါ Biological Survey ကောက်ယူခဲ့ သည့် အချိန်ကာလကို ခုနှစ် လ ရက် စသည်ဖြင့် ထည့်သွင်း ဖော်ပြရန်၊ -အဆိုပါ Biological Survey ကောက်ယူခဲ့ သည့် နေရာများကိုမြေပုံဖြင့် ထည့်သွင်းဖော်ပြ ရန်။	Biological Survey စစ်တမ်းကောက်ယူခြင်းကို စာမျက်နှာ ၂၄၅၊ အခန်း ၅.၂.၃ တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။
(၁၉)	အခန်း (၅.၃.၅) Fauna Portion ဖော်ပြချက်တွင် baselineဖော်ပြချက်များသည် Project Footprint တစ်ခုလုံး ခြုံငုံဖော်ပြထားကြောင်း စိစစ်တွေ့ရှိရ ပါသည်။	-အောက်ပါ Project Site အလိုက်တွေ့ရှိရ သည့် Species and Habitats ကို သတ်မှတ် ဖော် ပြရန်။ - Pipeline တစ်လျှောက်	Plant collection ကောက်ယူရာတွင် Project site အားလုံး ကောက်ယူထားခဲ့သော်လည်း ဖော်ပြရာတွင် plant list အနေ ဖြင့်သာ ဇယားများဖြင့်ဖော်ပြထားပါသည်။ Endangered species ကိုလည်း ဖော်ပြထားပါသည်။

		-Existing and new Refinery Site surrounding -Off-take Point area -အထက်ပါ Project Site အလိုက်တွေ့ရှိရသော Habitat များအရ အခြားမျိုးစိတ်များ တည်ရှိနိုင်မှုကို သုံးသပ်ဖော်ပြရန်။ -တွေ့ရှိရသောမျိုးစိတ်များ၏အရေးပါမှု အဆင့်အတန်း ကိုဖော်ပြပေးရန်နှင့် ဥပဒေအရ ကာကွယ်ထိန်းသိမ်းထားသော မျိုးစိတ်များရှိ/မရှိ သုံးသပ်ဖော်ပြရန်။	ဤသို့ဆောင်ရွက်ရခြင်းမှာ project zone တိုင်းသည် Dry Zone အတွင်း ပါဝင်နေခြင်းကြောင့် ပေါက်ရောက်သည့် အပင်များ တူနေသဖြင့် Plant List အနေဖြင့်သာ ဖော်ပြခဲ့ခြင်းဖြစ်ပါသည်။ Crop plantation တွင် paddy plantation and crop plantation ဟူ၍ ခွဲခြားပြီးဖော်ပြထားပါသည်။ Animal collection (Direct visual observation) နည်းအရ ကောက်ယူခဲ့ပြီး ဇယားများဖြင့် ဖော်ပြထားပါသည်။ ဥပဒေအရ ကာကွယ်ထားသော မျိုးစိတ်တစ်မျိုးရှိသော်လည်း ၎င်းအပင်သည် စက်ရုံ footprint area direct impact zone အတွင်းမဟုတ်ပါ။ Habitats type 2 မျိုးရှိသည်ကို စာမျက်နှာ ၂၃၈ အခန်းအမှတ် ၅.၂.၂.၂ တွင် ဖြည့်စွက်ဖော်ပြထားပြီး Forest type ကိုလည်း စာမျက်နှာ ၂၄၀ တို့တွင်ဖော်ပြထားပါသည်။
(၂၀)	Page 252 - 258 အထိ new refinery site နေရာဝန်းကျင်ရှိ မယ်ဇလီတောကျေးရွာ၊ ပန်တော်ပြင်ကျေးရွာ၊ သံပုရာကန်ကျေးရွာ၊ ရွာတော်ကျေးရွာ၊ ညယဉ်ကျေးရွာ၊ ချောင်းကောက်ကျေးရွာများ၏ Social-economic အခြေအနေကို မြန်မာဘာသာဖြင့် ထည့်သွင်းဖော်ပြ ထားပါသည်။	-အဆိုပါကျေးရွာများ၏ Socio-economic အခြေအနေကိုအခြားအခန်းများနှင့်လိုက်လျောညီထွေစွာ အင်္ဂလိပ်ဘာသာဖြင့် အနှစ်ချုပ်၍ ပြင်ဆင်ဖော်ပြရန်။	ကျေးရွာများ၏ Socio-economic status and profile များကို ကွင်ဆင်းကောက်ယူခဲ့သည် အချက်အလက်များကိုအခြေခံ၍ စာမျက်နှာ ၂၆၇ မှ ၂၈၇ နှင့်၂၉၂-၂၉၃ တို့တွင် အနှစ်ချုပ်၍ ပြင်ဆင်ဖော်ပြထားပါသည်။

