

# ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

For

## “Crown Cement Factory Project”

**NGWE YI PA LE' Cement Company Limited**

**Lauk Hpan Field, Lone Yone Village Tract, Naung Hkio Township,  
Kyauk Me District, Northern Shan State, Myanmar**



**PROPONENT:**



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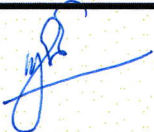
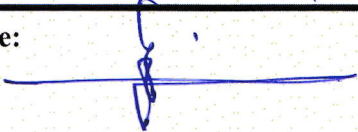
January 2024 (Revised – 01)

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**  
**FOR**  
**CROWN CEMENT FACTORY PROJECT**  
**(NGWE YI PA LE CEMENT CO., LTD.)**



## Report Review Form

<b>Report Title: Environmental Impact Assessment (EIA) Report for "Crown Cement Factory Project".</b>	
<b>Report Version: 01 Version</b>	
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Checked Date: 25/1/2024	Signature: 
Approved by: U Kyaw Soe Win	Position: Managing Director EED TCR No - 0019
Approved Date: 26/1/2024	Signature: 

ရှမ်းပြည်နယ် (မြောက်ပိုင်း) ၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ လောက်ဖန်းကျေးရွာရှိ ငွေရည်ပုလဲကုမ္ပဏီလီမိတက်၏ ဘိလပ်မြေစက်ရုံ တစ်ရက်လျှင် တန်ချိန် (၁၀၀၀ ကျ) မှ တန်ချိန် (၅၀၀၀ ကျ) ထိ တိုးမြှင့်ထုတ်လုပ်ခြင်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာအပေါ် ကနဦးစိစစ်တွေ့ရှိချက်နှင့် သုံးသပ်အကြံပြုချက်များ

စဉ်	ECD မှ ကနဦးစိစစ်တွေ့ရှိချက်နှင့် သုံးသပ်အကြံပြုချက်များ	ကုမ္ပဏီမှ တုန့်ပြန်ဖြေရှင်းဆောင်ရွက်မှုများ
၁။	အစီရင်ခံစာ၏ အကျဉ်းချုပ် (Executive Summary)	
က	<p>(Executive Summary) အစီရင်ခံစာ၏ အကျဉ်းချုပ်တွင်</p> <ul style="list-style-type: none"> <li>- စီမံကိန်းအဆိုပြုသူ နှင့် ထိခိုက်မှုဆန်းစစ်သည့် တတိယအဖွဲ့အစည်းရှိ ကျွမ်းကျင်ပညာရှင်များ၏ အချက် အလက်များ (ဥပမာ - ပညာရပ်ဆိုင်ရာ အရည်အချင်း၊ တာဝန်ယူဆောင်ရွက်သည့် နယ်ပယ် စသည်ဖြင့်)၊</li> <li>- EIA လေ့လာစဉ်အတွင်း ဆောင်ရွက်ခဲ့သော လုပ်ငန်း များနှင့် တွေ့ရှိချက် များ (ဥပမာ - Baseline Data ကောက်ယူခြင်းနှင့် ရလဒ်များအပေါ် အကဲဖြတ်ချက်များ)</li> <li>- လေ့လာခဲ့သော အခြားဆောင်ရွက်နိုင်သည့် အစားထိုး နည်းလမ်းများ၊ နှိုင်းယှဉ်လေ့လာခြင်း၏ ရလဒ်များ၊ ရှင်းလင်းဖော်ပြချက်များနှင့် ယင်းတို့ အား ရွေးချယ်ရသည့် အကြောင်းအရင်းများ၊</li> <li>- ရွေးချယ်ထားသော စီမံကိန်း၏ လုပ်ငန်းစဉ် များကြောင့် ဖြစ်ပေါ်နိုင်မည့် သိသာထင်ရှားသော ပတ်ဝန်းကျင် ထိခိုက်မှုများ၊ လျော့ပါးသက်သာ စေရေး နည်းလမ်းများ၊ လျော့ပါးစေရေး နည်းလမ်းများအား အကောင်အထည်ဖော် ဆောင်ရွက်ရန် ရန်ပုံငွေများ၊ EMP အကောင်အထည်ဖော် ဆောင်ရွက်ရာ တွင် စီမံကိန်း အဆိုပြုသူက စိုက်ထုတ်မည့် လူ့စွမ်းအား အရင်းအမြစ်များ၊</li> </ul>	<p>အစီရင်ခံစာတစ်ခုလုံးကို ခြုံငုံသိရှိနိုင်မည့် အချက်များဖြင့် အကျဉ်းချုပ်အစီရင်ခံစာကို စာမျက်နှာ ၁ မှ ၄၈ ထိ ဖော်ပြထားပါသည်။</p>

	စသည်ဖြင့် ပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အကျဉ်းချုပ်၊ - အစီရင်ခံစာ၏ အကျဉ်းချုပ်အား ဖော်ပြရာတွင် အစီရင်ခံစာ တစ်ခုလုံးကို ခြုံငုံသိရှိနိုင်မည့် အချက်များကို အကျဉ်းချုပ်၍ ဖော်ပြရန်လိုအပ်ပါ သည်။ သို့မှသာ အစီရင်ခံစာတစ်ခုလုံးကို ပြည့်စုံစွာ သိရှိဖတ်ရှုနိုင်မည် ဖြစ်ပါသည်။	
<b>၂။</b>	<b>ကတိကဝတ်များ</b>	
က	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ပါထိခိုက်မှုလျော့နည်းစေရေးလုပ်ငန်းစဉ်မ ချားကို စီမံကိန်းပိုင်ရှင်မှ လိုက်နာမည် ဖြစ်ကြောင်း ကတိကဝတ်ကို ဖော်ပြရန်၊	DOCUMENT CERTIFICATION နှင့် အခန်း ၂.၆ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
<b>၃။</b>	<b>နိဒါန်း</b>	
က	စီမံကိန်းဆောင်ရွက်သူအကြောင်း (ဆက်သွယ်ရန် အသေး စိတ်အချက်များ၊ ကုမ္ပဏီ အမည်၊ လိပ်စာ၊ ဖုန်းနံပါတ်၊ ဖက်စ်နံပါတ်၊ အီးမေးလ်နှင့်ဝဘ်ဆိုဒ်၊ တာဝန်ခံပုဂ္ဂိုလ် စသည်ဖြင့်) ဖော်ပြပါရှိရန်၊	အခန်း ၁.၁၊ Table 1.1 တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
	စီမံကိန်း၏ အကောင်အထည်ဖော်ဆောင်ရွက် နေသည့် အချိန်ဇယားအား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	အခန်း ၃.၄ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
<b>၄။</b>	<b>မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်</b>	
က	- စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင် ငွေရည်ပုလဲကုမ္ပဏီ လီမိတက်၏ စီမံကိန်းနှင့် ဆက်စပ်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ကိစ္စရပ် များအတွက် ထားရှိမည့် ပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒများကို အခန်း(၂) မူဝါဒ/မူဘောင်အခန်းတွင် ဖော်ပြရန်၊ - စီမံကိန်းပိုင်ရှင်မှ စီမံကိန်းနှင့်သက်ဆိုင်သည့် ဥပဒေ၊ မူဘောင်များကို	အခန်း ၂.၁.၂ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။

	လိုက်နာမည် ဖြစ်ကြောင်း ကတိကဝတ် ဖော်ပြရန်၊	
ခ	စီမံကိန်း၏ လူမှုဆိုင်ရာ၊ ကျန်းမာရေးနှင့် ပတ်ဝန်းကျင် ဆိုင်ရာ စီမံခန့်ခွဲမှု ကိစ္စအရပ်ရပ်အား အကောင်အထည်ဖော် ဆောင်ရွက်မည့် အဖွဲ့အစည်း၏ ဖွဲ့စည်းတည်ဆောက်ပုံ၊ အဖွဲ့အစည်းဆိုင်ရာမူဘောင် (ဥပမာ - ပါဝင်ဖွဲ့စည်း ထားသည့် ဌာနများ၊ ဌာနခွဲများ၊ ထိုဌာနခွဲများတွင် ပါဝင်သည့် ဝန်ထမ်း အရေအတွက်များ နှင့် လုပ်ဆောင်ရမည့် တာဝန်ဝတ္တရား) အစရှိသည့် အသေးစိတ် အချက်အလက်များအား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	အခန်း ၂.၅ ထည့်သွင်းဖော်ပြထားပါသည်။
ဂ	စီမံကိန်းမှ လိုက်နာဆောင်ရွက်မည့် လူမှုနှင့် ကျန်းမာရေး ဆိုင်ရာ လမ်းညွှန်ချက်များ၊ စံချိန်စံနှုန်းများအား ဖော်ပြရန်၊	အခန်း ၂.၄ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
	အစီရင်ခံစာတွင် Baseline Data များ ကောက်ယူရရှိသော ရလဒ်များကို WHO, Indian Specifications (IS: 10500,2012) နှင့် နှိုင်းယှဉ် ဖော်ပြ ထားသည်ကို တွေ့ရှိရသည့်အတွက် ထို လမ်းညွှန်ချက်များ၊ စံချိန်စံညွှန်း များအား မူဝါဒနှင့် ဥပဒေဆိုင်ရာ အခန်းကဏ္ဍတွင် ကြိုတင်သတ်မှတ်၍ ထည့် သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ (စီမံကိန်းမှ လိုက်နာမည့် လေ၊ မြေ၊ ရေ အရည်အသွေးများကို လိုက်မည့် Target Level နှင့်အတူ ဖော်ပြရန်)	အခန်း ၂.၄ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။
<b>၅။</b>	<b>စီမံကိန်းအကြောင်းဖော်ပြချက်နှင့် ခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများ</b>	
က	စီမံကိန်းသည် မူလအစက တစ်ရက်လျှင် ဘီလပ်မြေ တန် ၁၀၀၀ နှုန်းဖြင့် ထုတ်လုပ် လည်ပတ်ခဲ့သည်ဟု ဖော်ပြပါရှိသည့်အတိုင်း မူလစီမံကိန်းတွင် ပါဝင်သော စီမံကိန်း၏ အစိတ်အပိုင်းများ (ဥပမာ - အဆောက်အဦများ၊ စက်ပစ္စည်းများ၊ အလိုအလျောက်ရွေ့လျား စက်များ၊ သိုလှောင်ကျိများ၊ မီးဖို များ၊ ခေါင်းတိုင်များ၊ ထုတ်ပိုး စက်များ၊ မီးစက်နှင့် ဓာတ်အားခွဲရုံများ၊ အမှုန်ဖမ်းသည့် စနစ်များ၊ Water Circulation System များ၊ ကုန်ကြမ်းနှင့် ကုန်ချော သိုလှောင်ထားရှိသည့်နေရာများ၊ စီမံကိန်းမှ အသုံးပြုနေသည့်	အဓိက စက်ပစ္စည်းများ တည်နေရာကို Figure 3.2 ၊ Layout Plan တွင် ထည့်သွင်းဖော်ပြထားပြီး တန် ၁၀၀၀ ကျ စက်ရုံတွင် တပ်ဆင်ထားသော အဓိက စက်ပစ္စည်းများကို အခန်း ၃.၈ ၊ Table 3.13 တွင် ထည့်သွင်းဖော်ပြထားပါသည်။



<p>လမ်းများ၊ ကားပါကင်များ၊ လောင်စာဆီ၊ ကျောက်မီးသွေး ဓာတုပစ္စည်းများ၊ ဖောက်ခွဲရေး ပစ္စည်းများ အစရှိသည့် အန္တရာယ်ရှိ ပစ္စည်းများ သိုလှောင်ထားရှိရာ နေရာများ၊ အအေးခံ တာဝါများ၊ အစရှိသဖြင့်) မူလ စီမံကိန်းတွင် ပါဝင်သည့် အစိတ်အပိုင်း အားလုံး၏ အရေ အတွက်များ၊ အသေးစိတ် ဖော်ပြချက်များ၊ လုပ်ဆောင် နိုင်စွမ်းများ၊ အရွယ်အစားနှင့် အမြင့် စသည့် ဒီဇိုင်းပိုင်း ဆိုင်ရာ အချက်အလက်များ၊ Schematic Drawing များနှင့် တကွ အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p>စီမံကိန်းမှ ဘိလပ်မြေ တန် ၁၀၀၀ မှ တန် ၅၀၀၀ အထိ တိုးမြှင့် ထုတ်လုပ်မည့် အစီအစဉ် ကြောင့် ထပ်မံတိုးချဲ့ တည်ဆောက်မည့် စီမံကိန်း အစိတ်အပိုင်း များအားလုံး (ဥပမာ - သိုလှောင်ကျိုများ၊ မီးပြင်းဖိုများ၊ ခေါင်းတိုင်များ၊ ကုန်ကြမ်းနှင့် ကုန်ချော သိုလှောင်ထားရှိသည့် နေရာများ စသည်ဖြင့်) ပါဝင်မည့် အစိတ်အပိုင်းအားလုံး၏ အရေ အတွက်များ၊ အသေးစိတ် ဖော်ပြချက် များ၊ လုပ်ဆောင်နိုင်စွမ်းများ၊ အရွယ်အစားနှင့် အမြင့် စသည့် ဒီဇိုင်းပိုင်း ဆိုင်ရာ အချက်အလက်များ၊ Schematic Drawing များနှင့်တကွ အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အဓိက စက်ပစ္စည်းများ တည်နေရာကို Figure 3.2 ၊ Layout Plan တွင် ထည့်သွင်းဖော်ပြထားပြီး တန် ၄၀၀၀ ကျ စက်ရုံတွင် တပ်ဆင်ထားသော အဓိက စက်ပစ္စည်းများကို အခန်း ၃.၈ ၊ Table 3.14 တွင် ထည့်သွင်းဖော်ပြထားသည်။</p>
<p>စီမံကိန်းတွင် ဘိလပ်မြေအရည်အသွေး စစ်ဆေးရန်အတွက် ဓာတ်ခွဲခန်း ထားရှိမည် ဆိုပါက ထိုဓာတ်ခွဲခန်းတွင် အသုံးပြုမည့် စက်ကိရိယာများ၊ ဓာတုပစ္စည်းပမာဏများ၊ သိမ်းဆည်းမည့် နည်းလမ်းများ၊ ကိုင်တွယ်သည့် နည်းစနစ်နှင့် ဓာတ်ခွဲခန်းသုံးစွန့်ပစ်ပစ္စည်းများအား စွန့်ပစ်ရာတွင် အန္တရာယ်မဖြစ်စေရန် စနစ်တကျ စီမံခန့်ခွဲထားရှိမှုများ အစရှိသည့် အချက်အလက်များအား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါ သည်။</p>	<p>အခန်း ၃.၉.၃ တွင် ထည့်သွင်းဖော်ပြထားသည်။</p>
<p>စီမံကိန်းလည်ပတ်စဉ်အတွင်း ဆောင်ရွက်မည့် လုပ်ငန်းများဖြစ်သော (Crushing, Storing, Raw Milling, Pre-heating, Pre-calcining, Heating, Cooling, Clinker Crushing, Cement Milling နှင့် Cement</p>	<p>အဓိက စက်ပစ္စည်းများ တည်နေရာကို Figure 3.2 ၊ Layout Plan တွင် ထည့်သွင်းဖော်ပြထားပြီး တန် ၅၀၀၀ ကျ စက်ရုံတွင် တပ်ဆင်ထားသော အဓိက စက်ပစ္စည်းများကို အခန်း ၃.၈ ၊ Table</p>



	<p>Packaging) အစရှိသော လုပ်ငန်းများတွင် တပ်ဆင် အသုံးပြု ထားသော စက်ပစ္စည်းစာရင်း၊ အရေအတွက်နှင့် လုပ်ဆောင်ချက်များ၊ အလုပ်လုပ်ပုံများ ၊ ဒီဇိုင်းဖော်ပြချက်များ၊ Machine Locations များ ပါဝင်သော Factory Floor Layout မြေပုံများ၊ ဓာတ်ပုံများ စသည်ဖြင့် အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>ဖော်ပြရာတွင် မူလရှိပြီးဖြစ်သော စက်ပစ္စည်းများနှင့် ထပ်မံ တပ်ဆင်သည့် စက်ပစ္စည်းများ စသည်ဖြင့် ယှဉ်တွဲဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>3.14 တွင် ထည့်သွင်းဖော်ပြထားသည်။</p>
<p>ခ</p>	<p>စက်ရုံ၏ တည်နေရာအား ဖော်ပြသော ဂြိုဟ်တုဓာတ်ပုံတွင် စီမံကိန်း၏ Boundary Line (နယ်နိမိတ်လိုင်း) များအား ထည့်သွင်းဖော်ပြ၍ ကိုဩဒိနိတ်အမှတ်များဖြင့် အတိအကျ ဖော်ပြပေးရန် လိုအပ်ပါသည်။</p>	<p>စက်ရုံ၏ တည်နေရာအား Boundary Line (နယ်နိမိတ်လိုင်း) များအား ဖော်ပြသော ဂြိုဟ်တုဓာတ်ပုံအား Figure 3.1 တွင် ဖော်ပြထားပြီး ကိုဩဒိနိတ်အမှတ်များကို Table 3.1 တွင် ထည့်သွင်းဖော်ပြထားသည်။</p>
	<p>စာမျက်နှာ (၃.၅)၊ ပုံ (၃.၅) တွင် ဖော်ပြထားသော Layout Plan သည် ရှင်းလင်းပြတ်သားမှု မရှိသည့်အတွက် ပါဝင်သော စက်ရုံ၏ အစိတ်အပိုင်း များအား ကောင်းမွန် ပြတ်သားစွာ ကြည့်ရှုမရနိုင်သောကြောင့် အဆိုပါ Layout Plan အား A-3 ဆိုဒ်ဖြင့် ဖော်ပြ၍ စက်ရုံ၏ နယ်နိမိတ် လိုင်းများ၊ ကုန်ကြမ်းကုန်ချော ပို့ဆောင်မည့် ယာဉ်များ အသုံးပြုရန် ချဉ်းကပ်လမ်း ၊ စသည်တို့ ဖော်ပြ၍ အသစ်ဆောက်လုပ်မည့် အဆောက်အဦ များရှိပါက ပုံတွင် ထည့်သွင်းဖော်ပြပေးရန် လိုအပ်ပါသည်။</p>	<p>Figure 3.2 ၊ Layout Plan တွင် ပြင်ဆင်ဖော်ပြထားပါသည်။</p>
	<p>စာမျက်နှာ (၃.၅)၊ ပုံ (၃.၅) တွင် ဖော်ပြထားသော (၁) စက်ရုံဧရိယာ၏ Layout Plan အား အသေးစိတ် ဖော်ပြ ပေးရန် လိုအပ်ပါသည်။ အဆိုပါ Layout Plan တွင် စက်ကိရိယာ ထားရှိသည့် နေရာများ၊ ကုန်ကြမ်း ကုန်ချော ထားရှိသည့် နေရာများ၊ သိုလှောင် ကျိုများ၊ အလိုအလျောက် ရွေ့လျားစက်များ အစရှိသည်ဖြင့် စက်ရုံ၏ အစိတ်အပိုင်း အားလုံးအား ကောင်းမွန်ပြတ်သားစွာ အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ ထပ်မံတိုးချဲ့သည့် ဧရိယာနှင့် ၎င်းတို့တွင် ပါဝင်မည့် အစိတ်အပိုင်းများအား</p>	<p>Figure 3.2 ၊ Layout Plan တွင် ပြင်ဆင်ဖော်ပြထားပါသည်။</p>

လည်း အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	
ကုန်ကြမ်းပစ္စည်းများဖြစ်သော Coal နှင့် Iron Ore ထုတ်ယူမည့် နေရာများကို ဖော်ပြထားသော မြေပုံများသည် ရှင်းလင်းပြတ်သားမှု မရှိခြင်း၊ မြေပုံအညွှန်းအမှတ်များ၊ ကိုဩဒိနိတ်အမှတ်များ မပါဝင်ခြင်း စသည့် အချက်များ တွေ့ရှိရသည့်အတွက် ပြန်လည် ပြင်ဆင် ဖော်ပြရန် လိုအပ်ပါသည်။	
ကုန်ကြမ်းပစ္စည်းထုတ်ယူမည့် နေရာများ၏ နယ်နိမိတ် လိုင်းများအား နေရာ တစ်ခုချင်းစီအတွက် ကိုဩဒိနိတ် အမှတ်များဖြင့် တိတိကျကျ ထည့်သွင်း ဖော်ပြပေးရန် လိုအပ်ပါသည်။	ကုန်ကြမ်းပစ္စည်းများ ထုတ်ယူမည့် နေရာများနှင့်ပတ်သက်၍ အခန်း ၃.၆.၂ တွင် မြေပုံများ၊ သက်ဆိုင်ရာဇယားများတွင် ဩဒိနိတ်အမှတ်များနှင့်တကွ ပြည့်စုံစွာ ဖော်ပြထားပါသည်။
ကုန်ကြမ်းပစ္စည်းများ ထုတ်ယူမည့် မြေပုံများတွင် အနီးအနားရှိ ရွာများ၊ မြို့များအား ဖော်ပြ၍ ထိုမြို့ရွာများနှင့် အကွာအဝေးအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။	
ကျောက်မီးသွေး ထုတ်ယူမည့် မိုင်းတွင်း များအား ဖော်ပြရာတွင် စာမျက်နှာ (၃.၈) တွင် ဖော်ပြထားသော ဇယားအရ ဧက (၄၆၅)၊ ဧက (၁၀၀) နှင့် ဧက (၉၁၃.၂၂) အကျယ်အဝန်း ရှိသော ကျောက်မီးသွေး မိုင်းတွင်းများ၏ မြေပုံ အား ဖော်ပြပါရှိခြင်း မရှိပဲ Annex II တွင် (၃၁၃၀.၅) ဧက နှင့် (၁၈၉) ဧက ခန့် ကျယ်ဝန်း သော မြေပုံများကိုသာ ဖော်ပြထား သည်ကို တွေ့ရှိရသည့်အတွက် ထိုလွှဲမှားချက် များအား ပြန်လည် ပြင်ဆင်ဖော်ပြရန် လိုအပ်ပါသည်။	
၈ ထုတ်လုပ်ရေးလုပ်ငန်းစဉ်အဆင့်ဆင့်အားရှင်းလင်းရာတွင် ကုန်ကြမ်း ပစ္စည်းများအား လိုအပ်သည့် အရွယ်အစားရရှိရန် ပြုလုပ်ပုံ အဆင့်ဆင့်၊ Silo သို့ ပို့ဆောင်သည့် စနစ် နှင့်သိုလှောင်ပုံ၊ ရောစပ်ပုံ အဆင့်ဆင့်အား	အခန်း ၃.၇ တွင် ထုတ်လုပ်မှုလုပ်ငန်းစဉ်အဆင့်ဆင့်အား ပြည့်စုံစွာ ထည့်သွင်းဖော်ပြထားပါ သည်။

<p>ထည့်သွင်း ဖော်ပြရန်လိုအပ်ပါသည်။</p>	
<p>Clinker အဆင့်သို့ရောက်ရှိသည် အထိ ဆောင်ရွက်ရသည့် အဆင့်များ၊ အသုံးပြုသည့် စက်ပစ္စည်းများ၊ Kiln သို့ လောင်စာ ထည့်သွင်းပုံ၊ Heat recycle လုပ်၍ ပြန်လည်အသုံးပြုပုံ၊ ထုတ်လုပ်သည့် လုပ်ငန်းအဆင့်ဆင့်မှ အခိုးအငွေ့များ ထွက်ရှိပုံ၊ အဆိုပါ အခိုးအငွေ့များအား လျော့ကျစေရန် စီစဉ်ထားရှိပုံ အစရှိသည် တို့အား အသေးစိတ်ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၇ တွင် ထုတ်လုပ်မှုလုပ်ငန်းစဉ်အဆင့်ဆင့်အား ပြည့်စုံစွာ ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>အသုံးပြုမည့် SP Boiler နှင့် AQC Boiler တို့၏ စွမ်းဆောင်ရည်များ၊ အသေးစိတ် အချက်အလက်များ၊ နည်းပညာပိုင်းဆိုင်ရာ ဖော်ပြချက်များ နှင့် ထို Boiler တို့မှ ထွက်ရှိမည့် ထုတ်လွှတ်မှု ပမာဏများ၊ ထုတ်လွှတ်မည့် ဓာတ်ငွေ့အမျိုးအစားများ စသည်ဖြင့် အသေးစိတ် တွက်ချက်ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>SP Boiler နှင့် AQC Boiler တို့သည် rotary kiln မှ ထွက်ရှိသော အပူဖြင့် ရေအား ရေနွေးငွေ့အဖြစ် ပြောင်းလဲပြီး ၎င်းရေနွေးငွေ့ဖြင့် Turbine များ လည်ပတ်ကာ ရည်ရွယ်တည်ဆောက်ခဲ့ခြင်း ဖြစ်သဖြင့် လောင်စာသုံးစွဲခြင်း မရှိပါ။</p> <p>ယခုအခြေအနေတွင် 60 MW Coal Power Plant တည်ဆောက်ပြီး ဖြစ်သဖြင့် ရေနွေးငွေ့ ထုတ်ယူခြင်း မရှိပါ။</p>
<p>ထုတ်လုပ်ပြီးနောက် ရရှိသည့် ကုန်ချောပစ္စည်းများအား သိုလှောင်ရုံသို့ ပို့ဆောင်ပုံ၊ ထုတ်ပိုးပုံ နှင့် ဖြန့်ဖြူးပုံ အစရှိသည်တို့အား အသုံးပြုသည့် စက်ပစ္စည်းများ နှင့်တကွ အသေးစိတ် ထည့်သွင်း ရှင်းလင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၇.၁၀ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>- စာမျက်နှာ (၅.၇) တွင် ထည့်သွင်းဖော်ပြထားသော Waste Fuel များ အား Kiln တွင် လောင်စာအဖြစ် အမှန်တကယ် အသုံးပြုမပြုနှင့် အသုံးပြုမည် ဆိုပါက အသုံးပြုမည့် Fuel Waste ပမာဏသည် .အမျိုးအစား တစ်မျိုးစီအတွက် မည်မျှရှိမည် ဖြစ်ကြောင်း ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>Klin တွင် လောင်စာအဖြစ် လက်ရှိအချိန်ထိ ကျောက်မီးသွေး တစ်မျိုးတည်းသာ သုံးစွဲလျက်ရှိကြောင်း အခန်း ၃.၇.၅ တွင် ထည့်သွင်းဖော်ပြထားပြီး ကျောက်မီးသွေး သုံးစွဲမှုပမာဏကို Table 3-18 တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>စီမံကိန်း၏ လုပ်ငန်းလည်ပတ်ပုံ အဆင့်ဆင့်အား စာမျက်နှာ ၅.၆ တွင်</p>	<p>အခန်း ၃.၇ တွင် ထုတ်လုပ်မှုလုပ်ငန်းစဉ်အဆင့်ဆင့်အား ပြည့်စုံစွာ ထည့်သွင်းဖော်ပြထားပါ</p>

	<p>ဖော်ပြထားသော ပုံ (၅.၄) မှာ ပြည့်စုံကောင်းမွန်သော်လည်း စာဖြင့်ဖော်ပြချက်မှာ ပြည့်စုံခြင်း မရှိသည့် အတွက် အဆိုပါ ပုံပါ လုပ်ငန်းစဉ်များ၊ စက်ပစ္စည်းများ၏ လုပ်ဆောင်ချက်များ အသေးစိတ်ပါဝင် သည့် ထုတ်လုပ်ရေး လုပ်ငန်းအဆင့်ဆင့်အား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>သည်။</p>
<p>ဃ</p>	<p><u>Limestone, Gypsum, Iron Ore , Clay , Sandstone, Coal ထုတ်လုပ်ခြင်း အတွက် IEE နှင့် EIA အစီရင်ခံစာများ ပြင်ဆင်ဆောင်ရွက်ရန် လိုအပ်ချက်</u></p> <p>Limestone, Gypsum, Iron ore နှင့် Clay ထုတ်လုပ်ခြင်း လုပ်ငန်း အတွက် EIA လုပ်ထုံးလုပ်နည်း အမှတ်စဉ် ၁၃၃ အရ ထုတ်လုပ်ဧရိယာ ဧက (၂၀၀) အောက် ထုတ်လုပ်မှု တစ်နှစ်လျှင် တန်ချိန် ၁၀၀၀၀၀ ဖြစ်ပါက (IEE) ဆောင်ရွက်ရန် လိုအပ်ပြီး၊ ထုတ်လုပ်မှုဧရိယာ ဧက (၂၀၀) နှင့် အထက် ထုတ်လုပ်မှု တန်ချိန် ၁၀၀၀၀၀ နှင့် အထက် ဖြစ်ပါက (EIA) ဆောင်ရွက်ရန် လိုအပ်ပါသည်။ တစ်နှစ်လျှင် ကျောက်မီးသွေး တူးဖော်မှု တန်ချိန် ၁၀၀၀၀၀ အောက်ဖြစ်ပါက IEE လုပ်ဆောင်ရန်နှင့် တန်ချိန် ၁၀၀၀၀၀ အထက်ဖြစ်ပါက EIA လုပ်ဆောင်ရန်အတွက် လိုအပ်သည်ဟု EIA လုပ်ထုံးလုပ်နည်းတွင် ဖော်ပြထားပါသည်။</p> <p>သို့ဖြစ်ပါ၍ ကုန်ကြမ်းထုတ်ယူမည့်နေရာ အသီးသီးမှ တစ်နှစ်လျှင် ထုတ်ယူသုံးစွဲမည့် ပမာဏအား ဖော်ပြ၍ တူးဖော်ထုတ်လုပ်မည့် သက်ဆိုင်ရာ နေရာ အသီးသီးအတွက် EIA (သို့မဟုတ်) IEE အစီရင်ခံစာအား တင်ပြရန် ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p>	<p>ယခု EIA အစီရင်ခံစာ ဘိလပ်မြေထုတ်လုပ်သည့် စက်ရုံအတွက် ဆန်းစစ်ထားခြင်း ဖြစ်ပါသည်။ ကုန်ကြမ်းပစ္စည်းများ ထုတ်လုပ်ခြင်းများအတွက် EIA လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဆောင်ရွက်သွားပါမည်။</p>
	<p>စီမံကိန်းတွင် အသုံးပြုမည့် ကုန်ကြမ်းပစ္စည်းများ၏ အသေးစိတ် အချက်အလက်များနှင့် အရည်အသွေးအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။ (ဥပမာ - ကျောက်မီးသွေး၏ အသေးစိတ်အချက် အလက်များကို</p>	<p>ကုန်ကြမ်းပစ္စည်းများ၏ အရည်အသွေးနှင့်ပတ်သက်၍ အခန်း ၃.၆.၁ ၊ Table 3.5 တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p>

	<p>ဖော်ပြရာတွင် အရည်အသွေးပိုင်းဆိုင်ရာ ဆန်းစစ်ချက်များဖြစ်သည့် Sulphur Content, Carbon Content, Volatile Content, Surface Moisture, Ash Content, Lump Size, Inherent Moisture, Gross Heating Value စသည့် အချက်အလက်များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။)</p>	
	<p>ကုန်ကြမ်းပစ္စည်းထုတ်လုပ်ရာတွင် သက်ဆိုင်ရာ လုပ်ကွက် တစ်ခုချင်းစီ အတွက် သက်ဆိုင်ရာ ဌာနဆိုင်ရာမှ ရရှိထားသော ခွင့်ပြုချက်စာရွက်စာတမ်းများ၊ အထောက်အထားများအား၊ အစီရင်ခံစာတွင် ပူးတွဲဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>ကုန်ကြမ်းပစ္စည်း တစ်ခုချင်း၏ သက်ဆိုင်ရာ လုပ်ကွက် တစ်ခုချင်းအတွက် permit များကို Appendix XII တွင် ပူးတွဲ ဖော်ပြထားပါသည်။</p>
	<p>ကုန်ကြမ်းပစ္စည်း တစ်မျိုးချင်းစီအား တူးဖော် ထုတ်လုပ်ရာ နေရာမှ စက်ရုံသို့ သယ်ယူပို့ဆောင်ရေး နည်းလမ်းများ၊ သယ်ယူပို့ဆောင်မည့် လမ်းကြောင်းများ၊ စက်ရုံနှင့် တူးဖော်ထုတ်လုပ်သည့် နေရာ တစ်ခုချင်းစီ အကြား အကွာအဝေးများ၊ စသည်ဖြင့် အသေးစိတ် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၆ တွင် Table ၊ Figure များဖြင့် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>c</p>	<p>စီမံကိန်းတွင် အဓိကအသုံးပြုမည့် ပင်မရေလှောင်တံ/ ဆည်နှင့် သက်ဆိုင်သည့် အချက်များကို ဖော်ပြရန်၊ (ဥပမာ - ဆည်အမျိုးအစား၊ အရွယ်အစား၊ သိုလှောင်နိုင်မှု ပမာဏ၊ စတင်တည်ဆောက်ခဲ့သည့် ခုနှစ်) အစရှိသည့် အချက်များအား အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၉.၂ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
	<p>စီမံကိန်းမှ ထုတ်လုပ်ခြင်းလုပ်ငန်း အဆင့်ဆင့်တွင် သုံးစွဲမည့် ရေပမာဏနှင့် အိမ်ယာများ၊ ရုံးခန်းများမှ သုံးစွဲမည့် ရေပမာဏ အစရှိသည်တို့၏ လစဉ်သုံးစွဲမှု ပမာဏအား ခန့်မှန်းတွက်ချက်၍ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၉.၂ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>



	<p>စွမ်းအင်အရင်းအမြစ်အား ဖော်ပြရာတွင် -</p> <p>စီမံကိန်းမှ လစဉ် သုံးစွဲမည့် လျှပ်စစ်ဓါတ်အားပမာဏ နှင့် လျှပ်စစ်ဓာတ်အားလိုင်းများ၊ မီးစက်များ တပ်ဆင် ထားရှိပုံများ၊ တပ်ဆင်ထားရှိရာ နေရာများအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၉.၁ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
	<p>လောင်စာဆီ သုံးစွဲမှု ပမာဏသည် -</p> <p>ဒီဇယ် - တစ်နှစ်လျှင် ဂါလံ ၂ သန်းခန့်</p> <p>ဓာတ်ဆီ - တစ်နှစ်လျှင် ဂါလံ ၇ သောင်းခန့်</p> <p>အင်ဂျင်ပိုင် / စက်ဆီ - တစ်နှစ်လျှင် ဂါလံ ၅၀၀၀ ခန့်ဖြစ်သည်ဟု ဖော်ပြထားသည့်အတိုင်း သုံးစွဲမည့် လောင်စာဆီ၏ အရည်အသွေးများ (specific gravity, sulfur content, ash, gross calorific value) စသည်တို့အား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ သို့မှသာ ထုတ်လွှတ်မည့် အခိုးအငွေ့ ပမာဏအား ခန့်မှန်း တွက်ချက်နိုင်မည် ဖြစ်ပါသည်။</p>	<p>အခန်း ၃.၉.၁ တွင် ပြင်ဆင်ဖြည့်စွက်ဖော်ပြထားပါသည်။</p>
	<p>အဆိုပါ လောင်စာများအား သိုလှောင်ထားရှိမည့် အစီအစဉ်များ၊ နေရာများအား ဓာတ်ပုံများနှင့်တကွ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၉.၁ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
စ	<p>ကုန်ကြမ်းပစ္စည်း နှင့် ကုန်ချောပစ္စည်းများ သယ်ယူပို့ဆောင်ရာတွင် အသုံးပြုမည့် နည်းလမ်းများ၊ အသုံးပြုမည့် ယာဉ်အရေ အတွက်များ၊ အစရှိသည်ဖြင့် အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၆.၃ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
ဆ	<p>- စီမံကိန်း၏ ထုတ်လုပ်ရေးလုပ်ငန်းများမှ ထွက်ရှိမည့် ရေများအား ထွက်ရှိမည့် အရင်းအမြစ်များကို ဖော်ပြ၍ စွန့်ပစ်ရေ အမျိုးအစားနှင့် စွန့်ထုတ်မည့် ခန့်မှန်း ရေဆိုးပမာဏကို အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>- အစီရင်ခံစာ၏ စာမျက်နှာ ၃.၁၄ ပုံ ၃.၁၆တွင် ဖော်ပြထားသော ရေဆိုး</p>	<p>အခန်း ၃.၁၁.၂ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>

	<p>စွန့်ပစ်ကန်၏ တည်ဆောက်ပုံများ၊ နည်းပညာပိုင်းဆိုင်ရာ အချက်အလက်များ၊ ရေဆိုး သန့်စင်မည့် နည်းစနစ်များ၊ စသည့် အချက်အလက်များအား အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p>ဇ</p>	<p>စီမံကိန်း၏ ကုန်ချောများ၊ ကုန်ကြမ်းများ သိုလှောင်ရာ နေရာမှ ထွက်ရှိလာ နိုင်သော အမှုန်များ၊ Conveyor Belt များလည်ပတ်မှုများမှ ထွက်ရှိလာနိုင်သော အမှုန်များ၊ မီးပြင်းဖို Kiln မှ ထွက်ရှိမည့် အမှုန်နှင့် အခိုးအငွေ့များ၊ ကျောက်မီးသွေးနှင့် ဒီဇယ်၊ ဓာတ်ဆီ လောင်စာများ သုံးစွဲမှုမှ ထွက်ရှိလာမည့် အခိုးအငွေ့များ၊ ချော်ခဲများအအေးခံခြင်းမှ ထွက်ရှိနိုင်မည့် အခိုးအငွေ့များ၊ ယာဉ်များ သွားလာခြင်းမှ ထွက်ရှိမည့် အမှုန်နှင့် အခိုးအငွေ့များ၊ ကြိတ်စက်များ၊ ထုတ်ပိုးစက်များ စသည့် စက်ကိရိယာများမှ ထွက်ရှိမည့် အခိုးအငွေ့များ စသည့် ထုတ်လွှတ်မှုများ ရှိမည် ဖြစ်သည့်အတွက် ထွက်ရှိနိုင်မည့် အခိုးအငွေ့ နှင့် ဓာတ်ငွေ့များ၏ ပမာဏနှင့် အမျိုးအစား၊ လေထုအတွင်းသို့ ထုတ်လွှတ်မှု အခြေအနေ၊ နည်းလမ်းများနှင့် ထုတ်လွှတ်မည့် အခိုးအငွေ့များ၏ ဝိသေသအခြေအနေ များ၊ ပါဝင်မှုများ စသည်တို့အား ဖော်ပြ၍ ထွက်ရှိနိုင်မည့် အမျိုးအစား တစ်ခုချင်းစီအတွက် ခန့်မှန်းတွက်ချက်မှုများ ဖြင့် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>- စီမံကိန်းမှ လေထုအတွင်းသို့ ထုတ်လွှတ်မှုများ လျှော့ချရန် အတွက် (BACT) စနစ်အား အသုံးပြုမည်ဟု ဖော်ပြထားသည့်အတိုင်း ၎င်းစနစ် တွင် ပါဝင်သည့် အကြောင်းအရာများ၊ အချက်အလက်များအား အသေး စိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>- အဆိုပါ (BACT) စနစ်အသုံးပြုသည့် အတွက် လျှော့ချပေးနိုင်သည့် air pollution ပမာဏများ၊ လျှော့ချရေး နည်းလမ်းများ အစရှိသည်တို့အား အသေးစိတ် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၁၁.၁ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>

<p>ဈ</p>	<p>ထွက်ရှိနိုင်သည့် အစိုင်အခဲစွန့်ပစ် ပစ္စည်းများအား အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများ၊ အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ၊ ပြန်လည် အသုံးပြုနိုင် သည့် စွန့်ပစ်ပစ္စည်းများ စသည်ဖြင့် အမျိုးအစား ခွဲခြား၍ စွန့်ပစ်ပစ္စည်း ၏ ပမာဏ၊ သိမ်းဆည်းပုံ၊ စွန့်ပစ်မည့် နည်းလမ်းများ၊ ပြန်လည်အသုံးပြုမည့် နည်းလမ်းများ နှင့် နောက်ဆုံးစွန့်ပစ်ရာနေရာ အစရှိသည်တို့ကို ဓာတ်ပုံ နှင့်တကွ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၁၁.၃ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>ည</p>	<p>ဓာတ်ခွဲခန်းသုံး နမူနာပစ္စည်းများနှင့် စွန့်ပစ် ပစ္စည်းများ၊ ဓာတု ပစ္စည်းများ၊ အသုံးပြုပြီးသော စက်ဆီများ၊ ဖောက်ခွဲရေးသုံး ပစ္စည်းများမှ ထွက်ရှိ လာမည့် စွန့်ပစ်ပစ္စည်းများ၊ စသည့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ ထွက်ရှိ နိုင်သည့်အတွက် ထွက်ရှိနိုင်မည့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်း ပမာဏများ၊ သိုလှောင် သိမ်းဆည်းမည့် နည်းစနစ်များ၊ စွန့်ပစ်မည့် နည်းစနစ်များ၊ စွန့်ပစ်မည့် နေရာများ စသည်ဖြင့် အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၃.၁၁.၃ နှင့် အခန်း ၇.၈.၄ တို့တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>ဋ</p>	<p>- ဆောင်ရွက်မည့် စီမံကိန်းအား ရွေးချယ်ရာတွင် ထည့်သွင်း စဉ်းစားထားသည့် အခြား ဆောင်ရွက်နိုင်သော နည်းလမ်း များကို အစီရင်ခံစာတွင် ထည့်သွင်း ဖော်ပြပေးရန် လိုအပ်ပါ သည်။</p> <p>(ဥပမာ - စီမံကိန်း တည်နေရာရွေးချယ်ခြင်း၊ ထုတ်လုပ်သည့် နည်း စနစ် များအား ရွေးချယ် အသုံးပြုခြင်း စသည့်ဖြင့် အခြားဆောင်ရွက် နိုင်သော နည်းလမ်းများကို ထည့်သွင်းစဉ်းစား ထားခြင်းနှင့် သရုပ်ခွဲဆန်းစစ်ချက် များ)</p> <p>- အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများထဲမှ ယခုအသုံးပြု ထားသော နည်းလမ်းအား ရွေးချယ်ခြင်းအတွက် ခိုင်မာ လုံလောက်သော အကြောင်းပြ ချက်များဖြင့် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါ သည်။</p>	<p>အခန်း ၃.၁၂ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။</p>

၆။ စီမံကိန်း၏ အနီးပတ်ဝန်းကျင် အကြောင်းအရာ ဖော်ပြချက်များ နှင့် အခြေပြုအချက်အလက်များ		
က	<p><b>အပင်များနှင့် သတ္တဝါများအား လေ့လာခြင်း</b></p> <p>- ရှမ်းပြည်နယ် (မြောက်ပိုင်း) ရှိ ဘီလပ်မြေစက်ရုံအနီး ပတ်ဝန်းကျင်ရှိ အပင် များဖြစ်တည်မှုသည် ဒီဇေဘော နှင့် မည်ကဲ့သို့ ဆက်စပ် ပတ်သတ်သည်ကို ဖော်ပြရန်၊</p>	ပြင်ဆင်ဖော်ပြထားပါသည်။
	<p>အစီရင်ခံစာ စာမျက်နှာ (၄.၆) တွင် အပင်များကို လေ့လာရာ၌ (၃၀မီတာ x ၃၀ မီတာ) အကွက်များပြုလုပ်၍ အပင်မျိုးစိတ်များကို စစ်တမ်း ကောက်ယူခဲ့သည်ဟု ဖော်ပြထား သော်လည်း တိကျစွာ ထည့်သွင်း ဖော်ပြ ထားခြင်း မရှိသည့်အတွက် လေ့လာသည့် အကွက် အရေအတွက် နှင့် လေ့လာခဲ့သည့် ဧရိယာကို သတ်မှတ်၍ ကိုဩဒိနိတ်ပါသော နယ်နိမိတ် လိုင်းများဖြင့် မြေပုံတွင် တိကျစွာ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	အခန်း ၄.၃.၃.၃ နှင့် Figure 4.30 တို့တွင် ပြင်ဆင်ဖြည့်စွက်ထားပါသည်။
	<p>စစ်တမ်းကောက်ယူရရှိသော ရလဒ်များကို ဖော်ပြရာတွင် မြန်မာနိုင်ငံမှ ပေါများမှု၊ ရှားပါးမှု၊ မျိုးတုံးလုနီးပါးဖြစ်မှု စသည့် အခြေအနေများကို နှိုင်းယှဉ်ဖော်ပြ၍ သက်ရောက်မှုများ မဖြစ်ပေါ်စေရန် ထည့်သွင်းစဉ်းစား ထား မှုများ၊ လုပ်ဆောင်ချက်များအား ဖော်ပြပါရှိရန် လိုအပ် ပါသည်။</p>	Table 4.2 နှင့် Table 4.3 တို့တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။
	<p>အစီရင်ခံစာ စာမျက်နှာ ၄.၁၀ ရှိ ဇယား (၄.၄) တွင် စက်ရုံအတွက် စိုက်ပျိုးခဲ့သော အပင်များအား ထည့်သွင်း ဖော်ပြထားသည်ကို တွေ့ရှိရသည့်အတွက် ထိုအပင်များ စိုက်ပျိုးထားရှိသော ဧရိယာ အသီးသီးနှင့် ဧရိယာများကို ဖော်ပြထားသော မြေပုံများအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	Table 4.4 နှင့် Figure 4.30 တို့တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။
ခ	<p><b>လေအရည်အသွေးတိုင်းတာခြင်း</b></p> <p>လေအရည်အသွေးတိုင်းတာရာတွင် တိုင်းတာ ထားသည့် တည်နေရာ</p>	လေအရည်အသွေးတိုင်းတာခြင်းအား ၂၀၂၃ ခုနှစ် အောက်တိုဘာလ ၁၂ ရက်နေ့မှ ၁၅ ရက်နေ့အထိ ပြန်လည်တိုင်းတာခဲ့ပြီး တိုင်းတာသည့်နေရာ၊ တိုင်းတာမှုရလဒ်များကို အခန်း