		-အဆိုပါကျေးရွာများအနက် ဥယဉ်ကျေးရွာ၊ ချောင်းကောက်ကျေးရွာများ၏အချက်အလက်များကို ပြည့်စုံစွာဖော်ပြရန်။	
(၂၁)	Page 260 277 အထိ pipeline တစ်လျှောက် ရှိ off-take point မှ မင်းဘူးအထိ ကျေးရွာများ၏ အချက်အလက်များကို မြန်မာဘာသာဖြင့် ထည့်သွင်း ဖော်ပြ ထားပါသည်။	-pipeline တစ်လျှောက်ရှိ off-take point မှ မင်းဘူး အထိ ကျေးရွာများ၏ အချက်အလက်များကို အခြား အခန်းများနှင့် လိုက်လျောညီထွေစွာ အင်္ဂလိပ်ဘာသာဖြင့် အနှစ်ချုပ်၍ ပြင်ဆင်ဖော်ပြရန်။	Off-take point မှ Refinery Site အထိ ကျေးရွာများ၏ အချက်အလက်များကို လည်း စာမျက်နှာ ၂၇၆ မှ ၂၈၂ ထိ အနှစ်ချုပ်ပြင်ဆင်ဖော်ပြထားပါသည်။
(၂၂)	Page 278 မှ 294 အထိ pipeline တစ်လျှောက် ရှိ မင်းဘူးမြို့မှ Refinery Site အထိ ကျေးရွာများ၏ အချက်အလက်များကို မြန်မာဘာသာဖြင့်ထည့်သွင်း ဖော်ပြထား ပါသည်။	- pipeline တစ်လျှောက်ရှိ မင်းဘူးမြို့မှ Refinery Site အထိကျေးရွာများ၏ အချက်အလက်များကို အခြားအခန်းများနှင့် လိုက်လျောညီထွေစွာအင်္ဂလိပ်ဘာသာဖြင့် အနှစ်ချုပ်၍ ပြင်ဆင်ဖော်ပြရန်။	pipeline တစ်လျှောက်ရှိ မင်းဘူးမြို့မှ Refinery Site အထိ ကျေးရွာများ၏ အချက်အလက်များကိုလည်း စာမျက်နှာ ၂၇၉ မှ ၂၈၂ ထိ အနှစ်ချုပ် ပြင်ဆင်ဖော်ပြထားပါသည်။
(၂၃)	အထက်ပါ မြန်မာဘာသာဖြင့် ဖော်ပြထားသော အချက်အလက်များကို နောက်ဆက်တွဲဖြင့် ဖော်ပြရန် အကြံ ပြုပါသည်။		မြန်မာဘာသာဖြင့် ဖော်ပြထားသော အချက်အလက်များကို နောက်ဆက်တွဲ Appendix 40 ဖြင့်လည်း ဆက်လက် ဖော်ပြ ထားပါသည်။
(၂၄)	5.3.6 Stakeholder Engagement for New Refinery ကို မြန်မာဘာသာဖြင့် 306 မှ 391 အထိ ဖော်ပြထားသော်လည်း အဆိုပြုစီမံကိန်းအပေါ် အမြင် သဘောထားကိုသုံးသပ်ရန်ခက်ခဲသည်ကို စိစစ်တွေ့ရှိရသည်။	-အဆိုပြုစီမံကိန်းအပေါ် အမြင်သဘောထားကို စုစည်း သုံးသပ်နိုင်ရန် အဆိုပါ page 306 မှ 391 အထိဖော်ပြချက်များကို summarize ပြုလုပ်၍ အခြား	စာမျက်နှာ ၂၉၃ မှ ၂၉၄ ထိတွင် ပြင်ဆင်ဖော်ပြထားပါသည်။

		အခန်းများ နှင့် လိုက်လျောညီထွေစွာ အင်္ဂလိပ်ဘာသာဖြင့် ထည့်သွင်းဖော်ပြရန်။	
(၂၅)	အဆိုပါ Page 306 မှ 391 ထိ ဖော်ပြချက်များကို နောက်ဆက်တွဲဖြင့် ဖော်ပြရန် အကြံပြုပါသည်။		နောက်ဆက်တွဲဖြင့် ဖော်ပြထားပါသည်။
	ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှုနှင့် ဘေးအန္တရာယ်ရှိမှု ဆန်းစစ်ခြင်း နှင့် လျော့နည်းစေရေးလုပ်ငန်းများ		
(၂၆)	အခန်း (၆.၄) တွင် -construction Phase နှင့် Operation Phase တို့တွင် Physical Environmentတို့အပေါ် သက်ရောက်မှုများကို ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရသည်။ -Pipeline အတွက် Construction Phase တွင် သက်ရောက်မှုများကို ထည့်သွင်းဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရသည်။ -6.4.6 Potential Impacts on Biological Environment in the Operation Phase တွင်သာ Impact Assessment Methodology ကို ယေဘုယျသတ်မှတ်ထားသည်ကို စိစစ်တွေ့ ရှိရပြီး Impact Significance ဖော်ပြရာတွင်လည်း Low, Medium, High စသည်တို့၏ အဓိပ္ပါဘ်ဖွင့်ဆိုချက်	ဤအခန်းတွင် Impact Assessment Methodology ကို ပြည့်စုံစွာ ဖော်ပြရန်နှင့် ဤ အခန်း၌ ဦးစွာ ဖော်ပြရန်။ -အခန်း 6.4.1မှ 6.4.9 အထိ Construction Phase, Operation Phase, Decommission, Demolition and Closure Phase, တို့အလိုက် Impactများကို Impact Assessment Methodology ဖြင့်ပြည့်စုံစွာ ဆန်းစစ်သုံးသပ်ရန်။ အထက်ပါ impact များကို ဆန်းစစ် သုံးသပ်ရာတွင် အချို့ impactများကို impact Quantitativeဖြင့် သုံးသပ်၍ ထည့်သွင်းဖော်ပြရန်။	Impact assessment Methodology ကို အခန်း ၆.၃ တွင် ပြည့်စုံစွာဖော်ပြထားပါသည်။ Phase တစ်ခုခြင်းစီအလိုက် impactများကို အခန်း ၆.၃.၁ စာမျက်နှာ ၃၁၀ မှ ၃၄၁ အထိဖြည့်စွက်ဖော်ပြထားပါသည်။

	(Definition)ဖော်ပြဖားခြင်းမရှိကြောင်း စိစစ်တွေ့ရှိရသည်။ - အထက်ပါများ၏ကို သတ်မှတ်ရန် အတွက်ကို ပြည့်စုံစွာဖော်ပြထားခြင်းမရှိကြောင်း စိစစ်တွေ့ရှိရသည်။ (မှတ်ချက်- Impact တစ်ခုစီ၏ Significance ကို ဆုံးဖြတ်ရာတွင် Impact၏ Magnitude, Receptor ၏ အရေးပါမှုကို သိရှိရန် လိုအပ်ပြီး Magnitude of impact နှင့် Importance of Receptorကိုဆုံးဖြတ်ရန် အတွက် Methodology ကို ပြည့်စုံစွာဖော်ပြရန်လိုအပ်သည်) သက်ရောက်မှုများကိုလည်း အကျဉ်းချုပ်သာဖော်ပြထားသည်။ ဖြစ်ပေါ်နိုင်သည့် Impact များကို Quantity ပြုလုပ်ထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရပါ သည်။ ဥပမာ- - ရှင်းလင်းရမည့်သစ်ပင်အရေအတွက်/ habitat အမျိုးအစား - - volume of emission - -land lost for agriculture		

(၂၇)	အောက်ပါတို့ကို ဥပမာအနေနှင့် ဖော်ပြ၍ အကြံပြုပါသည်။ အခြား impact တစ်ခုချင်းဆီကို review ပြုလုပ်၍ ဆန်းစစ်သုံးသပ်ရန်လိုအပ်ပါသည်။ • ၆.၄.၅ Potential impacts on physical environment in the operation phase ၌ smell (odor) ကြောင့် သက်ရောက်မှုကို ဆန်းစစ်သုံးသပ်ရာတွင် ထိခိုက်နိုင်သည့်သူများ၊ သက်ရောက်မည့် နေရာဒေသ၊ သက်ရောက်မည့်အကြိမ်အရေ စသည်ဖြင့် ထည့်သွင်းသုံးသပ်ရန်လိုအပ်ပါသည်။ • ၆.၄.၅ Potential impacts on physical environment in the operation phase ၌ noise and vibration ကြောင့် သက်ရောက်မှုကို ဆန်းစစ်သုံးသပ်ရာတွင် စီမံကိန်းအနီးရှိ လူနေထိုင်ရာ ကျေးရွာ/ရပ်ကွက်များ (Residents') အပေါ် သက်ရောက်မှု ရှိ မရှိကို quantitative modelling ဖြင့် ထည့်သွင်းသုံးသပ်ရန်လိုအပ်ပါသည်။ (ဥပမာ - Noise Source ၏ Decibel က ဘယ်လောက်လဲ၊ ဘယ်လောက် အကွာအဝေး ထိရောက်နိုင်လဲ၊ လူနေထိုင်ရာ ကျေးရွာ/ရပ်ကွက်များ (Residents' အပေါ် သက်ရောက်မှု ရှိ/မရှိ) • ၆.၄.၅ Potential impacts on physical environment in the operation phase ၌ wastewater disposal ကြောင့် သက်ရောက်မှုကို ဆန်းစစ်သုံးသပ်ရာတွင် wastewater disposal ကြောင့် သက်ရောက်မည့် နေရာ/Receptors အားဆန်းစစ်သုံးသပ်ရန် လိုအပ်ပါသည်။	Potential impacts on physical environment in the operation phase ၌ smell (odor) ကြောင့် သက်ရောက်မှုကို အခန်း ၆.၃.၃.၁ Air Quality အခန်း၊ စာမျက်နှာ ၃၂၇ တွင် Operational odour impacts အနေဖြင့်ဖော်ပြထားပါသည်။ Noise and Vibration ကြောင့် သက်ရောက်မှုကို အခန်း ၆.၃.၃.၂ စာမျက်နှာ ၃၂၇ - ၃၃၀ တွင် သုံးသပ်ဖော်ပြထားပါသည်။ Wastewater disposal ကြောင့် သက်ရောက်မည့် နေရာ/Receptors အား ဆန်းစစ်သုံးသပ်ချက်ကို စာမျက်နှာ၃၄၂ အခန်း ၆.၃.၃.၄ နှင့် စာမျက်နှာ ၃၃၁ - ၃၃၅ ထိ အခန်း ၆.၃.၃.၆ တို့တွင် သက်ရောက်မည့်နေရာအလိုက် ဆန်းစစ်သုံးသပ်ဖော်ပြပေးထားပါသည်။