<p>များ၏ ကိုဩဒိနိတ်အမှတ်များကို တိကျစွာ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>၄.၂.၄ တွင် ဖော်ပြထားပါသည်။</p>
<p>တိုင်းတာရာတွင် စီမံကိန်းအနီးရှိ နေရာ ၄ နေရာ၊ လောင်ဖန်ရွာတွင် တစ်နေရာနှင့် နောင်ချိုမြို့အနီးတွင် နှစ်နေရာ စုစုပေါင်း နေရာ (၇) နေရာတွင် တိုင်းတာ ထားသည်ကို တွေ့ရှိရသည့်အတွက် ထိုတိုင်းတာထားသော နေရာများအား ရွေးချယ်သတ်မှတ်ရသည့် အကြောင်းအရင်း များအား တွက်ချက်မှုများ၊ တွေ့ရှိချက်များဖြင့် သက်သေပြရန် လိုအပ်ပါသည်။</p>	
<p>စက်ရုံမှ အခိုးအငွေ့ ထုတ်လွှတ်မှုပျံ့နှံ့နှုန်းများကို သေချာစွာ တွက်ချက်၍ ပျံ့နှံ့မည့် ပမာဏနှင့် ဧရိယာအား မြေပုံပေါ်တွင် ဖော်ပြပြီး ထိုဧရိယာအတွင်း ကျရောက်သည့် နေရာများတွင် လေအရည်အသွေးအား တိုင်းတာ စစ်ဆေးရန် လိုအပ်ပါသည်။ (ဥပမာ - စီမံကိန်းမှ ၈ ကီလိုမီတာခန့် ဝေးကွာသော နောင်ချိုမြို့တွင် တိုင်းတာထားသော်လည်း စီမံကိန်းမှ ၅ ကီလိုမီတာ အတွင်း ရှိသော Khe Hsan ရွာနှင့် Kone Mo ရွာများ စသည်တို့တွင် တိုင်းတာ ထားခြင်း မရှိသည့်အတွက် စီမံကိန်းမှ လေထုအတွင်းသို့ ပျံ့နှံ့မှုသည် ၈ ကီလိုမီတာ အကျယ်အဝန်းအတွင်း သက်ရောက်မည်ဆိုပါက အဆိုပါ ရွာများတွင် လေအရည်အသွေး တိုင်းတာခြင်းအား ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p>	
<p>- CO, CO2, NO2, SO2 များ၏ တိုင်းတာရလဒ်များကို ဖော်ပြရာတွင် ဒဿမ သုံးနေရာအထိ ဖော်ပြပေးရန် လိုအပ်ပါသည်။</p>	
<p>- လေအရည်အသွေးတိုင်းတာရာတွင် တိုင်းတာ သည့် စက်ကိရိယာများ၏ စံညှိထားသော မှတ်တမ်း (Calibration Record) အား ထည့်သွင်းဖော်ပြပေးရန် လိုအပ်ပါသည်။</p>	
<p>- SP-1 မှ SP-5 အမှတ်များ၏ CO, CO2, NO<sub>2</sub>, SO<sub>2</sub> တိုင်းတာချက်</p>	



<p>ရလဒ်များသည် Non Detected ဖြစ်နေသည့် အကြောင်းအရင်းများအား ရှာဖွေ ဖော်ထုတ်၍ အစီရင်ခံစာတွင် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p><b>ရေအရည်အသွေးတိုင်းတာခြင်း</b></p> <p>- ရေနမူနာကောက်ယူရာတွင် ကောက်ယူသည့် နည်းစနစ်များ၊ ကောက်ယူသည့် ရက်စွဲများ စသည်ဖြင့် ဖော်ပြ၍ ရေနမူနာ ကောက်ယူထားရှိသည့် နေရာများအား ကိုဩဒိနိတ်အမှတ်များဖြင့် တိကျစွာ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>ရေအရည်အသွေးတိုင်းတာခြင်းအား ၂၀၂၃ ခုနှစ် အောက်တိုဘာလ ၁၂ ရက်နေ့မှ ၁၅ ရက်နေ့အထိ ပြန်လည်တိုင်းတာခဲ့ပြီး တိုင်းတာသည့်နေရာ၊ တိုင်းတာမှုရလဒ်များကို အခန်း ၄.၂.၄ တွင် ဖော်ပြထားပါသည်။</p>
<p>အချို့သောတိုင်းတာချက်ရလဒ်များမှာ Drinking Water Standard တန်ဖိုးများထက် ကျော်လွန်နေပါသဖြင့် တိုင်းတာချက် ရလဒ် များအပေါ် သုံးသပ်ချက်များထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p><b>ဆူညံသံ တိုင်းတာခြင်း</b></p> <p>- ဆူညံသံ တိုင်းတာခြင်း ဆောင်ရွက်သည့် တည်နေရာတစ်ခုချင်းစီအား ကိုဩဒိနိတ်များနှင့်တကွ မြေပုံပေါ်တွင်ဖော်ပြပြီး တိုင်းတာဆောင်ရွက်သည့် အချိန်ကာလ၊ တိုင်းတာသည့် နည်းစနစ်များ၊ နေ့ရက်များ အစရှိသည် တို့ကို အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>ဆူညံသံတိုင်းတာခြင်းအား ၂၀၂၃ ခုနှစ် အောက်တိုဘာလ ၁၂ ရက်နေ့မှ ၁၅ ရက်နေ့အထိ ပြန်လည်တိုင်းတာခဲ့ပြီး တိုင်းတာသည့်နေရာ၊ တိုင်းတာမှုရလဒ်များကို အခန်း ၄.၂.၄ တွင် ဖော်ပြထားပါသည်။</p>
<p>တိုင်းတာသည့် ရလဒ်အား ဖော်ပြရာတွင် NEQG သတ်မှတ် စံနှုန်းများဖြင့် နှိုင်းယှဉ်ဖော်ပြ၍ အချို့သော တိုင်းတာချက် ရလဒ်များမှာ စံနှုန်းများထက် ကျော်လွန်နေသည့်အတွက် သုံးသပ်ချက်များ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p>ဆူညံသံ တိုင်းတာရာတွင် ၂၄ နာရီ (နေ့၊ည) တိုင်းတာ ရန် လိုအပ်ပါ သည်။ သို့ဖြစ်ပါ၍ ၂၄ နာရီတိုင်းတာထားခြင်း မရှိပါက ထပ်မံ၍ တိုင်းတာရန် လိုအပ်ပါသည်။</p>	

<p><b>မြေအရည်အသွေး တိုင်းတာခြင်း</b></p> <p>စီမံကိန်းမှထုတ်လွှတ်မည့် အခိုးအငွေနှင့်အမှုန်များ ပြန့်နှံ့မှုကို တွက်ချက်ကာ ထိုသို့ထွက်ရှိမှုများကြောင့် မြေအရည်အသွေး ထိခိုက်နိုင်မည့် နယ်မြေအား သတ်မှတ်၍ ထိုနယ်မြေများအတွင်း ကျရောက်နေသည့် စိုက်ခင်းများ၊ ကျေးရွာများတွင် မြေအရည်အသွေး တိုင်းတာခြင်းအား ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p>	<p>မြေအရည်အသွေးတိုင်းတာခြင်းအား ၂၀၂၃ ခုနှစ် အောက်တိုဘာလ ၁၂ ရက်နေ့မှ ၁၅ ရက်နေ့အထိ ပြန်လည်တိုင်းတာခဲ့ပြီး တိုင်းတာသည့်နေရာ၊ တိုင်းတာမှုရလဒ်များကို အခန်း ၄.၂.၄ တွင် ဖော်ပြထားပါသည်။</p>
<p><b>လူမှုစီးပွား စစ်တမ်းကောက်ယူခြင်း</b></p> <p>အဆိုပါ Slovin's formula သုံး၍ တွက်ချက်ရာတွင် အသုံးပြုထားသည့် confidence level နှင့် margin error အား ဖော်ပြ၍ မည်သည့် အတွက်ကြောင့် ထို confidence level နှင့် margin error တန်ဖိုးများအား ယူဆ၍ ထည့်သွင်းတွက်ချက်ထားသည်ကို အသေးစိတ် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>- Slovin's formula သုံး၍ တွက်ချက်ရာတွင် confidence level နှင့် margin error တန်ဖိုးများအား ယူဆ၍ ထည့်သွင်းတွက်ချက်ထားမှုကို Appendix (12)၊ စာမျက်နှာ (၁၄ နှင့် ၁၅) တို့တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p>
<p>အကြံပေးအဖွဲ့ဝင်များ၊ ရွာလူကြီးများနှင့် ထွေအုပ်ရုံးမှ မြို့နယ်အုပ်ချုပ်ရေးမှူးတို့ ဆွေးနွေး၍ ထိခိုက်မည့် ဧရိယာအား ၃ ကီလိုမီတာ သတ်မှတ်ခဲ့ခြင်းအပေါ် တိုင်ပင်ဆွေးနွေးချက် အသေးစိတ်အား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ သို့မှသာ ထိုကဲ့သို့ သတ်မှတ် ထားခဲ့သော လေ့လာသည့် ဧရိယာ ၃ ကီလိုမီတာသည် ပြည့်စုံ၍ ခြုံငုံလုံလောက်မှု ရှိမည်ဟု သတ်မှတ်၍ ရမည် ဖြစ်ပါသည်။</p>	<p>- ထိခိုက်မည့် ဧရိယာအား ၃ ကီလိုမီတာ သတ်မှတ်ခဲ့ခြင်းအပေါ်ဆွေးနွေးချက်များအား Appendix (12)၊ စာမျက်နှာ (၁၂) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p>
<p>လေ့လာသည့် ဧရိယာအား ၃ ကီလိုမီတာဟု သတ်မှတ် ထားသော်လည်း အမှန်တကယ် လေ့လာခဲ့သည့်ရွာများမှာ (Khe San Village, Khone Mo Village, Nan Ke Aik Village, Ngoke Ka Lay Village) ၃ ကီလိုမီတာ ထက်ကျော်လွန်၍ စီမံကိန်းမှ ခန့်မှန်းခြေ ၄ ကီလိုမီတာ၊ ၅ ကီလိုမီတာ နှင့် ၆ ကီလိုမီတာ စသည်ဖြင့် တည်ရှိနေသည့် အတွက် အဆိုပါရွာများအား</p>	<p>လေ့လာမည့်ဧရိယာအား ၃ ကီလိုမီတာ သတ်မှတ်ထားရှိသော်လည်း အချို့ ကျေးရွာများ ဖြစ်သည့် (Khe San Village , Khone Mo Village , Nan Ke Aik Village, Ngoke Ka Lay Village ) တို့၏ နောင်ချိုမြို့သို့သွားရောက်မည့် ရွာအထွက်လမ်းများသည် စက်ရုံအထွက်လမ်း နှင့် တူညီနေခြင်းကြောင့် လမ်းပိတ်ဆိုမှ၊ ယာဉ်မတော်တဆမှု တို့ရှိနိုင်သည့်အတွက် စက်ရုံမှ တိုက်ရိုက် သက်ရောက်မှုမျိုးမရှိနိုင်သော်လည်း ထည့်သွင်း လေ့လာခဲ့ခြင်းဖြစ်ပါသည်။</p>

မည်သည့် အတွက်ကြောင့် လေ့လာခဲ့သည်ကို ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။	
အဆိုပါလေ့လာခဲ့သည့်ရွာများသည် လေ့လာရန် လိုအပ် သည်ဟု ယူဆရပါက အဆိုပါရွာများနှင့် အကွာအဝေး တူညီစွာ တည်ရှိနေသည့် Nawang Kwang Village, Pang Ti Village နှင့် Kyauk Kyan Village များ တွင် အဘယ်ကြောင့် လူမှုဆိုင်ရာ လေ့လာခြင်းများ ပြုလုပ်ခဲ့ခြင်း မရှိသည်ကို ရှင်းလင်းဖော်ပြရန် လိုအပ်ပါ သည်။	အခြားသော အကွာအဝေးတူညီစွာရှိသည့် လူနေကျေးရွာများဖြစ်သည့် Nawang Kwang Village , Pang Ti Village နှင့် Kyauk Kyan Village များ မှ နောင်ချိုမြို့သို့သွားရောက်သည့် လမ်းကြောင်းသည် စက်ရုံအနီးမှ သွားရောက်ခြင်းမရှိသည့်အတွက် ထည့်သွင်းလေ့လာခဲ့ခြင်း မရှိခြင်းဖြစ်ပါသည်။
Lal Gyi Daw Village အား မြေပုံပေါ်တွင် ဖော်ပြပါရှိခြင်း မရှိသည့် အတွက် စီမံကိန်းမှ မည်မျှဝေးကွာ၍ မည်သည့် နေရာတွင် တည်ရှိနေသည်ကို မသိရှိနိုင်သောကြောင့် ၎င်းရွာအား မြေပုံပေါ်တွင် ထည့်သွင်း ဖော်ပြပေးရန် လိုအပ် ပါသည်။	Lal Gyi Daw Village အား Appendix (12)၊ စာမျက်နှာ (၁၀) ရှိ မြေပုံပေါ်တွင် ပြန်လည် ထည့်သွင်း ဖော်ပြ ထားပါသည်။
စစ်တမ်းကောက်ယူထားသောရွာများမှာ ရွာ (၆) ရွာ ဖြစ်ပြီး အဆိုပါ စာမျက်နှာ (၂၅) ရှိ ဇယား တွင် ဖော်ပြထားသော ရွာမှာ (၅) ရွာသာ ရှိ၍ Nan Ke Aik ကျေးရွာမှ ဒေသခံများ၏ စိုးရိမ်ပူပန်မှုများနှင့် လိုအပ်ချက်များအား ထည့်သွင်း ဖော်ပြ ထားသည်ကို မတွေ့ရှိရသည့် အတွက် အဆိုပါ ရွာအတွက် ကျန်ရှိနေသော အချက်အလက်များအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။	Nan Ke Aik ကျေးရွာမှ ဒေသခံများ၏ စိုးရိမ်ပူပန်မှုများနှင့် လိုအပ်ချက်များအား Appendix (12)၊ စာမျက်နှာ (၂၈) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။
ဂ - စီမံကိန်းတည်ရှိရာ ရှမ်းပြည်နယ် (မြောက်ပိုင်း) အတွင်းရှိ နိုင်ငံအဆင့်၊ ပြည်နယ်/တိုင်းဒေသကြီး အဆင့်တွင် ဥပဒေဖြင့် ကာကွယ်ထားသည့် နယ်မြေများတွင်ပါဝင်မှု ရှိမရှိကို သတ်မှတ် ဖော်ထုတ်ပေးရန် လိုအပ်ပါ သည်။	အခန်း ၄.၃.၂ တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။
ထိုသို့သတ်မှတ်ဖော်ထုတ်၍ ရရှိလာသော ရလဒ်များအရ စီမံကိန်းသည် ဥပဒေဖြင့် ကာကွယ်ထားသည့် နယ်မြေ များအပေါ် သက်ရောက်မှု ရှိ/မရှိ	အခန်း ၅.၅.၇၊ အခန်း ၅.၆.၅ တို့တွင် သက်ရောက်မှုများအပေါ် ဆန်းစစ်ထားပြီး အခန်း ၇.၇.၈

	ဆန်းစစ်၍ သက်ရောက်မှု များရှိပါက သက်ရောက်မှု လျော့နည်းစေသည့် နည်းလမ်း များအား ဖော်ထုတ်ပြီး ပတ်ဝန်းကျင် စီမံခန့်ခွဲရေး အစီအစဉ်တွင် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	တွင် Management Plan အား ထည့်သွင်းဖော်ပြထားပါသည်။
ဃ	စီမံကိန်းတည်ရှိရာ ရှမ်းပြည်နယ် (မြောက်ပိုင်း)တွင် ဖြစ်ပေါ်ခဲ့သော ငလျင်၊ လွန်ကဲ မိုးလေဝသဖြစ်ရပ်များ၊ ရေကြီးခြင်း၊ မိုးခေါင်ခြင်း၊ တောမီးစသည့် သဘာဝဘေး အန္တရာယ်များကို ကြိုတင်သတ်မှတ်၍ ဖော်ထုတ် တင်ပြရန် လိုအပ်ပါသည်။	- အခန်း ၄.၂.၁၊ အခန်း ၄.၂.၂ တို့တွင် မိုးလေဝသအခြေအနေနှင့် ငလျင်ကြေအခြေအနေတို့ကို တင်ပြထားပါသည်။
	ထိုမှတစ်ဆင့် ကြုံတွေ့ခဲ့သော၊ ဖြစ်ပွားနိုင်ချေရှိသော သဘာဝ ဘေးအန္တရာယ်များကို ဆန်းစစ်ကာ သဘာဝဘေး သက်ရောက်မှု တစ်ခုချင်းစီအတွက် သက်ရောက်မှု ဆန်းစစ်ခြင်း ပြုလုပ်၍ ကြိုတင် ကာကွယ်မှုများ၊ သက်ရောက်မှု လျော့နည်းစေသည့် နည်းလမ်းများအား ဖော်ထုတ်ပြီး ပတ်ဝန်းကျင်စီမံခန့်ခွဲရေး အစီအစဉ်တွင် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။	စီမံကိန်းအပေါ် သက်ရောက်မှုနိုင်မှုကို အခန်း ၅.၇ တွင် ဆန်းစစ်ထားပါသည်။  - အခန်း ၇.၈.၈ တွင် Emergency Response Plan အား ထည့်သွင်းဖော်ပြထားပါသည်။
င	စီမံကိန်းအကောင်အထည်ဖော်မီ ကာလတွင် တည်ရှိ နေသော မြေယာ ရှုခင်းများ၊ တောတောင်ရှုခင်းများ၊ မြစ်ချောင်း၊ အင်းအိုင် ရှုခင်းများ စသည် ဖြင့် မြင်ကွင်းဆိုင်ရာ အစိတ်အပိုင်းများအား သတ်မှတ်ဖော်ထုတ်၍ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။	အခန်း ၄.၄.၁၀ တွင် Visual Component အား ထည့်သွင်းဖော်ပြထားပါသည်။
	စီမံကိန်းကြောင့် ထိခိုက်မည့် မြင်ကွင်းဆိုင်ရာ အစိတ် အပိုင်းများ၊ စိမ်းလန်း မြေယာရှုခင်းများ စသည်တို့ကို ထည့်သွင်းဖော်ပြ၍ ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် လိုအပ်ပါသည်။ ထိုသို့ ထိခိုက်မှုများအား လျော့ပါးသက်သာ စေရေး နည်းလမ်းများ၊ ပြည်လည်ဖြည့်တင်းနိုင်ရေး ဆောင်ရွက်ချက်များ အား ထည့်သွင်း ဖော်ပြ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါ သည်။	အခန်း ၇.၁၁ တွင် Greenbelt Development အား ထည့်သွင်းဖော်ပြထားပါသည်။

<p>စ</p>	<p>စီမံကိန်းတည်ရှိရာ ရှမ်းပြည်နယ် (မြောက်ပိုင်း)၊ နောင်ချို မြို့နယ် အတွင်းရှိ ယဉ်ကျေးမှု၊ သမိုင်းဝင်နှင့် ဘာသာရေး နေရာများ၊ သာသနိက အဆောက်အဦများ၊ အရာဝတ္ထုများ၊ အလှအပ တန်ဖိုးမြင့်မားသည့် အရာဝတ္ထုများကို လည်းကောင်း၊ ရိုးရာ အသိပညာနှင့် ယုံကြည်မှုများ၊ ယဉ်ကျေးမှု အလေ့အထများကို လည်းကောင်း ရှင်းလင်း ဖော်ပြချက်များ၊ မြေပုံများနှင့်တကွ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>စီမံကိန်းဧရိယာ အနီးတဝိုက်ရှိ ဘာသာရေး နှင့် သာသနာရေးဆိုင်ရာ အဆောက်အဦများ၊ ယဉ်ကျေးမှု အမွေအနှစ်ဆိုင်ရာ နေရာများ တည်ရှိမှု အခြေအနေ၊ စီမံကိန်းဧရိယာနှင့် အကွာအဝေး၊ ထိခိုက်နိုင်မှု အခြေအနေ အစရှိသည်တို့အား စီမံကိန်းဧရိယာ ပါဝင်သော မြေပုံနှင့်တကွ အသေးစိတ် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၄.၄.၉ တွင် Cultural Component အား ထည့်သွင်းဖော်ပြထားပါသည်။</p>
	<p>ထိုမှတစ်ဆင့် စီမံကိန်းကြောင့် ယဉ်ကျေးမှုဆိုင်ရာ အစိတ် အပိုင်းများအပေါ် ထိခိုက်မှုများရှိပါက သက်ရောက်မှု ဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် လိုအပ်ပြီး လျော့ပါးသက်သာ စေရေး နည်းလမ်းများနှင့်အတူ ဖော်ပြ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါ သည်။</p>	<p>အခန်း ၅.၅.၂ နှင့် ၅.၆.၂ တို့တွင် ဆန်းစစ်ထားပါသည်။</p>
<p>၇။</p>	<p><b>ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုနှင့် ဘေးအန္တရာယ်ရှိမှု ဆန်းစစ်ခြင်း နှင့် လျော့နည်းစေရေးလုပ်ငန်းများ</b></p>	
<p>က</p>	<p>စီမံကိန်း လုပ်ငန်းအဆင့်ဆင့်ကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် သက်ရောက်မှု များအား ဆန်းစစ်ရာတွင် ကောင်းကျိုးနှင့် ဆိုးကျိုး သက်ရောက်မှုများ၊ တိုက်ရိုက်နှင့် သွယ်ဝိုက် သက်ရောက်မှုများ၊ ပြန်ပြင်နိုင်သော / ပြန်မပြင်နိုင်သော သက်ရောက်မှုများ၊ စုပေါင်းသက်ရောက်မှုများ စသည် ဖြင့် ထည့်သွင်း စဉ်းစား၍ အန္တရာယ်တစ်ခုချင်းစီ၏ ဖြစ်နိုင်ခြေ၊ အန္တရာယ် တစ်ခုချင်းစီ၏ အဆုံးသတ်အခြေအနေနှင့် ထိတွေ့ သက်ရောက်မှုများကို သတ်မှတ်ဆောင်ရွက်သည့် နည်းစနစ်များ၊ သက်ရောက်မှုများကို</p>	<p>အခန်း ၅.၃ တွင် သက်ရောက်မှုဆန်းစစ်မှုနည်းစနစ်အား ထည့်သွင်းဖော်ပြထားပါသည်။</p>



<p>အဆင့်သတ်မှတ်သည့် နည်းစနစ်များဖြင့် အသေးစိတ် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p>ပတ်ဝန်းကျင်ထိခိုက်မှု အတွက် ထိခိုက်နိုင်သည့် နယ်ပယ်အား ကြိုတင် သတ်မှတ်၍ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ ထိုသို့သတ်မှတ်ရာတွင် ထိခိုက်နိုင်မည့် သက်ရောက်မှု တစ်ခုချင်းစီ၏ သက်ရောက်မှု အဆုံးသတ် များအား ခန့်မှန်းတွက်ချက်မှုများ၊ တွေ့ရှိချက်များဖြင့် ဖော်ထုတ်သတ်မှတ် ရန် လိုအပ်ပါသည်။</p> <p>- ထိခိုက်မှုဆန်းစစ်ရာတွင် စီမံကိန်း၌ တပ်ဆင်အသုံးပြုမည့် စက်ပစ္စည်း များ၏ လုပ်ဆောင်နိုင်သည့် စွမ်းရည်များ၊ ဒီဇိုင်းပိုင်းဆိုင်ရာ အသေးစိတ် အချက်အလက်များအား အခြေခံ၍ စိစစ်သုံးသပ်ပြီး ထည့်သွင်း စဉ်းစားရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၅.၅ တွင် တည်ဆောက်ရေးကာလ သက်ရောက်မှုများကိုလည်းကောင်း ၊ အခန်း ၅.၆ တွင် လည်ပတ်ရေးကာလ သက်ရောက်မှုများကို လည်းကောင်း ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>ယခုအစီရင်ခံစာတွင် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် အထက် ဖော်ပြပါ အသေးစိတ်အချက် အလက်များကို ထည့်သွင်း စဉ်းစားထားခြင်း၊ ဆန်းစစ်သည့် နေရာတွင်လည်း နည်းစနစ်ကျကျ ဆန်းစစ် ထားခြင်းအား မတွေ့ရှိရသည့်အတွက် အထက်ဖော်ပြပါ အန္တရာယ် ဖြစ်နိုင်မှု နည်းစနစ်များ၊ တပ်ဆင် အသုံးပြုမည့် စက်ပစ္စည်း များ၏ စွမ်းဆောင်ရည် နှင့်အသေးစိတ် ဒီဇိုင်းအချက် အလက်များအား ထည့်သွင်းစဉ်းစား ထားသော သုံးသပ်ချက်များကို အခြေခံသည့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အား ပြန်လည် ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၅.၅ တွင် တည်ဆောက်ရေးကာလ သက်ရောက်မှုများကိုလည်းကောင်း ၊ အခန်း ၅.၆ တွင် လည်ပတ်ရေးကာလ သက်ရောက်မှုများကိုလည်းကောင်း ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>ခ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် ထပ်မံ ထည့်သွင်း စဉ်းစားရန် လိုအပ်သော သက်ရောက်မှုများမှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။</p> <p><b><u>ဆောက်လုပ်ရေးလုပ်ငန်းဆောင်ရွက်သည့်အဆင့်</u></b></p> <p>(၁) ရေထုညစ်ညမ်းမှု</p>	

<p>(၂) အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ</p> <p>(၃) အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ</p> <p>(၄) မိလ္လာရေဆိုးများ</p> <p>(၅) ဆောက်လုပ်ရေးလုပ်ငန်းများမှ ထွက်ရှိမည့် ရေဆိုးများ</p> <p>(၆) အန္တရာယ်ရှိပစ္စည်းများ / ဓာတုပစ္စည်းများ</p> <p>(၇) မြေထုညစ်ညမ်းမှု</p> <p>(၈) ဆူညံသံနှင့် တုန်ခါမှုများ</p> <p>(၉) မြေအောက်ရေ ညစ်ညမ်းမှုများ</p> <p>(၁၀) လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး သက်ရောက် မှုများ</p> <p>(၁၁) ဒေသခံပြည်သူများ၏ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး သက်ရောက် မှုများ</p> <p>(၁၂) ငလျင်လှုပ်ခြင်း၊ ရေကြီးခြင်း၊ မြေပြိုခြင်း၊ မီးလောင်ခြင်း စသည့် သဘာဝ ဘေးအန္တရာယ်ဆိုင်ရာ သက်ရောက်မှုများ</p> <p>စသည်ဖြင့် အထက်ဖော်ပြပါ သက်ရောက်မှုများအတွက် ဆောက်လုပ်ရေး လုပ်ငန်းဆောင်ရွက်သည့် အဆင့်တွင် သက်ရောက်မှု ဆန်းစစ်ရန် လိုအပ်ပါသဖြင့် ထပ်မံ ဖြည့်စွက်၍ ဆန်းစစ်ပြီး လျော့ပါးစေရေးနည်းလမ်းများ၊ စောင့်ကြပ်ကြည့်ရှုရေး လုပ်ငန်းစဉ်များနှင့် အတူ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။ (ထိခိုက်မှုမရှိပါက မရှိကြောင်း ရှင်းလင်းဖော်ပြရန်)</p>	<p>အခန်း ၅.၅ တွင် တည်ဆောက်ရေးကာလ သက်ရောက်မှုများကို ထည့်သွင်းဖော်ပြထားပါသည်။</p> <p>အခန်း ၅.၇ တွင် မမျှော်လင့်သော ဖြစ်ရပ်များကြောင့် အန္တရာယ်ဖြစ်ပေါ်နိုင်မှုများကို ဆန်းစစ် ထားပါသည်။</p>
<p><b>လုပ်ငန်းလည်ပတ်သည့်အဆင့်</b></p> <p>လုပ်ငန်းလည်ပတ်သည့် အဆင့်အတွက် သက်ရောက်မှု ဆန်းစစ်ရာတွင် အောက်ပါ သက်ရောက်မှုများကို ထပ်မံ ထည့်သွင်း၍ ဆန်းစစ်ရန် လိုအပ်ပါ</p>	<p>အခန်း ၅.၆ တွင် လည်ပတ်ရေးကာလ သက်ရောက်မှုများကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>

<p>သည်။</p> <p>(၁) မြေထုညစ်ညမ်းမှု (Eg, Cement Dust, Oil Spillage)</p> <p>(၂) အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ (Eg, Filter Bags)</p> <p>(၃) အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်းများ (Domestic Wastes)</p> <p>(၄) မိလ္လာရေဆိုးများ (Sewage)</p> <p>(၅) ထုတ်လုပ်ရေး လုပ်ငန်းများမှ ထွက်ရှိမည့် ရေဆိုးများ (Eg, Cooling Water)</p> <p>(၆) အန္တရာယ်ရှိပစ္စည်းများ / ဓာတုပစ္စည်းများ (Eg, Chemicals, Diesel)</p> <p>(၇) မြေအောက်ရေ ညစ်ညမ်းမှုများ (Eg, Accidental Spillage)</p> <p>(၈) ငလျင်လှုပ်ခြင်း၊ ရေကြီးခြင်း၊ မြေပြိုခြင်း၊ မီးလောင်ခြင်း စသည့် သဘာဝ ဘေးအန္တရာယ်ဆိုင်ရာ သက်ရောက်မှုများ</p> <p>စသည်ဖြင့် အထက်ဖော်ပြပါ သက်ရောက်မှုများအတွက် လုပ်ငန်း လည်ပတ် သည့် အဆင့်တွင် သက်ရောက်မှု ဆန်းစစ်ရန်နှင့် ထိုသက်ရောက် မှုများအတွက် လျော့ပါးစေရေးနည်းလမ်းများ၊ ကာကွယ်ရေးနည်းလမ်းများ များကို ထည့်သွင်းဖော်ပြ၍ စောင့်ကြည့်လေ့လာမည့် အစီအစဉ်များတွင် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>သက်ရောက်မှု ဆန်းစစ်ခြင်း ဆောင်ရွက်ရာတွင် စီမံကိန်းမှ စက်ယန္တရား များ၏ အချက်အလက်များ၊ တွေ့ရှိချက်များ၊ တွက်ချက်မှုများ အပေါ် အခြေခံ၍ သက်ရောက်မှု ဆန်းစစ်ရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၅.၇ တွင် မမျှော်လင့်သော ဖြစ်ရပ်များကြောင့် အန္တရာယ်ဖြစ်ပေါ်နိုင်မှုများကို ဆန်းစစ် ထားပါသည်။</p>
<p>အစီရင်ခံစာတွင် ဖော်ပြထားသော ဆန်းစစ်ချက်များမှာ ပြည့်စုံ လုံလောက်မှု မရှိသည့် အတွက် အောက်ဖော်ပြပါ အချက်အလက်များအား ထည့်သွင်း စဉ်းစား၍ သက်ရောက်မှု ဆန်းစစ်ခြင်းအား ပြန်လည် ဆောင်ရွက်ရန်</p>	

လိုအပ်ပါသည်။

**လေအရည်အသွေး အပေါ် သက်ရောက်မှု မှုအား ဆန်းစစ်ခြင်း**

လေအရည်အသွေးအပေါ် သက်ရောက်မှုများကို ဆန်းစစ် ရာတွင် လုပ်ဆောင်မည့် လုပ်ငန်းဆောင်ရွက်ချက်အား အသေးစိတ်ဖော်ပြ၍ ဆန်းစစ်ခြင်းကို ဆောင်ရွက်ရန် လိုအပ်ပါသည်။

ဥပမာ -

- စီမံကိန်း လုပ်ငန်းဆောင်ရွက်စဉ်အတွင်း လစဉ် အသုံးပြုမည့်ယာဉ် အရေအတွက်များ (ကုန်ကြမ်း၊ ကုန်ချော သယ်ယူပို့ဆောင်မည့် ယာဉ်များ) ကို အသေးစိတ် ဖော်ပြ၍ ၎င်းတို့မှ ထွက်ရှိမည့် အခိုးအငွေ့ ထုတ်လွှတ်မှု ပမာဏကို ခန့်မှန်း တွက်ချက်၍ ဖော်ပြရန်နှင့် ထိုထုတ်လွှတ်မှုကြောင့် ဖြစ်ပေါ်နိုင်မည့် သက်ရောက်မှုများအား ထည့်သွင်းစဉ်းစား၍ သက်ရောက်မှုများအား လျော့ပါးသက်သာစေရန် ဆောင်ရွက်မည့် အစီအစဉ်များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။

- စီမံကိန်းမှ လိုအပ်သော လျှပ်စစ်ဓာတ်အား အား 300 kVA နှင့် 500 kVA ပမာဏထုတ်လုပ်ပေးနိုင်သည့် ဒီဇယ်သုံး မီးစက်များမှ ရယူမည် ဖြစ်ပြီး တစ်နှစ်လျှင် ဒီဇယ် ဂါလန် ပေါင်း ၂ သန်းခန့် သုံးစွဲမည်ဟု ဖော်ပြထားသည့် အတိုင်း အဆိုပါ မီးစက်များမှ ထွက်ရှိလာမည့် ထုတ်လွှတ်မှုများကို လောင်စာဆီ၏ အရည်အသွေးအပေါ် အခြေခံပြီး ခန့်မှန်း တွက်ချက်၍ သက်ရောက်မှု ဆန်းစစ်ခြင်းတွင် ထည့်သွင်း စဉ်းစားကာ သက်ရောက်မှု များအား လျော့ပါးစေရေး နည်းလမ်းများနှင့်အတူ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါ သည်။

- ဘိလပ်မြေထုတ်လုပ်သည့် လုပ်ငန်းအဆင့်ဆင့်တွင် အသုံးပြုသော စက်ယန္တရား တစ်ခုချင်းစီမှ ထွက်ရှိနိုင်သော ထုတ်လွှတ်မှုများကို အဓိက ထွက်ရှိမည့် အမျိုးအစား (ဥပမာ - PM, CO, SO<sub>2</sub>, NO<sub>x</sub> အစရှိသည်ဖြင့်)၊

အခန်း ၅.၅.၁ တွင် တည်ဆောက်ရေးကာလအတွင်း လေထုအရည်အသွေးအပေါ် သက်ရောက်နိုင်မှု များကိုလည်းကောင်း ၊ အခန်း ၅.၆.၁ တွင် လည်ပတ်ရေးကာလအတွင်း လေထုအရည်အသွေးအပေါ် သက်ရောက်နိုင်မှုများကိုလည်းကောင်း ထည့်သွင်းဖော်ပြ ထားပါသည်။

စီမံကိန်းတွင် သုံးစွဲမည့် လောင်စာ (ကျောက်မီးသွေး ၊ ဒီဇယ်) တို့၏ GHG Emission ထွက်ရှိမှုများကို အခန်း ၃.၁၁.၁ တွင် တွက်ချက်ဖော်ပြထားပြီး အခန်း ၅.၆.၁ ၊ လည်ပတ်ရေးကာလ သက်ရောက်မှုများတွင် ထည့်သွင်း ဆန်းစစ်ထားပါသည်။

ထွက်ရှိနိုင်သည့် ခန့်မှန်းပမာဏများအား တစ်နာရီတွင် ထွက်ရှိနိုင်မည့် ပမာဏ (Nm<sup>3</sup>/hr) ဖြင့်လည်းကောင်း၊ စသည့်အသေးစိတ် ဖော်ပြချက်များကို စုစည်းတင်ပြ၍ သက်ဆိုင်ရာ ယန္တရား တစ်ခုချင်းစီအတွက် သက်ရောက်မှု များကို လျော့ပါး သက်သာစေမည့် ဆောင်ရွက်ချက်များကို အသေးစိတ် ဖော်ပြရန် လိုအပ်ပါသည်။

- လျော့ပါးသက်သာစေရေး ဆောင်ရွက်ချက်များကြောင့် ထုတ်လွှတ်မှု ပမာဏအား မည်မျှမည်မျှ လျော့ချနိုင် ကြောင်းကိုလည်း မူလထွက်ရှိမည့် ခန့်မှန်းပမာဏနှင့် နှိုင်းယှဉ်၍ ဖော်ပြရန် လိုအပ်ပါသည်။ (ဥပမာ - အမှုန်ဖမ်းစက်များ (Bag filters, ESP, Jet Pulse bag filters များ) တပ်ဆင်ရာတွင် တပ်ဆင်မည့် နေရာများ၊ အမှုန် ဖမ်းစက်၏ နည်းပညာပိုင်း ဆိုင်ရာ အသေးစိတ်ဖော်ပြချက်များ၊ တပ်ဆင်ထားသော ယန္တရား (သို့မဟုတ်) စနစ်၏ Schematic Drawing များ၊ ဓာတ်ပုံများ စသည် တို့ကို ဖော်ပြ၍ ထိုအမှုန်ဖမ်းစက်ကြောင့် လျော့ကျသွားမည့် ပမာဏများ၊ အမှုန်ဖမ်းစက်၏ အရည်အသွေးအား စစ်ဆေးမည့် အချိန်ဇယားများ၊ နည်းလမ်းများ၊ စောင့်ကြပ်ကြည့်ရှုရေး လိုအပ်ချက်များကို ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။)

- စီမံကိန်း လည်ပတ်စဉ်ကာလအတွင်း လေထုညစ် ညမ်းစေနိုင်သော ဓာတ်ငွေ့ နှင့် အမှုန်များ ထွက်ရှိမည့် နေရာရင်းမြစ် (Emission Sources) များကို သီးခြားဖော်ပြ၍ စီမံကိန်း layout ပါဝင်သော မြေပုံပေါ်တွင် အမှတ်များဖြင့် နေရာချထား၍ ဖော်ပြရန် လိုအပ်ပါသည်။

- တနေ့လျှင် ဘီလပ်မြေ တန် ၅၀၀၀ ထုတ်လုပ်ပါက ကာဗွန် ဒိုင်အောက်ဆိုဒ်ပမာဏ တန် ၅၀၀၀ ခန့် ထုတ်လွှတ်မည်ဟု ခန့်မှန်း တွက်ချက်၍ ရပါသည်။ အသုံးပြုမည့် ကျောက်မီးသွေး၊ ထုံးကျောက်နှင့် အခြားလောင်စာ တို့၏ အရည်အသွေး (ကာဗွန်ပါဝင်မှု၊ ဆာလဖာပါဝင်မှု) ပတ်ဝန်းကျင် ရာသီဥတု အခြေအနေ၊ စသည်တို့ အပေါ်မူတည်၍ စီမံကိန်း

တပ်ဆင်မည့် Bag Filters, ESP စသည့်အရေအတွက်နှင့် တပ်ဆင်မည့်နေရာ စသည့်တို့ကို အခန်း Table 3.24 ၊ Table 3.25 တို့တွင် ထည့်သွင်းဖော်ပြထားပါသည်။

စတင် လည်ပတ်သည့်ကာလတွင် စီမံကိန်းကြောင့် လေထုထဲသို့ ထုတ်လွှတ်နိုင်သော အခြားအခိုးအငွေ့များ၏သက်ရောက်မှုများအား တွက်ချက်ရာတွင် တိကျ၍ လက်တွေ့ကျသော ဆန်းစစ်မှုများ ပြုလုပ်ရန် လိုအပ်ပါသည်။

- ယခုဘိလပ်မြေစက်ရုံမှ တည်ဆောက်ထားသည့် အခိုးအငွေ့များ ထုတ်လွှတ်မည့် ခေါင်းတိုင်သည် နိုင်ငံတကာမှ သတ်မှတ်ထားသည့် ပတ်ဝန်းကျင်ဆိုင်ရာ စံနှုန်းများနှင့် ပြေလည်စေမည့် ခေါင်းတိုင်အမြင့် ဖြစ်ကြောင်း တွက်ချက် ဆန်းစစ်သက်သေပြ၍ ပြန်လည် ဖော်ပြပေးရန် လိုအပ်ပါသည်။ သို့မှသာ စီမံကိန်း ဆောင်ရွက်ရာမှ ထွက်ရှိမည့် အခိုးအငွေ့များ (ကာဗွန်ဒိုင် အောက်ဆိုဒ်၊ ဆာလဖာဒိုင်အောက်ဆိုဒ်၊ နိုက်ထရိုဂျင်ဒိုင် အောက်ဆိုဒ် စသည့်) နှင့်အမှုန်များသည် အနီးပတ်ဝန်းကျင် သို့ ပျံ့နှံ့ကျရောက်စေမည် မဟုတ်ဟု လက်ခံနိုင်မည် ဖြစ်သည်။

- အစီရင်ခံစာ၏ စာမျက်နှာ (၅.၇) တွင် ဖော်ပြထားသည့် အတိုင်း မီးပြင်းဖိုတွင် ကျောက်မီးသွေး အပြင် -

- ၁) Used Motor Oil
- ၂) Spent Solvents
- ၃) Printing Inks
- ၄) Paint Residues
- ၅) Cleaning Fluids
- ၆) Scrap Tires

အစရှိသည့် ပစ္စည်းများအား လောင်စာအဖြစ် အသုံးပြုနိုင် မည်ဟု ဖော်ပြ ထားသည့်အတိုင်း စီမံကိန်းတွင် အမှန်တကယ် အသုံးပြုမည့်

မီးပြင်းဖိုတွင် ကျောက်မီးသွေး တမျိုးသာ သုံးစွဲမည်ဖြစ်ကြောင်း ပြင်ဆင်ဖော်ပြထားပါသည်။

ပစ္စည်းများအား ပြည့်စုံစွာ ဖော်ပြ၍ ၎င်းတို့မှ ထုတ်လွှတ်နိုင်မည့် ဓာတ်ငွေ့ အမျိုးအစားများနှင့် ပမာဏများကို ခန့်မှန်းတွက်ချက် ဖော်ပြ၍ သက်ရောက်မှုဆန်းစစ်ခြင်းကို ဆောင်ရွက်ရန် လိုအပ်ပါ သည်။ အဆိုပါ သက်ရောက်မှုများအတွက် လျော့ပါးစေရေး နည်းလမ်းများ၊ ကာကွယ်ရေး နည်းလမ်းများကို ထည့်သွင်း ဖော်ပြ၍ စောင့်ကြည့်လေ့လာမည့် အခန်းကဏ္ဍတွင် အထက်ပါ သက်ရောက်မှုများကို ပါ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါ သည်။

- ထုတ်လွှတ်မည့် ဓာတ်ငွေ့အမျိုးအစား တခုချင်းစီနှင့် အမှုန်များ၏ ပျံ့နှံ့နှုန်းအား Simulating Methods များဖြင့် တွက်ချက်ခြင်းဖြင့် သက်ရောက်မှု ဆန်းစစ်ခြင်းအား ခွဲခြမ်းစိတ်ဖြာသော နည်းလမ်းများ (Numerical Methods) များဖြင့် ဆန်းစစ်၍ ပျံ့နှံ့ပုံများကို မြေပုံ ပေါ်တွင် ဖော်ပြ၍ ပြန်လည်ရေးသား ဖော်ပြရန် လိုအပ်ပါသည်။

- နေ့စဉ် ဘီလပ်မြေထုတ်လုပ်မည့် ပမာဏသည် ၅၀၀၀ တန်ဖြစ်ခြင်း၊ တနေ့လျှင် ကာဗွန်ဒိုင်အောက်ဆိုဒ် တန် ၅၀၀၀ ခန့် ထုတ်လွှတ်ခြင်း စသည့်အချက်များကြောင့် နိုင်ငံတကာ လမ်းညွှန်ချက်များအရ ယခု ဘီလပ်မြေ စီမံကိန်းမှ အခိုးအငွေ့ ထုတ်လွှတ်မှုကို စောင့်ကြပ် ကြည့်ရှုရာတွင် ခေါင်းတိုင်များမှ အခိုးအငွေ့ ထုတ်လွှတ်မှုကို (continuous monitoring system (real time measurement) အဆက်မပြတ် စောင့်ကြည့် တိုင်းတာသည့် စနစ်ထည့်သွင်း၍ စောင့်ကြပ်ကြည့်ရှုရန် လိုအပ်ပါသည်။

- ထွက်ရှိမည့် ဓာတ်ငွေ့များကိုလည်း စဉ်ဆက်မပြတ် စောင့်ကြည့် တိုင်းတာခြင်း Continuous Monitoring ဆောင်ရွက်ရန် လိုအပ်ပါသည်။ စောင့်ကြည့်တိုင်းတာရမည့် ဓာတ်ငွေ့အမျိုးအစား များတွင် အောက်ပါ ဓာတ်ငွေ့များကို ထည့်သွင်း၍ ခေါင်းတိုင်များမှ စောင့်ကြည့်တိုင်းတာရန် လိုအပ်ပါသည်။

စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်အား အခန်း ၇.၇.၁ တွင် ထည့်သွင်းဖော်ပြထားပါသည်။

<p>(၁) CO</p> <p>(၂) SO2</p> <p>(၃) NOx</p> <p>(၄) SPM, PM 10 and PM 2.5</p> <p>(၅) Mercury</p> <p>(၆) temperature</p> <p>(၇) velocity</p> <p>(၈) HC</p> <p>(၉) Total Metal</p>	
<p><b>ဆူညံမှု အပေါ် သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း</b></p> <ul style="list-style-type: none"> <li>- စက်ရုံလည်ပတ်စဉ် ကာလအတွင်းတွင် ဆူညံသံ ထွက်ပေါ်မည့် စက်ယန္တရားများနှင့် ၎င်းတို့မှ ထွက်ရှိမည့် ဆူညံသံ ပမာဏကို ထည့်သွင်း ဖော်ပြပေးရန် လိုအပ်ပါသည်။</li> <li>- ဆူညံသံ ထွက်ရှိမည့်နေရာများ (Noise Sources) များကို စက်ရုံ Layout Plan ပါဝင်သော မြေပုံပေါ်တွင် ဖော်ပြပေးရန် လိုအပ်ပါသည်။</li> <li>- ဆူညံသံ ထွက်ရှိမှု လျှော့ချရန် အတွက် စက်ကိရိယာများ (ဥပမာ - Silencer များ) ၏ အသေးစိတ် အချက်အလက် များနှင့် တပ်ဆင်ထားရှိမှု အခြေအနေများကို ဖော်ပြ၍ ၎င်းတို့ မတပ်ဆင်မှီ အခြေအနေနှင့် တပ်ဆင်ပြီး အခြေအနေ နှစ်ရပ်မှ ဆူညံသံ ထွက်ရှိမှု ပမာဏများကို နှိုင်းယှဉ် ဖော်ပြပေးရန် လိုအပ်ပါသည်။</li> <li>- ဆူညံသံ ထွက်ရှိမည့် နေရာနှင့် ထွက်ရှိမည့် ပမာဏများကို အခြေခံ၍ စက်ရုံအနီးရှိ လောကီဖန်ရွာသည် ဆူညံသံ သက်ရောက်မှု</li> </ul>	<p>အခန်း ၅.၅.၂ နှင့် ၅.၆.၂ တို့တွင် ဆူညံမှုအပေါ် သက်ရောက်မှုများကို ဆန်းစစ်ထားပါသည်။</p>