	• ၆.၄.၅ Potential impacts on biological environment in the operation phase ၌ impact များကို ဆန်းစစ်သုံးသပ်ရာတွင် ယင်းဒေသရှိ Habitat ပမာဏနှင့် နှိုင်းဆ၍ Habitat မည်မျှဖယ်ရှားမှု ပြလုပ်ရန်လိုအပ်သည်ကို ဆန်းစစ်၍ ထည့်သွင်း သုံးသပ်ရန် လိုအပ်ပါသည်။		စက်ရုံတည်ဆောက်မည့် နေရာသည် သံပုရာကန်ရေနံချက်စက်ရုံတည်ဆောက်စဉ်ကာလတွင် မြေနေရာရှင်းလင်ပြုပြင်ခြင်းကြောင့်၎င်း၊ စက်ရုံလည်ပတ်နေသည်ကာလဖြစ်နေခြင်းကြောင့်၎င်း၊ မူရင်းသစ်တော ရေမြေအနေအထားမှာ အပူပိုင်းဇုံ ရွက်ကြွေတောခြောက်ပေါက်ရောက်သည့် ဒေသ ဖြစ်နေခြင်းကြောင့်၎င်း ဆူးထူပင်များ၊ ဆူးခြုံတောများ ကွက်ကြား ကွက်ကြား ဖုံးလွှမ်းနေသည့် နေရာဖြစ်ပါသည်။ မြေအမျိုးအစာမှာလည် မြေနှင့်ကျောက်ခဲများ ရောနှောနေ သောမြေမာ အမျိုးအစားများ ဖြစ်နေခြင်းကြောင့် စိုက်ပျိုး၍မရပါ။
	အဆိုပြုစီမံကိန်းမှ Operation ကာလတွင် အဓိက Impact အဖြစ် လေထုညစ်ညမ်းမှုနှင့် ပတ်သက်၍ အခန်း (၆.၄.၅.၅) ၊ Air pollution ကို ဖော်ပြထားသည်ကို သိရှိရသည်။ အဆိုပြုစီမံကိန်းကဲ့သို့ ရေနှုချက်စက်ရုံတစ်ခုအတွက် အနီးရှိ ၆.၄.၅ Potential impacts on physical environment in the operation phase ၌ wastewater disposal ကြောင့် သက်ရောက်မှုကို ဆန်းစစ်သုံးသပ်ရာတွင် wastewater disposal	Refinery မှ ထွက်ရှိမည့် Main Air Pollutant များ၏ ပျံ့နှံ့နိုင်မှုအတွက် Operational Scenario အမျိုးမျိုးအလိုက် Air Emission Modelling ဖြင့်ဆန်းစစ်သုံးသပ် ဖော်ပြပေးရန်၊ ဆန်စစ်သုံးသပ်ချက်များ မူတည်၍ အနီးဆုံးရှိ Sensitive Receptor များတွင် လေထုညစ်ညမ်းမှု ရှိ/မရှိ သုံးသပ်ဖော်ပြပေးရန်၊	Main Air Pollutant များ၏ ပျံ့နှံ့နိုင်မှုအတွက် Air Emission Modelling ဖြင့်ဆန်းစစ်သုံးသပ်သည့် နည်စနစ်အစား Professional judgment နှင့် Matrix impact assessment method ကိုသုံး၍ အနီးဆုံးရှိ Sensitive Receptor များတွင် လေထု ညစ်ညမ်းမှု ရှိ/မရှိ ကို အခန်း ၆ တွင်ဖော်ပြထားပါသည်။

	ကြောင့် သက်ရောက်မည့်နေရာ/Receptors အား ဆန်းစစ်သုံးသပ်ရန် လိုအပ်ပါသည်။ Sensitive Receptor များအတွက် လေထုညစ်ညမ်းမှု ရှိ/မရှိ ဆုံဖြတ်နိုင်ရန် Operational Scenario အမျိုးမျိုးအလိုက် Air Emission Modelling ဖြင့်ဆန်းစစ်ရန်လိုအပ်ကြောင်းစီစစ်သုံးသပ်တွေ့ရှိရသည်။		
(၂၈)	Potential impacts on Socio-economic Environment in the Operation Phase တွင် Impactများကိုယေဘုယျဖော်ပြထားပြီး Potential Impact ပြည့်စုံစွာ ဆန်းစစ်ထားခြင်း မရှိကြောင်း နှင့် Baseline Informationများအရ ဆန်းစစ်မှု ပြုလုပ်ထားခြင်းမရှိကြောင်းစစ်ဆေးတွေ့ရှိရသည်။	အဆိုပြုစီမံကိန်း တည်ရှိရာ နေရာများ၏ Baseline Information များအရ Potential impacts impact assessment (Consistent Impact Assessment Method) ကို အသုံးပြုရန်။	Socio-economic ကို phase တစ်ခုခြင်းစီအလိုက် စာမျက်နှာ ၃၁၀၊ အခန်း ၆ အပိုဒ်ခွဲ ၆.၃.၁, ၆.၃.၂.၄.၆၊ ၆.၃.၃.၃ တို့တွင် ပြင်ဆင်ဖြည့်စွက် ဖော်ပြပေးထားပါသည်။
(၂၉)	အခန်း(၆.၅)တွင် များကို ယေဘုယျဖော်ပြထားသည်ကို သုံးသပ်ရရှိသည်။ -ဆက်စပ်သက်ရောက်မှုများဖြစ်စေမည့် အဆိုပြုစီမံကိန်းနှင့်စီမံကိန်းဝန်းကျင်ရှိအခြားစီမံကိန်းများအား မြေပုံနှင့်တကွ ထည့်သွင်းဖော်ပြထားခြင်းမရှိကြောင်း စိစစ်တွေ့ရှိရသည်။	-ဆက်စပ်သက်ရောက်မှုကိုဖြစ်စေမည့် New Refinery ဝန်းကျင်ရှိ အခြားစီမံကိန်းများအား ဖော်ပြပေးရန်နှင့် အဆိုပါ စီမံကိန်းများအား Mapဖြင့် ထည့်သွင်းဖော်ပြ ပေးရန်။	New Refinery မှ 3 kilometers Radius ဝန်းကျင်အတွင်းတွင် တည်ဆောက်ဆဲစီမံကိန်းနှင့် အနာဂတ် အခြားစီမံကိန်းများ မရှိပါ။ 8 – 10 kilometers radius အတွင်းတွင် Chemical plant အမျိုးအစားစက်ရုံများမရှိပဲ Mechanical plant အမျိုးအစားစက်ရုံ ၃ရုံသာရှိပါသည်။ သို့ပါ၍ လက်ရှိအနေအထားအရ ဆက်စပ်သက်ရောက်မှုကို မဖြစ်စေနိုင်ကြောင်း တွေ့ရှိရပါသည်။