<p>မည်မျှခံစားရမည်ကို တွက်ချက်၍ ထည့်သွင်း ဖော်ပြရန်နှင့် သက်ရောက်မှု လျော့ပါးစေရေး နည်းလမ်း များနှင့်အတူ မည်ကဲ့သို့ဆက်လက် ဆောင်ရွက်မည်ကို အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p><b>ရေထု အရည်အသွေးအပေါ် သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း</b></p> <ul style="list-style-type: none"> <li>- နေ့စဉ်စွန့်ထုတ်မည့် စွန့်ထုတ်ရေ ပမာဏအား တွက်ချက်ဖော်ပြရန် လိုအပ်ပါသည်။ စီမံကိန်း၏ အဆင့်တစ်ခုချင်းစီမှ စွန့်ထုတ်မည့် ရေများ၊ မိလ္လာရေများ၊ စသည်တို့ကို ပမာဏတွက်ချက်ပြီး ရေစီးဆင်းမှုများ၊ ရေနုတ်မြောင်းများ၊ နောက်ဆုံး စွန့်ထုတ်မှုများကို ဖော်ပြ၍ စုဆောင်းခြင်း၊ သယ်ယူခြင်း၊ သန့်စင်ခြင်း၊ နောက်ဆုံး စွန့်ထုတ်ခြင်း စသည့် စနစ်အလိုက် လုပ်ငန်းစဉ်များ၊ နည်းလမ်း များကို သက်ဆိုင်ရာ မြေပုံနှင့်တကွ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါ သည်။</li> <li>- စီမံကိန်းမှ စွန့်ထုတ်ရေများတွင် ပါဝင်သည့် ပစ္စည်းများ၊ ဓာတုပစ္စည်းများ ၊ စွန့်ထုတ်သည့် ပမာဏများကြောင့် ပတ်ဝန်းကျင် ထိခိုက်မှု မည်မျှရှိနိုင်သည်ကို ဖော်ပြ၍ စွန့်ထုတ်ရေများအတွက် သက်ရောက်မှု ဆန်းစစ်ခြင်းအား အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</li> <li>- အစီရင်ခံစာ၏ စာမျက်နှာ (၈.၅) တွင် စက်ရုံမှ ထွက်ရှိ လာသော ရေဆိုးများသည် ရေဆိုးစွန့်ပစ်ကန်သို့ စီးဝင်မည် ဖြစ်ပြီး မိလ္လာရေဆိုးများ သည် မိလ္လာကန် အတွင်းသို့ စီးဝင်မည် ဖြစ်ကြောင်း ဖော်ပြထားသည့် အတိုင်း ထို ရေဆိုး စွန့်ပစ်ကန်နှင့် Septic Tank အကြောင်း နည်းပညာပိုင်း ဆိုင်ရာ ဖော်ပြချက်များ၊ အသေးစိတ် ဖော်ပြချက်များ၊ အတိုင်းအတာများ ၊ drawingsများ ဖြင့် တိကျစွာ ဖော်ပြရန် လိုအပ် ပါသည်။</li> <li>- ဆန်းစစ်ချက်များပြုလုပ်ရာတွင် မသန့်စင်မှီက ရှိနေသော စွန့်ပစ်ရေ အမျိုးအစား၊ အရည်အသွေး နှင့် သန့်စင်ပြီးနောက် ထွက်ရှိမည့် စွန့်ပစ်ရေ အမျိုးအစား၊ အရည်အသွေးများအား နှိုင်းယှဉ်ဖော်ပြ၍ ထိုထွက်ရှိလာသော</li> </ul>	<p>အခန်း ၅.၅.၄ နှင့် ၅.၆.၃ တို့တွင် ရေထုအရည်အသွေးအပေါ် သက်ရောက်မှုများကို ဆန်းစစ်ထားပါသည်။</p> <p>အခန်း ၅.၅.၄ တွင် Wastewater Management Plan ကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>

<p>ရေများကို ပြည်လည် အသုံးပြုမည် ဆိုပါက အသုံးပြုမည့် ရည်ရွယ်ချက်များ၊ နည်းလမ်းများအား ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	
<p><b>စွန့်ပစ်ပစ္စည်းများဆိုင်ရာသက်ရောက်မှုဆန်းစစ်ခြင်း</b></p> <ul style="list-style-type: none"> <li>- လုပ်ငန်းလည်ပတ်သည့် ကာလတွင် ထွက်ရှိမည့် စွန့်ပစ်ပစ္စည်းအမျိုးအစားများအား အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ၊ အန္တရာယ် မရှိနိုင်သော စွန့်ပစ်ပစ္စည်းများ၊ ပြန်လည် အသုံးပြုနိုင်သော စွန့်ပစ်ပစ္စည်း များ၊ အစရှိသဖြင့် အမျိုးအစား ခွဲခြား၍ အမျိုးအစား တစ်ခုချင်းစီအလိုက် ထွက်ရှိမည့် အမှိုက်များကို အသေးစိတ် ထည့်သွင်းစဉ်းစား၍ ထွက်ရှိနိုင်မည့် ပမာဏများကို တွက်ချက် ဖော်ပြရန် လိုအပ်ပါသည်။</li> <li>- လုပ်ငန်း လည်ပတ်စဉ်ကာလတွင် ထွက်ရှိမည့် အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများအားလုံး (ဥပမာ - ဓာတုပစ္စည်းများ၊ အသုံးပြုပြီး သော Dust Filter များ၊ စက်ဆီများ) ကို သီးခြားဖော်ပြ၍ ထိုပစ္စည်းများအား သိုလှောင်ခြင်း၊ ကိုင်တွယ်ခြင်း၊ စသည့် နည်းလမ်း များကို ဖော်ပြပြီး ထွက်ရှိမည့် ခန့်မှန်းပမာဏကို အသေးစိတ် ဖော်ပြပါရှိရန် လိုအပ်ပါသည်။</li> <li>- စွန့်ပစ်ပစ္စည်းများအား အထက်ပါအတိုင်း အန္တရာယ်ရှိ စွန့်ပစ် ပစ္စည်းများ၊ အန္တရာယ် မရှိနိုင်သော စွန့်ပစ်ပစ္စည်းများ စသည်ဖြင့် အမျိုးအစား ခွဲခြား၍ အသေးစိတ် သက်ရောက်မှု ဆန်းစစ်ရန် လိုအပ်ပါသည်။</li> </ul>	<p>အခန်း ၅.၅.၆ နှင့် ၅.၆.၄ တို့တွင် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများကြောင့် သက်ရောက်မှုများကို ဆန်းစစ်ထားပါသည်။</p> <p>အခန်း ၇.၈.၃ တွင် Solidwaste Management Plan ကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p><b>သယံဇာတများ ထုတ်ယူသုံးစွဲမှုအပေါ် ဆန်းစစ်ခြင်း</b></p> <ul style="list-style-type: none"> <li>- စီမံကိန်းမှ မြေအောက်ရေ ထုတ်ယူသုံးစွဲမည် ဆိုပါက မြေအောက်ရေ ထုတ်ယူသုံးစွဲနိုင်သည့် ပမာဏကို လေ့လာ၍ စီမံကိန်းမှ ရေသုံးစွဲမှု ပမာဏနှင့်နှိုင်းယှဉ်ကာ ရေအရင်းအမြစ် ထုတ်ယူသုံးစွဲမှု အပေါ်တွင် သက်ရောက်မှု ဆန်းစစ်ရန် လိုအပ်ပါသည်။(မရှိပါကမရှိကြောင်း ဖော်ပြရန်)</li> <li>- စီမံကိန်းမှ အသုံးပြုရန်အတွက် ရေလှောင် တာ၊တမံ များဖြင့် ရေရယူမှု</li> </ul>	<p>အခန်း ၅.၈.၆ တွင် သဘာဝသယံဇာတများအပေါ် သက်ရောက်မှုများကို ဆန်းစစ်ထားပါသည်။</p>

<p>နည်းလမ်းသည် အနီးပတ်ဝန်းကျင်ရှိ ကျေးရွာများမှ ရေရယူသုံးစွဲမှု အပေါ် ထိခိုက်နိုင်မှု ရှိ၊ မရှိ ဆန်းစစ်သုံးသပ်၍ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p> <ul style="list-style-type: none"> <li>- အဆိုပါ ရေလှောင် တာတမံမှ ရေလွှမ်းမိုးမှု အန္တရာယ် ဆန်းစစ်ခြင်း (Flood Risk Assessment) ပြုလုပ်၍ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</li> <li>- ထုံးကျောက်၊ ဂေါ်ဒန်ကျောက်၊ ရွံ့စေး၊ သဲ အစရှိသည့် ကုန်ကြမ်းများ တူးဖော်သုံးစွဲရာတွင် သယံဇာတ ထုတ်ယူသုံးစွဲမှုအပေါ် သက်ရောက်မှု ဆန်းစစ်ခြင်းအား သက်ဆိုင်ရာ ကုန်ကြမ်း ပစ္စည်းအတွက် ဆောင်ရွက်ရမည့် IEE သို့မဟုတ် EIA အစီရင်ခံစာ တစ်ခုချင်းစီတွင် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</li> </ul>	
<p><b>လုပ်ငန်းပိတ်သိမ်းသည့်အဆင့်တွင်</b></p> <ul style="list-style-type: none"> <li>- စီမံကိန်း ပိတ်သိမ်းသည့် အဆင့်နှင့် ပိတ်သိမ်းပြီး နောက်တွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှု တစ်ခုချင်းစီ အတွက် ထည့်သွင်းစဉ်းစား ဆန်းစစ်၍ အစီရင်ခံစာတွင် ဖော်ပြပေးရန် လိုအပ်ပါသည်။</li> </ul> <p>(ဥပမာ - စီမံကိန်း ပိတ်သိမ်းသည့် ဆောင်ရွက်ချက်များ ကြောင့် ဖြစ်ပေါ်မည့်လေထု၊ ရေထု၊ မြေထု ညစ်ညမ်းခြင်း များ၊ ဆူညံသံနှင့် တုန်ခါမှုများ၊ အနံ့ဆိုးများ၊ သစ်ပင်များ၊ သတ္တဝါများနှင့် သက်ရှိပတ်ဝန်းကျင် ဖြစ်တည်မှု စနစ် ထိခိုက်မှုများ၊မြေမျက်နှာသွင်ပြင်နှင့် စိမ်းလန်းပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများ၊ လူမှု ပတ်ဝန်းကျင်ထိခိုက်မှုများ၊ ကျန်းမာရေးနှင့် ဘေး အန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာ ထိခိုက်မှုများ၊ အရေးပေါ် အခြေအနေ များနှင့် အခြား ထိခိုက်နိုင်မှုများ) စသည်တို့ကို ဆန်းစစ်၍ လျော့ပါး သက်သာစေရေး နည်းလမ်းများ၊ ထိန်းချုပ် ဆောင်ရွက်ချက်များ၊ စီမံခန့်ခွဲ ရေး အစီအစဉ်များအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါ သည်။</p>	<p>Crown Cement Plant သည် နှစ်ပေါင်းများစွာ လည်ပတ်ဆောင်ရွက်ရသည့် စီမံကိန်းမျိုး ဖြစ်သဖြင့် လက်ရှိအချိန်တွင် လုပ်ငန်းပိတ်သိမ်းသည့်အဆင့်တွင် ဖြစ်ပေါ်နိုင်သည့် သက်ရောက်မှုများကို ကြိုတင်သတ်မှတ်ရန်မှာ ကျိုးကြောင်းဆီလျော်မှု မရှိနိုင်ကြောင်း သုံးသပ်ရပါသည်။</p> <p>Crown Cement Plant သည် စက်ပစ္စည်းများ သက်တမ်းကုန်ဆုံးပြီး ပြုပြင်ထိန်းသိမ်းနိုင်မှု မရှိခြင်းသော်လည်းကောင်း စီးပွားဖြစ်ထုတ်လုပ်နိုင်မှု မရှိတော့ခြင်း သော်လည်းကောင်း ဖြစ်ပေါ်လာသည့်အခါတွင် ဖြိုဖျက်၍ အပြီးပိတ်သိမ်းရပါမည်။ ၎င်းအခြေအနေတွင် ပိတ်သိမ်းခြင်းအဆင့်တွင် သက်ရောက်မှုများကို ဆန်းစစ်သုံးသပ်၍ ထိခိုက်မှုလျော့ပါးရေး အစီအမံများ ဆောင်ရွက်သွားပါမည်။</p> <p>သို့ဖြစ်ပါ၍ လက်ရှိအခြေအနေတွင် စက်ရုံသည် နှစ်များစွာ လည်ပတ်နိုင်ဦးမည်ဖြစ်သဖြင့် ယခုအစီရင်ခံစာတွင် ပိတ်သိမ်းခြင်းအဆင့်အတွက် ဆန်းစစ်သုံးသပ်ထားမှု မရှိသေးပါကြောင်း တင်ပြအပ်ပါသည်။</p>

	<p>- ထို့အပြင် စီမံကိန်းပိတ်သိမ်းပြီးသည့် အဆင့်တွင် လုပ်ဆောင်မည့် မြေမျက်နှာသွင်ပြင်နှင့် ပတ်ဝန်းကျင် စီမံကိန်းစိုပြေရေးဆိုင်ရာ ပြန်လည် ဖွံ့ဖြိုးရေး အစီအစဉ် များကို ထည့်သွင်းစဉ်းစား၍ ရေးဆွဲဖော်ပြရန် လိုအပ်ပါ သည်။</p>	
ဂ	<p>ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ရာတွင် စီမံကိန်း၏ အဆင့်တိုင်း အတွက် လျော့ပါးသက်သာစေရေး နည်းလမ်းများ ဆောင်ရွက်ပြီး သည့် နောက်တွင် ဆက်လက် ကြွင်းကျန်တည်ရှိနိုင်သည့် သက်ရောက်မှုများအား သတ်မှတ် ဖော်ထုတ်၍ လျော့ပါး သက်သာစေရေး နည်းလမ်းများနှင့်အတူ ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးအဆင့်တို့ရှိ သက်ရောက်မှုတစ်ခုချင်းတိုင်း၏ ဆန်းစစ်ချက် များတွင် လျော့ပါးစေရေးနည်းလမ်းများနှင့် ကြွင်းကျန်သက်ရောက်နိုင်မှုများကို ထည့်သွင်း ဖော်ပြထားပါသည်။</p>
ဃ	<p>စီမံကိန်း၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ထမ်းများက EMP ကို အကောင်အထည်ဖော်ရာတွင် လိုအပ်သော စွမ်းဆောင်ရည် ဖွံ့ဖြိုးရေးနှင့် သင်တန်းများအစီအစဉ်များအား ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၇.၁၂ တွင် ကုမ္ပဏီက ဆောင်ရွက်လျက်ရှိသော စွမ်းဆောင်ရည် ဖွံ့ဖြိုးရေးနှင့် သင်တန်းများအစီအစဉ်များကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<b>၈။</b>	<b>လူမှုဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်း နှင့် လျော့နည်းစေရေး လုပ်ငန်းများ</b>	
က	<p>လူမှုဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်း (SIA) အစီရင်ခံစာတွင် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။</p> <p>- လူမှုစစ်တမ်း ကောက်ယူခဲ့သည့် စစ်တမ်းမေးခွန်းလွှာအား ပူးတွဲ ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>- လူမှုစစ်တမ်း ကောက်ယူခဲ့သည့် စစ်တမ်းမေးခွန်းလွှာအား SIA အစီရင်ခံစာ ၏ နောက်ဆက်တွဲ(ဃ)တွင် ပူးတွဲဖော်ပြထားပါသည်။</p>
	<p>SIA အစီရင်ခံစာ၏ စာမျက်နှာ (၇၁) တွင် သကြားစက်ရုံ ဟူ၍ ဖော်ပြ ချက်အား တွေ့ရှိရပါသဖြင့် မှားယွင်းနေသော အဆိုပါ ဖော်ပြချက်အား ပြင်ဆင်ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>- SIA အစီရင်ခံစာ၏ စာမျက်နှာ (၇၁) တွင် သကြားစက်ရုံ ဟူ၍ မှားယွင်းနေသော အဆိုပါ ဖော်ပြချက်အား စာမျက်နှာ (၇၆) တွင်ပြင်ဆင် ဖော်ပြထားပါသည်။</p>
	<p>SIA အစီရင်ခံစာ စာမျက်နှာ (၇၃)၊ ဇယား (၇.၁) တွင် Operation Phase ၏ Positive Impacts များအား ဖော်ပြရာတွင် Benefits for Local</p>	<p>- SIA အစီရင်ခံစာ၏ စာမျက်နှာ (၇၃)၊ ဇယား (၇.၁) တွင် operation phase ၏ Positive Impacts များအားဖော်ပြရာတွင် Benefits for Local Economy အား စာမျက်နှာ (၇၉)</p>

	Economy အား ထည့်သွင်းဖော်ပြရန် ကျန်ရစ်ခဲ့ကြောင်း တွေ့ရှိရ ပါသဖြင့် ထပ်မံထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	တွင်ပြင်ဆင် ဖော်ပြထားပါသည်။
	SIA တွင်ဖော်ပြထားသော သက်ရောက်မှု တစ်ခုချင်းစီ အတွက် သက်ရောက်မှု အဆင့်များ ဖော်ပြရာတွင် ထိုသက်ရောက်မှု အဆင့် များ၏ အဓိပ္ပါယ် ဖွင့်ဆိုချက်များနှင့် ထိုအဆင့်များ သတ်မှတ်ခြင်း အကြောင်းပြချက်များကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	- SIA တွင်ဖော်ပြထားသော သက်ရောက်မှု တစ်ခုချင်းစီအတွက် သက်ရောက်မှု အဆင့်များ ဖော်ပြရာတွင် ထိုသက်ရောက်မှု အဆင့်များ၏ အဓိပ္ပါယ် ဖွင့်ဆိုချက်များနှင့် ထိုအဆင့်များသတ်မှတ်ခြင်း အကြောင်းပြ ချက်များကို စာမျက်နှာ (၄၇ မှ ၅၂) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။
<b>၉။</b>	<b>ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့နည်း စေရေး လုပ်ငန်းများ</b>	
က	- HIA အစီရင်ခံစာ၏ စာမျက်နှာ (၇) တွင် လည်းကောင်း၊ စာမျက်နှာ (၄၈) တွင် လည်းကောင်း သကြားစက်ရုံစီမံကိန်း ဟူ၍ ဖော်ပြချက်အား တွေ့ရှိရ ပါသဖြင့် မှားယွင်းနေသော အဆိုပါ ဖော်ပြချက်အား ပြင်ဆင် ဖော်ပြရန် လိုအပ်ပါသည်။	- Appendix (16) ၊ HIA အစီရင်ခံစာ၏ စာမျက်နှာ (၇) တွင်လည်းကောင်း၊ စာမျက်နှာ (၄၈) တွင်လည်းကောင်း သကြားစက်ရုံစီမံကိန်း ဟူ၍ မှားယွင်းနေသော အဆိုပါ ဖော်ပြချက်အား စာမျက်နှာ (၇ နှင့် ၄၈) တို့တွင် ပြင်ဆင် ဖော်ပြထားပါသည်။
	HIA အစီရင်ခံစာ၏ စာမျက်နှာ (၂၇) တွင် ဆူညံသံ သတ်မှတ်ချက် များကို ဖော်ပြရာ၌ ၁၀၀ dB(A) အတွက် သတ်မှတ်ထားသည့် အချိန်သည် ၂ နာရီ ဖြစ်ရမည့် အစား ၅ နာရီဟု မှားယွင်းဖော်ပြထားသည့်အတွက် ပြန်လည် ပြင်ဆင်ဖော်ပြရန် လိုအပ်ပါသည်။	- Appendix (16) ၊ HIA အစီရင်ခံစာ၏ စာမျက်နှာ (၃၀) တွင် ဆူညံသံသတ်မှတ်ချက်များ ကို ဖော်ပြရာ၌ ၁၀၀ dB(A) အတွက် သတ်မှတ်ထားသည့် အချိန် ၂ နာရီ အား ပြန်လည်ပြင်ဆင် ဖော်ပြထားပါသည်။
ခ	- လုပ်ငန်းလည်ပတ်သည့် ကာလအတွင်း ကျန်းမာရေး ဆိုင်ရာ ထိခိုက်မှုများ အား ထည့်သွင်းစဉ်းစားရာတွင် အလုပ်သမားများ အဓိက ထိခိုက်ခံစားရ မည့် ဆူညံသံ၊ အပူ၊ VOC များ၊ အမှုန်များကြောင့် ဖြစ်ပေါ်နိုင်မည့် ကျန်းမာရေး ထိခိုက်မှုများအား ထည့်သွင်းစဉ်းစား၍ လျော့ပါးသက်သာစေရေး နည်းလမ်းများ နှင့်အတူ ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။	လုပ်ဆောင်လည်ပတ်သည့် ကာလတွင်း ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှုများအား ထည့်သွင်းစဉ်းစား ရာတွင် အလုပ်သမားများ အဓိက ထိခိုက်ခံစားရမည့် ဆူညံသံ ၊ အပူ ၊ VOC များ ၊ အမှုန်များ ကြောင့် ဖြစ်ပေါ် နိုင်မည့်ကျန်းမာရေး ထိခိုက်မှုများအား လျော့ပေါ့သက်သာစေရေး နည်းလမ်း များ နှင့်အတူ Appendix (16) ၊ HIA အစီရင်ခံစာ၏ စာမျက်နှာ (၄၂၊၄၃၊၄၄၊၄၅) တို့တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။
ဂ	- ဆောက်လုပ်ရေးအဆင့်နှင့် လုပ်ငန်းလည်ပတ်သည့် အဆင့်တွင်	ဆောက်လုပ်ရေးအဆင့်နှင့် လုပ်ငန်းလည်ပတ်သည့် အဆင့်တွင် ဆောင်ရွက်မည့်

<p>ဆောင်ရွက်မည့် Sexually transmitted infections များအား ကာကွယ်ရန် လုပ်ဆောင်မည့် HIV control အတွက် ပညာပေး လုပ်ငန်းများ ဆောင်ရွက်မည့် အကြိမ်အရေအတွက် နှင့် အဆိုပါ ပညာပေး လုပ်ငန်းများ ဆောင်ရွက်ရန် ဦးတည်သော အဖွဲ့အစည်း (ဥပမာ- အလုပ်သမားများ ၊ အနီးနားဝန်းကျင်ရှိ ကျေးရွာသူ/ ရွာသားများ)၊ အစရှိသည်ဖြင့် ကျန်းမာရေးဆိုင်ရာ သက်ရောက်မှု များအား လျော့ပါး စေရေး နည်းလမ်းများဖြင့် အသေးစိတ် ဖော်ပြထားသော ကျန်းမာရေး ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် (Health Management Plan) အား ပြည့်စုံစွာ ထည့်သွင်း ဖော်ပြရန်လိုအပ် ပါသည်။</p>	<p>Sexually transmitted infections များအား ကာကွယ်ရန် လုပ်ဆောင်ရမည့် HIV contro အတွက် ပညာပေး လုပ်ငန်းများဆောင်ရွက်မည့် အကြိမ်အရေအတွက် နှင့် အဆိုပါ ပညာပေး လုပ်ငန်းများ ဆောင်ရွက်ရန် ဦးတည်သော အဖွဲ့ အစည်း( ဥပမာ-အလုပ်သမားများ ၊ အနီးနား)ဝန်းကျင်ရှိ ကျေးရွာသူ/ရွာသားများ)၊ အစရှိသဖြင့် ကျန်းမာရေး ဆိုင်ရာ စီမံခန့် ခွဲမှုအစီစဉ်များ (Health Management Plan) အား စာမျက်နှာ (၄၇) တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p>
<p>ဃ စစ်တမ်းကောက်ယူချက်ရလဒ်များအရ စီမံကိန်းမှ ထုံးကျောက်မီး ရှို့ရာမှ ထွက်ရှိသည့် အခိုးအငွေ့များကြောင့် အနံ့ဆိုးများ ရရှိသည်ဟု ဖော်ပြပါရှိ သည့်အတိုင်း ထိုကဲ့သို့ အနံ့ဆိုးများအား ထိန်းချုပ်ရန် အတွက် စနစ်အား မည်သို့သော အခြေအနေတွင် တပ်ဆင်မည် ဖြစ်ကြောင်း၊ ထိုတပ်ဆင်မည့် စနစ်၏ အချက်အလက်များ၊ ယခုလက်ရှိ အနံ့ဆိုး ထွက်ရှိမှု အခြေအနေနှင့် အဆိုပါစနစ် တပ်ဆင် ပြီးချိန်တွင် ထိန်းချုပ်နိုင်မှု အခြေအနေများ စသည်တို့ကို အသေးစိတ် ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါ သည်။</p>	<p>အခန်း ၇.၈.၁ ၊ Air Emission Management Plan အား ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p><b>၁၀။ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်</b></p>	
<p>က ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်များကို ဖော်ပြရာတွင် သက်ရောက်မှု လျော့ချရေးဆိုင်ရာ အချက်အလက်များအား အသေးစိတ် ဖော်ပြရန် လိုအပ် ပါသည်။</p> <p>(ဥပမာ - NOx ထွက်ရှိမှုကို လျော့ချရန်အတွက် well designed burner system တပ်ဆင်မည်ဟု ဖော်ပြထားသော်လည်း ဖော်ပြရုံဖြင့် လုံလောက်မှု မရှိသောကြောင့် ထိုတပ်ဆင်မည့် စနစ်၏ အသေးစိတ် အချက်အလက်များ၊ ထိုစနစ်ကြောင့် လျော့ချနိုင်မည့် ပမာဏများ စသည်ဖြင့် ထည့်သွင်း</p>	

	<p>ဖော်ပြရန် လိုအပ်ပါသည်။</p> <p>ဥပမာ - ဒီဇယ်သုံးမီးစက်အား စိတ်ချရသော ခေါင်းတိုင် အမြင့်ဖြင့် သတ်မှတ်မည်ဟု ဖော်ပြထားသော်လည်း ပြည့်စုံ လုံလောက်မှု မရှိပါ။ သတ်မှတ်မည့် ခေါင်းတိုင်အမြင့်အား ဖော်ပြ၍ ထိုအမြင့်သည် နိုင်ငံတကာမှ သတ်မှတ်ထားသည့် စံချိန်စံညွှန်းအတိုင်း တွက်ချက်ထား၍ စိတ်ချရသည် ဟူသော အကြောင်းပြချက်များ၊ သက်သေပြချက်များဖြင့် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>စက်ရုံရှိ ခေါင်းတိုင်များ၏ အမြင့်များအား အခန်း (၃) ၊ Table 3-15 တွင် ထည့်သွင်း ဖော်ပြထားပါသည်။</p>
ခ	<p>- စီမံကိန်း၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် တစ်ခုလုံးအား ဆောင်ရွက်ရန် အတွက် ညစ်ညမ်းမှု ထိန်းချုပ် အရာရှိ (Pollution Control Officer) တစ်ဦးအား ခန့်အပ်ရုံဖြင့် လုံလောက်မှု မရှိပါ။</p> <p>- စီမံကိန်း၏ တည်ဆောင်ရေးအဆင့်၊ လုပ်ငန်းလည်ပတ်သည့် အဆင့်နှင့် လုပ်ငန်းပိတ်သိမ်းသည့် အဆင့်များတွင် လုပ်ဆောင်သွားမည့် စောင့်ကြပ် ကြည့်ရှုရေး လုပ်ငန်းများအား <b>တာဝန်ယူဆောင်ရွက်မည့် အဖွဲ့အစည်းနှင့် အဆိုပါ အဖွဲ့အစည်းတွင် ပါဝင်သူများ နှင့် တာဝန် သတ်မှတ်ချက်များအား</b> အသေးစိတ်ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၇.၅ တွင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား တာဝန်ယူဆောင်ရွက်မည့် Ngwe Yi Pa Le' Cement Company Limited မှ အဖွဲ့အစည်းနှင့် ၎င်းတို့၏ တာဝန်ဝတ္တရားတို့အား ဖော်ပြ ထားပါသည်။</p>
ဂ	<p>- ဆောက်လုပ်ရေးလုပ်ငန်းအဆင့် စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ် ဇယား (၉.၁) တွင်ဖော်ပြထားသော parameter အမျိုးအစားများအား အတိအကျ ထည့်သွင်း ဖော်ပြရန်နှင့် တိုင်းတာမည့် သို့မဟုတ် နမူနာ ကောက်ယူမည့် နေရာများ၏ တည်နေရာ ကိုဩဒိနိတ်အား အတိအကျဖြင့် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>CROWN Cement Plant သည် လက်ရှိအချိန်တွင် လည်ပတ်သည့်အဆင့်ရောက်ရှိနေပြီ ဖြစ်နေသည့် အတွက် ဆောက်လုပ်ရေးလုပ်ငန်းအဆင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ် ဆောင်ရွက်ရန် မဖြစ်နိုင်သည့်အတွက် အခန်း ၇.၇ ၊ Table 7-5 &amp; 7-6 တို့တွင် လည်ပတ်ရေးအဆင့် စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ်များကို ပြင်ဆင်ဖော်ပြထားပါသည်။</p>
	<p>လုပ်ငန်းလည်ပတ်သည့်အဆင့် စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ်တွင် စက်ရုံခေါင်းတိုင်မှ Air Emission တိုင်းတာခြင်းတွင် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး ထုတ်လွှတ်မှု လမ်းညွှန်ချက် ၏</p>	<p>Air Emission အတွက် Parameter (၁၂) ခုတွင် Cadmium + Thallium, Dioxins/Furans, Mercury, Total Metals တို့သည် မြန်မာနိုင်ငံတွင် တိုင်း တာ၍ မရနိုင်ပါ။ Air Emission တိုင်းတာသည့် စက်တွင် Hydrogen chloride, hydrogen fluoride, nitrogen oxides, total</p>

	<p>စာမျက်နှာ ၈၆ တွင်ပါရှိသော (Air Emission Levels for cement manufacturing နှင့် Lime manufacturing) ရှိ parameter များ အားလုံးအား ထည့်သွင်းတိုင်းတာရန် နှင့် လမ်းညွှန်ချက်အတိုင်း ကိုက်ညီမှု ရှိအောင် ဆောင်ရွက်ရန် လိုအပ်ပါသည်။</p>	<p>organic carbon တို့ကို တိုင်းတာသည့် sensor မပါရှိခြင်းကြောင့် ၎င်း parameters များကို တိုင်းတာ၍ မရနိုင်ပါ။</p>
	<p>လုပ်သားများ၏ လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ဆိုင်ရာ ကင်းရှင်းရေးအတွက် လုပ်ငန်းခွင်အတွင်း လေအရည်သွေး တိုင်းတာမှု (Indoor Air Quality ) ပြုလုပ်ရန် လိုအပ်ပါသည်။</p> <p>(ဥပမာ -SO2, NO, CO2, CO, O3, VOC စသည့် Parameters) များ အား တိုင်းတာခြင်း ပြုလုပ်ရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၇.၇.၁ တွင် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်ပါ Table 7.5 တွင် ဖြည့်စွက် ဖော်ပြထားပါသည်။</p>
<p>ဃ</p>	<p>စောင့်ကြပ်ကြည့်ရှုရေး လုပ်ငန်းများ ဆောင်ရွက်ရန်အတွက် ကုန်ကျ စရိတ် များ၊ ပတ်ဝန်းကျင်၊ လူမှုနှင့် ကျန်းမာရေး ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုရေး ဝန်ထမ်းများ ခန့်အပ်ရန် အတွက် ကုန်ကျ စရိတ်များ၊ သင်တန်းများ ဖော်ထုတ် ဖွင့်လှစ်ရန်အတွက် ကုန်ကျစရိတ်များ စသည်ဖြင့် EMP အား အကောင်အထည်ဖော် ဆောင်ရွက်ရန်အတွက် ကုန်ကျစရိတ်များအား ဆောင်ရွက်မည့် လုပ်ငန်းတစ်ခုချင်း စီအလိုက် အသေးစိတ်ကို ခန့်မှန်း ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၇.၇.၂ တွင် စောင့်ကြပ်ကြည့်ရှုရေး လုပ်ငန်းများအတွက် ခန်းမှန်း ကုန်ကျစရိတ်အား ထည့်သွင်းဖော်ပြထားပါသည်။</p>
<p>c</p>	<p>ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အခန်း (၉) အပိုဒ်ခွဲ ၁၀၈ အရ “ စီမံကိန်း အဆိုပြုသူသည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်၏ ဇယားပါအတိုင်း စောင့်ကြပ်ကြည့်ရှုမှု အစီရင်ခံစာကို ဝန်ကြီးဌာနသို့ (၆) လ တစ်ကြိမ် (သို့မဟုတ်) ဝန်ကြီးဌာနက သတ်မှတ် ထားသည့်အတိုင်း တင်ပြရမည်” ဟု ဖော်ပြပါ ရှိသည့်အတိုင်း စောင့်ကြပ် ကြည့်ရှုမှု အစီရင်ခံစာအား ဝန်ကြီးဌာနသို့ တင်ပြမည့် အစီအစဉ်၊ အချိန်ဇယား စသည်တို့ ကို ထည့်သွင်းဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၇.၇.၃ တွင် စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာကို ဝန်ကြီးဌာနသို့ (၆) လ တစ်ကြိမ် (သို့မဟုတ်) ဝန်ကြီးဌာနက သတ်မှတ် ထားသည့်အတိုင်း တင်ပြရမည်ဖြစ်ကြောင်း</p>



၁၁။ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း		
က	<p>စီမံကိန်း၏ ဆောက်လုပ်ရေး လုပ်ငန်းစတင်သည့် အချိန်မှ စ၍ စီမံကိန်း ပိတ်သိမ်းသည့် ကာလအထိ ဒေသခံ ပြည်သူများ၏ မကျေနပ်ချက်များ၊ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ပြဿနာ အရပ်ရပ်အား လက်ခံ သုံးသပ်၍ ဖြေရှင်း ပေးနိုင်ရန် အတွက် နစ်နာမှု ဖြေရှင်းရေး လုပ်ငန်းစဉ် တစ်ရပ်အား ဒီဇိုင်းရေးဆွဲ၍ ဖော်ထုတ်ရန် လိုအပ်ပါသည်။</p> <p>- အဆိုပါ နစ်နာမှု ဖြေရှင်းရေး လုပ်ငန်းစဉ်အား ဒေသခံ ပြည်သူများမှ သိရှိစေပြီး ဒေသခံပြည်သူများမှ ပြဿနာများ၊ မကျေနပ်ချက်များ ရှိပါက လွယ်ကူစွာ တိုင်ကြားနိုင်ကြောင်းကိုလည်း သတင်းထုတ်ပြန် ကြေညာရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၈.၇ တွင် နစ်နာမှု ဖြေရှင်းရေး လုပ်ငန်းစဉ် Grievance Redress Mechanism (GRM) ကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>
ခ	<p>စီမံကိန်း၏ EIA အစီရင်ခံစာအား Public Disclosure ပြုလုပ်ခဲ့သည့် Key Stakeholders များအကြောင်း အသေးစိတ် ဖော်ပြရန် လိုအပ်ပါ သည်။</p> <p>- အစီရင်ခံစာအား စီမံကိန်းအဆိုပြုသူ၏ ဝက်ဘ်ဆိုဒ်မှ လည်းကောင်း ထုတ်ပြန်ကြေညာရမည်ဖြစ်သဖြင့် ဝက်ဘ်ဆိုဒ်တွင် အစီရင်ခံစာအား ထုတ်ပြန်ကြေညာ၍ ထုတ်ပြန်ကြေညာမည့် ဝက်ဘ်ဆိုဒ် အညွှန်း (website link) အား အစီရင်ခံစာတွင် ထည့်သွင်း ဖော်ပြရန် လိုအပ်ပါသည်။</p>	<p>အခန်း ၈.၃ တွင် Key Stakeholder များကို ထည့်သွင်းဖော်ပြထားပါသည်။</p> <p>အခန်း ၈.၆ တွင် အစီရင်ခံစာ ထုတ်ပြန်ကြေညာမည့် website link အား ဖော်ပြထားပါသည်။</p>
၁၂။ ဆက်စပ်သက်ရောက်မှုများ		
က	<p>စီမံကိန်း၏ အခြားအစိတ်အပိုင်းများ (ဥပမာ- ထုံးကျောက် ထုတ်လုပ်ခြင်း ကဲ့သို့သော အခြားလိုအပ်သော ကုန်ကြမ်း ပစ္စည်းများတူးဖော်ထုတ်လုပ် ခြင်း၊ လျှပ်စစ်ဓာတ်အားပေး မီးစက်များ အသုံးပြုခြင်း) စသည့် တို့ကြောင့် သက်ရောက် နိုင်မှုများနှင့် စီမံကိန်း အနီးတဝိုက်ရှိ အခြား စီမံကိန်းများမှ သက်ရောက်နိုင်သော ဆက်စပ် သက်ရောက်မှုများကို သတ်မှတ်</p>	<p>အခန်း ၆ တွင် စီမံကိန်း၏ အခြားအစိတ်အပိုင်းများ နှင့် စီမံကိန်း အနီးတဝိုက်ရှိ အခြား စီမံကိန်းများမှ သက်ရောက်နိုင်သော ဆက်စပ်သက်ရောက်မှုများနှင့် သင့်လျော်သော လျှော့ချရေးနည်းလမ်းများကို ထည့်သွင်းဖော်ပြထားပါသည်။</p>

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## **ABBREVIATION**

ACI	Activated Carbon Injection
AIDS	Acquired immunodeficiency syndrome
APH	ASEAN Heritage Park
A.Q.C	Air Quenching Cooler
BACT	Best Available Control Technology
BCT	Bulk Cement Truck
BE	Bachelor of Engineering
BEHS	Basic Education High School
BEMS	Basic Education Middle School
BEPS	Basic Education Primary School
B.Sc	Bachelor of Science
Btus	British Thermal Units
Cd	Cadmium
CaO	Calcium Oxide
CaCO <sub>3</sub>	Calcium Carbonate
CCS	Carbon Capture and Storage
CH <sub>4</sub>	methane
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species
CITES	Convention on International Trade in Endangered
CKD	Cement Kiln Dust
cm	centimeter
CO	Carbon monoxide
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
CSR	Corporate social responsibility
Ø	Diameter
dB(A)	Decibel (measured with A-weighting)
°C	Degree Celsius
°F	Degree Fahrenheit
DEA	Decommissioning Environmental Assessment
DG	Diesel Generator
DHF	Dengue Hemorrhagic Fever
DICA	Directorate of Investment and Company Administration
DIN	Deutsches Institut FUR Normung



DISI	Directorate of Industrial Supervision and Inspection
DICA	Directorate of Investment and Company Administration
DSI	Dry Sorbent Injection
E	East
EC	Electrical Current
ECC	Environmental Compliance Certificate
ECD	Environmental Conservation Department
ECL	Environment Conservation Law
EGU	Electric Generating Unit
EIA	Environmental Impact Assessment
EMO	Environmental Monitoring Organization
EMP	Environmental Management Plan
EMS	Environmental Monitoring Specialist
EO	Environmental Officer
EPA	Environmental Protection Agency
EPO	Environmental Program Officer
ERPs	Emergency Response Plans
ESIA	Environmental and Social Impact Assessment
EDTA	Ethylene Diamine Tetraacetic Acid
ESP	Electrostatic Precipitator
ETP	Effluent Treatment Plant
FGD	Flue Gas Desulphurization
GAD	General Administration Department
gal	gallon
GHGs	Green House Gases emissions
GMES	Green Myanmar Environmental Services Co., Ltd.
g/mol	gram per mole
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
GW	Ground Water Sampling Point
GWZ	Ground Water Zone
ha	hectare
HACI	Halogenated Activated Carbon Injection
HBV	Hepatitis B Virus
HC	Hydro Carbon
HCFC	Hydrochlorofluorocarbons

HCL	Hydrochloric acid
HCB	Hepatitis C Virus
HDPE	High Density Poly Ethylene
HF	Hydrogen Fluoride
Hg	Mercury
HSE	Health, Safety and Environment
HFCs	Hydrofluorocarbons
HIV	Human Immunodeficiency Virus
HSE	Health, Safety and Environment
IBA	Important Biodiversity Area
IEC	Information, education and communication
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IGCC	Integrated Gasification Combined Cycle
IUCN	International Union Conservation of Nature
IVI	Important Value Index
KBA	Key Biodiversity Area
kg	kilogram
km/h	kilometer per hour
kV	kilo Volt
kVA	kilo Volt Ampere
kW	Kilo Watt
L	Liter
L.S	LiConservation Department
Leq	Equivalent sound level
LEV	Local Exhaust Ventilation
LNB	Low No <sub>x</sub> Burner
LOI	Loss on ignition
m	meter
mm	millimeter
m/s	meter per second
m <sup>2</sup>	square meter
mg/kg	milligram per kilogram
µg/L	micro gram per liter
µg/ m <sup>3</sup>	micro gram per cubic meter
µg/Nm <sup>3</sup>	micro gram per Normal cubic meter

mg/m <sup>3</sup>	milligram per Cubic meter
mg/Nm <sup>3</sup>	milligram per Normal Cubic meter
MIC	Myanmar Investment Commission
mm	millimeter
MOEE	Ministry of Electricity and Energy
MONREC	Ministry of Natural Resources and Environmental Conservation
MOST	Ministry of Science and Technology
Mpa	Mega Pascal
MTU	Mandalay Technology University
wt	Weight
MW	Mega Watt
N	North
N <sub>2</sub>	Nitrogen
NBSAP	National Biodiversity Strategies and Action Plan
ND	Not Detected
NECCCC	National Environmental Conservation and Climate Change Committee
NEQG	National Environmental Quality Emission Guidelines
NGO	Non-Government Organization
N <sub>2</sub> O	Nitrous oxide
NO <sub>x</sub>	Nitrogen Oxides
NO <sub>2</sub>	Nitrogen Dioxides
NTU	Nephelometric Turbidity
NV	Noise and Vibration Measuring Point
OFA	Over Fire Air
O <sub>2</sub>	Oxygen
O <sub>3</sub>	Ozone
OHS	Occupational Health and Safety
OPC	Ordinary Portland Cement
OSO	Operating Safety Officer
PCO	Pollution Control Officer
Ph.D	Doctor of Philosophy
PCF	perfluorocarbons
PHO	Public Health Officer
PM	Particulate Matter
PM <sub>10</sub>	Particulate Matter Smaller than 10 micrometer
PM <sub>2.5</sub>	Particulate Matter Smaller than 2.5 micrometer

PPE	Personal Protective Equipment
ppm	part per million
PTW	Permit to Work
RCD	Residual Current Device
RD	Relative Density
RF	Relative Frequency
r.p.m	revolution per minutes
SAoI	Social Area of Influence
SF <sub>6</sub>	sulfur hexafluoride
SMP	Social Management Plan
SO <sub>2</sub>	Sulfur Dioxide
Soba	State of The Basin Assessment
SPM	Suspended Particulate Matter
SS	Suspended Solids
STP	Sewage Treatment Plant
SW	Surface Water Sampling Point
TVOC	Total Volatile Organic Compound
TDS	Total Dissolved Solids
TJ	Amount of fuel combusted
TPD or t/d	Tons per Day
TPH	Tons per Hour
Ton/yr	Tons per Year
US\$	Dollar of United States
UNFCCC	United Nations Framework Convention on Climate Change
USC Boiler	Ultra Supercritical Boiler
VDRL	Venereal Disease Research Laboratory
VOC	Volatile Organic Carbon
WHO	World Health Organization
Ygn	Yangon
YTU	Yangon Technology University

## DOCUMENT CERTIFICATION


This project report on Environmental and Social Impact Assessment has been prepared by Green Myanmar Environmental Services Co., Ltd. and Socially Responsible Partner SIA/ HIA Group assigned by GMES. Ngwe Yi Pa Le' Cement Co., Ltd, project proponent for Crown Cement Factory (5000 TPD) Project, do hereby solemnly affirm and declare that I fully understand and undertake to operate the project strictly in accordance with the said conditions, Environmental Impact Assessment. Ngwe Yi Pa Le' Cement Company Limited in its capacity as the promoter and operator of the project hereby declares the intention to abide by the existing national laws and regulations regarding environmental protection during the construction and operation of the Project.

Ngwe Yi Pa Le' Cement Co., Ltd endorse this EIA Report as follow;

- a) The EIA is the accurate and complete.
- b) The EIA has been prepared in strict compliance with applicable laws including EIA Procedure (2015), and
- c) The Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report.

I, the undersigned, certify that the particulars in this report are correct and true to the best of my knowledge.

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Signature :  -----

Name : Sein Myo Aung  
Executive Director  
Ngwe Yi Palè Cement Co., Ltd. -----

Designation : -----

Date : -----

## COMMITMENT AND ACKNOWLEDGEMENT

An Environmental Impact Assessment (EIA) Report which includes Environmental Management Plan (EMP) is a procedure that identifies, describes, evaluates and develops means of mitigating potential impacts of a proposed activity on the environment.

This EIA report was prepared by using information from the following sources: review of selected literature, reports, and advisories; meetings with several interested parties; personal visitation with several persons; the experience of the EIA team; and other information solicited from baseline data and stakeholders. And we strongly commit that this report was prepared in compliance with Myanmar Environmental Laws and Regulations.

The EIA team is grateful to the project proponent – **Ngwe Yi Pa Le' Cement Co., Ltd.** - for commissioning us to conduct this Environmental Management and Monitoring Plan report in respect of the proposed project. We would like to further acknowledge with great appreciation all those neighbors who participated in the public consultation process for their cooperation throughout the exercise.

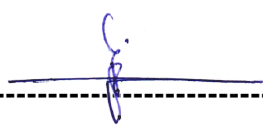
We further acknowledge the support, either direct or indirect, from the various parties who assisted the EIA team towards the successful completion of this report.