(၃၀)	-Surface Water (Fisheries resources)ပါ ဖော်ပြချက်များအရ proposed jetty site and landing stage area စသည့် jetty area ၌ လုပ်ငန်းများ၊ oil spill, waste water စသည်တို့ ကြောင့် (Fisheries resources) အပေါ် ဆက်စပ် သက်ရောက်နိုင်မှုကို ဆန်းစစ်ထားသည်ကို သုံးသပ်ရရှိပါသည်။	Impact on Fisheries resources ဟု ပြင်ဆင်ဖော်ပြ ရန်နှင့် proposed jetty site and landing stage area အား Map ဖြင့် ထည့်သွင်း ဖော်ပြရန်။	စာမျက်နှာ ၃၃၈တွင် စာသားအား ပြင်ဆင်ဖော်ပြပြီး ဖြစ်ပါသည်။
(၃၁)	-New Refinery Plant မှ Air Shield အပေါ် ဆက်စပ်သက်ရောက်မှုကို ဆန်းစစ်ထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။ -Cumulative effects of emissions from two refineries တွင် Emission ကြောင့် Cumulative effects ဆန်းစစ်ထားသော်လည်း ယေဘုယျသာ ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။	- Existing New Refinery ကြောင့် Air shed/ Air Qualityအပေါ်ဆက်စပ် သက်ရောက်မှုများကို Modelling ဖြင့် ပြည့်စုံစွာ ဆန်းစစ်ဖော်ပြပေးရန်။ (မှတ်ချက် - အဆိုပြု စီမံကိန်းနှင့် ကပ်လျက်တွင် Existing Refinery တစ်ခုတည်ရှိနေသည့် အတွက် ဆက်စပ် သက်ရောက်မှုများ ဆန်းစစ်ရာတွင် အဓိကအားဖြင့် Air Quality ဆက်စပ်သက်ရောက်မှုများ ဆန်းစစ်ရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရသည်။	Existing New Refinery ကြောင့် Air shed/ Air Qualityအပေါ်ဆက်စပ် သက်ရောက်မှုများ ကို Modelling ဖြင့် ပြည့်စုံစွာဆန်းစစ်ဖော်ပြပေးရန်မှာ လက်ရှိအနေအထာတွင် မဖြစ်နိုင်သေးပါ။ အဆိုပြုထားသည့် စီမံကိန်းတွင် Design information နှင့်ပတ်သက်၍ EPC contractor ကို စီမံကိန်းပိုင်ရှင်မှ အပြီးသတ်ရွေးချယ်ပြီး နောက်ပိုင်းတွင် ရရှိလာမည့် နည်ပညာပိုင်းဆိုင်ရာ အသေးစိတ်အချက်အလက်များ ကိုလေ့လာပြီး Air shed/ Air Quality အပေါ် ဆက်စပ်သက်ရောက်မှုများ ပြည့်စုံစွာ ဆန်းစစ်ဖော်ပြပေးနိုင် မည်ဖြစ်ပါသည်။ စက်ရုံစီမံကိန်း ဆောက်လုပ်ရေး ကာလတွင် ပြုလုပ်ရမည့် Monitoring report နှင့်အတူ Revise EMP တွင် ဆန်းစစ်ဖော်ပြပေးသွာမည်ဖြစ်ပါသည်။
(၃၂)	Existing & New Refinery နှင့် အခြားစီမံကိန်းများမှ ရေရယူသုံးစွဲခြင်းနှင့် Wastewater စွန့်ပစ်ခြင်းတို့	အဆိုပြု စီမံကိန်းနှင့် အခြားစီမံကိန်းများမှ ရေရယူ သုံးစွဲခြင်းနှင့် Waste Water စွန့်ပစ်ခြင်း	Existing New Refinery ၏ပတ်ဝန်းကျင်တွင် အခြားစီမံကိန်းများမရှိသော်လည်း ကာကွယ်ရေးပစ္စည်းစက်ရုံ (DI) နှစ်ခုနှင့်