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## **EXECUTIVE SUMMARY**

### **Introduction**

Ngwe Yi Pale’ Cement Company Limited, a subsidized company of Ngwe Yi Pale’ Group of Company Limited, was first established on March 3, 2014 under Registration No.130799027 of the Myanmar Directorate of Investment and Company Administration. The company had been operating 5000 TPD Cement Plant at Lauk Hpan Village, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, Northern Shan State in Myanmar (see **Figure A.1**).

Ngwe Yi Pale’ Cement Company Limited commissioned Green Myanmar Environmental Services Company (**GMES**) Limited to conduct Environmental and Social Impact Assessment study for this project.

This Environmental Impact Assessment (EIA) study has been started at the end of winter season of March 2015. The Experts of EIA study are described in **Table 1.2, Chapter 1 of EIA Report**.

### **Policy, Legal and Institution**

Ngwe Yi Pale’ Cement Company Limited will comply in accordance with policy, legal and institution for the cement production project and summarized as the following;

- Government policy: National Sustainable Development Strategy in 2009, National Environmental Policy (2019) and other relevant policies with the project
- National laws and regulations relevant with the project
- International convention and agreement with the project
- National Environmental Quality (Emission) Guidelines and other relevant standards with the project
- Institution of government regarding to Health, Safety and Environment (HSE) issues,

Detail information of policy, legal and institution for CROWN Cement plant are described in **Chapter 2 of EIA Report**.

### **Project Description**

Ngwe Yi Pa Le’ Cement Company Limited implemented 1,000 TPD Cement Plant near Lauk Hpan village at Shan State Naung Hkio Township. Due to high demand and annual shortage of cement supply in Myanmar, the company decided to expend from 1,000 TPD to 5,000 TPD with the approval of MIC. So, the maximum production capacity of 4,000 tons per day of cement plant is constructed within the plant site area.

Ngwe Yi Pa Le’ Cement Company Limited started the construction of Phase I of 1000 TPD Cement Plant in 2011 and has been commercially produced in 2013. This company planned

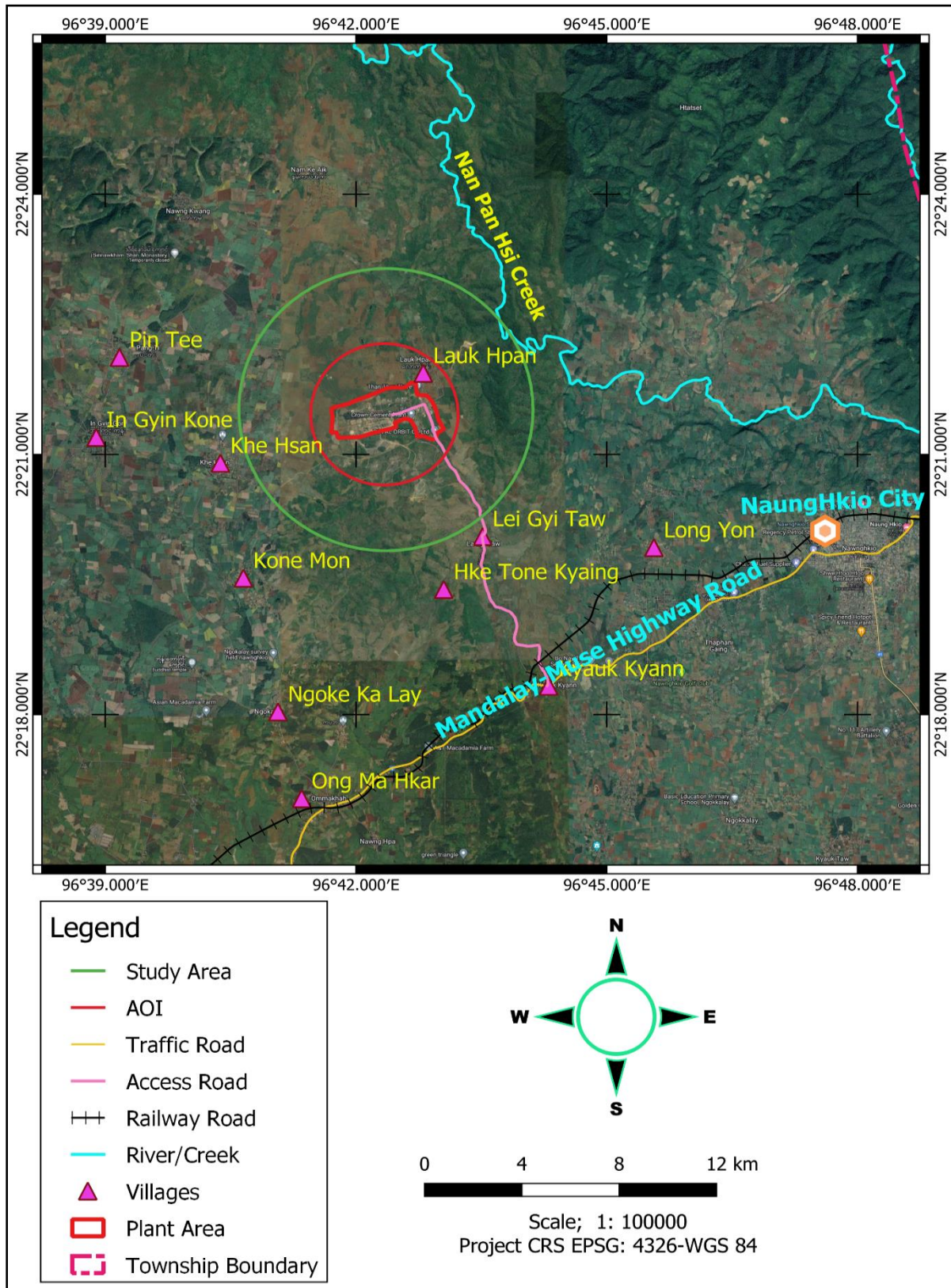
to expand the production capacity of 5000 TPD and then the phase II of 4000 TPD Cement Plant started the construction stage in July, 2015 and commercially produced in June 2019. The Project invested approximately 99,025.55 million Kyats (including 89.235 million US \$).

The plant is located at Lauk Hpan Village, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, Northern Shan State in Myanmar. The project area comprises of 250 acres of plant site and 210 acres of associated area for residential which were permitted as industrial lands. The approximate geographical coordinate of the plant site is shown in **Table A.1** and overview of geographical Map is shown in **Figure A.1**.

Table A.1 Coordination Points of Plant Site

Name	Latitude	Longitude
Location Plant Site	22° 21' 22.65" N	42' 11.68" E.





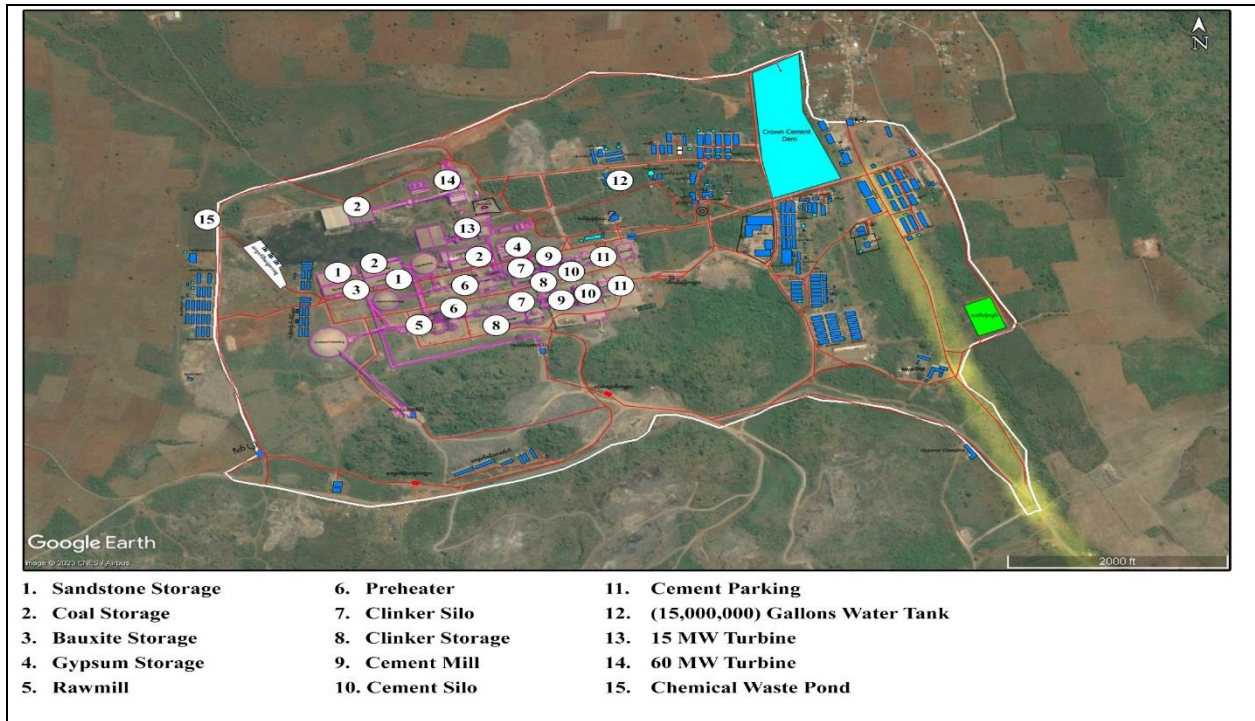


Fig A-2 Layout Plan of Plant Area

The production design capacity of the plant is 5000 Tons per day (the total production of two cement plants). The product name is “CROWN Cement” (see **Figure 3.3**) and there are four (4) classes of cement such as 52.5 Class Cement, 42.5 Class Cement, 32.5 Class Cement.



Fig 3.3 Product Name of CROWN Cement Plant

Limestone, Clay, Laterite and Gypsum will be required as main raw materials for cement production process and Coal will be used as the fuel for the generation of heat in Clinker Section. Consumption of raw materials are **Table A.2**.



Table A.2 Consumption of raw materials

Sr. No.	Commodities	Unit	Quantity	
			Daily	Monthly
1	Limestone	Metric Ton	6,720	2,217,600
2	Clay	Metric Ton	1,040	343,200
3	Iron ore	Metric Ton	240	79,200
4	Gypsum	Metric Ton	450	148,500
5	Coal	Metric Ton	1250	412,500

### ***Production Process***

The operation process of CROWN Cement Plant, dry process has been selected to manufacture cement. In the manufacturing process, the significant manufacturing stages are namely; crushing, raw material grinding, clinkeriation, cement grinding and packing.

**Stage 1:** Mining and crushing of limestone, and blending with other raw materials containing aluminum, iron and silica is referred to as raw meal.

**Stage 2:** The raw meal is then preheated with exhaust gases from the kiln, and then introduced to the kiln where it becomes a semi-smelted product at around 1,450°C. It is then fast cooled to form clinker, which ranges from dust particles to golf ball size.

**Stage 3:** Involves grinding of the clinker, and blending the powder with 5% gypsum. Other additives may also be used to provide the required properties of the cement. The maximum cement production would be about 5,000 TPD.

**Stage 4:** The final cement product is stored in silos, for bulk loading to trucks, or for supply to the bagging plant. The cement powders from the silos are put into a 50 kg stretch bag and Bulk Cement Truck (BCT) and distribute and sell it.

### ***Utilities***

CROWN Cement Plant will operate cement production with about **1230** employees. The electrical power will be sourced from the 60 MW of **Coal Power Plant** at the plant site and SINN SHWE LI Sugar Mill No.2. During the sugarcane season, electrical power will be sourced from SINN SHWE LI Sugar Mill No.2 which will transmit 15 MW. The total electrical consumption of 5000 TPD Cement plant and residential is 32 MW.

Main water source for Crown Cement Plant is nearby streams which flows every season and the stream water will be collected with three (3) water collection ponds and then stored with the storage tanks which are the capacity of **21, 15 and 1 million** gallons each. Total annual water requirement for cement plants is 9,250,000 gallons. Diesel and Gasoline will be required for

transport vehicles and generators and Fuel requirements are 70,000 gallons/day of diesel and 750 gallons/day of gasoline.

***Emission, Discharge and Waste Management***

Air pollutant emitted from **Crown Cement Plant** are summarized as

- Dust and particulate matter by transportation and processing of raw materials and packing products
- GHG Emission by coal burning, fuel combustion (especially diesel usage) and kiln production.

Total GHG emitted from cement plant is shown in **Table A.3**.

Table A.3 Total GHG Emission (CO2) from fuel usage

Emission	GHG Emission, CO2 (ton/day)			Total GHG Emission, CO2 (ton/day)
	Diesel	Coal	Clink Production	
GHG Emission, CO2	455	2,309	2535	<b>5299</b>

Solid wastes generated from the plant are summarized as in Table A.4.

Table A-4 Solid wastes generated from the plant

Waste type	Waste name	Weight (Estimated)	Waste Management/ Disposal Method
Process Wastes	▪ Suspended particulate matter and stone pieces from raw materials of cement manufacturing process	1 Ton/yr	Recycle Suspended particulate matter and stone pieces in Cement Manufacturing Process
	▪ Coal Ash	80 Ton/day	Reused Coal Ash in cement manufacturing process and brick manufacturing (see section 7.7.3; Coal Ash Utilization)
Domestic Wastes	<ul style="list-style-type: none"> <li>▪ Food scraps</li> <li>▪ Kitchen waste</li> <li>▪ Bottles, cans</li> <li>▪ Uncontaminated fabric or clothing</li> <li>▪ Packaging, paper</li> </ul>	10 Tons/yr	<ul style="list-style-type: none"> <li>▪ Some Recycle or reusable solid wastes will be sold to the recycling shop for further use, as appropriate or dispose to waste disposal site of plant.</li> <li>▪ Food waste shall be handed over to local villagers for livestock feeding if there is a demand. If no demand, this waste shall be disposed to</li> </ul>

**Environmental Impact Assessment Report  
For “Crown Cement Plant 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd.*

			waste disposal site of plant.
Sewage	Sludge	0.5 Ton/yr	Use in Plantation as the fertilizer after mixing with soil
Maintenance Wastes	<ul style="list-style-type: none"> <li>▪ Iron, Scrap Metal, Used vehicle tyres, ruined machine parts and vehicle parts (damage),</li> <li>▪ Used welding electrodes etc. rubber gasket material</li> </ul>	5 Ton/yr	<ul style="list-style-type: none"> <li>▪ All reusable maintenance wastes will be sold to the recycling shop for further use, as appropriate.</li> <li>▪ Rest of waste with contaminated oil disposed to the plant disposal site or will be transferred to waste disposal site of NaungHkio City Development Committee.</li> </ul>
Hazardous Wastes	<ul style="list-style-type: none"> <li>▪ Used lubricating oil</li> <li>▪ Used hydraulic oil</li> <li>▪ Filters contaminated with oil</li> <li>▪ Drums and containers used for oil</li> <li>▪ Rags, paper, gloves, plastics and other materials contaminated with oil</li> <li>▪ bulb, fluorescence tube, LED bulb,</li> <li>▪ Used batteries</li> <li>▪ Medical Waste</li> </ul>	3 Tons/yr	Hazardous Waste Management (Section 7.7.3 Waste Management Plan)

The cement production process of CROWN Cement Plant is dry process so that water will not be required in this process. Water will be used for cooling system, dust suppression and domestic uses. In cooling system, water is circulated from cooler to cooling tower and there is no waste water discharge. In addition, water will be sprayed over raw materials to control dust suppression where there is no waste water comes out. Offices and worker accommodation will generate domestic waste water such as greywater from showers and kitchen. All domestic waste water will be discharged to the detention pond. Stormwater will solute cement dust from plant site and it will be handled through drainage systems.

If any discharge form that pond is required, all effluent will be treated in accordance with NEQEG.

***Project Alternatives***

The analysis of alternatives for the proposed project is important one of the EIA. It makes more positive and less adverse impact.

**Project site alternatives** - No off-site or other site has been investigated because of the nearness of the Mandalay - Lashio – Muse National Highway to the current project site location. This ensures easy transportation of raw and product.

**Process Alternatives** - There are two main processes as wet and dry for the manufacturing the cement. CROWN Cement Plant chose the **dry process** Comparison of pros and cans of both processes are followed.

**Comparison between wet and dry process**

<b>Wet Process</b>	<b>Dry Process</b>
- Moisture content of the slurry is 35-50%	- Moisture content of the pallets is 12%
- Size of the kiln needed to manufacture the cement is bigger	- Size of the kiln need to manufacture the cement is smaller
- The amount of heat required is higher, so the required fuel amount is higher	- The amount of heat required is lower, so the required fuel amount is lower
- Less economically	- More economically
- The raw materials can be mixed easily so a better homogeneous material can be obtained.	- Difficult to control the mixing of raw materials process, so it is difficult to obtain homogeneous materials
- The machinery and equipment do not need much maintenance	- The machinery and equipment need mor maintenance

**Surrounding Environment**

In this project, EIA study area has been identified as 5 km radius with the proposed project as its center. It is important to set the study area for conducting the Environmental Impact Assessment Study which will reflect the impacts due to the proposed project activity.

For preparation of this EIA report, there are two methodologies to collect the data to describe the current environmental and social conditions of the proposed project.

- (i) Primary Data Collection and Analysis
- (ii) Secondary Data Collection and Analysis

Environmental baseline data (primary data) such as ambient air quality, ambient noise levels, water quality and soil quality are measured by using instruments. Some socioeconomic conditions and biological environment are surveyed by the consultants as the primary data. Some data such as socioeconomic conditions of Naung Hkio Township, physical, biological environment and weather data are collected from the respective websites and reviewed by the EIA study team. The regional data of the Naung Hkio Township was collected from the Township Data published by General Administration Department (GAD) in 2019.

The project area is situated in the Naung Hkio Township, Northern Shan State. The topography of this region is represented by moderate hills, plain and valley. The elevation is 976 msl. Rock types of project area are Paleozoic-Triassic (see **Figure 4.5**)

Primary data of Environmental Quality of the Project Study Area was collected during surveys, as follows and detail discussion of primary data of Environmental Quality is described in **Chapter 4**.

- Ambient Air quality –air quality was monitored at five (2) locations which are with the firm. The monitoring was recorded continuously for 24 hours per station during 24<sup>th</sup> July 2020 to 25<sup>th</sup> July 2020;
- Noise level – monitoring of ambient noise level was conducted at same five (2) location within the project site and also in parallel to the air quality monitoring.
- Surface water – Samples of surface water was collected at (1) locations from stream like stream water near the project at 27 July 2020;
- Soil – Individual grab soil samples were collected at locations throughout the hot spot with the project site. The totals of (38) grab sample collected from the banana plantation were combined to (8) samples and analysis in lab of Landuse Division, Department of agriculture. A sample from a depth of 120 cm was collected at each location. All samples were collected at 27 July 2020; and
- Groundwater – groundwater sampling was conducted at six (6) locations at the project site at 27 July 2020;

The project area, Crown Cement Factory, NYPLGCL, is located at Lauk Hpan Village, Long Yon Village Track, Naung Hkio Township, Kyauk Me District, Northern Shan State. The nearest water body is Nan Pan Hsi Creek, which is 4.15 kilometers away. Upper Ayeyarwady Catchment Area Corridor and Mehon (Myintnge River) KBA as the type of Important Bird Area (IBA) are included within the Naung Hkio Township but there is no KBA within the Study Area.

According to the fauna survey for Ngwe Yi Pa Le' Cement Factory, a total of 100 species representing butterfly (17 species), dragonfly and damselfly (15 species), bee (2 species), fish (11 species), frog and toad (9 species), lizard and skink (5 species), Snake (3 Species), birds (24 species) and Mammalians (14species) are recorded. There is no endangered and endemic species under IUCN Red list category.

The socio-economic baseline will be collected base on the Social Area of Influence (SAoI), which have to be positively or negatively affected by the Project.

Based on concerns of stakeholders, Lauk Hpan Village, Lal Gyi Taw Village, and Khe Hsan Village, can have social-economic impact. All of these villages are located within study area of **3 km radius** of the proposed project.

The social baseline focuses on Naung Hkio Township and the receptors within the study area. The secondary data collected from Naung Hkio Township profile dated 30<sup>th</sup> September 2019.

According to the status of 2019 profile, total population of Naung Hkio Township is 125,269 persons as shown in **Table A.5**.

Table A.5. Household and Population of Township

Residence	Older than 18			Younger than 18			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<b>Urban</b>	2288	2292	4580	5369	5765	11134	7657	8057	15714
<b>Rural</b>	19033	18855	37888	35560	36107	71667	54583	54962	109555
<b>Total</b>	21321	21147	42465	40929	41872	82801	62250	63019	125,269

Source: TspProfiles\_GAD\_NaungHkio\_2019\_MMR

According to official statistics, unemployment rate in Naung Hkio Township is estimated as 4.04% (see **Table A.6**).

Table A.6 Unemployment rate

Workforce	Employed	Unemployed	Unemployment rate
<b>82,801</b>	79, 456	3,345	4.04%

### Impacts and Mitigation Measures

Due to these project activities in construction and operation phases, the impact on the following environmental and social component will occur:

- Air quality
- Noise
- Vibration
- Surface Water Quality
- Soil and Topography
- Biodiversity
- Social-economy
- Occupational health and safety
- Community health and safety

A summary of key impacts from the Project, as well as the results of impact assessment are listed in **Table A.7** through **Table A.8**. Full details of all potential impacts assessment and mitigation measures are presented in **Chapter 7 of EIA report**.



Table A.7 Impacts and its significance of Construction Phase

<b>Environmental Component</b>	<b>Potential Impacts</b>
Air quality	<ul style="list-style-type: none"> <li>✓ Dust (PMs) dispersion in air is expected from movements of vehicles, site preparation and construction, access road construction/upgrading, such as excavating, grading, filling and compacting</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in engine of vehicles, machinery.</li> </ul>
Noise	Noise generally causes nuisance and disturbance to the workers and community
Vibration	Vibration from Traffic, Construction activities, Heavy Machine Running
Water Environment	Impact on water environment cause of water usage and run off water, waste water by construction activities
Soil Quality	Soil degradation and contamination
Solid Waste	<ul style="list-style-type: none"> <li>✓ If not properly handled, it has the potential to degrade the quality of land.</li> <li>✓ Odor problem</li> <li>✓ Breeding of flies, birds, rodents etc.</li> <li>✓ Nuisance to the nearby communities if present within the proximity of the project area.</li> </ul>
Ecology	<ul style="list-style-type: none"> <li>✓ Flora and Fauna can be affected due to construction activities</li> <li>✓ Temporary migration of birds and mammals from the area.</li> </ul>
Social-economy	<ul style="list-style-type: none"> <li>✓ Job opportunity</li> <li>✓ Promote business</li> </ul>
Occupational health and safety	<ul style="list-style-type: none"> <li>✓ Health and safety risks to workers due to high levels of dust and noise.</li> <li>✓ Respiratory problems</li> <li>✓ Hearing issues</li> </ul>
Community health and safety	<ul style="list-style-type: none"> <li>✓ Reduced visual amenity</li> <li>✓ Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions.</li> </ul>

Table A.8 Impacts and significance of Operation Phase

<b>Environmental Component</b>	<b>Potential Impacts</b>
Air quality	<ul style="list-style-type: none"> <li>✓ Dust is generated from loading and unloading, crushing/ grinding and blending/mixing of raw materials, packing and vehicle movements.</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in power plant, clink production and engine of vehicles, machinery.</li> <li>✓ Increase GHG Emission.</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>✓ Increased background noise level due to operation of cement plant and power plant, and vehicle movement.</li> <li>✓ Disturbance to workers and local residents (if any).</li> </ul>

<b>Environmental Component</b>	<b>Potential Impacts</b>
	<ul style="list-style-type: none"> <li>✓ Reduced hearing issues for workers and staff.</li> <li>✓ Crack due to the vibration from movement of heavy vehicles.</li> </ul>
Water Environment	Impact on water environment cause of water usage, wastewater and runoff from cement plant, power plant and domestic
Solid Waste	<ul style="list-style-type: none"> <li>✓ Dust from air pollution control equipment may impact respiratory diseases in employees/ nearby persons.</li> <li>✓ Used oil &amp; waste residue containing oil, may lead to contamination of soil and groundwater, if leakage or evaporation from storage occurs accidentally.</li> <li>✓ Open dumping of domestic solid waste generated from plant canteen may create environmental impacts like infectious diseases, obstruction of drains and loss of biodiversity.</li> </ul>
Ecology	<ul style="list-style-type: none"> <li>✓ potential degradation of habitat</li> <li>✓ Ecosystem service and biodiversity</li> </ul>
Resource	✓ Depletion of Natural Resource
Social-economy	<ul style="list-style-type: none"> <li>✓ Job opportunity</li> <li>✓ Promote business</li> </ul>
Occupational health and safety	<ul style="list-style-type: none"> <li>✓ Health on workers.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>
Community health and safety	<ul style="list-style-type: none"> <li>✓ Health issue on community.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>

### **Cumulative Impact Assessment**

**Cement Plant and Coal power plant** are located the compound area of the Cement Plant area. Potential impacts from these projects are related to increase air emission, natural resource usage as well as to utilisation of public infrastructures and amenities during operation phase.

### **Environmental Management Plan**

Ngwe Yi Pale Cement Limited will implement the Environmental Management Plan-EMP with the following organization structure as shown in **Figure A.3**.

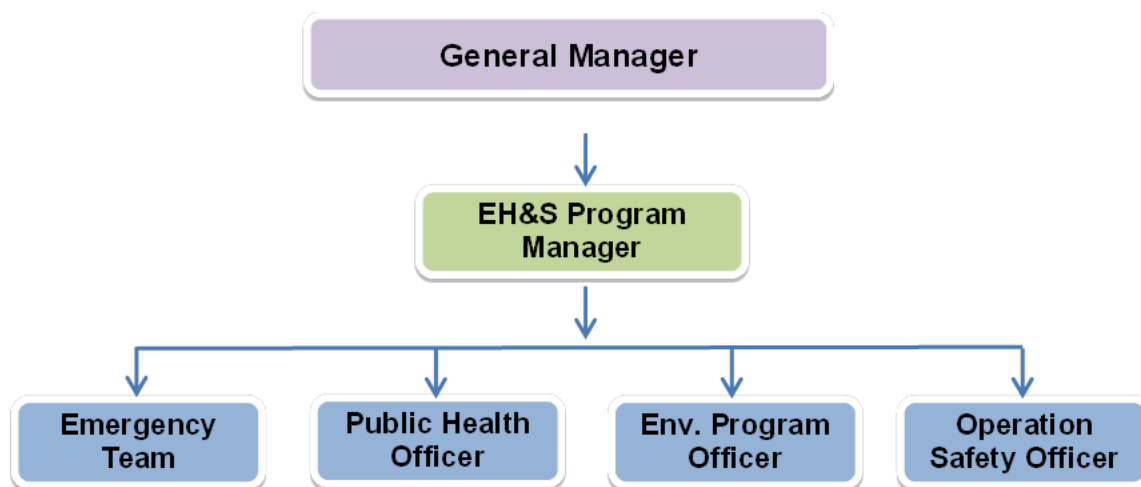


Figure A-3 Organization Chart for Environmental Management

Ngwe Yi Pale Cement Co., Ltd estimated to allocate budget for the implement the Environmental Management Plan. Total estimated overall budget for Environmental Management Plan is **80,000,000 kyats**. Ngwe Yi Pale Cement Co., Ltd also commits that additional budget will be provided if this estimated budget is not enough when the environmental management plan is implemented as practically.

The Monitoring Program encompasses location, duration, frequency of the parameters that has to be monitored. The Monitoring Program will include environmental monitoring and compliance monitoring.

Table A-9 Environmental Monitoring

Impact	Monitoring Method	Parameter	Location	Frequency
<b>Construction Phase</b>				
Ambient air quality	Measurement/sampling	PM <sub>10</sub> & PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> and CO	At three locations covering one upwind and two down winds	Quarterly
Noise Level	Measurement	L <sub>eq</sub> (day) and L <sub>eq</sub> (night)	At construction yard and construction Sites	Quarterly
Water Quality	Sampling/analysis	Physical, chemical and biological parameters	Two surface water samples	Twice in a year (non- monsoon season)
Soil Quality	Sampling/analysis	Physico-chemical parameters	At one location	Twice in a year (non- monsoon season)
<b>Operation Phase</b>				
Air Quality	Measurement/sampling	PM/ PM <sub>10</sub>	Kiln stack	Continuous
		NO <sub>x</sub> , SO <sub>x</sub>	Kiln stack	Quarterly
		PM/ PM <sub>10</sub>	Cement grinding and	Quarterly

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
			clinker cooler stacks	
		Temperature, Oxygen level, combustion efficiency	Combustion sources	Biannually
		Ambient PM/ PM <sub>10</sub> , NO <sub>x</sub> and SO <sub>x</sub>	Selected receptor villages, colony, plant premises	Biannually
Noise and Vibration	Measurement	Leq [(dB(A)]	Crusher, Raw mills, Cement mills	Biannually
			4 sides around Plant site	Biannually and upon complaints
Water	Sampling	pH, Temperature increase, Total suspended solids, Oil content, COD	Surface Water sources, installed grease traps, oil/ water separators, sedimentation tanks, effluent, inlet and outlet of STP	Quarterly
Soil	Sampling	Moisture content, pH, salinity, Nitrogen, Phosphate, Chloride, Potassium, Sodium	Agricultural plots near project site	Annual
		Heavy metal content (mercury, lead, chromium, copper, nickel, zinc and cadmium)		Every three years

Table A-10 Compliance Monitoring

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Solid Waste	Audits, photographic documentation, and interviews	Generation, storage, recycling, transport and disposal	Plant premises	Quarterly
Biodiversity	Visual inspection and photographic	General condition of the floral cover	Plant and landscaped areas	Annual

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*Ngwe Yi Pale Cement Co., Ltd.*

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
	documentation			
Resource use	Metering	Water and energy consumption	Plant	Continuously
	Audit	Raw material consumption	Plant	Continuously
Health and safety	Health and safety surveys	Proper use of PPE, presence of safety signs, first aid kit, firefighting devices, Injury/ illness records. Accident statistics recording	Plant, road linking the proposed project with the main road network	Continuously
Fire Hazard	Inspection & Testing	Checking oxygen content in dust-air mixture (Auto control)	Raw material and product handling areas	Continuously
Socio-economic	Field questionnaire	Local population	Plant and surrounding	Annually
	Interviews	Employment record	Plant	Continuously
Operations monitoring	Visual inspection and documentation	Production rate, gas flow rates, counter readings, pressure valves, temperatures, abnormal readings, overloads, stoppages	All facilities and major equipment at Plant	Daily

Ngwe Yi Pale Cement Co., Ltd will implement the following Specific Sub-plans for environmental management;

- Air Pollution Management Plan
- Noise and Vibration Management Plan
- Wastewater Management Plan
- Soil waste Management Plan
- Ecology Management Plan
- Resource Management Plan
- Health and Safety Management Plan
- Emergency Response Plan

**Corporate Social Responsibility**

Corporate social responsibility (CSR) is now an important factor in the project operation. Ngwe Yi Pale Cement Co., Ltd is well known for its social responsibility in the country and will

take up different social activities. Recognizing the vital role of social responsibility, Ngwe Yi Pale Cement Co., Ltd will contribute about 500 million kyats (500,000,000) per year for CSR plan from 2% of net annual profit.

### **Social Welfare Program**

Ngwe Yi Pale Co., Ltd. plans to provide the following facilities.

- Residential houses for staff
- Library to improve the knowledge of the workers
- Health care facilities and a clinic
- Green belt development for better aesthetic environment.
- Dining rooms equipped with sufficient tables, chairs and wash- basins with soap and detergent materials.
- Separate toilets and bathrooms for males and females.
- Provide social security, factory and fire security.
- Transportation to and from the factory.
- Intended new appointed employees are pre-employment medical examined and appointed if succeed.
- The new appointed employees should be member of Social Security Welfare.
- All employees are medical checked up after every 6 months.
- If there were some community/ occupational disease upon employees and they are medical cared according to law of Social Security Welfare.
- All reasonable supporting will be performed by factory.

### **Public Consultation and Disclosure**

There were two public consultations for the CROWN Cement plant, first meeting was held at 4<sup>th</sup> July 2015 and second at 23<sup>rd</sup> August 2015 and both at Meeting Hall, CROWN Cement plant.

#### ***First Public Meeting***

In the first public consultation, there were about 150 people from local authorities, communities, and those who are directly or indirectly affected by the proposed project were attended in this meeting. Summary of comments received from 1<sup>st</sup> public meeting are under the table;

Table A-1 Summary of comments received from Public Meeting

Public Needs	To plant more trees around the Plant
	To construct or renovate a monastery
	To upgrade and extent the roads in the villages

	To employ more local people at the Plant
	To do environmental conservation continuously and fulfill the requirements as necessary
	To develop social, economic and health status
Concerns	Impact to agriculture lands due to dispersion of dust
	Dust emission during transportation of raw material and cement bags

### ***Second Public Meeting***

In the 2<sup>nd</sup> public consultation, there were about 176 people were attended in this meeting. Summary of comments received from 2<sup>nd</sup> public meeting are under the table;

Table A-2 Summary of comments received from 2<sup>nd</sup> public meeting

Public Needs	For electrification of village
	Upgrading village road
	Selling bags of cement to local residents without specifying the quantity
	Tube well for constant water supply during summer
	Private clinic for health care
	To develop social, economic and health status
Suggestions	To carry out greenbelt development
	To maintain safe environment and ecology
	To have the regional development
	To build a two-lane road from the Plant to Lashio
	To repair the damaged access road which is used for transportation
	To employ more local people at the Plant
Concerns	Impact to agriculture land due to dispersion of dust emission
	Noise/ Waste Disposal/
	Potential to road accidents
	Dust emission during transportation of raw material and cement bags

### **Conclusion**

Cement manufacturing has a high impact on the ecological environment from “quarry to lorry”. Starting from excavation of limestone, raw material crushing and milling, clinker manufacturing, cement grinding and bulk & bag material transportation demand use of natural resources in the form of material and energy.

Ngwe Yi Pale Cement Co., Ltd committed to undertake an occupational health, safety and environmental management plan, a waste management plan, or a social management or comparable plan that aims to consult and support the communities affected by the project. Monitoring plans will also be conducted during the construction and the operation phases.

Ngwe Yi Pale Cement Co., Ltd will establish a strong committee to undertake and manage occupational health, safety, social and environmental management responsibilities on site as well as off site.

This project is recommended for implementation because the positive impacts far outweigh the negative impacts. Myanmar will benefit from increase employment, increased earnings, increased tax revenue, increased foreign investment, and decreased imports while the use of modern technology and other measures are taken to mitigate all of the potentially negative impacts.

The project will also have economic and environmental value-added on a national and regional scale, since it will allow cement to be produced instead of imported, through a productive process that integrates a set of environmental protection measures, enabling the production of cement with less environmental impacts when compared to less modern cement industries.

The project proponents have committed to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements. They should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report and the statutory requirements.



## အကျဉ်းချုပ်အစီရင်ခံစာ

### နိဒါန်း

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် ငွေရည်ပုလဲကုမ္ပဏီလီမိတက်၏ ပံ့ပိုးကူညီမှု ပေးသည့်ကုမ္ပဏီဖြစ်ပြီး မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများ ညွှန်ကြားမှုဦးစီးဌာန၏ မှတ်ပုံတင်အမှတ် (၁၃၀၇၉၉၀၂၇) အရ ၂၀၁၄ ခုနှစ် မတ်လ ၃ ရက်နေ့တွင် စတင်တည်ထောင်ခဲ့ပါသည်။ ၎င်းကုမ္ပဏီသည် မြန်မာနိုင်ငံ ရှမ်းပြည်နယ်မြောက်ပိုင်း ၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ် ၊ လုံရုံးကျေးရွာအုပ်စု၊ လောက်ဖန်းကျေးရွာတွင် တနေ့လျှင် တန် ၅၀၀၀ ကျ ဘိလပ်မြေစက်ရုံကို လည်ပတ်နေပါသည်။ (ပုံ A.1 ကိုကြည့်ပါ)။

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် ဤလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်းလေ့လာမှုပြုလုပ်ရန် Green Myanmar Environmental Services Company Limited အား တာဝန်ပေးအပ်ခဲ့သည် ။

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) လေ့လာမှုအား ၂၀၁၅ ခုနှစ် မတ်လဆောင်းရာသီအကုန်တွင် စတင်ခဲ့ပါသည်။ EIA လေ့လာမှု၏ ကျွမ်းကျင်သူများကို EIA အစီရင်ခံစာ၏ အခန်း (၁)၊ဇယား (၁-၂) တွင် ဖော်ပြထားသည်။

### မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်း

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် ဘိလပ်မြေထုတ်လုပ်ရေး စီမံကိန်း အတွက် မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းနှင့်အညီ လိုက်နာဆောင်ရွက်မည်ဖြစ်ပြီး အကျဉ်းချုပ် အနေဖြင့် အောက်ပါအတိုင်း ဖြစ်ပါသည်-

- အစိုးရမူဝါဒ- ၂၀၀၉ ခုနှစ် အမျိုးသား စဉ်ဆက်မပြတ် ဖွံ့ဖြိုးတိုးတက်ရေး မဟာဗျူဟာ၊ အမျိုးသား ပတ်ဝန်းကျင် မူဝါဒ (၂၀၁၉) နှင့် စီမံကိန်းနှင့် အခြား သက်ဆိုင်ရာ မူဝါဒများ
- စီမံကိန်းနှင့် သက်ဆိုင်သည့် ဥပဒေ၊ နည်းဥပဒေများ
- စီမံကိန်းနှင့် သက်ဆိုင်သည့် အပြည်ပြည်ဆိုင်ရာ ကွန်ဗင်းရှင်းနှင့် သဘောတူညီချက်များ

- အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များနှင့် စီမံကိန်းနှင့် အခြားသက်ဆိုင်ရာ စံနှုန်းများ
- ကျန်းမာရေး၊ ဘေးကင်းရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ (HSE) ကိစ္စရပ်များနှင့် စပ်လျဉ်းသည့် အစိုးရအဖွဲ့အစည်း၊

မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းတို့နှင့်ပတ်သက်၍ အသေးစိတ်ဖော်ပြချက်များကို **EIA အစီရင်ခံစာ၏ အခန်း ၂** တွင် ဖော်ပြထားသည်။

**စီမံကိန်းအကြောင်းအရာဖော်ပြချက်**

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် ရှမ်းပြည်နယ် နောင်ချိုမြို့နယ် လောက်ဖန်းကျေးရွာအနီးတွင် TPD ဘိလပ်မြေစက်ရုံ ၁၀၀၀ ကို စတင်အကောင်အထည် ဖော်ခဲ့သည်။ မြန်မာနိုင်ငံတွင် ဘိလပ်မြေ ဝယ်လိုအား မြင့်မားမှုနှင့် နှစ်စဉ် ပြတ်လပ်မှုများ ကြောင့် MIC ၏ ခွင့်ပြုချက်ဖြင့် TPD 1,000 မှ 5,000 TPD အထိ တိုးမြှင့်ထုတ်လုပ်ရန် ဆုံးဖြတ်ခဲ့သည်။ ထို့ကြောင့် လက်ရှိစက်ရုံဧရိယာအတွင်း တစ်ရက်လျှင် အများဆုံး တန်ချိန် ၄,၀၀၀ ထုတ်လုပ်နိုင်မည့် ဘိလပ်မြေစက်ရုံ(ရုံ)ကို တည်ဆောက်ခဲ့ပါ သည်။

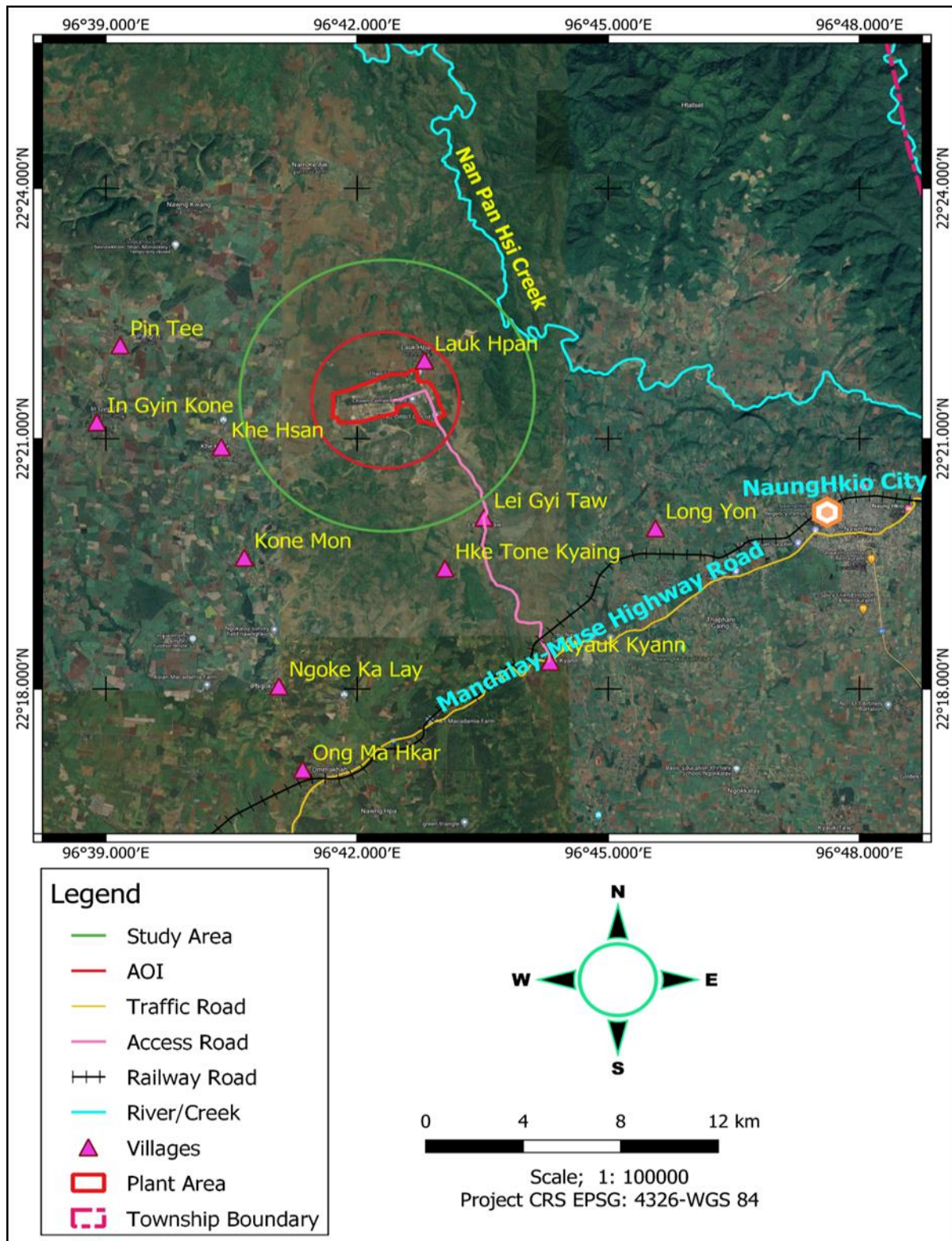
ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် 1000 TPD ဘိလပ်မြေစက်ရုံ Phase I ကို 2011 ခုနှစ်တွင် စတင်တည်ဆောက်ခဲ့ပြီး 2013 ခုနှစ်တွင် စီးပွားဖြစ်ထုတ်လုပ်ခဲ့ပါသည်။ ဤကုမ္ပဏီသည် 5000 TPD ထုတ်လုပ်မှုတိုးချဲ့ရန် 4000 TPD ဘိလပ်မြေစက်ရုံ Phase II ကို ၂၀၁၅ ခုနှစ် ဇူလိုင်လတွင် စတင်တည်ဆောက်ခဲ့ပြီး ၂၀၁၉ ခုနှစ် ဇွန်လတွင် စီးပွားဖြစ် ထုတ်လုပ်ခဲ့သည်။ အဆိုပါစီမံကိန်းအားလုံးအတွက် ကျပ်ငွေ ၉၉,၀၂၅ ဒသမ ၅၅ သန်း (အမေရိကန်ဒေါ်လာ ၈၉.၂၃၅ သန်း အပါအဝင်) ရင်းနှီးမြုပ်နှံခဲ့သည်။

၎င်းစက်ရုံသည် မြန်မာနိုင်ငံ ရှမ်းပြည်နယ်မြောက်ပိုင်း ၊ ကျောက်မဲ ခရိုင်၊ နောင်ချို မြို့နယ် ၊ လုံရုံးကျေးရွာအုပ်စု၊ လောက်ဖန်းကျေးရွာအနီးတွင် တည်ရှိပါသည်။ စီမံကိန်း ဧရိယာတွင် စက်ရုံမြေဧက ၂၅၀ နှင့် လူနေထိုင်ရန် ဆက်စပ်ဧရိယာ ဧက ၂၁၀ ပါဝင်ပါသည်။

စက်ရုံ၏ အနီးစပ်ဆုံး ပထဝီဝင်ဆိုင်ရာ သြဒီနိုတ်ကို ဇယား အေ.၁ တွင် ပြထားပြီး ခြုံငုံ ဖော်ပြထားသည့် ပထဝီဝင်မြေပုံကို ပုံ အေ.၁ တွင် ပြထားပါသည်။

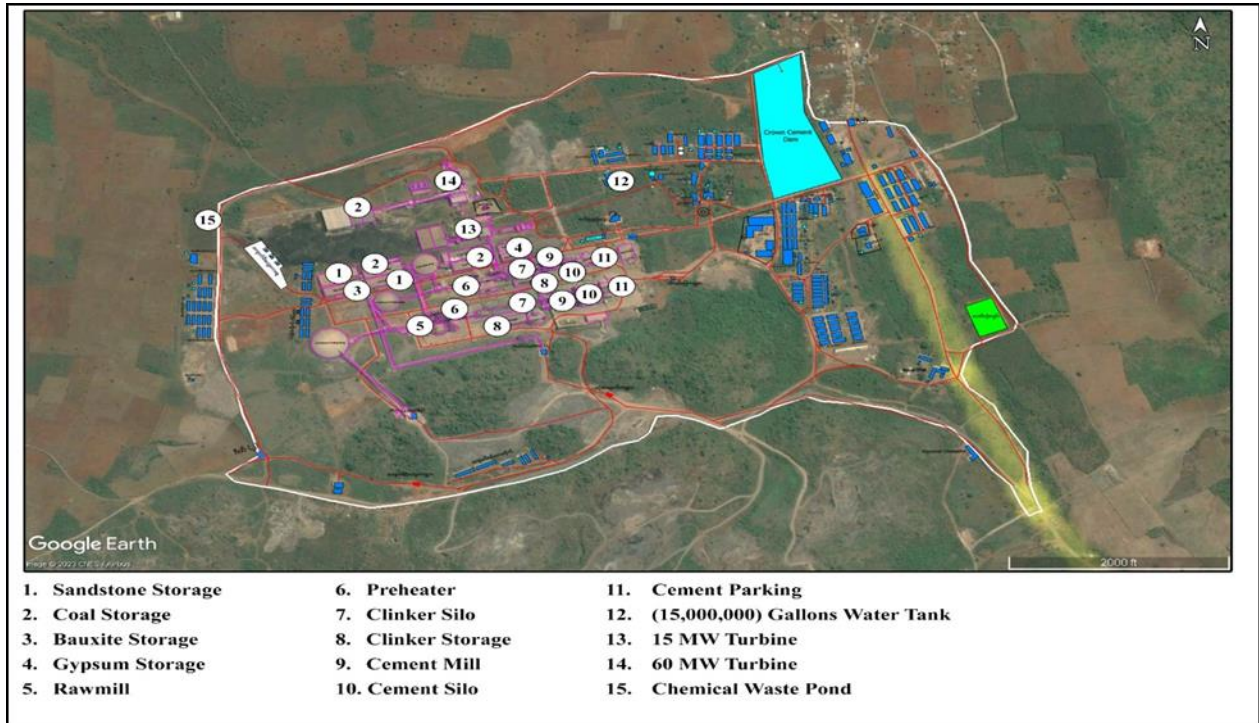
ဇယား အေ.၁။ စက်ရုံ၏ ပထဝီဝင်ဆိုင်ရာ သြဒီနိုတ်

နာမည်	လတ္တီတွဒ်	လောင်ဂျီကျု
စက်ရုံတည်နေရာ	22 ° 21' 22.65" N	42' 11.68" E.



ပုံ(အ-၁) ခြုံငုံဖော်ပြထားသည့်ပထဝီဝင်မြေပုံ





စက်ရုံ၏ ထုတ်လုပ်မှု ဒီဇိုင်းစွမ်းရည်မှာ တစ်ရက်လျှင် တန်ချိန် ၅၀၀၀ (စုစုပေါင်း ဘီလပ်မြေစက်ရုံ ၂ ရုံ) ဖြစ်သည်။ ထုတ်ကုန်အမည်မှာ “CROWN Cement” ( ပုံ အေ-၂ ကို ကြည့် ပါ) နှင့် 52.5 Class Cement ၊ 42.5 Class Cement ၊ 32.5 Class Cement ကဲ့သို့သော ဘီလပ်မြေအမျိုးအစား (၄) မျိုးရှိပါသည်။



ပုံ (အေ-၂) CROWN ဘီလပ်မြေစက်ရုံ၏ ထုတ်ကုန်အမည်

ဘိလပ်မြေထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်အတွက် အဓိကကုန်ကြမ်းအဖြစ် ထုံးကျောက်၊ မြေစေး၊ ဂဝံနှင့် ဂျစ်ပဆမ်တို့ လိုအပ်မည်ဖြစ်ပြီး **Clinker Section** တွင် အပူထုတ်လုပ်ရန်အတွက် ကျောက်မီးသွေးကို လောင်စာအဖြစ် အသုံးပြုမည်ဖြစ်သည်။ ကုန်ကြမ်း စားသုံးမှု **ဇယား အေ.၂** ဖြစ်သည်။ ။

ဇယား အေ.၂ ကုန်ကြမ်းစားသုံးမှု

စဉ်	ကုန်ကြမ်း ပစ္စည်းများ	ယူနစ်	ပမာဏ	
			နေ့စဉ်	လစဉ်
၁	ထုံးကျောက်	မက်ထရစ်တန်	၆၇၂၀	၂,၂၁၇,၆၀၀
၂	ရွှံ့	မက်ထရစ်တန်	၁,၀၄၀	၃၄၃,၂၀၀
၃	သံရိုင်း	မက်ထရစ်တန်	၂၄၀	၇၉၂၀၀
၄	ဂျစ်ပဆမ်	မက်ထရစ်တန်	၄၅၀	၁၄၈,၅၀၀
၅	ကျောက်မီးသွေး	မက်ထရစ်တန်	၁,၂၅၀	၄၁၂,၅၀၀

**ထုတ်လုပ်မှုလုပ်ငန်းစဉ်**

CROWN Cement Plant ၏ လည်ပတ်မှု လုပ်ငန်းစဉ်မှာ ဘိလပ်မြေ ထုတ်လုပ်ရန် အခြောက်ခံသော လုပ်ငန်းစဉ်ကို ရွေးချယ်ထားပါသည်။ ထုတ်လုပ်မှု လုပ်ငန်းစဉ်တွင် သိသာထင်ရှားသော ကုန်ထုတ်လုပ်မှု အဆင့်များမှာ ၊ ကြိတ်ခွဲခြင်း၊ ကုန်ကြမ်းကြိတ်ခြင်း၊ clinkeriation၊ ဘိလပ်မြေကြိတ်ခွဲခြင်းနှင့် ထုပ်ပိုးခြင်း စသည်တို့ ရှိပါသည်။

**အဆင့် ၁ :** ထုံးကျောက်တူးဖော်ခြင်းနှင့် ကြိတ်ခွဲခြင်း၊ အလူမီနီယမ်၊ သံနှင့် ဆီလီကာ ပါဝင်သော အခြားကုန်ကြမ်းများနှင့် ရောနှောခြင်းကို ကုန်းကြမ်းအဖြစ် ရည်ညွှန်းသည်။

**အဆင့် ၂ :** ကုန်းကြမ်းများကို မီးဖိုမှ ထွက်သောဓာတ်ငွေ့များဖြင့် ကြိုတင်အပူပေးပြီး အပူချိန် 1,450°C ဝန်းကျင်၌ တစ်စိတ်တစ်ပိုင်း ထုတ်ကုန်တစ်ခုဖြစ်လာမည့် Kiln အဖြစ်

ရောက်ရှိလာမည်။ ထို့နောက် ဖုန်မှုန့်အမှုန်အမွှားများမှ ဂေါက်သီးဘောလုံးအရွယ်အစားအထိ clinker ပုံစံသို့ လျင်မြန်စွာ အအေးခံသည်။

**အဆင့် ၃:** clinkerကို ကြိတ်ချေပြီး အမှုန့် 5% gypsum နှင့် ရောမွှေပါ။ ဘီလပ်မြေ၏ လိုအပ်သော ဂုဏ်သတ္တိများကို ပေးစွမ်းရန် အခြားသော ဖြည့်စွက်ပစ္စည်းများကိုလည်း အသုံးပြုနိုင်သည်။ အများဆုံး ဘီလပ်မြေထုတ်လုပ်မှုမှာ TPD 5,000 ခန့်ဖြစ်သည်။

**အဆင့် ၄:** အကုန်တင်ကားကြီးများတင်ဆောင်ရန် သို့မဟုတ် အိတ်သွတ်စက်ရုံသို့ ပို့ဆောင်ရန်အတွက် ဘီလပ်မြေအမှုန့်များကို Silo တွင် သိမ်းဆည်းထားပါသည်။ Silos မှ ဘီလပ်မြေအမှုန့်များကို ကီလိုဂရမ် ၅၀ဆန့်အိတ်နှင့် Bulk Cement Truck (BCT) အတွင်းသို့ ထည့်ကာ ဖြန့်ဖြူးရောင်းချပါသည်။

**အသုံးအဆောင်များ**

**CROWN** ဘီလပ်မြေစက်ရုံသည် ဝန်ထမ်းပေါင်း ၁၂၃၀ ခန့်ဖြင့် ဘီလပ်မြေ ထုတ်လုပ်မှုကို လုပ်ကိုင်မည်ဖြစ်သည်။ လျှပ်စစ်ဓာတ်အားကို စက်ရုံနေရာရှိ ၆၀ မဂ္ဂါဝပ်ရှိ ကျောက်မီးသွေးသုံး ဓာတ်အားပေးစက်ရုံ နှင့် **SINN SHWE LI** သကြားစက် အမှတ် ၂ တို့မှ ရရှိမည်ဖြစ်သည်။ ကြံရာသီအတွင်း **SINN SHWE LI** သကြားစက် အမှတ် ၂ မှ လျှပ်စစ်ဓာတ်အား ၁၅ မဂ္ဂါဝပ် ရယူမည်ဖြစ်သည်။ စက်ရုံ နှင့် လူနေအိမ်ရာအတွက် စုစုပေါင်း လျှပ်စစ်သုံးစွဲမှုမှာ 32 MW ဖြစ်သည်။

စက်ရုံအတွက် အဓိကရေအရင်းအမြစ်မှာ ရာသီမရွေးစီးဆင်းနေသော စမ်းချောင်း များမှ ရေကို ဂါလန် ၂၁၊ ၁၅ နှင့် ၁ သန်း ဆုံသော သိုလှောင်ကန်များဖြင့် သိမ်းဆည်းမည် ဖြစ်သည်။ ဘီလပ်မြေစက်ရုံများအတွက် စုစုပေါင်း နှစ်စဉ်ရေ လိုအပ်ချက်မှာ ဂါလန် ၉,၂၅၀,၀၀၀ ဖြစ်သည်။ သယ်ယူပို့ဆောင်ရေးယာဉ်များနှင့် မီးစက်များအတွက် ဒီဇယ်နှင့် ဓာတ်ဆီ လိုအပ်မည်ဖြစ်ပြီး စက်သုံးဆီလိုအပ်ချက်မှာ တစ်ရက်လျှင် ဒီဇယ်ဂါလံ ၇၀၀၀၀ နှင့် ဓာတ်ဆီတစ်ရက်လျှင် ၇၅၀ ဂါလံဖြစ်သည်။

ထုတ်လွှတ်မှု၊ စွန့်ပစ်မှုနှင့် အမှိုက်စီမံခန့်ခွဲမှု

Crown Cement စက်ရုံမှ ထုတ်လွှတ်သော လေထုညစ်ညမ်းမှုကို အကျဉ်းချုံး၍ ဖော်ပြထားသည်။

- ကုန်ကြမ်းများနှင့် ထုပ်ပိုးပစ္စည်းများကို သယ်ယူပို့ဆောင်ခြင်းနှင့် စီမံ ဆောင်ရွက်ခြင်းအားဖြင့် ဖုန်မှုန့်နှင့် အမှုန်အမွှားများ
  - ကျောက်မီးသွေးလောင်ကျွမ်းခြင်း၊ လောင်စာဆီလောင်ကျွမ်းခြင်း (အထူးသဖြင့် ဒီဇယ်အသုံးပြုမှု) နှင့် kiln ထုတ်လုပ်ခြင်းဖြင့် GHG ထုတ်လွှတ်ခြင်း။
- ဘိလပ်မြေစက်ရုံမှ ထုတ်လွှတ်သော GHG စုစုပေါင်းကို ဇယား အေ.၃ တွင် ပြထားသည်။

ဇယား အေ.၃ လောင်စာဆီမှ စုစုပေါင်း GHG ထုတ်လွှတ်မှု (CO2)

ထုတ်လွှတ်ခြင်း။	GHG ထုတ်လွှတ်မှု၊ CO2 (တန်/နေ့)			စုစုပေါင်း GHG ထုတ်လွှတ်မှု၊ CO2 (တန်/နေ့)
	ဒီဇယ်	ကျောက်မီးသွေး	Clink ထုတ်လုပ်မှု	
GHG ထုတ်လွှတ်မှု၊ CO2	၄၅၅	၂,၃၀၉	၂၅၃၅	၅၂၉၉

စက်ရုံမှထွက်ရှိသော အမှိုက်များကို ဇယား အေ.၄ တွင် အကျဉ်းချုပ်ဖော်ပြထား သည်။

ဇယား အေ-၄။ စက်ရုံမှထွက်ရှိသော အမှိုက်များ

အမှိုက် အမျိုးအစား	အမှိုက်နာမည်	အလေးချိန် (ခန့်မှန်း)	အမှိုက်စီမံခန့်ခွဲမှု/ စွန့်ပစ်နည်း
လုပ်ငန်းစဉ် အမှိုက်များ	<ul style="list-style-type: none"> <li>ဘိလပ်မြေထုတ်လုပ်ရေး လုပ်ငန်းစဉ်၏ ကုန်ကြမ်းများမှ အမှုန်အမွှားများနှင့် ကျောက်တုံးအပိုင်းအစများ</li> </ul>	၁ တန်/ နှစ်	ဘိလပ်မြေထုတ်လုပ်ခြင်း လုပ်ငန်းစဉ်တွင် ပြန်လည် အသုံးပြုခြင်း။
	<ul style="list-style-type: none"> <li>ကျောက်မီးသွေးပြာ</li> </ul>	၈၀ တန်/	ဘိလပ်မြေထုတ်လုပ်ရာတွင်



		နှစ်	ကုန်ကြမ်းများနှင့်ရောစပ်၍ ပြန်လည် အသုံးပြုခြင်းနှင့် အုတ်ထုပ်လုပ်ရာတွင် ရောစပ်အသုံးပြုခြင်း
အိမ်တွင်းအမှိုက်	<ul style="list-style-type: none"> <li>▪ အစားအသောက် အပိုင်းအစများ</li> <li>▪ မီးဖိုချောင်အညစ်အကြေး</li> <li>▪ ဗူးများ</li> <li>▪ ညစ်ညမ်းသော အထည်သို့မဟုတ်အဝတ် အစား</li> <li>▪ ထုပ်ပိုးမှု၊ စက္ကူ</li> </ul>	၁၀ တန်/ နှစ်	<ul style="list-style-type: none"> <li>▪ အချို့သော Recycle သို့မဟုတ် ပြန်သုံးနိုင် သော အစိုင်အခဲ စွန့်ပစ် ပစ္စည်းများကို သင့်လျော် သလို ထပ်မံအသုံးပြုရန် အတွက် ပြန်လည် အသုံး ပြုရန်အတွက် သို့မဟုတ် စက်ရုံ၏ အမှိုက်စွန့် ပစ်သည့်နေရာသို့ စွန့်ပစ်ရန် ရောင်းချမည် ဖြစ်သည်။</li> <li>▪ စားနပ်ရိက္ခာ စွန့်ပစ် ပစ္စည်းများကို ဒေသခံ ရွာသားများ စားသုံးရန် လိုအပ်ပါက လွှဲပြောင်း ပေးအပ်ရမည်။ မလိုအပ် ပါက ဤအမှိုက်များကို စက်ရုံ၏ စွန့်ပစ်အမှိုက် နေရာတွင် စွန့်ပစ်ရမည်။</li> </ul>
မိလ္လာ	အနည်အနှစ်	၀.၅ တန်/ နှစ်	<ul style="list-style-type: none"> <li>▪ မြေနှင့်ရောစပ်ပြီး မြေဩဇာအဖြစ် စိုက်ခင်းတွင် အသုံးပြုပါ။</li> </ul>
ပြုပြင်ထိန်းသိမ်း	<ul style="list-style-type: none"> <li>▪ သံ၊ သတ္တုအပိုင်းအစများ၊</li> </ul>	၅တန်/ နှစ်	<ul style="list-style-type: none"> <li>▪ ပြန်လည်အသုံးပြုနိုင်</li> </ul>

<p>မှု အမှိုက်များ</p>	<p>တစ်ပတ်ရစ်ယာဉ် တာယာများ ၊ ပျက်စီးနေသော စက်အစိတ်အပိုင်းများနှင့် ယာဉ်အစိတ်အပိုင်းများ (ပျက်စီးမှု)၊</p> <ul style="list-style-type: none"> <li>▪ ဂဟေလျှပ် စသည်တို့ကို အသုံးပြုသော ရော်ဘာ gasket ပစ္စည်း</li> </ul>		<p>သော ပြုပြင်ထိန်းသိမ်းမှု စွန့်ပစ်ပစ္စည်းများအား လုံးကို အလျဉ်းသင့်သလို ဆက်လက်အသုံးပြုရန် အတွက် ပြန်လည် အသုံးပြုသည့်ဆိုင်သို့ ရောင်းချသွားမည်ဖြစ်သ ည်။</p> <ul style="list-style-type: none"> <li>▪ ညစ်ညမ်းဆီများပါသည့် အမှိုက်များကို စက်ရုံ အမှိုက်ပစ်သည့်နေရာသို့ စွန့်ပစ်ခြင်း သို့မဟုတ် ဟိုပုံးမြို့နယ်စည်ပင်သာ ယာရေးကော်မတီ၏ အမှိုက်စွန့်ပစ်သည့်နေရာ သို့လွှဲပြောင်းပေးမည်ဖြစ် သည်။</li> </ul>
<p>အန္တရာယ်ရှိသော အမှိုက်များ</p>	<ul style="list-style-type: none"> <li>▪ အသုံးပြုပြီးချောဆီ။</li> <li>▪ အသုံးပြုပြီးဟိုက်ဒရော လစ်ဆီ။</li> <li>▪ ဆီနှင့်ညစ်ညမ်းသောစစ်ထု တ်စက်</li> <li>▪ ဒရမ်များနှင့် ကွန်တိန်နာ များကို ဆီအတွက် အသုံးပြုသည်။</li> <li>▪ အညစ်အကြေးများ၊ စက္ကူ၊ လက်အိတ်များ၊</li> </ul>	<p>၃တန်/ နှစ်</p>	<p>အန္တရာယ်ရှိသော အမှိုက်စီမံခန့်ခွဲမှု (အပိုင်း ၇.၇.၃ အမှိုက်စီမံခန့်ခွဲမှု အစီအစဉ်)</p>

	<p>ပလတ်စတစ်များနှင့် ဆီနှင့် ညစ်ညမ်းသော အခြားပစ္စည်းများ</p> <ul style="list-style-type: none"> <li>▪ မီးသီး၊ fluorescence tube၊ LED မီးသီး၊</li> <li>▪ အသုံးပြုပြီးဘက်ထရီ။</li> <li>▪ ဆေးဘက်ဆိုင်ရာအမှိုက်</li> </ul>		
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**CROWN Cement Plant** ၏ ဘီလပ်မြေ ထုတ်လုပ်မှု လုပ်ငန်းစဉ်သည် ခြောက်သွေ့သော လုပ်ငန်းစဉ်ဖြစ်ပြီး ဤလုပ်ငန်းစဉ်တွင် ရေမလိုအပ်ပါ။ အအေးခံစနစ်၊ ဖုန်မှုန့်များကိုနှိမ်နင်းခြင်းနှင့် အိမ်တွင်းအသုံးပြုမှုများအတွက် ရေကို အသုံးပြုမည်ဖြစ်သည်။ အအေးခံ စနစ်တွင် ရေသည် အအေးခံမှ အအေးခံတာဝါသို့ စီးဆင်းပြီး စွန့်ပစ်ရေများ ထွက်လာခြင်း မရှိပါ။ ထို့အပြင် ရေကို ဖုန်မှုန့်များကို ထိန်းချုပ်ရန်အတွက် ကုန်ကြမ်းများ ပေါ်တွင် ရေဖြန်းခြင်းတွင် သုံးစွဲမည်ဖြစ်ပြီး ၎င်းမှ စွန့်ပစ်ရေ ထွက်ရှိခြင်း မရှိပါ။ ရုံးခန်း များနှင့် အလုပ်သမား တည်းခိုနေထိုင်သည့်နေရာများရှိ ရေချိုးခန်းနှင့် မီးဖိုချောင်မှ မီးခိုး ရောင်ကဲ့သို့သော အိမ်တွင်း စွန့်ပစ်ရေများကို ထွက်ရှိမည်ဖြစ်ပြီး အိမ်တွင်းစွန့်ပစ်ရေအား လုံးကို ထိန်းသိမ်းရေးကန်သို့ စွန့်ပစ်မည်ဖြစ်သည်။ စက်ရုံအတွင်းရှိ ဘီလပ်မြေ အမှုန်အမွှား များ ပါဝင်သော စီးဆင်းရေကို ရေနုတ်မြောင်းစနစ်ဖြင့် ထိန်းသိမ်းကိုင်တွယ် မည်ဖြစ်သည်။

ထိုရေကန်မှ စွန့်ပစ်ရေများ စွန့်ထုတ်မည်ဆိုပါက စွန့်ပစ်ရေများကို NEQEG နှင့်အညီ စွန့်ပစ်မည်ဖြစ်ပါသည်။

**စီမံကိန်းအခြားရွေးချယ်စရာများ**

အဆိုပြုထားသော စီမံကိန်းအတွက် အခြားရွေးချယ်စရာများကို ခွဲခြမ်းစိတ်ဖြာခြင်း သည် EIA ၏ အရေးကြီးသော အချက်တစ်ခုဖြစ်သည်။ ၎င်းသည် ပိုမိုအပြုသဘော ဆောင်ပြီး ဆိုးရွားသောသက်ရောက်မှုကို လျော့နည်းစေသည်။

စီမံကိန်းနေရာရွေးချယ်စရာများ - ဤစီမံကိန်းနေရာသည် မန္တလေး-လားရှိုး-မူဆယ် ပြည်ထောင်စုလမ်းမကြီးနှင့် နီးသောကြောင့် အခြား နေရာများကို စူးစမ်း လေ့လာထားခြင်း မရှိပါ။

၎င်းနေရာသည် ကုန်ကြမ်းနှင့် ကုန်ပစ္စည်းများ လွယ်ကူ စွာ သယ်ယူနိုင်ရန် သေချာစေသည်။

ထုတ်မှုလုပ်နည်းစဉ်

- ဘိလပ်မြေကို ထုတ်လုပ်ရန်အတွက် အစိုနှင့် အခြောက်ခံနည်းအဖြစ် အဓိက လုပ်ငန်းစဉ် နှစ်ခုရှိသည် ။ CROWN ဘိလပ်မြေစက်ရုံသည် အခြောက်ခံသည့် လုပ်ငန်းစဉ်ကို ရွေးချယ်ခဲ့ပြီး လုပ်ငန်းစဉ်နှစ်ခုစလုံး၏ ကောင်းကျိုး များနှင့် သံဗူးများကို နှိုင်းယှဉ်ကာ လိုက်နာ ဆောင်ရွက်ခဲ့ပါသည်။

အစိုနှင့်အခြောက်ဖြစ်စဉ်ကို နှိုင်းယှဉ်ခြင်း

အစိုဓာတ်နည်းဖြင့် ထုတ်လုပ်ခြင်း	အခြောက်ခံနည်းဖြင့် ထုတ်လုပ်ခြင်း
- slurry ၏ အစိုဓာတ် 35-50%	- အစိုဓာတ်ပါဝင်မှု 12%
-ဘိလပ်မြေထုတ်လုပ်ရန် လိုအပ်သော မီးဖိုအရွယ်အစားသည် ပိုကြီးသည်။	-ဘိလပ်မြေထုတ်လုပ်ရန် မီးဖို၏အရွယ်အစားသည် သေးငယ်သည်။
-လိုအပ်သော အပူပမာဏ ပိုများသောကြောင့် လိုအပ်သော ဆီပမာဏ ပိုများသည်။	-လိုအပ်သော အပူပမာဏ နည်းပါးသောကြောင့် လိုအပ်သော လောင်စာ ဆီပမာဏ နည်းပါးပါသည်။
- စီးပွားရေးအရနည်းတယ်။	- စီးပွားရေးအရ ပိုအဆင်ပြေတယ်။
- ကုန်ကြမ်းများကို အလွယ်တကူ ရောစပ်နိုင်သောကြောင့် ပိုမိုကောင်းမွန်သော တစ်သားတည်းကျသော ပစ္စည်းကို ရရှိနိုင်ပါသည်။	- ကုန်ကြမ်းများ ရောစပ်ခြင်း လုပ်ငန်းစဉ်ကို ထိန်းချုပ်ရန် ခက်ခဲသောကြောင့် တစ်သားတည်းသော ပစ္စည်းများ ရရှိရန် ခက်ခဲသည်။
-စက်ယန္တရားများနှင့် စက်ပစ္စည်းများကို ပြုပြင်ထိန်းသိမ်းရန် များစွာမလိုအပ်ပါ။	-စက်ယန္တရားများနှင့် စက်ပစ္စည်းများကို ပိုမိုထိန်းသိမ်းရန် လိုအပ်ပါသည်။

**လက်ရှိပတ်ဝန်းကျင်အခြေအနေ**

ဤစီမံကိန်းတွင် EIA လေ့လာရေး ဧရိယာအား အဆိုပြုထားသော စီမံကိန်း ဗဟို အဖြစ် အဆိုပြုထားသော အချင်းဝက် ၅ ကီလိုမီတာအဖြစ် သတ်မှတ်ခဲ့သည်။ အဆိုပြု ထားသော

စီမံကိန်းကြောင့် အကျိုးသက်ရောက်မှုများကို ထင်ဟပ်စေမည့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းကို လေ့လာမှု ပြုလုပ်ရန်အတွက် လေ့လာမှုဧရိယာ သတ်မှတ်ရန် အရေးကြီးပါသည်။

ဤပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာကို ပြင်ဆင်ရန်အတွက်၊ အဆိုပြု ထားသော စီမံကိန်း၏ လက်ရှိပတ်ဝန်းကျင်နှင့် လူမှုရေးအခြေအနေများကို ဖော်ပြရန် အတွက် အချက်အလက်စုဆောင်းရန် နည်းလမ်းနှစ်ခုရှိသည်။

- (က) မူလအချက်အလက်များ ကောက်ယူခြင်းနှင့် ခွဲခြမ်းစိတ်ဖြာခြင်း
- (ခ) တဆင့်ခံအချက်အလက်များ စုဆောင်းခြင်းနှင့် ခွဲခြမ်းစိတ်ဖြာခြင်း

ပတ်ဝန်းကျင်လေထုအရည်အသွေး၊ ပတ်ဝန်းကျင်ဆူညံမှုအဆင့်၊ ရေအရည်အသွေး နှင့် မြေဆီလွှာအရည်အသွေးကဲ့သို့သော ပတ်ဝန်းကျင်အခြေခံအချက် အလက် (မူလအချက် အလက်)ကို ကရိယာများအသုံးပြု၍ တိုင်းတာသည်။ အချို့သော လူမှုစီးပွားရေး အခြေအနေ များနှင့် ဇီဝပတ်ဝန်းကျင်ကို အတိုင်ပင်ခံများက မူလအချက်အလက်များအဖြစ် စစ်တမ်း ကောက်ယူသည်။ နောင်ချိုမြို့နယ်၏ လူမှုစီးပွားအခြေအနေ၊ ရုပ်ပိုင်းဆိုင်ရာ၊ ဇီဝပတ်ဝန်းကျင် နှင့် ရာသီဥတုဆိုင်ရာ အချက်အလက်အချို့ကို သက်ဆိုင်ရာ ပက်ဘ်ဆိုဒ်များမှ စုဆောင်းပြီး ဆန်းစစ်မှု လေ့လာမှုအဖွဲ့မှ ပြန်လည်သုံးသပ်ပါသည်။ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန (ထွေအုပ်)မှ ၂၀၁၉ ခုနှစ်အတွင်းက ထုတ်ပြန်သည့် မြို့နယ်အချက်အလက်များမှ နောင်ချို မြို့နယ်၏ ဒေသဆိုင်ရာအချက်အလက်များကို ကောက်ယူခဲ့ပါသည်။

**ရှုပ်ပိုင်းဆိုင်ရာအရင်းအမြစ်များ**

စီမံကိန်းဧရိယာသည် ရှမ်းပြည်နယ်မြောက်ပိုင်း နောင်ချိုမြို့နယ်တွင် တည်ရှိသည်။ ဤဒေသ၏ မြေမျက်နှာသွင်ပြင်မှာ အလယ်အလတ်တောင်ကုန်းများ၊ လွင်ပြင်နှင့် ချိုင့်ဝှမ်းများ ဖြစ်ပြီး ပင်လယ်ရေအမြင့်မှာ 976 msl ဖြစ်သည်။ စီမံကိန်းဧရိယာ၏ ကျောက်အမျိုးအစား များ မှာ Paleozoic-Triassic ဖြစ်ပါသည်။

- **ပတ်ဝန်းကျင်လေထုအရည်အသွေး** - စက်ရုံအတွင်းရှိ နေရာ (၂) နှင့် စက်ရုံပြင်ပ နေရာ (၄) လေအရည်အသွေးကို စောင့်ကြည့်တိုင်းတာခဲ့ပါသည်။ စောင့်ကြည့် တိုင်းတာမှုကို ၂၀၂၃ ခုနှစ် အောက်တိုဘာ ၁၄ ရက်နေ့မှ ၂၅ ရက်နေ့ အတွင်း နေရာတစ်ခုလျှင် ၂၄ နာရီဆက်တိုက် မှတ်တမ်းတင်ခဲ့ပါသည်။
- **ဆူညံသံအဆင့်** - ပတ်ဝန်းကျင်ဆူညံသံအဆင့်ကို စောင့်ကြည့်တိုင်းတာခြင်းအား စက်ရုံအတွင်း နေရာ(၂) နေရာတည်းတွင် ပြုလုပ်ခဲ့ပြီး လေထုအရည်အသွေး စောင့်ကြည့်တိုင်းတာ ခြင်းကိုလည်း ၎င်းနေရာတွင် တပြိုင်တည်းလုပ်ဆောင်ခဲ့သည်။
- **မြေပေါ်ရေအရည်အသွေး**- မြေပေါ်ရေနမူနာများကို စီမံကိန်းအနီးရှိ စမ်းချောင်းများမှ နေရာ (၁) ခုတွင် ၂၀၂၃ ခုနှစ် အောက်တိုဘာ ၂၄ ရက်နေ့တွင် ကောက်ယူခဲ့ပါသည်။
- **မြေဆီလွှာအရည်အသွေး** - စီမံကိန်းနေရာနှင့် အနီးပတ်ဝန်းကျင်ရှိ မြေနမူနာ (၃၈) လုံးကို စိုက်ပျိုးရေးဦးစီးဌာန မြေအသုံးချမှု ဦးစီးဌာန ဓာတ်ခွဲခန်းတွင် နမူနာ (၈) ခု ပေါင်းစပ်ပြီး ခွဲခြမ်းစိတ်ဖြာခဲ့ပါသည်။ အနက် ၁၂၀ စင်တီမီတာမှ နမူနာကို နေရာတစ်ခုစီတွင် ကောက်ယူခဲ့သည်။ နမူနာအားလုံးကို ၂၀၂၃ ခုနှစ် အောက်တိုဘာ ၂၄ ရက်နေ့တွင် ကောက်ယူခဲ့သည်။
- **မြေအောက်ရေ** - မြေအောက်ရေနမူနာကို ၂၀၂၃ ခုနှစ် အောက်တိုဘာ ၂၄ ရက်နေ့တွင် စီမံကိန်းနေရာ အနီး (၁) နေရာ၌ မြေအောက်ရေနမူနာကို ကောက်ယူခဲ့သည်။

**ဇီဝအရင်းအမြစ်များ**

စီမံကိန်းဧရိယာသည် ရှမ်းပြည်နယ်မြောက်ပိုင်း၊ ကျောက်မဲခရိုင် နောင်ချိုမြို့နယ် လုံရုံး ကျေးရွာအုပ်စု၊ လောက်ဖန်းကျေးရွာအနီးတွင် တည်ရှိသည်။ အနီးဆုံးရေအရင်း အမြစ်သည် ၄.၁၅ ကီလိုမီတာအကွာတွင်ရှိသော နန်းပန်းဆီချောင်းဖြစ်သည်။ ဧရာဝတီမြစ် အထက်ပိုင်း ရေဝေရေလဲဧရိယာ စင်္ကြံနှင့် မယ်ဟုန် ( မြစ်ငယ်မြစ် ) စသည့် အရေးကြီး ငှက်ဧရိယာ (IBA) တို့သည် နောင်ချိုမြို့နယ်အတွင်း ပါဝင်သည်။ သို့သော်လည်း Study Area တွင် KBA မရှိပါ။

ငွေ့ရှည်ပုလဲဘိလပ်မြေစက်ရုံ၏ စစ်တမ်းအရ စုစုပေါင်း လိပ်ပြာမျိုးစိတ် (၁၇)မျိုး၊ ပုစဉ်းမျိုးစိတ် (၁၅)မျိုး၊ ပျား (၂)မျိုး၊ ငါး (၁၁)မျိုး၊ ဖားနှင့် ဖား (မျိုးစိတ် (၁၁)မျိုး)၊ မျိုးစိတ် ၉ မျိုး၊ ပုတ်သင်ညို နှင့် မျောက်ခြောက် (၅ မျိုးစိတ်)၊ မြွေ (၃ မျိုးစိတ်)၊ ငှက် (၂၄ မျိုးစိတ်) နှင့် နို့တိုက်သတ္တဝါ (၁၄ မျိုးစိတ်) တို့ကို မှတ်တမ်းတင်ထားသည်။ IUCN Red list အမျိုးအစားအောက်တွင် မျိုးသုဉ်းလုနီးပါးနှင့် မျိုးသုဉ်းနိုင်သောမျိုးစိတ်များ မရှိပါ။

**လူမှုရေးအရင်းအမြစ်များ**

လူမှုစီးပွားအခြေခံ ကိန်းဂဏာန်းများကို စီမံကိန်းကြောင့် ကောင်းကျိုး သို့မဟုတ် ဆိုးကျိုး သက်ရောက်မှုရှိရမည့် လူမှုရေးနယ်ပယ် ( SAOI ) ကို အခြေခံ၍ စုဆောင်းသွားမည် ဖြစ်သည်။

သက်ဆိုင်သူများ၏ စိုးရိမ်မှုအပေါ် အခြေခံ၍ လောက်ဖန်းကျေးရွာ၊ လယ်ကြီးတော ကျေးရွာနှင့် ခဲဆန်းကျေးရွာတို့တွင်လူမှုရေး-စီးပွားရေး တိုက်ရိုက်ထိခိုက်နိုင်သည်။ အဆိုပါ ကျေးရွာများအားလုံးသည် အဆိုပြုစီမံကိန်း၏ ၃ ကီလိုမီတာအချင်းဝက် အတွင်း လေ့လာရေး ဧရိယာအတွင်းတွင် တည်ရှိသည် ။

လူမှုရေးအခြေခံအချက်အလက်များသည် နောင်ချိုမြို့နယ်နှင့် လေ့လာမှုဧရိယာ အတွင်း သက်ရောက်ခံများအပေါ် အဓိကထားမည်။တဆင့်ခံအချက်အလက်များကို ၂၀၁၉ ခုနှစ်၏ နောင်ချိုမြို့နယ်အချက်အလက်များမှ ရယူသည်။

၂၀၁၉ ခုနှစ်၏ နောင်ချိုမြို့နယ်အချက်အလက်များအရ စုစုပေါင်းလူဦးရေသည် ဇယား အေ.၅ တွင်ပြထားသည့်အတိုင်း လူဦးရေ 125,269 ဦး ရှိသည်။

ဇယား အေ.၅ အိမ်ထောင်စုနှင့် မြို့နယ်လူဦးရေ

နေထိုင်မှု	18 နှစ်ထက်မကြီး			အသက် 18 နှစ်အောက်			စုစုပေါင်း		
	ကျား	မ	စုစုပေါင်း	ကျား	မ	စုစုပေါင်း	ကျား	မ	စုစုပေါင်း
မြို့ပြ	၂၂၈၈	၂၂၉၂	၄၅၈၀	၅၃၆၉	၅၇၆၅	၁၁၁၃၄	၇၆၅၇	၈၀၅၇	၁၅၇၁၄
ကျေးလက်	၁၉၀၃၃	၁၈၈၅၅	၃၇၈၈၈	၃၅၅၆၀	၃၆၁၀၇	၇၁၆၆၇	၅၄၅၈၃	၅၄၉၆၂	၁၀၉၅၅၅
စုစုပေါင်း	၂၁၃၂၁	၂၁၁၄၇	၄၂၄၆၈	၄၀၉၂၉	၄၁၈၇၂	၈၂၈၀၁	၆၂၂၅၀	၆၃၀၁၉	၁၂၅၂၆၉

**အရင်းအမြစ်- TspProfiles\_GAD\_NaungHkio\_2019\_MMR**

တရားဝင်စာရင်းဇယားများအရ နောင်ချိုမြို့နယ်တွင် အလုပ်လက်မဲ့နှုန်းမှာ ၄.၀၄ % ( ဇယား အေ.၆ ကို ကြည့်ပါ )။

ဇယား အေ.၆ ။ အလုပ်လက်မဲ့နှုန်း



လုပ်သားအင်အား	တာဝန်ထမ်းဆောင်ခဲ့သည်။	အလုပ်လက်မဲ့	အလုပ်လက်မဲ့နှုန်း
၈၂,၈၀၁	၇၉,၄၅၆	၃,၃၄၅	၄.၀၄%

**ထိခိုက်မှုနှင့် လျော့ပါးရေးအစီအမံများ**

တည်ဆောက်ရေးနှင့် လည်ပတ်မှုအဆင့်များတွင် ဤစီမံကိန်းလုပ်ငန်းများကြောင့် အောက်ပါ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ အစိတ်အပိုင်းများအပေါ် အကျိုးသက်ရောက်မှု များ ဖြစ်ပေါ်နိုင်သည်-

- လေအရည်အသွေး
- ဆူညံသံ
- တုန်ခါမှု
- ရေမျက်နှာပြင် အရည်အသွေး
- မြေဆီလွှာနှင့် မြေမျက်နှာသွင်ပြင်
- ဇီဝမျိုးစုံမျိုးကွဲများ
- လူမှုရေး-စီးပွားရေး
- လုပ်ငန်းခွင်ကျန်းမာရေးနှင့်ဘေးကင်းလုံခြုံရေး
- လူထုကျန်းမာရေးနှင့် ဘေးကင်းရေး

စီမံကိန်းမှ အဓိကအကျိုးသက်ရောက်မှုများ၏ အကျဉ်းချုပ်နှင့် သက်ရောက်မှုဆန်းစစ်ခြင်း ရလဒ်များကို ဇယား အေ.၇ မှ ဇယား အေ.၈ တွင်ဖော်ပြထားပါသည်။ EIA အစီရင်ခံစာ၏ အခန်း 7 တွင် ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ ဆန်းစစ်ခြင်းနှင့် လျော့ပါးရေးအစီအမံ အားလုံး၏ အသေးစိတ် အချက်အလက်အပြည့်အစုံကို တင်ပြထားသည်။

ဇယား အေ.၇ သက်ရောက်မှုများနှင့် တည်ဆောက်ရေးအဆင့်၏ အရေးပါမှု

ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
လေအရည်အသွေး	✓ လေထုထဲတွင် ဖုန်မှုန့်များ (PMs) ပျံ့လွင့်မှုသည် ယာဉ် များ ရွေ့လျားမှု၊ နေရာပြင်ဆင်မှုနှင့် တည်ဆောက်ရေး၊ မြေတူး



ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
	<p>ခြင်းနှင့် မြေညိုခြင်း၊ မြေဖို့ခြင်းနှင့် မြေသိပ်ခြင်း ကဲ့သို့သော လမ်းဖောက်လုပ်ခြင်း/ အဆင့်မြှင့်တင်ခြင်း တို့မှ မျှော်လင့်ပါသည်။</p> <p>✓ မော်တော်ကားများ၊ စက်ယန္တရားများမှ ရုပ်ကြွင်း လောင်စာများကို လောင်ကျွမ်းခြင်းမှ လေထုညစ်ညမ်း စေသော SO<sub>2</sub>၊ NO<sub>x</sub>၊ CO၊ CO<sub>2</sub> ထုတ်လွှတ်ခြင်း</p>
ဆူညံသံ	ယေဘုယျအားဖြင့် အလုပ်သမားများနှင့် လူမှုအသိုက် အဝန်းကို အနှောင့်အယှက်ဖြစ်စေသည့် ဆူညံသံများ
တုန်ခါမှု	ယာဉ်ကြောပိတ်ဆို့မှု၊ ဆောက်လုပ်ရေး လုပ်ငန်းများ၊ လေးလံသော စက်လည်ပတ်ခြင်းမှ တုန်ခါမှု
ရေပတ်ဝန်းကျင်	ရေအသုံးပြုမှု နှင့် ရေသုံးစွဲမှုတို့ကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ၊ ဆောက်လုပ်ရေး လုပ်ငန်းများမှ ရေဆိုးများ ထွက်ရှိမှု
မြေဆီလွှာအရည်အသွေး	မြေဆီလွှာပျက်စီးခြင်းနှင့် ညစ်ညမ်းခြင်း။
အစိုင်အခဲစွန့်ပစ်ပစ္စည်း	<p>✓ စနစ်တကျ မကိုင်တွယ်ပါက မြေအရည်အသွေး ကျဆင်း သွားနိုင်သည်။</p> <p>✓ အနံ့ပြဿနာ</p> <p>✓ ယင်၊ ငှက်၊ ကြွက်စသည်တို့ကို မွေးမြူခြင်း၊</p> <p>✓ စီမံကိန်းဧရိယာအတွင်း ရှိနေပါက အနီးနားရှိ လူမှုအသိုက် အပိုင်းများကို အနှောင့်အယှက်ဖြစ်စေပါသည်။</p>
ဂေဟဗေဒ	✓ ဆောက်လုပ်ရေးလုပ်ငန်းများကြောင့် သစ်ပင်ပန်းမန်နှင့်

ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
	<ul style="list-style-type: none"> <li>တိရစ္ဆာန်များ ထိခိုက်ခြင်း၊</li> <li>✓ ကျေးငှက်များနှင့် နို့တိုက်သတ္တဝါများကို ယာယီ ရွှေ့ပြောင်း နေထိုင်ကြောင်း သိရ သည်။</li> </ul>
လူမှုရေး-စီးပွားရေး	<ul style="list-style-type: none"> <li>✓ အလုပ်အကိုင်အခွင့်အလမ်း</li> <li>✓ လုပ်ငန်းကို မြှင့်တင်ပါ။</li> </ul>
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး	<ul style="list-style-type: none"> <li>✓ ဖုန်မှုန့်များနှင့် ဆူညံသံများ မြင့်မားမှုကြောင့် အလုပ်သမား များအတွက် ကျန်းမာရေးနှင့် ဘေးကင်းရေး အန္တရာယ်များ။</li> <li>✓ အသက်ရှူလမ်းကြောင်းဆိုင်ရာပြဿနာများ</li> <li>✓ အကြားအာရုံကိစ္စများ</li> </ul>
ပြည်သူ့ကျန်းမာရေးနှင့် ဘေးကင်းရေး	<ul style="list-style-type: none"> <li>✓ အမြင်အာရုံကို လျော့ပါးစေတယ်။</li> <li>✓ ဥပမာအားဖြင့်၊ အချို့သော အသက်ရှူ လမ်းကြောင်းဆိုင်ရာ အခြေအနေများ ကြုံတွေ့နေရသော လူအချို့ အတွက် အလွန်အကျွံ ဖုန်မှုန့်သက်ရောက်မှုများ ရှိနိုင်ပါသည် ။</li> </ul>

ဇယား အေ.၈ လည်ပတ်မှုအဆင့်၏ သက်ရောက်မှုများနှင့် အရေးပါမှု

ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
လေအရည်အသွေး	<ul style="list-style-type: none"> <li>✓ ကုန်ကြမ်းများကို သယ်ဆောင်ခြင်း၊ ကြိတ်ခွဲခြင်း၊ ကြိတ်ခွဲခြင်းနှင့် ရောနှော ခြင်း၊ ထုပ်ပိုးခြင်းနှင့် ယာဉ်လှုပ်ရှားမှု များမှ ဖုန်မှုန့်များကို ထုတ်လွှတ်ပါသည်။</li> <li>✓ ဓာတ်အားပေးစက်ရုံရှိ ရုပ်ကြွင်း လောင်စာများ</li> </ul>

ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
	<p>လောင်ကျွမ်းခြင်း၊ clink ထုတ်လုပ်ခြင်း နှင့်အင်ဂျင်စက်များ မှ SO<sub>2</sub>၊ NO<sub>x</sub>၊ CO၊ CO<sub>2</sub> ၏ လေထု ညစ်ညမ်းမှု ဓာတ်ငွေ့ထုတ်လွှတ်မှု၊ GHG ထုတ်လွှတ်မှုကို တိုးလာခြင်း။</p>
ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> <li>✓ ဘိလပ်မြေစက်ရုံနှင့် ဓာတ်အားပေးစက်ရုံ လည်ပတ်မှုနှင့် မော်တော်ကား လှုပ်ရှားမှုကြောင့် နောက်ခံဆူညံသံများ မြင့်တက် လာခြင်း၊</li> <li>✓ အလုပ်သမားများနှင့် ဒေသခံပြည်သူများ အား အနှောက်အယှက်ဖြစ်စေခြင်း (ရိုပါက)။</li> <li>✓ အလုပ်သမားများနှင့် ဝန်ထမ်းများအတွက် အကြားအာရုံ လျော့နည်းလာခြင်း</li> <li>✓ လေးလံသောယာဉ်များ ရွေ့လျားမှုမှ တုန်ခါမှုကြောင့် အက်ကွဲခြင်း။</li> </ul>
ရေ ပတ်ဝန်းကျင်	<p>ဘိလပ်မြေစက်ရုံ၊ လျှပ်စစ်ဓာတ်အားပေး စက်ရုံနှင့် အိမ်တွင်းမှ ရေဆိုးများ ထွက်ရှိမှု၊ ရေသုံးစွဲမှုနှင့် စီးဆင်ရေများကြောင့် ပတ်ဝန်းကျင်ရေအပေါ် သက်ရောက်မှုများ။</p>
အစိုင်အခဲစွန့်ပစ်ပစ္စည်း	<ul style="list-style-type: none"> <li>✓ လေထုညစ်ညမ်းမှု ထိန်းချုပ်ရေး ကိရိယာ များမှ ဖုန်မှုန့်များသည် ဝန်ထမ်းများ/ အနီးနားရှိ လူများတွင် အသက်ရှူ လမ်းကြောင်းဆိုင်ရာ ရောဂါများကို ထိခိုက်စေနိုင်ပါသည်။</li> </ul>