	ကြောင့် ဖြစ်ပေါ်နိုင်သည့် ဆက်စပ်သက်ရောက်မှုများကိုထည့်သွင်းဆန်းစစ်သုံးသပ်ထားခြင်းမရှိကြောင်း စိစစ်တွေ့ရှိရသည်။	တို့ကြောင့် ဖြစ်ပေါ်နိုင်သည့်ဆက်စပ် သက်ရောက်မှုများကို ပြည့်စုံစွာဆန်းစစ်ဖော်ပြပေးရန်။	အကြီးစားစက်ရုံ (HI) တစ်ခုတို့ရှိပါသည်။ ယင်းတို့အနက် အကြီးစားစက်ရုံ (HI) သည် ဧရာဝတီမြစ်ရေကို မလွန်ဆိပ်ကမ်းဧရိယာမှ ထုတ်ယူသုံးစွဲပြီး ကာကွယ်ရေးစက်ရုံနှစ်ခု တို့မှာ စက်ရုံနှစ်ခုအကြားတွင်ရေလှောင်ကန်(reservoir)တည်ဆောက်အသုံးပြုပါသည်။ ထို့အပြင်အဆိုပါစက်ရုံများနှင့် စီမံကိန်းဧရိယာသည် 8 - 10 km ကွာဝေးသောကြောင့် ရေရယူသုံးစွဲခြင်း နှင့် WasteWater စွန့်ပစ်ခြင်းတို့သည် ဆက်စပ်သက်ရောက်မှု မရှိနိုင်ကြောင်း စီစစ်တွေ့ရှိရပါသည်။
(၃၃)	အခန်း (၆.၇) Risk Assessment -အဆိုပါ အခန်းတွင် New Refinery Project အတွက် Risk Assessmentကို ကောင်းမွန်စွာ ပြုလုပ်ထားသည်ကို စိစစ်တွေ့ရှိရသည်။ -Pre-construction and Construction, Operation, Decommission, demolition and closure တို့တွင် Physical Environment အတွက် Risk Assessment ပြုလုပ်ထားသည်ကို စိစစ်တွေ့ရှိရပါသည်။ - Risk တစ်ခုချင်းဆီအလိုက်ဖြစ်ပေါ်နိုင်မှုကို ရှင်းလင်းဖော်ပြထားခြင်းမရှိကြောင်းစိစစ်တွေ့ရှိရသည်။	ဤအခန်းတွင် New Refinery Project မှ မတော်တဆဖြစ်ပေါ်နိုင်သည့် အဖြစ်အပျက်များကိုသာ အဓိကထား၍ ဆန်းစစ်သုံးသပ်ပြီး ထည့်သွင်းဖော်ပြရန် ။ -မတော်တဆ ဖြစ်ရပ် တစ်ခုချင်း၏ ဖြစ်ပေါ်နိုင်မှုကို Scenario ဖြင့် ဆန်း စစ်၍ ရှင်းလင်း ဖော်ပြရန်။ - မတော်တဆ ဖြစ်ရပ် တစ်ခုချင်း၏ ဖြစ်ပေါ်နိုင်မှုကိုလျှော့ချနိုင်မည့်ကာကွယ်တားဆီးရေးအစီအစဉ်/နည်းလမ်း ဥပမာ - ရေနုံချက်စက်ရုံတွင်အဆိုးရွားဆုံးရေနုံယိုဖိတ်မှု ပမာဏ	-New Refinery Plant မှ မတော်တဆ ဖြစ်ပေါ်နိုင်သည့် အဖြစ်အပျက်များမှာ fire and explosion incident, toxic gas leaking နှင့် oil spill incident များဖြစ်ပေါ်နိုင်ပါသည်။ ၎င်းတို့၏ management plan ကို အခန်း ၈.၅.၄.၁၀ Emergency Response Plan ဖြင့်၎င်း၊ အသေးစိတ် အစီအစဉ်ကို Appendix 12, 13, 14, 15 တို့တွင်ဖော်ပြထားပါသည်။