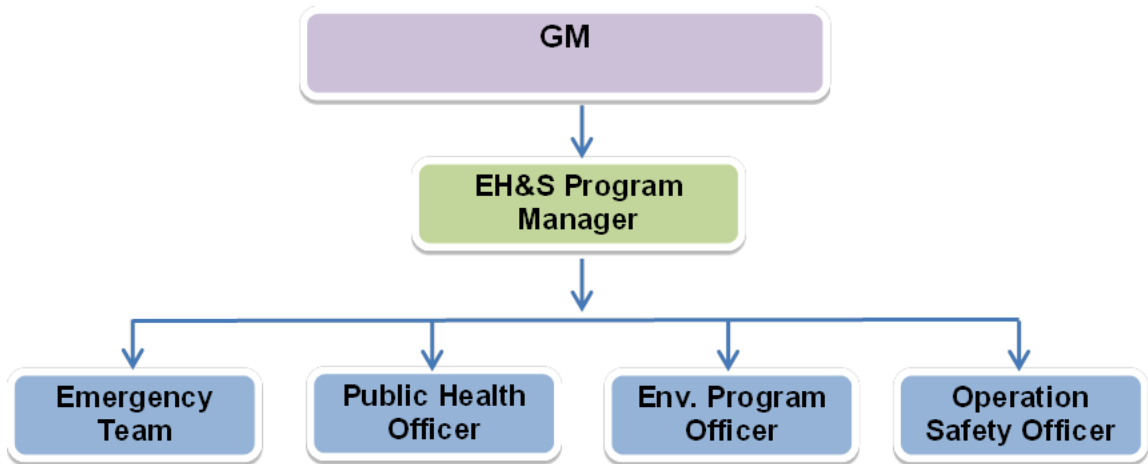
ပတ်ဝန်းကျင်ဆိုင်ရာ အစိတ်အပိုင်း	ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများ
	<ul style="list-style-type: none"> <li>✓ သိုလှောင်မှုမှ ယိုစိမ့်ခြင်း သို့မဟုတ် အငွေ့ ပျံ့ခြင်း မတော်တဆ ဖြစ်ပေါ်ပါက အသုံးပြုပြီးဆီနှင့် စွန့်ပစ် ပစ္စည်းအကြွင်း အကျန်များသည် မြေဆီလွှာနှင့် မြေအောက်ရေများကို ညစ်ညမ်းစေနိုင်သည်။</li> <li>✓ စက်ရုံမှထွက်ရှိသော အိမ်တွင်းအမှုိတ်များကို စွန့်ပစ်ခြင်းသည် ကူးစက်ရောဂါများ၊ မြောင်းများပိတ်ဆို့ခြင်းနှင့် ဇီဝမျိုးစုံမျိုးကွဲများ ဆုံးရှုံးခြင်းစသည့် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများ ဖြစ်စေနိုင်သည်။</li> </ul>
ဂေဟဗေဒ	<ul style="list-style-type: none"> <li>✓ ရှင်သန်နေထိုင်ရာ အလားအလာများ ပျက်စီးခြင်း။</li> <li>✓ ဂေဟစနစ်ဝန်ဆောင်မှုနှင့် ဇီဝမျိုးစုံမျိုးကွဲများ</li> </ul>
အရင်းအမြစ်	သဘာဝအရင်းအမြစ်များ လျော့နည်း လာခြင်း၊
လူမှုရေး-စီးပွားရေး	<ul style="list-style-type: none"> <li>✓ အလုပ်အကိုင်အခွင့်အလမ်း</li> <li>✓ လုပ်ငန်းကို မြှင့်တင်ပါ။</li> </ul>
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး	<ul style="list-style-type: none"> <li>✓ ကျန်းမာရေးဝန်ထမ်းများ။</li> <li>✓ မတော်တဆ ထိခိုက်ဒဏ်ရာရ/သေဆုံးမှုများ</li> </ul>
ပြည်သူ့ကျန်းမာရေးနှင့် ဘေးကင်းရေး	<ul style="list-style-type: none"> <li>✓ ပြည်သူ့ကျန်းမာရေးဆိုင်ရာ ပြဿနာများ ။</li> <li>✓ မတော်တဆ ထိခိုက်ဒဏ်ရာရ/သေဆုံးမှုများ</li> </ul>

**ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်း**

ဘိလပ်မြေစက်ရုံနှင့် ကျောက်မီးသွေးသုံး ဓာတ်အားပေးစက်ရုံတို့သည် ဘိလပ်မြေစက်ရုံ ဧရိယာ၏ ဧရိယာအတွင်းတွင် တည်ရှိသည်။ ဤစီမံကိန်းများမှ ဖြစ်နိုင်ခြေရှိသော အကျိုး သက်ရောက်မှုများသည် လုပ်ငန်းဆောင်ရွက်မှုအဆင့်တွင် လေထုအတွင်းထုတ်လွှတ်မှု တိုးမြှင့် ခြင်း၊ သဘာဝသယံဇာတ သုံးစွဲမှုနှင့် အများသုံး အခြေခံအဆောက်အအုံများနှင့် သာယာအဆင်ပြေမှုများကို အသုံးချမှုများနှင့်ဆက်စပ် နေပါသည်။

**ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်**

ပုံ အေ.၃ တွင်ပြထားသည့်အတိုင်း ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်-EMP ကို အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်ပါသည်။ ။



**ပုံ အေ. ၃ -ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအတွက် အဖွဲ့အစည်းဇယား**

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်မှ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အကောင်အထည်ဖော်ရန်အတွက် ဘတ်ဂျက်ခွဲဝေပေးရန် ခန့်မှန်းထားသည်။ သဘာဝ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်အတွက် စုစုပေါင်းခန့်မှန်းဘတ်ဂျက်မှာ ကျပ်ငွေ ၈၀,၀၀၀,၀၀၀ ဖြစ်သည်။ ငွေရည်ပုလဲဘိလပ်မြေ ကုမ္ပဏီလီမိတက် ကလည်း ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်ကို လက်တွေ့ကျကျ အကောင်အထည်ဖော်သည့်အခါတွင် ခန့်မှန်း ဘတ်ဂျက် မလုံလောက်ပါက ထပ်လောင်းဘတ်ဂျက် ပေးအပ်သွားမည်ဟု ကတိပြုပါသည်။

စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်တွင် စောင့်ကြည့်ရမည့် တည်နေရာ၊ ကြာချိန်၊ ကြိမ်နှုန်းတို့ကို လွှမ်းခြုံထားသည်။ စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်တွင် ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုမှု နှင့် လိုက်နာမှု စောင့်ကြပ်ကြည့်ရှုမှုတို့ ပါဝင်သည်။

ဇယား အေ. ၉ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

ထိခိုက်မှု	စောင့်ကြည့်လေ့လာရေးနည်းလမ်း	ပါရာမီတာ	တည်နေရာ	အကြိမ်ရေ
<b>ဆောက်လုပ်ရေးအဆင့်</b>				
ပတ်ဝန်းကျင်လေထုအရည်အသွေး	တိုင်းတာခြင်း/နမူနာ	PM <sub>10</sub> & PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> and CO	တောင်တက်တစ်ခုနှင့် လေတိုက်နှုန်းနှစ်ခုကို လွှမ်းခြုံထားသည့် နေရာသုံးနေရာတွင်	သုံးလတစ်ကြိမ်
ဆူညံသံအဆင့်	အတိုင်းအတာ	Leq (day) and Leq (night)	ဆောက်လုပ်ရေးခြံနှင့် ဆောက်လုပ်ရေးဆိုင်ရာများ	သုံးလတစ်ကြိမ်
ရေအရည်အသွေး	နမူနာ/ ခွဲခြမ်းစိတ်ဖြာခြင်း။	Physical, chemical and biological parameters	မျက်နှာပြင်ရေနမူနာနှစ်ခု	တစ်နှစ်လျှင် နှစ်ကြိမ် (မှတ်သုံးရာသီ)၊
မြေဆီလွှာအရည်အသွေး	နမူနာ/ ခွဲခြမ်းစိတ်ဖြာခြင်း။	Physico-chemical parameters	တစ်နေရာတည်းမှာ	တစ်နှစ်မှာ နှစ်ကြိမ် (မှတ်သုံးရာသီ)
<b>စစ်ဆင်ရေးအဆင့်</b>				
လေအရည်အသွေး	အတိုင်းအတာ/ နမူနာယူခြင်း။	PM/ PM <sub>10</sub>	မီးဖို	အဆက်မပြတ်
		NO <sub>x</sub> , SO <sub>x</sub>	မီးဖို	သုံးလတစ်ကြိမ်
		PM/ PM <sub>10</sub>	ဘိလပ်မြေကြိတ်ခြင်းနှင့် clinker cooler stacks	သုံးလတစ်ကြိမ်
		Temperature, Oxygen level, combustion	လောင်ကျွမ်းခြင်း ပါဝင်ပါတယ်။	နှစ်အလိုက်

ထိခိုက်မှု	စောင့်ကြည့်လေ့လာရေးနည်းလမ်း	ပါရာမီတာ	တည်နေရာ	အကြိမ်ရေ
		efficiency		
		Ambient PM/ PM <sub>10</sub> , NO <sub>x</sub> and SO <sub>x</sub>	ရွေးချယ်ထားသော အခံကျေးရွာများ၊ ကိုလိုနီများ၊ စက်ရုံများ	နှစ်အလိုက်
ဆူညံသံနှင့် တုန်ခါမှု	အတိုင်းအတာ	Leq [(dB(A)]	ကြိတ်စက်၊ ကုန်ကြမ်းကြိတ်စက်များ၊ ဘိလပ်မြေစက်များ	နှစ်အလိုက်
			Plant site ပတ်လည် ၄ ဖက်	နှစ်အလိုက်နှင့် တိုင်ကြားမှုများ အပေါ်
ရေ	နမူနာယူပါ။	pH, Temperature increase, Total suspended solids, Oil content, COD	<b>Surface Water</b> ရင်းမြစ်များ၊ တပ်ဆင်ထားသော အဆီထောင်ချောက်များ၊ ဆီ/ရေခြားနားမှုများ၊ အနည်ကျသည့် ကန်များ၊ စွန့်ပစ်ပစ္စည်းများ၊ STP ၏ ဝင်ပေါက်နှင့် ထွက်ပေါက်	သုံးလတစ်ကြိမ်
မြေဆီလွှာ	နမူနာယူပါ။	Moisture content, pH, salinity, Nitrogen, Phosphate, Chloride, Potassium, Sodium	စီမံကိန်းနေရာအနီး စိုက်ပျိုးရေးမြေကွက်များ	နှစ်စဉ်
		Heavy metal content (mercury, lead, chromium,		သုံးနှစ်တစ်ကြိမ်

ထိခိုက်မှု	စောင့်ကြည့်လေ့လာရေးနည်းလမ်း	ပါရာမီတာ	တည်နေရာ	အကြိမ်ရေ
		copper, nickel, zinc and cadmium)		

ဇယား အေ -၁၀ လိုက်နာမှု စောင့်ကြည့်ကြည့်ရှုခြင်း။

ထိခိုက်မှု	စောင့်ကြည့်လေ့လာရေးနည်းလမ်း	ကန့်သတ်ချက်	တည်နေရာ	အကြိမ်ရေ
အစိုင်အခဲစွန့်ပစ်ပစ္စည်း	စာရင်းစစ်များ၊ ဓာတ်ပုံပြပွဲ စာရွက်စာတမ်း၊ နှင့်အင်တာဗျူးများ	မျိုးဆက်၊ သိုလှောင်မှု၊ ပြန်လည်အသုံးပြုမှု၊ သယ်ယူပို့ဆောင်ရေးနှင့် စွန့်ပစ်ခြင်း။	စက်ရုံဥပစာ	သုံးလတစ်ကြိမ်
ဇီဝမျိုးစုံမျိုးကွဲများ	အမြင်အာရုံစစ်ဆေးခြင်းနှင့် ဓာတ်ပုံရိုက်ခြင်း။ စာရွက်စာတမ်း	ပန်းဖုံးများ၏အထွေထွေအခြေအနေ	အပင်နှင့် ရှုခင်းများ	နှစ်စဉ်
အရင်းအမြစ်အသုံးပြုခြင်း။	တိုင်းတာခြင်း	ရေနှင့်စွမ်းအင်သုံးစွဲမှု	စိုက်ခင်း။	အဆက်မပြတ်
	စာရင်းစစ်	ကုန်ကြမ်းသုံးစွဲမှု	စိုက်တယ်။	အဆက်မပြတ်
ကျန်းမာရေးနှင့် ဘေးကင်းရေး	ကျန်းမာရေးနှင့် ဘေးကင်းရေး စစ်တမ်းများ	<b>PPE</b> ကို မှန်ကန်စွာအသုံးပြုခြင်း၊ ဘေးကင်းရေး ဆိုင်းဘုတ်များပါရှိခြင်း၊ ရှေးဦးသူနာပြုစုခြင်း၊ မီးငြိမ်းသတ်စက်များ၊ ထိခိုက်ဒဏ်ရာရခြင်း/ နာမကျန်းမှုမှတ်တမ်းများ။ မတော်တဆမှု စာရင်းဇယား	စက်ရုံ၊ လမ်းသွယ် လမ်းပိုင်းကွန်ရက်နှင့်အတူ အဆိုပြုထားသော စီမံကိန်း	အဆက်မပြတ်



ထိခိုက်မှု	စောင့်ကြည့်လေ့လာရေးနည်းလမ်း	ကန့်သတ်ချက်	တည်နေရာ	အကြိမ်ရေ
		မှတ်တမ်းတင်ခြင်း။		
မီးဘေးအန္တရာယ်	စစ်ဆေးခြင်းနှင့် စမ်းသပ်ခြင်း။	ဖုန်လေထုထဲတွင် အောက်ဆီဂျင်ပါဝင်မှုကို စစ်ဆေးခြင်း (အလိုအလျောက် ထိန်းချုပ်ခြင်း)	ကုန်ကြမ်းနှင့် ကုန်ပစ္စည်း ကိုင်တွယ်ခြင်း။ ဒေသများ	အဆက်မပြတ်
လူမှုစီးပွား	ကွင်းဆင်းမေးခွန်းလွှာ	ဒေသခံလူဦးရေ	အပင်နှင့်ပတ်ဝန်းကျင်	နှစ်စဉ်
	အင်တာဗျူးများ	အလုပ်အကိုင်မှတ်တမ်း	စိုက်တယ်။	အဆက်မပြတ်
စစ်ဆင်ရေးစောင့်ကြည့်ရေး	အမြင်အာရုံစစ်ဆေးခြင်းနှင့် စာရွက်စာတမ်း	ထုတ်လုပ်မှုနှုန်း၊ ဓာတ်ငွေ့စီးဆင်းမှုနှုန်း၊ တန်ပြန်ဖတ်ရှုမှုများ၊ ဖိအားအဆိုရှင်များ၊ အပူချိန်များ၊ ပုံမှန်မဟုတ်သော ဖတ်ရှုမှုများ၊ ပိုလျှံမှုများ၊ ရပ်တန့်မှုများ	<b>Plant</b> တွင် အဆောက်အဦနှင့် အဓိက စက်ပစ္စည်းများအားလုံး	နေ့စဉ်

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအတွက် အောက်ဖော်ပြပါ အထူးအစီအစဉ်ခွဲများကို အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

- လေထုညစ်ညမ်းမှုစီမံခန့်ခွဲမှုအစီအစဉ်
- ဆူညံသံနှင့် တုန်ခါမှု စီမံခန့်ခွဲမှု အစီအစဉ်
- ရေဆိုးစီမံခန့်ခွဲမှု အစီအစဉ်
- အမှိုက်စီမံခန့်ခွဲမှု အစီအစဉ်
- ဂေဟဗေဒစီမံခန့်ခွဲမှု အစီအစဉ်
- သဘာဝအရင်းအမြစ်စီမံခန့်ခွဲမှုအစီအစဉ်
- ကျန်းမာရေးနှင့် ဘေးကင်းရေး စီမံခန့်ခွဲမှုအစီအစဉ်

- အရေးပေါ်တုံ့ပြန်ရေးအစီအစဉ်

### ကော်ပိုရိတ်လူမှုရေးတာဝန်

ကော်ပိုရိတ်လူမှုရေးတာဝန်ယူမှု (CSR) သည် ယခုအခါ ပရောဂျက်လည်ပတ်မှုတွင် အရေးကြီးသောအချက်တစ်ခုဖြစ်သည်။ ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် နိုင်ငံတွင်း လူမှုတာဝန်ယူမှုများကို ကောင်းစွာသိရှိနားလည်ထားပြီး မတူညီသော လူမှုရေး လုပ်ငန်းများကို လုပ်ဆောင်သွားမည်ဖြစ်သည်။ လူမှုတာဝန်ယူမှု၏ အရေးပါသော အခန်းကဏ္ဍကို အသိအမှတ်ပြုသည့်အနေဖြင့် ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် နှစ်စဉ် အသားတင် အမြတ်ငွေ၏ ၂ ရာခိုင်နှုန်းမှ CSR အစီအစဉ်အတွက် တစ်နှစ်လျှင် ကျပ်သန်း ၅၀၀ (၅၀၀,၀၀၀,၀၀၀ ကျပ်) ခန့် လျှာထားပါသည်။

### ဝန်ထမ်းသက်သာချောင်ချိရေးအစီအစဉ်

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် အောက်ပါ ဝန်ထမ်းသက်သာ ချောင်ချိရေး လုပ်ငန်းများကို ပံ့ပိုးပေးရန် စီစဉ်နေပါသည်။

- ဝန်ထမ်းနေထိုင်ရန် အိမ်များ
- စာကြည့်တိုက်လုပ်သားများ၏ အသိပညာတိုးတက်စေရေး၊
- ကျန်းမာရေး စောင့်ရှောက်မှု အထောက်အကူပြု ဆေးခန်း
- သာယာလှပသောပတ်ဝန်းကျင်အတွက် အစိမ်းရောင်ခါးပတ်များ ဖွံ့ဖြိုးတိုးတက်ရေး။
- ထမင်းစားခန်းများတွင် ဆပ်ပြာနှင့် ဆပ်ပြာပစ္စည်းများပါသော လုံလောက်သော စားပွဲ၊ ကုလားထိုင်နှင့် လက်ဆေးကန်များ တပ်ဆင်ထားသည်။
- အမျိုးသားနှင့် အမျိုးသမီးအတွက် အိမ်သာနှင့် ရေချိုးခန်းများကို ခွဲခြားထားသည်။
- လူမှုဖူလုံရေး၊ စက်ရုံနှင့် မီးဘေးလုံခြုံရေးတို့ကို ဆောင်ရွက်ပေးသည်။
- စက်ရုံတွင်း သယ်ယူပို့ဆောင်ရေး။
- ရည်မှန်းထားသော ဝန်ထမ်းအသစ်များသည် အလုပ်မဝင်မီ ဆေးစစ်ပြီး အောင်မြင်ပါက ခန့်အပ်သည်။
- အသစ်ခန့်အပ်ထားသော ဝန်ထမ်းများသည် လူမှုဖူလုံရေးအဖွဲ့ဝင်ဖြစ်သင့်သည်။

- ဝန်ထမ်းများအားလုံးကို ၆ လတစ်ကြိမ် ဆေးစစ်ပြီးသည်။
- လူမှုဖူလုံရေး ဥပဒေအရ လူမှုဖူလုံရေး ဥပဒေအရ ဆေးဝါးကုသမှု ခံယူနေရသော ဝန်ထမ်း/လုပ်ငန်းခွင်တွင် ရောဂါတစ်ခုခု ရှိခဲ့ပါက၊
- ကျိုးကြောင်းဆီလျော်သော ပံ့ပိုးကူညီမှုအားလုံးကို စက်ရုံမှဆောင်ရွက်ပေးမည် ဖြစ်ပါသည်။

**အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့်သတင်းအချက်အလက်ထုတ်ဖော်တင်ပြခြင်း**

CROWN ဘိလပ်မြေစက်ရုံအတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းကို (၂) ကြိမ်ပြုလုပ်ခဲ့ပြီး ပထမအကြိမ် အစည်းအဝေးကို ၂၀၁၅ ခုနှစ် ဇူလိုင်လ ၄ ရက် နှင့် ဒုတိယအကြိမ်ကို ၂၀၁၅ ခုနှစ် ဩဂုတ် ၂၃ ရက် တို့တွင် CROWN ဘိလပ်မြေစက်ရုံ အစည်းအဝေးခန်းမ၌ ပြုလုပ်ခဲ့သည်။

**ပထမအကြိမ် လူထုတွေ့ဆုံပွဲ**

ပထမအကြိမ် လူထုညှိနှိုင်းမှုတွင် ဒေသဆိုင်ရာ အာဏာပိုင်များ၊ ရပ်ရွာလူထုများနှင့် အဆိုပြုထားသော စီမံကိန်းကြောင့် တိုက်ရိုက် သို့မဟုတ် သွယ်ဝိုက်သောအားဖြင့် ထိခိုက် ခံစားရသူများ လူဦးရေ ၁၅၀ ခန့် တက်ရောက်ခဲ့ကြပါသည်။ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲမှ ရရှိသော မှတ်ချက်အကျဉ်းချုပ်ကို အောက်ပါဇယားတွင် ဖော်ပြထားပါသည်။

ဇယား အေ-၁၁ အစည်းအဝေးမှရရှိသော သဘောမှတ်ချက်များ အကျဉ်းချုပ်

ပြည်သူ့လိုအပ်ချက်	အပင်တစ်ဝိုက်တွင် သစ်ပင်များများစိုက်ပါ။
	ဘုန်းကြီးကျောင်း ဆောက်လုပ်ရန် သို့မဟုတ် ပြုပြင်မွမ်းမံရန်
	ကျေးရွာများရှိ လမ်းများ အဆင့်မြှင့်တင်ခြင်းနှင့် တိုးချဲ့ ဆောင်ရွက်ခြင်း
	စက်ရုံမှာ ဒေသခံတွေကို အလုပ်ခန့်ဖို့
	သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးကို စဉ်ဆက်မပြတ် လုပ်ဆောင်ရန်နှင့် လိုအပ်သလို ဖြည့်ဆည်းဆောင်ရွက်ပေးရန်

	လူမှုရေး၊ စီးပွားရေးနှင့် ကျန်းမာရေး အဆင့်အတန်း တိုးတက်စေရန်
စိုးရိမ်စိတ်	ဖုန်မှုန့်များ ပြန့်ကျဲမှုကြောင့် စိုက်ပျိုးမြေများကို ထိခိုက်နိုင် သည်။
	ကုန်ကြမ်းနှင့် ဘိလပ်မြေအိတ်များ သယ်ယူရာတွင် ဖုန်မှုန့်များ ထုတ်လွှတ်ခြင်း။

**ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲ**

ဒုတိယအကြိမ်မြောက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းတွင် လူဦးရေ ၁၇၆ ဦးခန့် တက်ရောက်ခဲ့ပါသည်။ ဒုတိယ အကြိမ်မြောက် လူထုတွေ့ဆုံပွဲ မှ ရရှိသော သဘောထားမှတ်ချက် အကျဉ်းချုပ်သည် အောက်ပါဇယားတွင် ဖော်ပြထားပါသည်။

ဒုတိယအကြိမ်မြောက်အကြိမ်မြောက် လူထုတွေ့ဆုံပွဲမှရရှိသောမှတ်ချက်များ အကျဉ်းချုပ်

ပြည်သူ့လိုအပ်ချက်	ကျေးရွာလျှပ်စစ်မီးရရှိရေး
	ရွာလမ်းအဆင့်မြှင့်တင်ခြင်း။
	ဘိလပ်မြေအိတ်များကို အရေအတွက် မသတ်မှတ်ဘဲ ဒေသခံများထံ ရောင်းချခြင်း ဖြစ်သည်။
	နွေရာသီတွင် အဆက်မပြတ် ရေပေးဝေရန်အတွက် ရေတွင်းများ
	ကျန်းမာရေးစောင့်ရှောက်မှုအတွက် ပုဂ္ဂလိကဆေးခန်း
	လူမှုရေး၊ စီးပွားရေးနှင့် ကျန်းမာရေး အဆင့်အတန်း တိုးတက်စေရန်
အကြံပြုချက်များ	ခါးပတ်ကြိုး ဖွံ့ဖြိုးတိုးတက်ရေး ဆောင်ရွက်ဖို့
	လုံခြုံသောပတ်ဝန်းကျင်နှင့် ဂေဟစနစ်ကို ထိန်းသိမ်းရန်
	ဒေသ ဖွံ့ဖြိုးတိုးတက်ဖို့
	စက်ရုံမှ လားရှိုးအထိ နှစ်လမ်းသွားလမ်း ဖောက်လုပ်ရန်

	လမ်းပန်းဆက်သွယ်ရေးအတွက် ပျက်စီးသွားသောလမ်းကို ပြန်လည်ပြုပြင်ရန် အသုံးပြုသော စက်ရုံမှာ ဒေသခံတွေကို အလုပ်ခန့်ဖို့
စိုးရိမ်စိတ်	ဖုန်မှုန့်များ ပြန့်ကျဲမှုကြောင့် စိုက်ပျိုးမြေကို ထိခိုက်နိုင်သည်။ ဆူညံသံ/ အမှိုက်စွန့်ပစ်ခြင်း/ ယာဉ်မတော်တဆဖြစ်နိုင်ချေများသည်။ ကုန်ကြမ်းနှင့် ဘိလပ်မြေအိတ်များ သယ်ယူရာတွင် ဖုန်မှုန့်များ ထုတ်လွှတ်ခြင်း။

**နိဂုံး**

ဘိလပ်မြေထုတ်လုပ်ခြင်းသည် “ကျောက်မိုင်းမှ ကုန်တင်ကားအထိ” ဂေဟဗေဒ ဆိုင်ရာ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုရှိသည်။ ထုံးကျောက်တူးဖော်ခြင်း၊ ကုန်ကြမ်း ကြိတ်ခွဲခြင်း၊ ကြိတ်ခွဲထုတ်လုပ်ခြင်း၊ ဘိလပ်မြေကြိတ်ခွဲခြင်းနှင့် အိတ်အမြောက်အများ သယ်ယူ ပို့ဆောင်ခြင်းမှ အစပြု၍ သဘာဝအရင်းအမြစ်များကို ပစ္စည်းနှင့် စွမ်းအင်ပုံစံဖြင့် အသုံးပြုရန် လိုအပ်ပါသည်။

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် လုပ်ငန်းခွင်ကျန်းမာရေး၊ ဘေးကင်းရေး နှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၊ အမှိုက်စီမံခန့်ခွဲမှုအစီအစဉ် သို့မဟုတ် စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသည့် ရပ်ရွာလူထုများကို တိုင်ပင်ဆွေးနွေးပြီး ပံ့ပိုးကူညီရန် ရည်ရွယ်သည့် လူမှုစီမံခန့်ခွဲမှု သို့မဟုတ် နှိုင်းယှဉ်မှုအစီအစဉ်ကို ဆောင်ရွက်သွားရန် ကတိပြုပါသည်။ ဆောက်လုပ်ရေးနှင့် လည်ပတ်မှုအဆင့်များအတွင်း စောင့်ကြည့်ရေး အစီအစဉ်များကိုလည်း ဆောင်ရွက်သွားမည်ဖြစ်သည်။

ငွေရည်ပုလဲဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် လုပ်ငန်းခွင်ကျန်းမာရေး၊ ဘေးကင်းရေး၊ လူမှုပတ်ဝန်းကျင်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုတာဝန်များကို လုပ်ငန်းခွင် အတွင်းနှင့်

လုပ်ငန်းခွင်ပြင်ပတွင် တာဝန်ယူစီမံခန့်ခွဲရန် ခိုင်မာသော ကော်မတီတစ်ရပ်ကို ဖွဲ့စည်းဆောင်ရွက်မည်ဖြစ်သည်။

ကောင်းကျိုးသက်ရောက်မှုများသည် ဆိုးကျိုးသက်ရောက်မှုများထက်များစွာ သာလွန်သောကြောင့် ဤစီမံကိန်းကို အကောင်အထည်ဖော်ရန် အကြံပြုထားသည်။ ခေတ်မီ နည်းပညာနှင့် အခြားသော သက်ရောက်မှုများအားလုံးကို လျော့ပါးသက်သာစေရန် ဆောင်ရွက်နေချိန်တွင် မြန်မာနိုင်ငံသည် အလုပ်အကိုင်များ တိုးမြှင့်လာခြင်း၊ ပင်ငွေ တိုးလာခြင်း၊ အခွန်အကောက်များ တိုးလာခြင်း၊ နိုင်ငံခြား ရင်းနှီးမြှုပ်နှံမှု တိုးလာခြင်းနှင့် သွင်းကုန် လျော့နည်းခြင်းတို့မှ အကျိုးကျေးဇူးများ ရရှိမည်ဖြစ်သည်။

စီမံကိန်းသည် ခေတ်နောက်ကျသော ဘိလပ်မြေစက်ရုံများနှင့် နှိုင်းယှဉ်ပါက ပတ်ဝန်းကျင်ထိခိုက်မှုနည်းပြီး ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ အစီအမံများ ပေါင်းစပ်ထားသည့် ဘိလပ်မြေထုတ်လုပ်မှုနည်းလမ်းဖြင့် သွင်းကုန်အစားထိုး ပြည်တွင်းထုတ် ဘိလပ်မြေများ ထုတ်လုပ်ခြင်းဖြင့် တနိုင်ငံလုံးနှင့် ဒေသအတွက် စီးပွားရေးနှင့် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ တန်ဖိုးများ ရရှိစေမည်ဖြစ်သည်။

စီမံကိန်းပိုင်ရှင်သည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို သတိရှိရှိ အကောင်အထည်ဖော်ရန် ကတိကဝတ်ပြုထားသည်။ ၎င်းတို့သည် သက်ဆိုင်ရာ အာဏာပိုင်များထံမှ လိုအပ်သော ပါမစ်နှင့် လိုင်စင်များကို ရယူနေပြီး အဆိုပြုထားသည့်အတိုင်း စီမံကိန်းကို လုပ်ဆောင်ရန် အရည်အချင်းပြည့်မီသော ဝန်ထမ်းများရှိသည်။ ၎င်းတို့သည် သက်ဆိုင်ရာ ပြဋ္ဌာန်းသတ်မှတ်ချက်များ၏ တစ်စိတ်တစ်ပိုင်းအဖြစ် လုံလောက်သော ဘေးကင်းရေးနှင့် ကျန်းမာရေး လျော့ပါးရေး အစီအမံများကို အဆိုပြုထားသည်။ ထို့ကြောင့် ၎င်းတို့အား ဤအစီရင်ခံစာတွင် အဆိုပြုထားသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် ပြဋ္ဌာန်း ထားသော သတ်မှတ်ချက်များနှင့်အညီ ဤစီမံကိန်းကို အကောင်အထည်ဖော် ဆောင်ရွက်သင့်သည်။

## **1.0 INTRODUCTION**

### **1.1 General**

#### **1.1.1 Brief Project Description**

Ngwe Yi Pa Le’ Cement Company Limited, a subsidized company of Ngwe Yi Pa Le’ Group of Company Limited, was first established on March 3, 2014 under Registration No. (130799027) of the Myanmar Directorate of Investment and Company Administration (see **Appendix I**). The company implemented a cement plant with a minimum production capacity of 1,000 tons per day near Lauk Hpan village at Shan State Naung Hkio Township, has been commercially produced on November 1, 2013, with the approval of the Myanmar Investment Commission. (See **Appendix II**)

Due to high demand and annual shortage of cement supply in Myanmar, the company is aggressively moving forward to meet the requirements of the country by upgrading more efficient cement plants. So, the company decided to expend the capacity of cement production from 1,000 TPD to 5,000 TPD with permission by MIC on 15<sup>th</sup> July 2015. (See **Appendix II**)

This Environmental Impact Assessment (EIA) study report has been prepared for an integrated cement production in Northern Shan State based on the rainy season (July 2015) baseline environmental quality data in the project area. Identification & prediction of significant environmental impacts due to proposed project are included.

Green Myanmar Environmental Services Company Limited is commissioned by Ngwe Yi Pa Le’ Cement Company Limited to conduct Environmental and Social Impact Assessment study for CROWN Cement Plant project.

For this study, the impact zone shall confine within a radius of 3 km from the center of the development site since the nature of the project is such that most of the potential impacts are likely to occur within this area. However, a buffer area extending to 5 km radius from the site has also been studied for any likely impacts. The methodology for EIA is to establish the baseline environmental setting in the 5 km radius area, assess the potential impacts of the proposed project components on different environmental components, develop adequate and feasible mitigation measures (via working practices, adopting cleaner development mechanism or to mitigate where appropriate) so as to keep residual impacts within acceptable limits and develop monitoring and other measures as necessary to ensure successful implementation.

Ngwe Yi Pa Le’ Cement Company Limited has engaged with Jiansu Pangfei Group Co., Ltd. as a seller for the design, equipment supply, and construction and commissioning of the Plant.



Crown Cement Plant will be supplied with limestone, clay, iron ore, coal and gypsum raw materials from nearby quarry mines.

The Plant will comprise cement production line with the rotary kilns being fired by kiln burner using coal as fuel. The Plant will consume about 0.8 million gallons of water per month. Main water source is two springs which flow nearby project site and also ground water. There is an adequate supply of water and sufficient enough for the project.

Table 1-1 Salient Features of the Project

<b>Name of Project:</b>	“CROWN Cement Plant (5,000 TPD) Project,”
<b>Project Location:</b>	Lauk Hpan Field, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, Northern Shan State in Myanmar. Latitude                    22° 21' 22.65" N Longitude                    96° 42' 11.68" E
<b>Proponent:</b>	Ngwe Yi Pa Le’ Cement Company Limited
<b>Office Address of the Proponent:</b>	Address: No.414/1, Corner of 35th & 65th Street, Chan Aye Thar Zan Township, Mandalay, Myanmar Phone : <a href="tel:(95)24030829">(95) 24030829</a> , <a href="tel:(95)24030828">(95) 24030828</a> , <a href="tel:(95)24068192">(95) 24068192</a>   <a href="tel:(95)9449491649">Hot Line : (95) 9449491649</a> Email: <a href="mailto:crowncement@ngweyipalegroup.com">crowncement@ngweyipalegroup.com</a> Website: <a href="https://www.ngweyipalegroup.com">https://www.ngweyipalegroup.com</a>
<b>Contact Person</b>	U Sein Myo Aung Executive Director Tel: 02 71424 Fax Number: 02 71424

### **1.1.2 EIA Consultants and EIA Team**

The planning and conduct of the EIA report of “**CROWN Cement Plant**” project was carried out by Green Myanmar Environmental Services Co., Ltd. (GMES). **Certificate of Incorporation (see Appendix III) and Transitional Consultant Registration Number of Organization No.0006 and Certificate of Personnel** for key experts are as shown in **Appendix VI**.

The EIA consultant company is;  
Green Myanmar Environmental Services Company Limited



No.(115), Kanaung Min Thar Gyi Road, Hlaing Thar Yar Industrial Zone (1), Hlaing Thar Yar City, Yangon, Myanmar.

Tel: 09-897978296

Email: [gmescompany@gmail.com](mailto:gmescompany@gmail.com), [info@gmes-mm.com](mailto:info@gmes-mm.com)

Facebook: [Green Myanmar Environmental Services Co., Ltd.](#)

Website: [www.gmes-mm.com](http://www.gmes-mm.com)

The potential environmental impacts of the proposed services as well as provide baseline information on the project that may be used in decision-making during the project’s evaluation process is to be established.

The EIA project report is expected to:

- 1) Define the baseline for future environmental audits of the proposed project.
- 2) Identify possible impacts of the proposed project on the environment.
- 3) Predict likely changes in the environment as a result of the development.
- 4) Propose mitigation measures for the significant negative impacts of the proposed project on the environment.
- 5) Generate baseline data for evaluating and monitoring impact, including mitigation measures during the project cycle.
- 6) Highlight environmental issues with a view to guiding policy makers, planners, stakeholders and government agencies to make environmentally and economically sustainable decisions.

An overview of the environmental, social and hydrology experts involved with the preparation of this EIA report are presented in **Table 1.2**.

Table 1-2 Key Experts of EIA Team

No.	Title of Post	Terms of Reference	Nominee, Organization & Transitional Consultant Registration Number
1.	Consultant	<ul style="list-style-type: none"> <li>• Overall management of EIA operation</li> <li>• Managing &amp; Team building</li> <li>• Budget and Financial management</li> <li>• Advice on air quality control system</li> <li>• Give advice on air pollution evaluate and mitigation</li> <li>• Advice on the water pollution evaluate, mitigation and water quality monitoring</li> </ul>	Engr. U Sein Thaug Oo Chairman Green Myanmar Environmental Services Co., Ltd. Professional Engineer  No.0023

<b>No.</b>	<b>Title of Post</b>	<b>Terms of Reference</b>	<b>Nominee, Organization &amp; Transitional Consultant Registration Number</b>
		<ul style="list-style-type: none"> <li>• Give advice on the writing Environmental Management Plan</li> </ul>	
2.	Team Leader	<ul style="list-style-type: none"> <li>• Technical meeting &amp; workshop</li> <li>• Lead and facilitation of public consultation and stakeholder engagement</li> <li>• Project Supervision and overall technical management</li> <li>• Preparing and writing Waste assessment and management plan for EIA Documentation</li> <li>• Impact assessment for noise and vibration and preparing/writing noise assessment chapter and noise management plan for EIA Documentation</li> <li>• Preparation for air pollution control management plan</li> <li>• Preparation of guideline for environmental sampling of air quality and monitoring</li> </ul>	Engr. U Kyaw Soe Win Managing Director Green Myanmar Environmental Services Co., Ltd. Experience in EIA processing  No.0019
3.	Environmental Consultant	<ul style="list-style-type: none"> <li>• Advise on the design of EIA</li> <li>• Develop term of reference for duty and responsibility among EIA team</li> <li>• Advise on the environmental baseline</li> <li>• Advise on the field survey</li> <li>• Facilitate technical analysis</li> <li>• Streamline the Environmental Management Plan (EMP)</li> </ul>	Engr. Daw Khin Swe Aye Former Lecturer, Chemical Engineering Dept., YTU  No.0021
4.	Consultant	<ul style="list-style-type: none"> <li>• Assist in preparation of guideline for environmental sampling of air and water quality</li> <li>• Assist in report preparation for environmental baseline</li> </ul>	Daw Khin Shwe Htay Former Lecturer, Chemical Engineering Dept., YTU Environmental Engineer

<b>No.</b>	<b>Title of Post</b>	<b>Terms of Reference</b>	<b>Nominee, Organization &amp; Transitional Consultant Registration Number</b>
		<ul style="list-style-type: none"> <li>• Quality control and reviewing of EIA Documentation</li> <li>• Preparing and writing hazardous assessment and management plan for EIA Documentation</li> <li>• Risk assessment and risk management</li> </ul>	No.0022
5.	Consultant (Laboratory Analysis)	<ul style="list-style-type: none"> <li>• Team leader for water sampling and laboratory testing</li> <li>• Check the result of environmental laboratory testing</li> <li>• Writing the environmental baseline for physical environment</li> <li>• Environmental impact evaluation and Assessment</li> <li>• Preparing water/soil pollution control management plan</li> <li>• Preparing and writing the Environmental management plan</li> </ul>	U Myo Myint Retired Factory Manager Ministry of Industry (1)  No.0026
6.	Specialist (Waste Management)	<ul style="list-style-type: none"> <li>• Collecting field data for industrial and municipal waste</li> <li>• Assist in laboratory testing</li> <li>• Data processing, computing, projection, modeling and analysis</li> <li>• Assist in report preparation</li> </ul>	Engr. Daw Tin May Soe Retired Professor & Head, Chemical Engineering Dept., MTU Experience in environmental toxicology and pollution control  No.0028
7.	EIA Operation and Field Coordinator	<ul style="list-style-type: none"> <li>• Develop operational checklist for EIA study</li> <li>• Facilitate Environmental Impact Assessment</li> <li>• Establish field operational office for EIA</li> </ul>	Dr. Phyto Thu Aung Former Associate Professor, Myanmar Aerospace Engineering University

No.	Title of Post	Terms of Reference	Nominee, Organization & Transitional Consultant Registration Number
		field survey <ul style="list-style-type: none"> <li>• Supervise field survey</li> <li>• Coordinate with local authority and communities for village level meeting</li> <li>• Assist technical consultant for technical observation and measurement</li> </ul>	
8.	Environmental Quality Engineer & Senior Environmental Specialist	<ul style="list-style-type: none"> <li>• Team leader for baseline survey (air, water, soil, noise and vibration)</li> <li>• Air and noise/vibration data analysis and assessment</li> <li>• Questionnaires survey for social baseline survey</li> <li>• Finalize checking for report and report formatting</li> </ul>	U Kyi Han Bo B.E - Aerospace Fuel and Propellant Engineer Myanmar Aerospace Engineering University  No.00275
9.	Specialist on Biodiversity (Flora)	<ul style="list-style-type: none"> <li>• Collection of Flora and Fauna data</li> <li>• Developing methods, impacts &amp; mitigation</li> <li>• Comment upon biodiversity environment</li> </ul>	Dr. Lai Lai Win Deputy Director, National Analytical Laboratory, Ministry of Science and Technology (MOST)  Daw Mu Mu Aye Lecturer, WYTU, Ministry of Science and Technology (MOST) and Technicians from Biodiversity Group  U Pyae Phyo Kyaw B.Sc (Forestry)
10.	Hydrology Consultant	<ul style="list-style-type: none"> <li>• Design of hydrological survey</li> <li>• Supervise hydrological survey</li> </ul>	U Sai Soe Thant B.Sc (Physics) AGTI (EC)

No.	Title of Post	Terms of Reference	Nominee, Organization & Transitional Consultant Registration Number
		<ul style="list-style-type: none"> <li>• Report on relevant section</li> </ul>	
11.	Legal Consultant	<ul style="list-style-type: none"> <li>• To manage environmental conflicts</li> <li>• To arrange resettlement discussion for resolution of environmental disputes</li> <li>• To create a mechanism for the resolution of land-use conflicts</li> <li>• To review relevant environmental impact assessment law for the proposed project</li> </ul>	Daw Tin Yi Win Director (Retired), Union Attorney General’s Office
12.	Social Consultant	<ul style="list-style-type: none"> <li>• Social Baseline Survey</li> <li>• Data Analysis and Impact Assessment</li> <li>• Mitigation Measure and Management plan preparing</li> </ul>	Engr. U Kyaw Soe Win Managing Director (GMES Co., Ltd.) Dr. Kyaw Swar Tint Ph.D. (Mining) Dr. Thein Tun Ph.D. (Metallurgy) Dr. Myo Min Tun Ph. D. (Metallurgy)
		<ul style="list-style-type: none"> <li>• Health Baseline Survey and Health impact Assessment</li> <li>• Data Analysis</li> </ul>	Dr. Than Aung Htwe Ph. D. (Psychology) Dr. Khun Aung M.B.B.S (Ygn) U Myo Thet Naung B.E - Aerospace Fuel and Propellant Engineer Myanmar Aerospace Engineering University
13.	Environmental Monitoring Experts	<ul style="list-style-type: none"> <li>• Environmental baseline measuring</li> <li>• Data analysis</li> <li>• Coordinate for public consultation meeting</li> <li>• Report preparing and formatting</li> </ul>	U Aung Ko Min B.E (Chemical Engineering)  U Aung Kyaw Than B.E (Chemical

No.	Title of Post	Terms of Reference	Nominee, Organization & Transitional Consultant Registration Number
			Engineering)  U Myo Min Htun B. Sc (Physics)
14.	Laboratory Experts	<ul style="list-style-type: none"> <li>• Water sampling and laboratory testing</li> <li>• Preparation for water &amp; wastewater sampling</li> <li>• Preparation for laboratory testing</li> <li>• Laboratory testing</li> <li>• Reporting for laboratory result</li> </ul>	Daw Aye Thuzar Hein B.E (Chemical Engineering)  Daw Hsu Pyae Hla Naing B.Sc (Industrial Chemistry)  U Myo Min Ko BE (Chemical Engineering)

### **1.1.3 Scoping Exercise and Public Consultation**

The team consulted with the local community and key stakeholders. This is an exercise that is the core of the entire EIA project report. The team made several site visits to collect and collate baseline data, secondary information about the project. Stakeholder participation and public consultation is paramount in collating the key issues at an earlier stage such that mitigation measures and action plans can be proposed in consultation with the interested stakeholders and affected public. The resultants of this are the unnecessary delays which can be avoided and the acceptance of the project by the local community.

### **1.1.4 Key Recommendations**

(1) Installation and construction drawings should be done as per international and local Standards.

(2) Administration of Ngwe Yi Pa Le’ Cement Company Limited will comply with the requirements of environmental issues and ensure that conservation of the environment is of paramount importance.

(3) Drainage and sewerage systems shall be appropriately done to cater for storm water and waste water.

(4) The project manager will be trained in firefighting, first aid skills and emergency preparedness skills.

(5) The construction company will observe Health and safety issues of the workers.

### **1.1.5 Issues**

Upon conducting this exercise a number of factors were considered concerning the status of the environment with respect to the probable scenarios during the implementation and operation phases of the project. The main issue is to ascertain

- (1) Whether the environment is suitable for development of the proposal.
- (2) Whether the proposed project will have any significant physical, economic and social impacts during implementation/ construction phase.
- (3) Whether the proposed project will have any significant physical, economic and social impacts upon commissioning (operation phase).
- (4) In cases of negative impacts as mentioned above, how these can be mitigated and the indicators that can be put in place to monitor the impacts and their mitigation.

### **1.1.6 Methodology**

During the analysis process, the study team adopted various approaches and undertook various actions. Secondary information was obtained mainly through desk research from books, journals, public documents and project documents. These included, for example: maps, government records, and standard guidelines. Primary information was obtained through field surveys. A sample interview survey was carried out using structured questionnaires to capture various stakeholders’ opinions concerning the project.

## **1.2 Project’s Objectives and Justification**

The present study refers to Crown Cement Plant, which will be installed in a 250 acres property located in NaungHkio. The industrial unit to be installed is intended to produce cement for the Myanmar market and is justified by the need to meet the growing demand for this product with national production. This product is indispensable to the ongoing development process where construction has a leading role.

In the past few years, Myanmar has had a remarkable economic growth associated with a strong investment in infrastructures and the recovery of urban and suburban areas. This growth resulted in an unprecedented increase in demand for construction materials, such as cement. Thus, Ngwe Yi Pa Le’ Cement Company Limited intends to undertake the development of the cement production plant project.

The project will be developed in two phases, which will correspond to a cement production capacity of approximately 1,000 tons of cement per day (TPD) during the first phase

and 5,000 TPD during the second phase of the project. The first proposal was to produce 2,000 TPD which was further increased to 4,000 TPD making the total production of 5,000 TPD during the second phase. Therefore, the new Plant aims to produce ordinary Portland cement, specification conformed to EN197-2000 (Class 525) using local raw materials and other local resources to supply the Myanmar market.

With the new Plant it will be possible to ensure that the employment opportunities and value-added productive process occur in Myanmar, while using available national raw materials and resources.

Regarding the location of the Crown Cement Plant, the NaungHkio area was chosen as the most favorable one since it had the higher number of advantages from a technical feasibility, economical and environmental point of view. In fact, the site selected for the new plant has a set of characteristics which can be listed as follows:

- It is located in Northern Shan State, where the main raw materials for the production process can be obtained (limestone, iron ore, gypsum, coal and clay);
- It has good access to the quarries located not far away from the project site;
- It has good road connections to the national transportation networks;
- It has a large enough available area for installing the new plant.

The above-mentioned conditions result in reduced environmental impacts related to the transportation of raw materials (limestone and gypsum) into the new plant and to the dispatch of the final product (cement).

In conclusion, the selected location for the Crown Cement Plant is the most environmentally and economically favorable alternative.

### **1.3 Need of EIA**

Concern for environment is now a primary issue in all aspects of human activities. Human activities, knowingly or unknowingly have caused impacts on air, water, land and ecology for many years. It is therefore time to review all our activities from environmental aspects so that environment around us is not impacted to cause harm to anyone. It is therefore very important to assess the impact on environment of our activities, present or future.

In case of any new project, it may cause different types of impacts on its surrounding environment and on human beings. Therefore, there are some statutory obligations that any project proponent has to fulfill before proceeding with any developmental work. With this view to assess the impact and to ensure environmental quality; environmental impact assessment is a very necessary exercise. The present Environmental and Social Impact Assessment Report has thus been prepared to assess the probable environmental impact due to the proposed Cement plant at NaungHkio in Northern Shan State.



This EIA report can serve as a guideline for use by the proponent in obtaining environmental authorization as well as to enlighten the environmental authorities on the operating system of the cement plant. The project proponent needs to prepare an ESIA report containing an analysis of the likely environmental impact of the project, and mitigation measures to be taken into consideration in order to obtain the permission from MIC.

## **1.4 Scope and Objectives of the EIA**

### **1.4.1 Objectives of EIA**

The objectives of EIA include the following:

- To ensure environmental considerations are explicitly addressed and incorporated into the development decision-making process;
- To anticipate and avoid, minimize or offset the adverse significant biophysical, social and other relevant effects of development proposals;
- To protect the productivity and capacity of natural systems as well as the ecological processes which maintain their functions; and
- To promote development that is sustainable and optimizes resource use and management opportunities.

### **1.4.2 Scope**

The scope includes literature review, field studies, impact assessment and preparation of the EIA Report covering:

- Description of the proposed project,
- Baseline environmental conditions of the area,
- Relevant environmental laws,
- Public and stakeholder consultation,
- Project activities (not include mining and hydropower generation),
- Identification of anticipated adverse impacts to the environment,
- Appropriate mitigation measures, and
- Provisions of an environmental management plan.

The overall scope of work also includes:

- Undertake an analysis of the potential ground borne noise impacts on the surrounding area and recommend appropriate mitigation measures where necessary.
- Provide technical advice and support to any Public Consultation Program associated with the project.

There are a number of technical requirements for assessing specific environmental impacts. These are clearly defined in noise impact, air and water quality impacts, and land contamination impact. In order to provide a comprehensive EIA, Green Myanmar Environmental Services Co. Ltd. has included assessment in other technical areas including occupational health and safety, risk and fire hazards.

The most critical environmental issues and recommendations have been identified and conveyed to the project management team. These were related to site drainage, construction work management, landscaping, resource protection and employee housing. With the incorporation and implementation of the recommendations and mitigation measures detailed in this EIA report, the proposed project is not expected to have any long-term adverse negative impacts on the ecological and social environments of Shan State.

## **2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK**

### **2.1 Policy and Legal Framework**

Policy, legal and institutional framework of the proposed project relating to the environmental, social, health and economic conditions are discussed in this section.

#### **2.1.1 Government Policy**

The Government of The Republic of The Union of Myanmar has issued an Environmental Policy in 1994, Myanmar Agenda 21 in 1997, National Sustainable Development Strategy in 2009 for purposes of environmental protection towards the process of sustainable development. In the Constitution of the Republic of the Union of Myanmar, 2008 detail basic principles are adopted that every citizen has the duty to assist the Union in carrying out environmental conservation.

In 2012, the Environmental Conservation Law has been enacted by Pyidaungsu Hluttaw and one of the objects of this law is to implement a National Environmental Policy which can provide long-term guidance for government organizations, civil society, the private sector and development partners on the achievement of environmental protection and sustainable development objectives in Myanmar.

Ministry of Natural Resources and Environmental Conservation (MNREC) of the Government of The Republic of The Union of Myanmar has responded a new National Environmental Policy (2019) with the aim of mainstreaming environmental considerations into economic and social development.

#### **2.1.2 Ngwe Yi Pa Le’ Cement Company Limited’s Principles**

To achieve the aim of National Environmental Policy of Myanmar, the basic principles of Ngwe Yi Pa Le’ Cement Company Limited to be adopted are:

- To enhance the quality of environment in and around the project area by adopting proper measures for conservation of natural resources;
- Prevention of adverse environmental and social impact to the maximum possible extent;
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

## **2.2 National Laws and Regulations for Environmental Protection Relevant to the Project**

The Project Proponent, Ngwe Yi Pa Le’ Cement Company Limited will comply the following Myanmar Acts, Laws, Rules, Regulations, Procedures and Guidelines relevant to the project described in **Table 2.1**.

Table 2-1 Myanmar Legislation and Relevance to the Project

No.	Name of Law	Provisions of Law relevant to the Project and Commitments of Project Proponent
<b>Environmental conservation and management</b>		
1	<p><b>The Environmental Conservation Law</b> (Pyidaungsu Hluttaw Law No. 9/2012)</p>	<p><b>The project proponent commits</b> to pay the compensation for damages if the project will cause injures to environment. [Section 7(o)]</p> <p><b>The project proponent commits</b> for waste disposal,</p> <ul style="list-style-type: none"> <li>• 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 14]</li> <li>• 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 15]</li> </ul> <p><b>The project proponent commits to allow the inspection</b></p> <ul style="list-style-type: none"> <li>• 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 24]</li> </ul> <p><b>The project proponent commits</b> will not operate business, work-site or factory, workshop which is required to obtain the prior permission without the prior permission under this law. [section 28]</p> <p><b>The project proponent commits</b> will not violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law. [section 29]</p>
2	<p><b>The Environmental Conservation Rules</b> (Notification No. 50/2014)</p>	<p><b>The project proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• Not to emit, cause to emit, dispose, and cause to dispose, pile and cause to pile, by any means, the pollutants and the hazardous waste or hazardous material stipulated by notification under the Law and any of these rules at any</li> </ul>

		<p>place which may affect the public directly or indirectly. [Section 69(a)]</p> <ul style="list-style-type: none"> <li>• Not to carry out to damage the ecosystem and the natural environment which is changing due to such system, except for carrying out with the permission of the Ministry for the interest of the people. [Section 69(b)]</li> </ul>
3	<p><b>Environmental Impact Assessment Procedure</b> (Notification No. 616/2015)</p>	<p><b>The Project Proponent commits the following provisions of EIA Procedures and comply ECC conditions</b></p> <p><b>To bear full legal and financial responsibility:</b></p> <ul style="list-style-type: none"> <li>• For his actions and omissions and those of its contractors, sub -contractors, 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</li> <li>• To 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 until PAPs have achieved socioeconomic stability at a level not lower than that in effect prior to the commencement of the Project</li> </ul> <p><b>For undertaking EMP,</b></p> <ul style="list-style-type: none"> <li>• To implement the EMP, all Project commitments, and conditions, and</li> <li>• For liability 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.</li> <li>• For his responsibility, and to fully and effectively implement the requirements set forth in ECC, applicable Laws, Rules, EIA Procedure and standards.</li> <li>• Project commitments and conditions when providing services to the Project and inform the Ministry with detailed information as to the propose project’s potential adverse impacts.</li> </ul> <p><b>For monitoring and reporting,</b></p> <ul style="list-style-type: none"> <li>• To notify and identify in writing to the Ministry, providing detailed information as to the proposed Project's potential Adverse Impacts.</li> <li>• To engage in continuous, proactive and comprehensive</li> </ul>

		<p>self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this EIA Procedure, standards, the ECC, and the EMP during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post closure).</p> <ul style="list-style-type: none"> <li>• To notify and identify in writing to the Ministry for any breaches of his obligations or other performance failures or violations of the ECC and 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, to undertake 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.</li> <li>• To 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.</li> <li>• To submit the monitoring report within ten (10) days of completing a monitoring report and the information to be included.</li> <li>• To make a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, (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 within ten (10) days of completing</li> <li>• To submit a digital copy of a monitoring report within ten (10) days of receiving such request via email or as may otherwise be agreed upon with the requestor for the request of any organization or person.</li> </ul> <p><b>For the purposes of monitoring and inspection, the event of emergency,</b></p> <ul style="list-style-type: none"> <li>• To grant 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;</li> <li>• To grant, from time to time as and when the Ministry may reasonably require, 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</li> </ul>
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		<p>Project are performed.</p> <ul style="list-style-type: none"> <li>• To grant full and immediate access to the Ministry at any time as may be required by the Ministry 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.</li> <li>• To ensure that the Ministry’s rights of access can extend to access by the Ministry to the Project’s contractors and subcontractors.</li> </ul> <p><b>For the Conditions and Revisions to Conditions prescribed in Environmental Compliance Certificate,</b></p> <ul style="list-style-type: none"> <li>• To commence the implementation of the Project strictly in accordance with the conditions attached to the ECC and including the EMP, within such time as may be prescribed by the Ministry upon receipt of the written approval from the relevant authority.</li> </ul>
4	<p><b>The Prevention of Hazard from Chemical and Related Substances Law</b> (Pyidaungsu Hluttaw Law No. 28/2013)</p>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• Not to produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board. [Section 33]</li> <li>• Not to operate the chemical and related substances business without license. [Section 34]</li> <li>• Not to use the chemical or the related substances which are unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business. [Section 35]</li> <li>• Not to restrict or disturb the inspecting of the Central Supervisory Board, the Supervisory Board and the Boards of Inspection in respect of the chemical and related substances business. [Section 36]</li> </ul>
5	<p><b>The Penal Code, 1861</b></p>	<p><b>The Project Proponent commits the following provisions</b></p> <ul style="list-style-type: none"> <li>• Voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used shall be punished. [Section 277]</li> <li>• Voluntarily vitiates the atmosphere in any place, so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhoods or passing along a public way shall be punished. [Section</li> </ul>



		<p><b>278]</b></p> <ul style="list-style-type: none"> <li>• Doing any act so rashly or negligently as to endanger human life or to be likely to cause hurt or injury to any other person with any explosive substance or machinery or, fails to guard sufficiently against any probable danger to human life from that substance or such machinery, shall be punished. [<b>Section 286, 287]</b></li> </ul>
6	<p><b>National Environmental Quality (Emission) Guidelines</b> (Notification 615/2015)</p>	<p><b>The Project Proponent commits the following guidelines of NEQEG.</b></p> <ul style="list-style-type: none"> <li>• General guideline for air emission, wastewater, noise and odor.</li> <li>• Air emission and effluent levels for Cement and Lime Manufacturing</li> </ul>
<p><b>Biodiversity and natural resources</b></p>		
7	<p><b>The Forest Law</b> (Pyidaungsu Hluttaw Law No. 29/2018)</p>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• To apply approval from the Ministry if desirous to implement the development work or economic project within a forest land and forest covered land. [(section 12(a)):</li> <li>• To comply the Environmental Conservation Law and the stipulations from respective Laws for whoever desirous to undertake. ((section 12(c))</li> </ul>
8	<p><b>Reserved trees under the Forest Law</b> (Notification No. 127/2019)</p>	<p><b>The Project Proponent commits to protect the reserved trees under the Forest Law:</b></p> <p>An overview of reserved trees under the Forest Law.</p>
9	<p><b>Conservation of Biodiversity and Protected Areas Law</b> (Pyidaungsu Hluttaw Law No. 12/2018)</p>	<p><b>The Project Proponent commits the following provisions:</b></p> <p>There may be charged with fine or imprisonment or both if finds guilty of;</p> <ul style="list-style-type: none"> <li>• Using dynamite or explosive chemicals, electrolyzing, destroying water flow or poisoning water, intentionally pollutes the soil, water, air in the conservation area. [Section 39(d));</li> <li>• Disposing or handling chemical waste and poisoning materials in the conservation area (section 39(e)).</li> </ul>
10	<p><b>Protected Animals under the Conservation of Biodiversity and</b></p>	<p><b>The Project Proponent commits not to harmful the protect animals due to the project activities.</b></p>

	<b>Protected Areas Law</b> (Notification No. 690/2020)	“List of protected animals under the Conservation of Biodiversity and Protected Areas Law ”.
11	<b>The Freshwater Fisheries Law, 1991</b>	<b>The Project Proponent commits</b> “not to erect, construct place, maintain or arrange any obstruction such as a dam, bank or weir in a freshwater fisheries waters without the permission of the Department.” [Section 36]
12	<b>The Conservation of Water Resources and Rivers Law</b> (SLORC Law No. 8/2006)	<b>The Project Proponent commits the following provisions:</b> <ul style="list-style-type: none"> <li>• Not to 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. [Section 11(a)]</li> <li>• Not to dispose of any substance into the river creek that may cause damage to waterway or change of watercourse from the bank or vessel. [Section 19]</li> </ul>
<b>Industrial (Cement and Lime Manufacturing)</b>		
13	<b>Mining Law (1994) and Mining Rules (2018)</b>	<b>The Project Proponent commits the following provisions:</b> <ul style="list-style-type: none"> <li>• The holder of permit shall: <ul style="list-style-type: none"> <li>(a) abide by the provisions of this Law, rules, orders and directives made there under;</li> <li>(b) abide by the conditions contained in the permit;</li> <li>(c) pay rent for the land related to the permit calculated in accordance with the rates prescribed by the rules made under this Law;</li> <li>(d) pay rent for the land for each permit separately;</li> </ul> [ Section 12] </li> <li>• The holder of permit shall comply with the rules prescribed under this Law in respect of the following matters: - <ul style="list-style-type: none"> <li>c) making provisions for safety and the prevention of accidents in a mine and their implementation;</li> <li>(e) making provisions for the environmental conservation works that may have detrimental effects due to mining operation;</li> </ul> [ Section 13] </li> <li>• If, in the interest of the State, it is necessary to acquire the land where mineral production could be undertaken</li> </ul>

		<p>on commercial scale, the Ministry shall co-ordinate with the relevant. Ministry for the acquisition of such land in accordance with the existing law. [Section 15]</p> <ul style="list-style-type: none"> <li>• If the holder of mineral production permit requires the use of public water for mineral production he shall first and foremost inform the Department of such requirement in accordance with the prescribed manner. [ Section 16]</li> <li>• The Ministry:- <ul style="list-style-type: none"> <li>(a) may designate an area where mineral can be produced on commercial scale as Mineral Reserve Area by notification with the approval of the Government. [ Section 21]</li> </ul> </li> <li>• If the holder of permit or a person managing on his behalf or any of the worker fails to comply with any of the orders or directives made under this Law, or contravenes any of the terms of the permit, the person issuing the permit may pass any of the following administrative orders:— <ul style="list-style-type: none"> <li>(a) suspending all or portion of the operations carried out under the permit;</li> <li>(b) allowing continuation of the operation, after causing the payment of fine;</li> <li>(c) cancelling the permit;</li> </ul> </li> </ul> <p>[Section 28]</p>
14	<p><b>Industrial Explosive Materials Law</b> (Pyidaungsu Hluttaw Law No. 17/2018)</p>	<ul style="list-style-type: none"> <li>• <b>The Project Proponent</b> will construct a magazine with specified features on the approved plot verified by the Office of the Commander-in-Chief (Army). [Section 6(d)]</li> <li>• <b>The Project Proponent</b> will comply for procurement, provision, storage and distribution of explosives with the specifications of the Office of the Commander-in-Chief (Army). [Section 7(d)]</li> <li>• <b>The Project Proponent</b> will grant a licence to the applicant with the approval of the Ministry if the magazine is constructed in specified features. [Section 11(b)]</li> <li>• <b>The Project Proponent</b> will apply the licensee to renew it, 30 days before expiration to the Chief Inspector in accordance with the stipulations if he wishes to continue to store industrial explosive materials. And <b>the Project Proponent</b> will comply the instructions to alter or add the requirements if the magazine is not constructed in specified features; [Section 13 + 14 (b)]</li> </ul>

		<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• A licensee shall: <ul style="list-style-type: none"> <li>(a) systematically store industrial explosive materials without exceeding the permitted amount in accordance with the specifications;</li> <li>(b) accept the inspection of the Chief Inspector or an inspector from time to time;</li> <li>(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;</li> <li>(d) pay licence fees stipulated by the Ministry to the Department.</li> </ul> </li> </ul> <p><b>[Section 15]</b></p> <ul style="list-style-type: none"> <li>• A permission holder shall: <ul style="list-style-type: none"> <li>(a) store industrial explosive materials only in the licensed magazine;</li> <li>(b) take necessary preventive measures in accordance with the specifications to avoid harm in transport, manufacture, use or possession of industrial explosive materials.</li> </ul> </li> </ul> <p><b>[Section 16]</b></p>
15	<p><b>The Explosive Substances Act.</b> [INDIA ACT VI, 1908.]</p>	<p><b>The Project Proponent commits</b> not to use any explosive substance an explosion of a nature likely to endanger life or to cause serious injury to property</p>
16	<p><b>The Electricity Law</b> (2014) (Pyidaungsu Hluttaw Law No. 44/2014)</p>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• The law elaborates the responsibilities of generation, transmission and distribution under the Ministry of Electrical Power</li> <li>• The law also elaborates for ensuring safety of electrical apparatus. It includes the testing of all electrical goods produced domestically or imported. If safety is at risk the Inspector has the authority to disconnect supply to any customer. The Inspector also is responsible for determining cause of any injury or death caused by electricity, issuing electrician registration certificates, and</li> </ul>

		establishing standards
17	<b>The Petroleum Product Law (2017)</b> (Pyidaungsu Hluttaw Law No. 20/2017)	<p><b>The Project Proponent commits the following provisions;</b></p> <ul style="list-style-type: none"> <li>• Provisions to regulate production, storage, and transport of oil. [Section 15, 16,17]</li> </ul> <p><b>The Project Proponent commits to comply</b> the prescriptions for the responsibilities of the Petroleum license holders. [Section 29(a-y)]</p> <ul style="list-style-type: none"> <li>• To abide as per prescribed laws, rules, regulations, notifications, directives, orders, procedures, terms and conditions being specified in agreement</li> <li>• To care occupational safety, health, environmental conservation, guidelines relating to waste disposal and to</li> <li>• Implement international petroleum good practices</li> </ul>
18	<b>The Petroleum Rules (1937)</b>	<p><b>Project Proponent commits to comply the stipulations for;</b></p> <ul style="list-style-type: none"> <li>• The import, transport or store of any petroleum that cannot be made save in accordance to the rules.</li> <li>• The needs and exemptions from licenses and authorizes for the testing of petroleum by the President of the Union and rules that might issue rules on that regard. [Chapter 3 &amp; 4]</li> </ul>
19	<b>The Factories Act (1951)</b> (Amendment 2016) (Pyidaungsu Hluttaw Law No. 12/2016)	<b>The Project Proponent commits</b> the provisions for the proper disposal of waste and effluents in factories; treatment of waste water; regulations for health and cleanliness in factories, and the prevention of hazards
20	<b>The Boiler Law</b> (Pyidaungsu Hluttaw Law No. 39/2015)	<ul style="list-style-type: none"> <li>• <b>The Project Proponent</b> will register for boiler use and will comply the duties and rights of a <b>Boiler Owner</b> as prescribed the provisions (Section 12 to 24) of Chapter VII of this law.</li> <li>• <b>The Project Proponent</b> will repair the boilers with certified boiler attendant. [Section 29(b)]</li> <li>• <b>The Project Proponent</b> will allow the access of Boiler Inspector to inspect the boiler. [Section 40]</li> </ul>
21	<b>The Private Industrial Enterprise Law, 1990</b> (SLORC Law No. 22/1990)	<b>The Project Proponent commits</b> the provisions to avoid environmental pollution.
<b>Public Health and Labour</b>		

22	<b>The Protection and Prevention of Communicable Disease Law, 1995</b>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• An entrepreneur should immediately report to the nearest health center or hospital if he or she finds out that any of the following cases have occurred; (Section 5) <ul style="list-style-type: none"> <li>(a) Mass death of animals, including poultry;</li> <li>(b) rat fall;</li> <li>(c) suspected to be an infectious disease or outbreak of such disease;</li> <li>(d) reportable outbreak of infectious disease.</li> </ul> </li> <li>• To prepare report for an outbreak of a communicable disease to the nearest Health Officer (section 9).</li> <li>• To support Health Officer to undertake investigations and medical examinations to prevent the control the spread of Principal Epidemic Disease (section 11).</li> </ul>
23	<b>The Public Health Law, 1972</b>	<p><b>The Project Proponent commits the following provisions to cooperate with the authorized person or organization in line with the stipulations of the government;</b></p> <ul style="list-style-type: none"> <li>• To abide by any instruction or stipulation of government for public health. [Section 3]</li> <li>• To accept any inspection, anytime, anywhere if it is needed. [Section 5]</li> </ul>
24	<b>Occupational Health and Safety Law (Pyidaungsu Hluttaw Law No. 8/2019)</b>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• Arrange as may be necessary to assess the condition of danger to the environment of work place and arrange until it is safe and good for health. [Sections 26(a)+(d)]</li> <li>• Make necessary arrangement for enabling to report immediately to the person-in-charge that a worker is likely to face occupational accident. [Section 26 (i)]</li> <li>• Arrange to be safe and not to injure health due to materials, machineries or wastes used in work place or processing. [Section 26 (j)]</li> <li>• Whoever operating or developing any business related to this law shall not fail to register to the Department. [section 48 (a)]</li> </ul>
25	<b>The Social Security Law (Pyidaungsu Hluttaw Law</b>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• Ministry identified the business which required to</li> </ul>

	No. 15/2012)	<p>allocate the social security funds.</p> <ul style="list-style-type: none"> <li>• To include the social security funds [<b>Section 15(a)</b>].</li> <li>• To 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 and in such case, he can incur the expense [<b>section 18(b)</b>].</li> <li>• To effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations [<b>Section 48 (a)</b>] but employment injury benefit does not reference with the workmen’ compensation.</li> <li>• To pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also bear the expenses for paying as such [<b>Section 51(a)</b>];</li> <li>• To pay defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit [<b>Section 51(b)</b>].</li> <li>• To incur the costs of medical treatment for employment injury occurring from criminal action or omission of the employer, or occurring from employer’s failure to keep occupational safety plans and protections, and other benefits entitled to enjoy under this Law in accord with the stipulations without fail [<b>Section 53(b)</b>].</li> <li>• To report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such (section 54(a)).</li> <li>• To keep records of work and lists as per prescription in <b>Section 75</b>.</li> </ul>
26	<p><b>The Workmen’s Compensation Act, 1923</b> (amended in 1955, 1957, 2005)</p>	<p><b>The Project Proponent commits the following provisions:</b></p> <ul style="list-style-type: none"> <li>• For the payment by certain classes of employers to their workmen of compensation for injury by accident.</li> <li>• For the liability for compensation of employer’s, amount of compensation, compensation to be paid when due and penalty for default, method of calculating</li> </ul>



		<p>wages, review, commutation of half-monthly payments, payment of a lump sum amount, distribution of compensation, compensation not to be assigned, attached or charged, notice and claim, power to require from employers statements regarding fatal accidents, reports of fatal accidents and serious bodily injuries, medical examination, contracting, remedies of employer against stranger, compensation to be first charge on assets transferred by employer, special provisions relating to masters and seamen.</p> <ul style="list-style-type: none"> <li>• For any updating for revising the monetary amount as per the amendment law.</li> </ul> <p><b>[Section 3]</b></p>
27	<p><b>The Labour Organization Law</b> (Pyidaungsu Hluttaw Law No. 7/2011)</p>	<p><b>The Project Proponent commits</b> to protect the rights of the workers, to have good relations among the workers or between the employer and the worker, and to enable to form and carry out the labor organizations systematically and independently;</p> <ul style="list-style-type: none"> <li>• Are free to organize and negotiate workers’ rights if not meeting labour laws. <b>[Section 17]</b></li> <li>• May demand re-appointment of worker if cause of dismissal is related to labour organization membership or activities or not conform with labour laws. <b>[Section 18]</b></li> <li>• Have the right to send representatives to conciliation tribunals. <b>[Section 19]</b></li> <li>• Have the right to participate and discuss workers’ rights and interests with government and employers. <b>[Section 20]</b></li> <li>• Have the right to participate in collective bargaining in accordance with labour laws. <b>[Section 21]</b></li> <li>• May take collective actions in accordance with the relevant procedures, regulations and law. <b>[Section 22]</b></li> <li>• Recognize the labor organizations <b>[Section 29]</b></li> <li>• Allow the member of executive committee assigned by the labor organization to perform their duty not exceeding two days per month <b>[Section 30]</b></li> <li>• Shall assist as much as possible if the labor organizations request help which is in the interest of the</li> </ul>



		<p>factory’s workers. [section 31]</p> <ul style="list-style-type: none"> <li>• Lock-out any work in public service or not without the permission of relevant conciliation body during the settlement of dispute period [<b>Section 43</b>]</li> <li>• Carry out an illegal lock-out, dismiss a worker for his membership in a labor organization or for the exercise of organizational activities or participating in a strike. [<b>Section 44</b>]</li> </ul>
28	<b>Settlement of Labour Dispute Law</b> (Pyidaungsu Hluttaw Law No. 5/2012)	<p><b>The Project Proponent commits</b> for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly.</p> <ul style="list-style-type: none"> <li>• Not to fail to negotiate and coordinate in respect of a complaint within the prescribed period without enough reasons. [<b>Section 38</b>]</li> <li>• Not to alter the conditions of service of workers involved in disputes prior to investigation by tribunals. [<b>Section 39</b>]</li> <li>• Not to lock-out any work without negotiation and determine by Arbitration Body or Tribunal. [<b>Section 40</b>]</li> <li>• To be liable to pay full compensation to workers as determined by Arbitration Body or Tribunal if commits acts without enough reasons. [<b>Section 51</b>]</li> </ul>
29	<b>The Payment of Wages Law</b> (Pyidaungsu Hluttaw Law No. 17/2016)	<p><b>The Project Proponent commits the following provisions;</b></p> <ul style="list-style-type: none"> <li>• That salaries are to be paid either in Myanmar Kyats or Foreign Cash permitted by National Bank of Myanmar. When delivery the salary, If the employer needs to pay the other opportunities or advantages, he can pay cash together with other materials according employee’s attitude. [<b>Section 3</b>]</li> <li>• To pay the salary (not more than one month) to employees. For the permanent worker, need to pay per monthly. If more than 100 employees, need to pay within the 5 days from the end of month. If fire the employees, need to pay salary within two days after fire. When employee dies due to the accident, need to pay money as an insurance to employee’s family within</li> </ul>

		<p>two days. [Section 4]</p> <ul style="list-style-type: none"> <li>To report to the Department with evidence of payment at later date agreed with the employee if the employer has difficulties to pay wages on time because of significant events (e.g. natural disaster). [Section 5]</li> <li>Not to cut the total salary more than 50% of his salary for any deducting from the salary due to the employees’ absence. [Section 9]</li> <li>To comply the stipulation for overtime work, to allow the presiding overtime rate as set by the Law. [Section 14]</li> </ul>
30	<b>The Minimum Wages Law, (Pyidaungsu Hluttaw Law No. 7/2013)</b>	<p><b>The Project Proponent commits the following provisions;</b></p> <ul style="list-style-type: none"> <li>Not to pay wage less than the minimum wage stipulated, do not have the right to deduct any other wage. [Section 12(a-e)]</li> <li>To inform rates of minimum wage relating to the business, allow the entry and inspection of the inspection officer, give the sick worker holiday for medical treatment in accord with stipulation and give holiday for the matter of funeral of the family of worker without deducting from the minimum wage. [Section 13(a-g)]</li> </ul>
31	<b>The Leave and Holiday Act, 1951</b>	<p><b>The Project Proponent commits to comply the relevant stipulations (4):</b></p> <ul style="list-style-type: none"> <li>For employee to be granted to pay public holidays as announced by the Government in the Myanmar Gazette. On average, Myanmar has 26 public holidays per year, depending on the date of the variable holidays.</li> <li>For additional rules to apply in accordance with other laws, such as the Social Security Law (2012) for employees contributing to the Social Security Fund.</li> <li>To grant earned leave with average wages or average pay for a period of ten consecutive days by his employer during the subsequent period of twelve months to every employee who has completed a period of twelve months continuous service.</li> </ul>
32	<b>Development of</b>	<b>The Project Proponent commits the following provisions;</b>

	<b>Employees and Expertise (Skill),</b> (Pyidaungsu Hluttaw Law No. 29/2013)	<ul style="list-style-type: none"> <li>• To conclude an employment agreement within thirty days after appointing worker to do any work. [<b>Section 5 (a) (i, ii)</b>]</li> <li>• To 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. [<b>Section 14</b>]</li> <li>• To carry out to cause to train each or group of workers, according to each or combination of works, in opening on-job trainings, training in workplace systematically, sending to external trainings and training by the system applying information technology in managing and carrying out training programmes for increasing employment skill of the workers. [<b>Section 15(a)</b>]</li> </ul>
33	<b>Myanmar Engineering Council Law</b> (Pyidaungsu Hluttaw Law No. 37, 2013)	<p><b>The Project Proponent acknowledge the provisions;</b></p> <ul style="list-style-type: none"> <li>• No one shall carry out any engineering work or technical work without a registration certificate issued by the Council, which may cause a public hazard as defined by the rules issued by this law, except for those employed by the engineering staff employed in government departments and government organizations. The direct supervision and responsibility of any person who receives a certificate of registration; Do not work without accountability.</li> </ul>
34	<b>The Control of Smoking and Consumption of Tobacco Product Law, 2006</b>	<p><b>The Project Proponent commits the following provisions;</b></p> <ul style="list-style-type: none"> <li>• To keep the caption and mark referring that it is a non-smoking area. [<b>Section 9(d)</b>]</li> <li>• To arrange the specific place. [<b>Section 9(b)</b>]</li> <li>• To supervise and carry out measures so that no one shall smoke at the non-smoking area. [<b>Section 9(c)</b>]</li> <li>• To accept the inspection when the supervisory body comes to the place for which he is responsible. [<b>Section 9(d)</b>]</li> </ul>
<b>Cultural</b>		
35	<b>The Protection and Preservation of Cultural Heritage Regions Law</b>	<p><b>The Project Proponent commits the following provisions;</b></p> <p><b>Rule 21 (b):</b> A person desires of carrying out one of the</p>

	<p>(Pyidaungsu Hluttaw Law No. 9/2019)</p>	<p>following, shall abide the provisions of existing laws and to get the prior permission for the facts that there are no impacts upon cultural heritage and applies to the State and Division Management committee if these is in the World on National Cultural Heritage region and to Regional Management Committee if there is other cultural heritage region except World and National Heritage Region with relevant definitions.</p> <p>At the intermediate region</p> <ul style="list-style-type: none"> <li>(i) Building road, constructing jetty, parking railways, station, gymnasium, stadiums, buildings and bridge in new or extension.</li> <li>(ii) Construction and installation of tele communicational towers, underground works, underground cables, mega electric power lines, substation, power tower, gas pipelines.</li> <li>(iii) Carrying the business of helicopters, passenger balloons and gliders.</li> <li>(iv) Construction of entertainment buildings such as theater, accommodation, rest camps, house riding camps, racetrack and basic buildings.</li> </ul> <p><b>Rule 31:</b> No person shall be, without prior permission, construction, extension, renovation, fencing, repairing, extension the buildings, extension of road, port, carrying out the well, pond, swimming pool, dam, breeding pond, yard, factory, commercial building, showroom, hotel, motel, inn, guesthouse, flying of any kinds.</p> <p><b>Rule 33:</b> No person shall be without prior permission; repairing the ancient monument, extension of fence, investigation antique material, installation of museum, construction the building necessary for preservation of cultural heritage region.</p>
<p>36</p>	<p><b>The Protection and Preservation of Ancient Monument Law</b> (Pyidaungsu Hluttaw Law No. 51/15)</p>	<p><b>The Project Proponent commits the following provisions;</b></p> <ul style="list-style-type: none"> <li>• To promptly inform the relevant Ward or Village-Tract Administrative Office for finding 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</li> </ul>

		<p>or custodian knows or it seems reasonable to assume that the said monument is an ancient monument. [Section 12]</p> <ul style="list-style-type: none"> <li>• To apply prior permission from the Department before searching for and extracting oil and gas or constructing pipelines within the specified area of an ancient monument. [Section 15(c)]</li> <li>• Not to damage ancient monuments including using machinery which causes vibration and discharging chemical substance. [Section 20]</li> </ul>
37	<b>The Protection and Preservation of Antique Objects Law</b> (Pyidaungsu Hluttaw Law No. 43/15)	<b>The Project Proponent commits</b> to 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 for finding any object which has no owner or custodian. [Section 12]
38	<b>Protection of Ethnic Right Law</b> , (Pyidaungsu Hluttaw Law No. 8/2015)	The Project Proponent will inform the details and complete description of projects and negotiate with the relevant government departments and ethnic people when the implementation projects such as development projects, large projects, businesses and natural resources extraction in ethnic region. [Section 5]
39	<b>Protection of Ethnic Right Rules</b> , (Notification No. 48/2019)	<p><b>The Project Proponent commits:</b></p> <p>(a) The advantages and disadvantages of the project must be fully and accurately explained in advance, using languages and methods they can understand, so that the local ethnic groups living in the area where the project will be implemented can understand.</p> <p>(b) the policy directions of the Myanmar Sustainable Development Plan (MSDP); strategies; It must be carried out in accordance with the procedures.</p> <p>(c) In order to find out whether there is any impact on the environment and socio-economic life in the area, environmental impact analysis and socio-economic development impact analysis shall be carried out in accordance with the guidelines of the relevant department.</p> <p>(d) In all stages of the environmental impact assessment and socio-economic development impact assessment process, discussions and consultations with indigenous peoples shall</p>

		<p>be carried out in an open and transparent manner.</p> <p><b>[Section 20]</b></p> <p><b>The Project Proponent commits:</b></p> <p>(a) According to rule 20, a comprehensive report to the Ministry and will obtain an opinion before the start of the project.</p> <p>(b) Upon completion of project implementation, the project proponent will submit pre-arranged activities and progress conditions to the Ministry.</p> <p><b>[Section 21]</b></p>
<b>Investment</b>		
40	<b>Myanmar Investment Law</b> (Pyidaungsu Hluttaw Law No. 40/2016)	<p><b>The Project Proponent commits;</b></p> <ul style="list-style-type: none"> <li>• To register the land lease contract at the office of Registry of Deeds in accordance with the Registration Act. <b>[Section 50(d)]</b></li> <li>• To comply the guideline for appointment, replacement, providing for the employment of staff and workers, ensuring to meet the entitlements and rights prescribed in the labor laws and rules in settling dispute regarding HR issues. <b>[Section 51]</b></li> <li>• To comply stipulation: <b>[Section 65]</b> <ul style="list-style-type: none"> <li>(a) To respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union;</li> <li>(e) To 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;</li> <li>(f) Not to make any significant alteration of topography or elevation of the land on which is entitled to lease or to use, without the approval of the Commission;</li> <li>(g) To 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</li> </ul> </li> </ul>

		<p>not to cause damage to cultural heritage;</p> <p>(h) To list and keep proper records of books of account and financial statement and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards;</p> <p>(j) To pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directive and so forth during the period of suspension of investment for a credible reason;</p> <p>(k) To pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease or death due to the work;</p> <p>(l) To supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar;</p> <p>(m) To respect and comply with the labor laws;</p> <p>(n) To have the right to sue and to be sued in accordance with the laws;</p> <p>(o) To pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement;</p> <p>(p) To allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;</p> <p>(q) To take in advance permit or endorsement of the Commission for the investments which need to</p>
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		<p>obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p> <ul style="list-style-type: none"> <li>To comply responsibilities of investors according to the provision of Article 65 of Myanmar Investment law. <b>[Section 67]</b></li> </ul>
41	<b>Myanmar Investment Rules</b> (Notification No. 35/2017)	<p><b>The Project Proponent commits;</b></p> <ul style="list-style-type: none"> <li>The Investor must, after obtaining the Permit, submit the status of performing environmental and social impact assessment to the Commission during doing business. <b>[Section 189]</b></li> <li>To comply with all terms and conditions in the permit and other applicable laws when the investment is carried out. <b>[Section 202]</b></li> <li>To fully assist while negotiating with the Authority for settling the grievances of the local community that have been affected due to Investments. <b>[Section 203]</b></li> </ul>
42	<b>The Farmland Law,</b> (Pyidaungsu Hluttaw Law No.11/2012)	<p><b>The Project Proponent acknowledges these and commits to</b> comply the directions being issued;</p> <ul style="list-style-type: none"> <li>The Central Farmland Management Body to give permission to utilize the paddy land for other purposes, with the recommendation of the Region or State Farmland Management Body. <b>[Section 30(a)]</b></li> <li>The respective Region or State Government shall give permission to utilize the farmland for other purposes except paddy land, with the recommendation of the Region or State Farmland Management Body. <b>[Section 30(b)]</b></li> </ul>
43	<b>The Vacant, Fallow, Virgin Land Management Law,</b> (Pyidaungsu Hluttaw Law	<p><b>The Project Proponent commits to</b> comply the conditions for Person who is granted the right to use the vacant, fallow and virgin lands; <b>[Section 16]</b></p> <p>(a) To use for the purpose granted and in relation to</p>



	No.10/2012)	<p>economic enterprise;</p> <p>(b) To carry out to be completed within four years from the date of grant according to the purpose granted (can revise by the Central Committee for losing time due to natural disaster and unstable security conditions;</p> <p>(c) Not to mortgaged, giving, sold, leasing or otherwise transferred or divided without the permission of the Cabinet of the Union Government;</p> <p>(d) To fully pay the land revenue;</p> <p>(e) To comply the conditions prescribed by the Central Committee</p> <p>(f) Not to explore other natural resources below and above ground except the purpose granted;</p> <p>(g) To surrender the natural resources found in the authorized land and the Government being desirous of extracting the same on a commercial resume the area required therefrom.</p>
<b>Other Laws with relevant the project</b>		
44	<b>The Import Export Law, 2012</b>	<ul style="list-style-type: none"> <li>• <b>The Project Proponent commits</b> will not import or export the prohibited goods. [Section 5]</li> <li>• <b>The Project Proponent commits</b> will not import or export the goods without permit which are prescribed to obtain permit. [Section 6]</li> </ul>
45	<b>Myanmar Insurance Law, 1993</b>	<p><b>The Project Proponent commits;</b></p> <ul style="list-style-type: none"> <li>• To arrange Third Party Liability Insurance with Myanma Insurance. [Section 15]</li> <li>• To have General Liability Insurance with the Myanma Insurance as a compulsory requirement for organizations operating as an enterprise which may cause damage to life and property of the public or may pollute the environment. [Section 16]</li> </ul>
46	<b>The Myanmar Fire Brigade Law (Pyidaungsu Hluttaw Law No. 10/2015)</b>	<p><b>The Project Proponent</b> will form the reserved fire brigade and will provide the equipment related to fire safety. [Section 25]</p>

47	<p><b>Motor Vehicle Law</b> (Pyidaungsu Hluttaw Law No. 6/2020)</p>	<ul style="list-style-type: none"> <li>• <b>The Project Proponent</b> will register all vehicles from the project with the relevant registrar in accordance with the requirements. [Section 17]</li> <li>• <b>The Project Proponent</b> will maintain and repair all vehicles from the project in accordance with the standards set by the relevant Department in order to drive it safely. [Section 18(a)]</li> <li>• <b>The Project Proponent will</b> not load or transport Dangerous Goods in a vehicle without complying with the requirements. [Section 81(g)]</li> </ul>
48	<p><b>Motor Vehicle Rules</b> (Notification No. 1/2022)</p>	<p>The Project Proponent will comply the regulations for Commercial Vehicle in the Chapter 9 under this rule.</p>
49	<p><b>Natural Disaster Management Law, 2013</b></p>	<p>By reason of any negligent act of any person without examination, Knowing that some kind of disaster may occur, either due to deliberate actions or If a natural disaster occurs or causes it to occur, that person may be sentenced to imprisonment for not more than three years and may also be fined.</p>
50	<p><b>Shan State Freshwater Fisheries Law</b> (Shan State Hluttaw Law No. 4/2014)</p>	<p><b>The Project Proponent complies</b> the prohibitions, or limitations, directives, terms and conditions, orders, notifications issued by Department from time to time. [Section 39]</p> <p><b>The Project Proponent will not change</b> type of water, the volume or direction of the water in streams or waterways connected with private inns and guaran inns without the permission of the department. [Section 41]</p>
51	<p><b>Shan State Natural Water Forest, Conservation and Protection of Watershed Forest Law</b> (Shan State Hluttaw Law No. 5/2019)</p>	<p><b>The Project Proponent will not destroy</b> natural water sources specified by this law; by building more than the existing building in the water control forest area; Cutting down trees that grow naturally.</p> <p>[Section 17]</p>

## **2.3 International Conventions, Treaties and Agreements**

Myanmar has signed a number of international treaties related to the environment which may have implications for the project. These include:

- Convention Concerning the Protection of the World Cultural and Natural Heritage
- Montreal Protocol on Substances that Deplete the Ozone Layer & all amendments
- Stockholm Convention on Persistent Organic Pollutants
- Convention on Biological Diversity
- Cartagena Protocol on Bio-safety
- International Tropical Timber Agreement
- Ramsar Convention on Wetlands
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ASEAN Agreement on the Conservation of Nature and Natural Resources
- United Nations Convention to Combat Desertification
- United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol
- ASEAN Agreement on Trans-boundary Haze
- Global Tiger Forum, India in August 1994.

## **2.4 Standards and Guidelines**

### **2.4.1 National Environmental Quality (Emission) Guidelines (2015)**

Effluent parameters and guideline value for Cement Manufacturing are issued by the Environmental Conservation Department and stated in the National Environmental Quality (Emission) Guidelines.

The environmental standards for air quality, noise level described in General Guidelines of the National Environmental Quality (Emission) Guidelines.

The proponent must comply with these standards and implement the project EMP strictly and any additional requirements set out in the project Environmental Compliance Certificate (ECC) adopted by the Environmental Conservation Department (ECD). Air emissions, noise, odor, and liquid / effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC.

According to Article 10 of the Environmental Conservation Law (2012), (now MONREC set up some environmental quality standards, with the approval of the Union Government and the Committee.

As of 29 December 2015, emission guideline and target values of ambient air quality, air emission, wastewater, and noise levels were set in NEQG, while other standards have not been set yet by MONREC.

In this Project, the Project Proponent, Ngwe Yi Pa Le’ Cement Co., Ltd. basically apply the NEQG and in case of no quantitative target values in NEQG, the quantitative target values of other country and international organizations will be referred. Each quantitative target value to be applied is described below sections.

**(a) Air Quality**

Since there is no ambient air quality standard in Myanmar and only air emission guideline values in National Environmental Quality Emission Guidelines (NEQG) (2015) referred from WHO’s air quality guidelines, these guideline values shown in below table will be set as target values for both ambient and emission air quality for operation and closing phases.

Table 2-2 Air Emission General Guidelines

Sr. No.	Parameter	Averaging Period	Guideline Value ( $\mu\text{g}/\text{m}^3$ )
1.	Nitrogen dioxide (NO <sub>2</sub> )	1-year	40
		1-hour	200
2.	Ozone (O <sub>3</sub> )	8-hour daily maximum	100
3.	PM <sub>10</sub>	1-year	20
		24-hour	50
4.	PM <sub>2.5</sub>	1-year	10
		24-hour	25
5.	Sulfur dioxide (SO <sub>2</sub> )	24-hour	20
		10-minutes	500

Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)

Table 2-3 Air Emission Levels Guidelines for Cement Manufacturing

Sr. No.	Parameter	Guideline Value	Unit
1.	Cadmium + Thallium	0.05	mg/Nm <sup>3a</sup>
2.	Dioxins / Furans	0.1	mg TEQ <sup>b</sup> /Nm <sup>3</sup>
3.	Dust (other point sources including clinker cooling, cement grinding)	50	mg/Nm <sup>3</sup>
4.	Hydrogen chloride	10	mg/Nm <sup>3</sup>
5.	Hydrogen fluoride	1	mg/Nm <sup>3</sup>
6.	Mercury	0.05	mg/Nm <sup>3</sup>
7.	Nitrogen oxides	600	mg/Nm <sup>3</sup>
8.	Particulate matter PM <sub>10</sub>	100	mg/Nm <sup>3</sup>

Sr. No.	Parameter	Guideline Value	Unit
	(existing kilns)		
9.	Particulate matter PM <sub>10</sub> (new kiln system)	30	mg/Nm <sup>3</sup>
10.	Sulfur dioxide	400	mg/Nm <sup>3</sup>
11.	Total metals <sup>d</sup>	0.5	mg/Nm <sup>3</sup>
12.	Total organic carbon	10	mg/Nm <sup>3</sup>

<sup>a</sup> Milligrams per normal cubic meter at specified temperature and pressure

<sup>b</sup> Toxicity equivalence factor

<sup>c</sup> Particulate matter 10 micrometers or less in diameter

<sup>d</sup> Total metals are Arsenic, Lead, Cobalt, Chromium, Copper, Manganese, Nickel, Vanadium, and Antimony

### **(b) Effluent Level**

The guideline values for effluent level are referred to general application standards and cement & lime manufacturing standards of NEQG (2015) and tabulated in **Table 2-4** and **Table 2-5**.