	-ဖော်ပြပါ Risk များသည် New Refinery Project မှ မတော်တဆဖြစ်ရပ်များ အဖြစ်ဖြစ်ပေါ်နိုင်သည့် Riskများ ဟုတ်မဟုတ် စိစစ်သုံးသပ်ရန် လိုအပ်ကြောင်း သုံးသပ်ရရှိသည်။	-ယင်းပမာဏရှိ ယိုဖိတ်မှုဖြစ်ရပ်၏ ဘေးအန္တရာယ်ယင်းယိုဖိတ်မှုကိုတားတီးကာကွယ်နိုင်ရန်ထားရှိရမည့် ထိန်းချုပ်မှုများ/ လျော့ချမည့်နည်းလမ်းများ	
(၃၄)	-အခန်း(၆.၈) Mitigation Measure ဖော်ပြချက်များ ပါ လျော့ချရေး နည်းလမ်းများသည် ယေဘုယျ ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရသည်။ -အခန်း(၆.၄)ပါ စီမံကိန်းကြောင့် သက်ရောက်မှုများနှင့် ချိတ်ဆက်၍ လျော့ချရေးနည်းလမ်းများကို သုံးသပ်၍ ထည့်သွင်းဖော်ပြထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။ (ဥပမာ- 6.4.2 Potential impacts on Biological Environment in the Constitution Phase၌ Loss of habitat and natural vegetation, Loss of forest cover (habitats) နှင့် Loss of wildlife စသည့်impactများဖြစ်ပေါ်နိုင်ကြောင်း ဖော်ပြထားသော်လည်း 6.8.2 Biological Environment impact Mitigation Measure in the Construction Phase၌ (1) Loss of wildlife habitat, (2) Disturbance of aquatic organisms	-အခန်း(၆.၄)ပါ စီမံကိန်းကြောင့် သက်ရောက်မှုများနှင့် ချိတ်ဆက်၍ အခန်း(၆.၈) Mitigation Measure ဖော်ပြချက်များပါ လျော့ချရေး နည်းလမ်းများ အားလုံးကို သုံးသပ်၍ပြင်ဆင် ဖြည့်စွက်ဖော်ပြရန်၊ - သက်ရောက်မှုများ၏သိသာမှု/ဘေးအန္တရာယ်ရှိမှုတို့ ကိုရှောင်ရှားခြင်း သို့မဟုတ်လျော့နည်းစေခြင်းတို့တွင် အဆိုပါလျော့ချရေးနည်းလမ်းများ၏ထိရောက်မှုကို ဆန်းစစ်သုံးသပ် ဖော်ပြပေးရန်။	အဆိုပြုစီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှု ဆန်းစစ်ခြင်းကို အခန်း ၆.၂.၃ စာမျက်နှာ ၃၀၀-၃၀၇ ထိ တွင် identification of potential impact ကဏ္ဍဖြင့်လည်းကောင်း၊ -Pre-construction and Construction, Operation, Decommission, demolition and closure တို့ကို အခန်း ၆.၃.၁, ၆.၃.၂, ၆.၃.၃ တို့တွင် Significant of impact level ဖြင့်လည်းကောင်း ဖော်ပြထားပြီး၊ သက်ရောက်မှု လျော့ချရေးနည်းလမ်းများကို အခန်း ၆.၅ စာမျက်နှာ ၃၄၇ - ၃၇၄ တွင် ချိတ်ဆက်ဖော်ပြထားပါသည်။

	and aquatic habitat; (3) Erosion and sedimentation, and (4) destruction of vegetation စသည့် impactများကြောင့် လျှော့ချနိုင်မည့် နည်းလမ်းများကို ထည့်သွင်းဖော်ပြ ထားသည်။) -အခန်း(၆.၈) Mitigation Measure ဖော်ပြချက်များပါ လျှော့ချရေးနည်းလမ်းများသည် စီမံကိန်းအဆိုပြုသူမှ လက်တွေ့အကောင်အထည်ဖော်နိုင်မှုကို ထည့်သွင်းသုံးသပ်ရန်လိုအပ်ကြောင်းလည်း သုံးသပ်ရရှိ သည်။ -(ဥပမာ- keep control on current protected forests at religious sites and military compounds in the township. Encourage protected area Management at Shwesettaw Sanctuaryစသည့် လျှော့ချရေး နည်းလမ်းများသည် စီမံကိန်းအဆိုပြုသူမှ လက်တွေ့ အကောင်အထည်ဖော်နိုင်မှုကို ထည့်သွင်း သုံးသပ်ရန် လိုအပ်သည်။) -အစီရင်ခံစာပါလျှော့ချရေး နည်းလမ်းအားလုံးသည် ဖြစ်ပေါ် နိုင်သောသက်ရောက်မှုများ၏သိသာမှု/ ဘေးအန္တရာယ်ရှိမှုတို့ကို လျှော့နည်းစေမည့် အချက်များ ဖြစ်ရန် လိုအပ်ကြောင်း သုံးသပ် တွေ့ရှိရသည်။		

(၃၅)	-အခန်း (၇) IFC Guidelines and Recommendations for Environmental Health and Safety ဖော်ပြချက်တွင် အဆိုပြု စီမံကိန်းနှင့် သက်ဆိုင်သည့် IFC Requirements ကို Summarize ပြုလုပ်ထားသော်လည်း စီမံကိန်း အဆိုပြုသူမှ ဖော်ပြပါ Requirements များနှင့် အညီ မည်သို့ဆောင်ရွက်မည်ကို ဆွေးနွေးဖော်ပြရန် လိုအပ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။	-EIA အစီရင်ခံစာတွင် IFC Guidelines ပါ Requirements များနှင့်အညီ စီမံကိန်းအဆိုပြု သူမှ ဆောင်ရွက်မည့် အစီအစဉ်များကို ရှင်းလင်း ဖော်ပြရန်။	အခန်း (၇) IFC Guidelines and Recommendations for Environmental Health and Safety ဖော်ပြချက်ကို နောက်ဆက်တွဲ Appendix 21 တွင်ပြောင်း၍ဖော်ပြထားပြီး စီမံကိန်းအဆိုပြု သူမှ ဆောင်ရွက်မည့် အစီအစဉ်များကို EMP plan တွင် Legal requirements/ Reference Standard, Guideline အနေဖြင့် ထည့်သွင်းဖော်ပြထားပါသည်။
	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်		
(၃၆)	-အခန်း(၈) Environmental Management and Monitoring Plan ဖော်ပြချက်တွင် Tableများ၌ Management Measures ထည့် သွင်းဖော်ပြ ထားသည်မှာ ကောင်းမွန်သော်လည်း သို့သော် အခန်း (၆.၈)ပါ Mitigation Measure တူညီမှု မရှိသည်ကို စိစစ်တွေ့ရှိရသည်။ - အခန်း(၈) Environmental Management and Monitoring Planဖော်ပြချက်ပါ Mitigation Measureများသည် အခန်း(၆.၈)ပါ Mitigation Measure နှင့် ညီညွတ်မှုရှိရန်လိုအပ်ပြီး စီမံကိန်း	-အခန်း(၈) Environmental Management and Monitoring Plan ဖော်ပြချက်ပါ Mitigation Measure များသည် အခန်း(၆.၈)ပါ Mitigation Measureနှင့် ညီညွတ်မှုရှိစေရန် စိစစ်သုံးသပ်၍ ပြင်ဆင်ဖော်ပြ ရန် -Project Impactအပေါ်အခြေခံ၍ Mitigation Measureများကို အချိတ်အဆက် မိမိဖော်ပြရန်။ -အဆိုပြုစီမံကိန်းမှ အဓိကသက်ရောက်မှုများကို ခြုံငုံသုံးသပ်နိုင်မည့် Monitoring Planကို ပြင်ဆင်ဖော်ပြရန်၊	Environmental Management and Monitoring Plan ကို ပြန်လည်ပြင်ဆင်ဖော်ပြထားပါသည်။

	အဆိုပြုသူမှအကောင်အထည်ဖော် ဆောင်ရွက်မည့် Measure များကို ရှင်းလင်းစွာ ဖော်ပြသင့်သည်။ - အခန်း(၈) Environmental Management and Monitoring Plan ပါ Table များတွင် air & noise emission, discharge to water စသည်တို့ နှင့် ပက်သက်၍ Monitoring ပြုလုပ်မည့် အစီအစဉ်မအား ထည့် သွင်းဖော်ပြထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရသည်။ -(မှတ်ချက်_ များတွင် air & noise emission, နှင့် Waste Water discharge တို့သည် သတ်မှတ် စံချိန် စံညွှန်း / Guideline နှင့် အညီ ထုတ်လွှတ်မှု/ စွန့် ပစ်မှု ရှိ မရှိ Environmental Monitoring ပြုလုပ်ရမည် ဖြစ်သည်။)	-သက်ဆိုင်ရာ Environmental Monitoring တွင် - Parameter တိုင်းတာမည့် နေရာ၊ တိုင်းတာအကြိမ်ရေ စသည့် တို့ ဖြင့် ထည့်သွင်း ဖော်ပြပေးရန်။	
(၃၇)	အခန်း(၈) Environmental Management and Monitoring၌ နောက်ဆက်တွဲ Plan အဖြစ် Emergency Planကို ထည့်သွင်းဖော်ပြထား သည်ကို စိစစ်တွေ့ရှိ ရသည်။ -	အောက်ပါ နောက်ဆက်တွဲ Plan (Sub plans) များကို ထည့်သွင်းဖော်ပြရန် - including Hazardous Solid waste - Waste Water Treatment Plan - Terrestrial Habitat Restoration Plan	Wastewater treatment plan ကို Appendix –19 ဖြင့် လည်းကောင်း၊ Waste Management Plan ကို Appendix 20 ဖြင့်လည်းကောင်း၊ Terrestrial Habitat Restoration Plan ကို Appendix –21 ဖြင့်လည်းကောင်း၊ IFC guidelines and recommendaions for Environmental Health and Safety ကို Appendix –22 ဖြင့်လည်းကောင်း၊ Traffic Management ကို အခန်း ၆.၅.၁.၁.၇ Water way and Road

		- Erosion and sediment control Plan - Traffic Management Plan - Decommissioning Plan	traffic စာမျက်နှာ ၃၅၆ တွင် Traffic Safety, Transport of Hazardous Materials နှင့် အခန်း ၈.၅.၃.၉ Water way and Road Traffic management plan တို့ဖြင့်လည်းကောင်း၊ Erosion and sediment control Plan ကို အခန်း ၆.၅.၂.၁.၃ Surface Water Mitigation measure ဖြင့်ဖော်ပြထားပါသည်။
	အထွေထွေ		
(၃၈)	-အစီရင်ခံစာ၏ Main Chapter တွင် အင်္ဂလိပ်ဘာသာဖြင့်သာဖော်ပြရန်နှင့် မြန်မာဘာသာဖြင့် ဖော်ပြထား မှုများကို နောက်ဆက်တွဲဖြင့် ဖော်ပြပေးရန်။		
(၃၉)	-အစီရင်ခံစာ၏ Chapter ခေါင်းစဉ်များကို အခန်း 1,7 Report Structure ပါ ဖော်ပြချက်များနှင့် အညီပြင်ဆင် ဖော်ပြရန်။		
(၄၀)	ဝန်ကြီးဌာန အမည်များကို ပြင်ဆင်ဖော်ပြပေးရန်။		
(၄၁)	အထက်ပါ Commentsများအပေါ် ပြန်လည် ရှင်းလင်းထားသည့် Response Table အား အစီရင်ခံစာထဲတွင် Appendix ဖြင့် ထည့်သွင်း ဖော်ပြပေးရန်။		

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