Table 2-4 Effluent Level for Operation Phase (General Application)

Sr. No.	Parameter	Guideline Values	Unit
1.	5-day Biological oxygen demand (BOD)	50	mg/l
2.	Ammonia	10	mg/l
3.	Arsenic	0.1	mg/l
4.	Cadmium	0.1	mg/l
5.	Chemical oxygen demand (COD)	125	mg/l
6.	Chlorine (total residual)	0.2	mg/l
7.	Chromium (Hexavalent)	0.1	mg/l
8.	Chromium (total)	0.5	mg/l
9.	Copper (Cu)	0.5	mg/l
10.	Cyanide (free)	0.1	mg/l
11.	Cyanide (total)	1	mg/l
12.	Fluoride	20	mg/l
13.	Heavy metals (total)	10	mg/l
14.	Iron	3.5	mg/l
15.	Lead	0.1	mg/l
16.	Mercury	0.01	mg/l
17.	Nickel	0.5	mg/l
18.	Oil and grease	10	mg/l
19.	pH	6-9	S.U. <sup>a</sup>
20.	Phenols	0.5	mg/l
21.	Selenium	0.1	mg/l

<b>Sr. No.</b>	<b>Parameter</b>	<b>Guideline Values</b>	<b>Unit</b>
22.	Silver	0.5	mg/l
23.	Sulfide	1	mg/l
24.	Temperature increase	<3 <sup>b</sup>	°C
25.	Total coliform bacteria	400	100 ml
26.	Total phosphorus	2	mg/l
27.	Total suspended solids	50	mg/l
28.	Zinc	2	mg/l

<sup>a</sup> Standard unit

<sup>b</sup> 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

**Table 2-5 Effluent Level for Cement and Lime Manufacturing**

<b>Sr. No.</b>	<b>Parameter</b>	<b>Guideline Values</b>	<b>Unit</b>
1.	pH	6-9	S.U. <sup>a</sup>
2.	Temperature	<3 <sup>b</sup>	°C
3.	Arsenic	0.1	mg/l

<sup>a</sup> Standard unit

<sup>b</sup> 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) Noise Levels**

According to the NEQG, the noise levels are set as shown in the following table and noise prevention and mitigation measures should be taken by all projects where predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impacts should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest receptor location off-site.

Since the project is located in the Industrial Zone and surrounding receptors are industrial and commercial areas, the target noise level targeted to industrial and commercial receptors will be applied during the operation phase of the project.

**Table 2-6 Ambient Noise Level Standards for Operation Phase**

<b>Sr. No.</b>	<b>Parameter</b>	<b>Guideline Values</b>	<b>Unit</b>
1.	pH	6-9	S.U. <sup>a</sup>
2.	Temperature	<3 <sup>b</sup>	°C
3.	Arsenic	0.1	mg/l

Source: National Environmental Quality (Emission) Guidelines (NEQG) (29 Dec 2015)

## 2.4.2 Others Standards and Guidelines

Ngwe Yi Pa Le’ Cement Co., Ltd will follow WHO Drinking Water Standards – 2011, us EPA Drinking Water Standard-2018.

Table 2-7 WHO Drinking Water Standards (2011)

Sr. No.	Parameter	Guideline Values	Unit
1.	Aluminum	0.2	mg/l
2.	Arsenic	10	µg/l
3.	Chloride	250	mg/l
4.	Copper	2	mg/l
5.	Cyanide	0.07	mg/l
6.	Manganese	0.4	mg/l
7.	pH	6.5~8.5	-
8.	Sulfate	250	mg/l
9.	Total Alkalinity	-	mg/l
10.	Total Dissolved Solids	600	mg/l
11.	Total Hardness	500	mg/l
12.	Total Iron	0.3	mg/l
13.	Turbidity	5	NTU

Myanmar developed their own National Drinking Water Standards in (2014), which was recently updated (2019). Thresholds values for chemicals of health significance in drinking-water are shown in **Table 2.8**.

Table 2-8 National Drinking Water Standards

Parameter	Guideline	
	mg/l	µg/l
Aluminium	0.2	200
Ammonia Nitrogen	1.5	1,500
Antimony	0.02	20
Arsenic	0.05	50
Barium	0.7	700
Boron	2.4	2,400
Cadmium	0.003	3
Calcium	200	200,000
Chloride	250	250,000
Chromium	0.05	50
Copper	2	200

Cyanide	0.07	70
Fluoride	1.5	1,500
Iron	1	1,000
Hardness	500	500,000
Lead	0.01	10
Magnesium	150	150,000
Manganese	0.4	400
Mercury	0.001	1
Nickel	0.07	70

## **2.5 Institutional Framework of Myanmar Government Responsible for Project**

Regarding to Health, Safety and Environment (HSE) requirements, Key Ministries and Departments are generally involved in the industrial sector in **Table 2.9**.

Table 2-9 Key Ministries and Departments for HSE

Organization	Responsible
Ministry of Natural Resources and Environmental Conservation (MONREC)	Ministry of Natural Resources and Environmental Conservation (MONREC) is the focal ministry for environmental management and empowered to undertake a range of regulatory activities under the Environment Conservation Law (ECL). The ECL gives MONREC mandate to implement the EIA-regime in Myanmar through the EIA Procedure.
The Environment Conservation Department (ECD)	The Environment Conservation Department (ECD) under MONREC has an executive role in environmental licensing, pollution control and monitoring of environmental impacts and coordination and collaboration role for the integration of environmental issues into sectorial planning. ECD is creating sub-national offices, at the regional level, with further offices planned at the district and township levels.  National Environmental Conservation and Climate Change Committee (NECCCC) has



	a coordinating role and a role in the approval of the EIAs.
Myanmar Investment Commission (MIC)	Myanmar Investment Commission (MIC) is the main administrative body for the granting of investment permits under the Myanmar Investment Law. Directorate of Investment and Company Administration (DICA) acts a secretariat to the MIC.
Department of Public Health	Department of Public Health within the Ministry of Health and Sports is responsible for occupational and health protection in Myanmar.
Ministry of Labour	Ministry of Labour also is responsible for labour and welfare administration. The Department of Factories and general labour laws inspection monitors and enforces safety and health standards in factories and disseminates industrial safety information.
Directorate of Industrial Supervision and Inspection (DISI)	Directorate of Industrial Supervision and Inspection (DISI) is responsible to inspect and register for boiler according to the boiler law (2012) and electrical system in factory according to the electrical power law (2014).
Departmental Cooperation Team	<p>The Departmental Cooperation Team is organized for the field inspection of the operation of business in accordance with section 14 of the Foreign Investment Law. The Departmental Cooperation Team is responsible for coordination between business and government department and to guide to the business for the government department’s requirements</p> <p>The Departmental Cooperation Team is organized by representatives from the governmental departments:</p> <p>(1) Directorate of Investment and</p>

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	Company Administration
(2)	Department of Customs
(3)	Department of Commerce
(4)	Directorate of Labor
(5)	Department of Immigration and National Registration
(6)	Ministry of Hotel and Tourism
(7)	Internal Revenue Department
(8)	Central Bank of Myanmar
(9)	Ministry of Electricity and Energy
(10)	Directorate of Industrial Supervision and Inspection
(11)	Ministry of Natural Resources and Environmental Conservation
(12)	Ministry of Agriculture, Livestock and Irrigation

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## **2.6 Commitment of Proponent**

Ngwe Yi Pa Le’ Cement Co., Ltd. endorse for this EIA Report as follow;

- The EIA is the accurate and complete.
- The EIA has been prepared in strict compliance with applicable laws including EIA Procedure (2015), and
- The Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report.

### 3.0 PROJECT DESCRIPTION AND ALTERNATIVE

#### 3.1 Project Background

Ngwe Yi Pa Le' Cement Company Limited was first established on March 3, 2014 under Registration No. (130799027) of the Myanmar Directorate of Investment and Company Administration (see **Appendix I**). This company implemented a cement plant with a maximum production capacity of 1,000 tons per day near Lauk Hpan village, Naung Hkio Township, Shan State with the approval of the Myanmar Investment Commission on 11<sup>st</sup> Nov 2011. (See **Appendix II**)

Due to high demand and annual shortage of cement supply in Myanmar, the company is aggressively moving forward to meet the requirements of the country by upgrading more efficient cement plants. So, the company decided to expend the capacity of cement production from 1,000 TPD to 5,000 TPD with the approval by MIC on 15<sup>th</sup> July 2015(see **Appendix II**). So, the maximum production capacity of 4,000 tons per day of cement plant is constructed within the plant site area.

#### 3.2 Project Location and Area

The plant is located at Lauk Hpan Village, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, Northern Shan State in Myanmar. The plant is situated on the side of Mandalay-Lashio Highway and can be entranced from the Ngwe Yi Pa le Road which is connected to that Highway which is the distance of 4 miles 3 furlongs from the Plant. The approximate geographical coordinate of the plant site is shown in **Table 3.1** and overview of geographical Map is shown in **Figure 3.1**.

Table 3-1 Coordination of Plant Site

Name	Latitude	Longitude
Location Plant Site	22° 21' 22.65" N	42' 11.68" E.

The project area comprises of 250 acres of plant site and 210 acres of associated area for residential which were permitted as industrial lands. The documents of land use permit are attached in **Appendix V**.

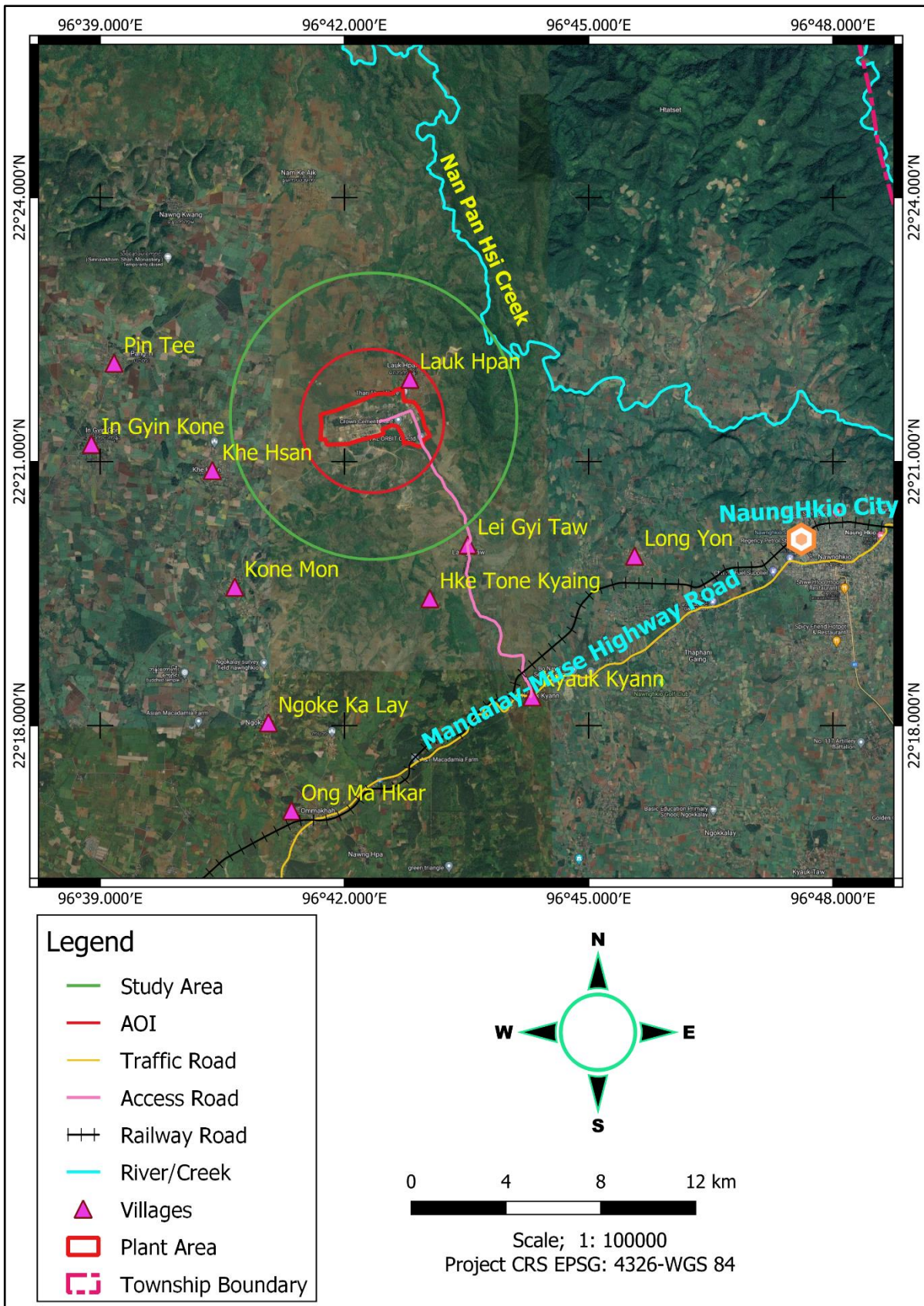


Figure 3-1 Overview Map of Crown Cement Plant and its Vicinities



**Environmental Impact Assessment Report  
For “Crown Cement Plant 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd.*

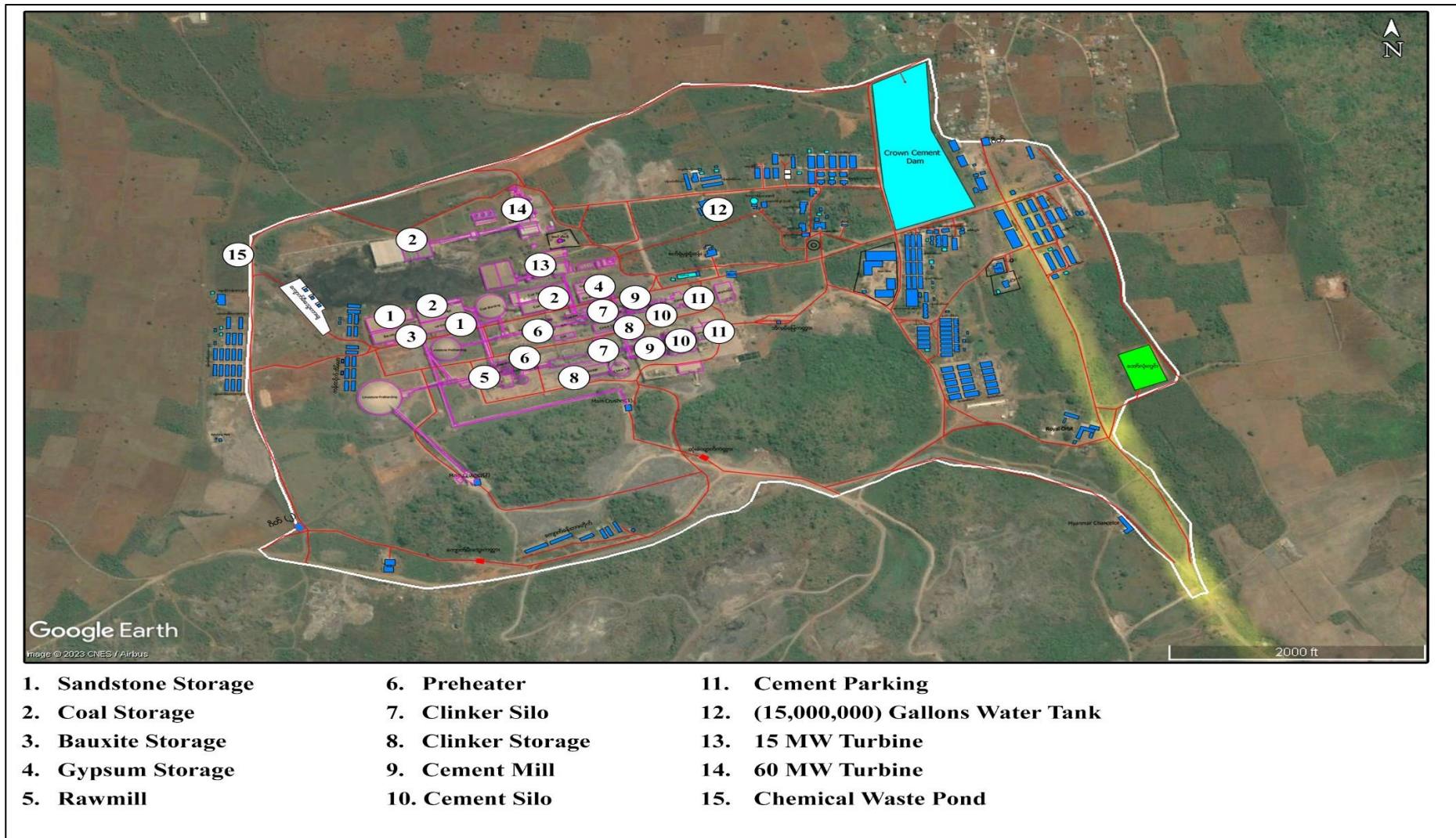


Figure 3-2 Layout Plan of plant area

### 3.3 Project Investment

Table 3-2 Total Investment for 5,000 TPD Crown Cement Factory

Phase \ Investment	Myanmar Kyats (in million)	US\$ (in million)	Total Kyats (in million)	Remarks
Original Phase I -- 1,000 TPD	24,731.00	20.735	24,855.42	Previous Ex. Rate; 1 US\$ = 6 Kyats
Phase II-- 4,000 TPD	190.13	68.499	74,169.26	5-5-2015 MCB, Ex. Rate; 1 US\$=1080Kyats
<b>Total – 5,000 TPD</b>	<b>24,921.13</b>	<b>89.234</b>	<b>99,024.68</b>	

Table 3-3 Details of Investment for the Project (in million)

Items	Initial Investment			Increased Amount for Extension			Total Investment		
	Kyats	US\$	Total Kyats	Kyats	US\$	Total Kyats	Kyats	US\$	Total Kyats
Cash	12,000	-	12,000	-	-	-	12,000	-	12,000
Initial Raw Material Costs	3132	-	3132	-	-	-	3132	-	3132
Machineries	44	18.20	153.2	-	68.5	73980	44	86.70	74133.20
Vehicles	-	2,535	1521	-	-	-	-	2,535	1521
Factory Buildings	9505	-	9505	-	-	-	9505	-	9505
Office Accessories & Furniture	50	-	50	190.13	-	190.13	240.13	-	240.13
<b>Total</b>	<b>24731</b>	<b>20.735</b>	<b>24855.42</b>	<b>190.13</b>	<b>68.5</b>	<b>74170.13</b>	<b>24921.13</b>	<b>89.235</b>	<b>99025.55</b>

### 3.4 Implementation Schedule

Ngwe Yi Pa Le’ Cement Co., Ltd started the construction of Phase I of 1000 TPD Cement Plant in 2011 and has been commercially produced in 2013. Ngwe Yi Pa Le Group planned to expand the production capacity of 5000 TPD and then the phase II of 4000 TPD

Cement Plant started the construction stage in July, 2015 and commercially produced in June 2019.

### **3.5 Production Capacity and Products**

#### Production Capacity

The production design capacity of Crown Cement Plant is 5000 Tons per day (the total production of two cement plants) as shown in **Table 3.4**. However, the plant will be operated 330 working days in a year and the daily production rate can vary according to the cement demand.

Table 3-4 Production Design Capacity

<b>Projects</b>	<b>Phase I</b>	<b>Phase II (Proposed Expansion)</b>	<b>Capacity After Expansion</b>
Crown Cement Plant	1000 TPD	4000 TPD	5000 TPD

Note: 1 ton = 50 kg x 20 bags

#### Product

The product name is “CROWN Cement” (see **Figure 3.3**) and there are four (4) classes of cement such as 52.5 Class Cement, 42.5 Class Cement, 32.5 Class Cement. The **52.5 Class Cement** is a quality of 52.5 Mpa (Grade 52.5 = 7612.5 psi) obtained after Strength Test 28 days after pouring concrete. 52.5 Class can be used in Roads, bridges, high-rise condominiums and buildings with more than 4 storeys. The **42.5 Class Cement** is 42.5 MPa (Grade 42.5 = 6162.5 psi) obtained after Strength Test 28 days after pouring concrete. 42.5 class Cement brick business; Ideal for wall finishing applications. Simple brick number plates; 42.5 Class Cement can be used in buildings under 4 storeys high. The **2.5 Class Cement** is a quality of cement obtained at 32.5 MPa (Grade 32.5 = 4712.5 psi) after 28 days after pouring concrete and strength test. 32.5 class cement brick business; Ideal for wall finishing applications.



Figure 3-3 Photo of Products

### 3.6 Raw Material Sources and Requirement

#### 3.6.1 Type and consumption of Raw materials

The major raw material for manufacturing of cement is Limestone and the other raw materials are Clay, Iron Ore and Gypsum. Coal is used as fuel for combustion in the kiln. Raw material requirement of the cement plant is presented in **Table 3.5**. The plant will be operated 330 working days in a year.

Table 3-5 Raw Material Requirement

No.	Raw Material	Characteristics	Requirement Quantity (Ton)					
			Phase I (1000 TPD)		Phase II (4000 TPD)		Total	
			Ton per day	Ton per year	Ton per day	Ton per year	Ton per day	Ton per year
1	Limestone	CaO : >48% MgO: < 4%	1344	443520	5376	1,774,080	6,720	2,217,600
2	Clay	SiO <sub>2</sub> : > 80%	208	68640	832	274,560	1,040	343,200
3	Iron Ore	Fe <sub>2</sub> O <sub>3</sub> : 35-45% Al <sub>2</sub> O <sub>3</sub> : 20-35%	48	1580	192	63,360	240	79,200
4	Gypsum	SO <sub>3</sub> : 25-30	60 (6%)	19800	240	79200	300	99,000
			90 (9%)	29700	360	118,800	450	148,500
5	Coal	Calorific value (heating value): 4500-8300 Btu/lb; (9.3-19.3 MJ/kg) CO <sub>2</sub> : 25-35 % Ash: 5-10 % Sulphur: 0.4-1 %	250	82,500	1000	330,000	1,250	412,500

#### 3.6.2 Source of raw materials

Raw material sources are extracted from the permitted area of Ministry Natural Resources and Environmental Conservation (former name: Ministry of Mining) (see **Appendix VII**). The locations and reserve of limestone raw materials sources are as described in **Table 3.6** and **Figure 3.4**.

##### *Limestone*

Table 3-6 locations and reserve of raw materials source (Limestone)

Sr. No.	Description	Limestone Mine			
		Lauk-Hpan	Lauk-Hpan (Extension Area)	Ngokkalay	Kone Thar



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1	Coordination Points	(22°20'48.87"N, 96°42'28.55"E)	(22°20'20.02"N, 96°42'31.33"E)	(22°18'40.98"N, 96°41'33.49"E)	(22°15'10.83"N, 96°44'25.35"E)
2	Location	Shan State, Naung Hkio Township, Loneyon Village Track, Lauk- Phan Village,	Shan State, Naung Hkio Township, Loneyon Village Track,Lauk-Phan Village,	Shan State, Naung Hkio Township, Ommakkah Village Track, Ngokkalay Village,	Shan State, Naung Hkio Township, Kone Thar Village Track,
3	Distance from the plant, miles	1.2	1.4	4.8	12.9
4	Area, acres	450	60	28	199
5	Deposit, million tons	50.86	38.64	12	55.22
6	Mine Life/ Production period, years	18	14	15	19

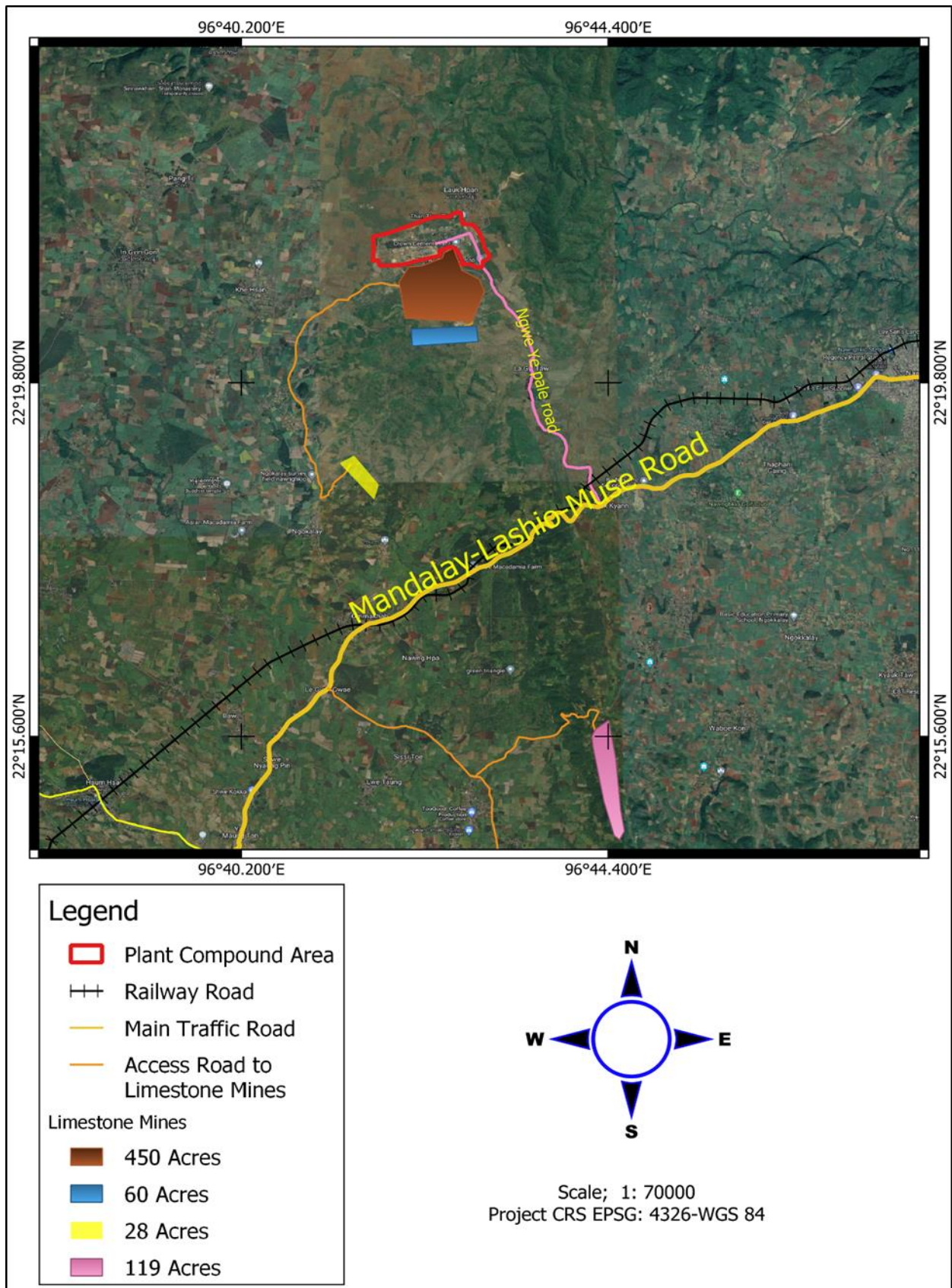


Figure 3-4 Plant Site and locations of Limestone Raw Material Sources

**Clay (Sandstone)**

The locations and reserve of Clay (Sandstone) raw materials sources are as described in **Table 3.7** and **Figure 3.5**.

Table 3-7 Locations and reserve of raw materials source (Clay)

Sr. No.	Description	Clay (Sandstone) Mine
		Lauk-Hpan
1	Coordinate Points	(22°22'8.38"N, 96°43'13.13"E)
2	Location	Shan State, Kyauk Me District, Naung Hkio Township, Has Pya Do Village, Bant Bwe Kyinn
3	Distance from the plant, miles	1.5
4	Area, acres	278
5	Deposit, million tons	117.76
6	Mine Life/ Production period, years	195

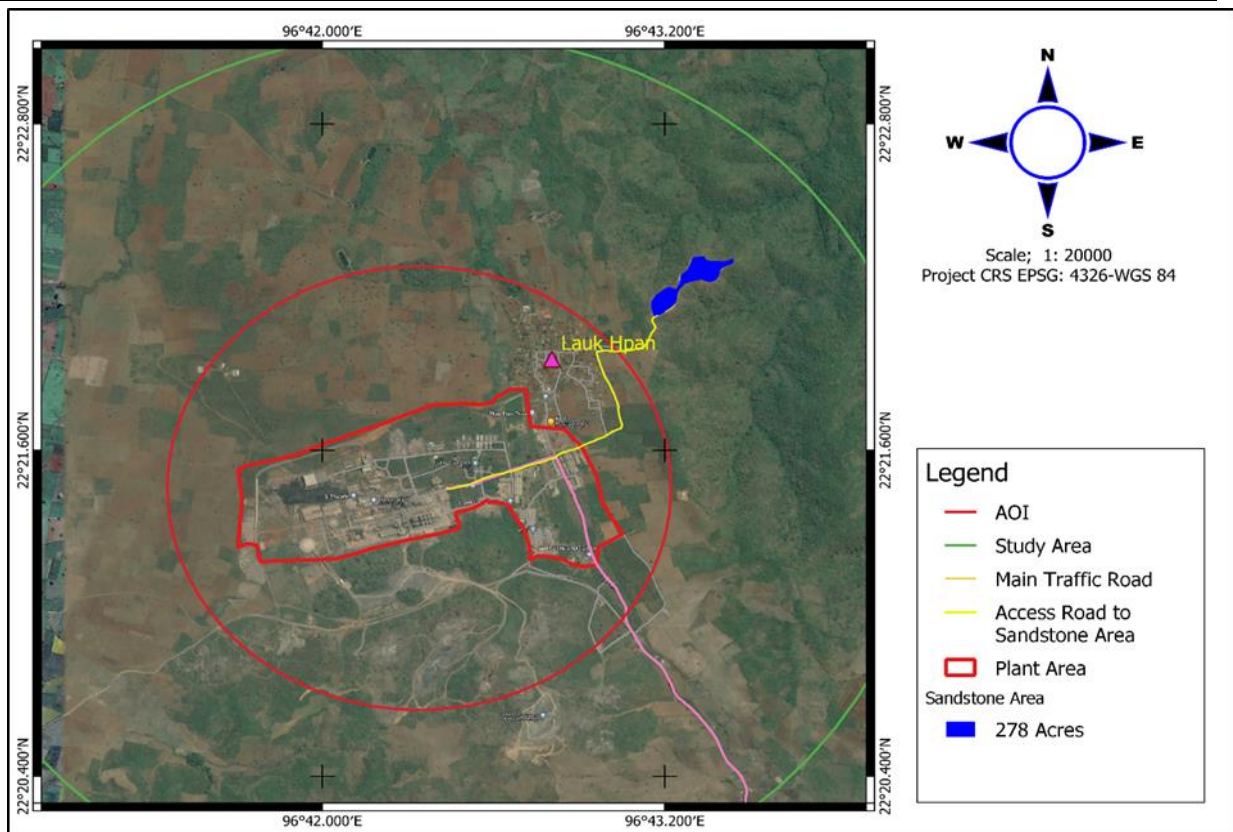


Figure 3-5 Plant Site and locations of Clay (Sandstone) Raw Material Sources

***Iron Ore (Laterite)***

The locations and reserve of Iron Ore (Laterite) raw materials sources are as described in **Table 3.8**, and **Figure 3.6**.

Table 3-8 Locations and reserve of raw materials source (Iron Ore)

Sr. No.	Description	Iron Ore (Laterite) Mine	
		Has- Pye-Do	Doebin
1	Coordinate Points	(22°24'32.54"N, 96°24'24.75"E)	(22°23'14.71"N, 96°25'18.43"E)
2	Location	Shan State, Kyauk Me District, Naung Hkio Township, <b>Has- Pye-Do</b> Village	Shan State, Kyauk Me District, Naung Hkio Township, Bant Bwe Kyinn
3	Distance from the plant, miles	40	48
4	Area, acres	980	400
5	Deposit, million tons	0.25	1
6	Mine Life/ Production period, years	22	30



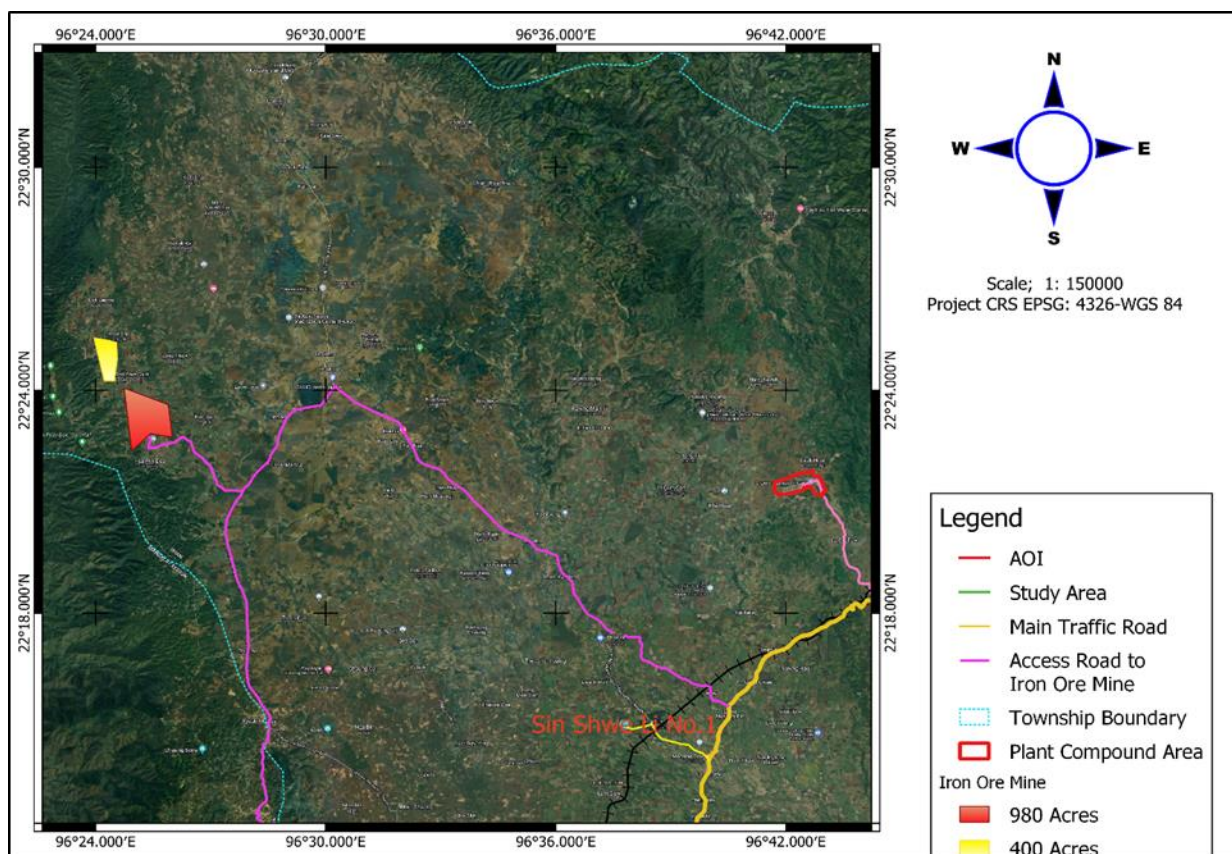


Figure 3-6 Plant Site and locations of Iron Ore (Laterite) Raw Material Sources

### **Gypsum**

The locations and reserve of Gypsum raw materials sources are as described in **Table 3.9** and **Figure 3.7**.

Table 3-9 locations and reserve of raw materials source (Gypsum)

Sr. No.	Description	Gypsum Mine	
		Pang Hsai	Moe Tae
1	Coordinate Points	(22°39'53.29"N, 97°17'55.28"E)	(22°42'14.82"N, 97°20'41.10"E)
2	Location	Shan State, Kyauk Me District, Hsi Paw Township, Ywa Thit Village Tract	Shan State, Kyauk Me District, Hsi Paw Township, Moe Tae Village Track
3	Distance, miles	66.5	69.8
4	Area, acres	100	50
5	Deposit, million tons	2.55	0.82

6	Mine Life/ Production period, years	41	13.4
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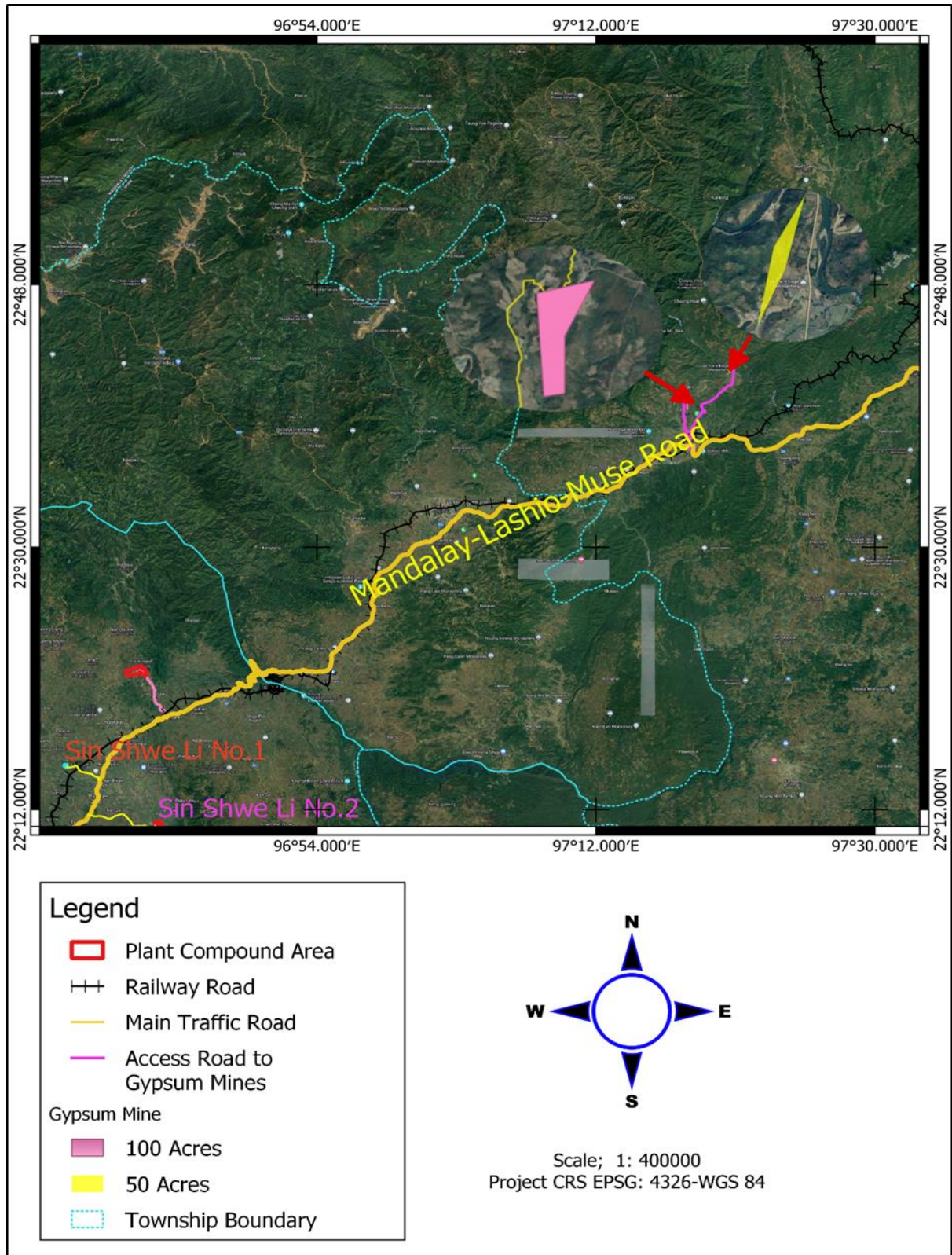


Figure 3-7 Plant Site and locations of *Gypsum* Raw Material Sources

**Coal**

The locations and reserve of Gypsum raw materials sources are as described in **Table 3.10**, and **Figure 3.8**.

Table 3-10 Locations and reserve of raw materials source (Coal)

Sr. No.	Description	Coal Mine						
		Namma	Namma (Plot-1)	Namma (Plot-2)	Namma (Plot-3)	Har Put	Narr Hote	Naung Ye
1	Coordinate Points	(22°40'14.16"N, 97°47'28.31"E)	(22°37'46.87"N, 97°43'49.68"E)	(22°39'51.03"N, 97°46'9.51"E)	(22°42'11.46"N, 97°48'15.61"E)	(22°30'1.66"N, 98°15'10.21"E)	(22°30'11.04"N, 98°14'40.57"E)	(22°18'6.49"N, 97°57'49.52"E)
2	Location	Shan State, Kyauk Me District, Hsi Paw Township, Nanma Village Tract, Kone Baung (Narr Kun)	Shan State, Kyauk Me District, Hsi Paw Township, Nanma Village Tract, Kone Baung (Narr Kun)	Shan State, Kyauk Me District, Hsi Paw Township, Nanma Village Tract, Kone Baung (Narr Kun)	Shan State, Kyauk Me District, Hsi Paw Township, Nanma Village Tract, Kone Baung (Narr Kun)	Shan State, La Shio District, Tang Yan Township, Narr Hote Village Tract, Har Put Village	Shan State, La Shio District, Tang Yan Township, Narr Hote Village	Shan State, La Shio District, Mine Yel Township, Kho Sine Village Tract, Naung Ye
3	Distance, miles	111	111	111	111	152	152	128.34
4	Area, acres	2796.75	55.79	238	235.54	200	90	170.45
5	Deposit, million tons	2.67	0.25	0.78	0.68	0.38	0.47	0.46
6	Mine Life/ Production period, years	15	9.4	12.49	12.16	6.9	11	11



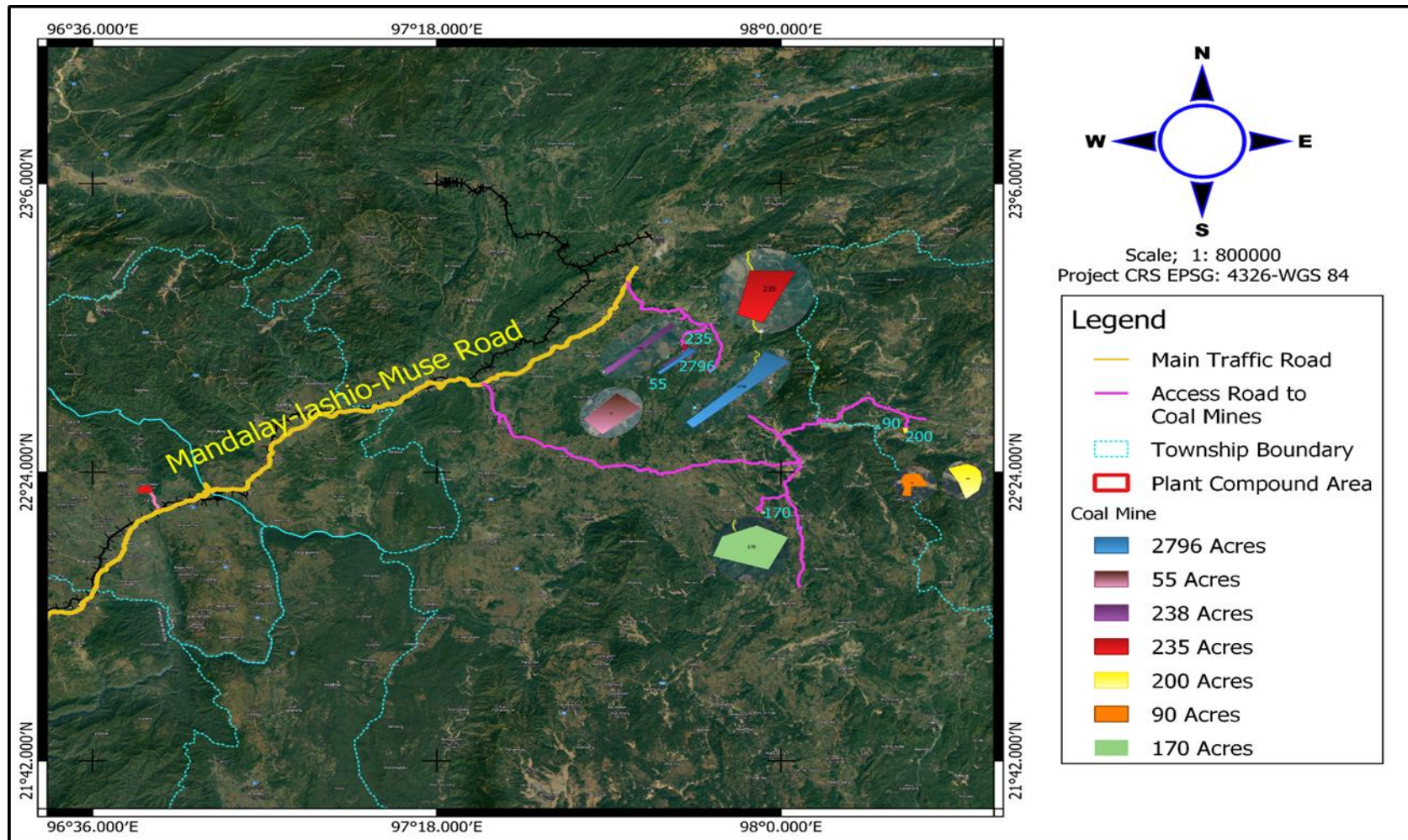


Figure 3-8 Plant Site and locations of Raw Material Sources



### 3.6.3 Transportation of Raw material

The raw materials will be carried from the location of raw materials sources by trucks usually and the plant expect approximately 582 trucks will be carried according to the daily basis production and no. of trucks of each raw material are as shown in **Table 3.11**.

Table 3-11 Transportation of raw materials

Sr. No.	Raw Material	Unit	Consumption (Ton/day)	No. of Trucks	Mode of Transportation
1	Limestone	Metric Ton	6,720	448	Road Transportation by Truck
2	Clay (Sandstone)	Metric Ton	1,040	69	Road Transportation by Truck
3	Iron Ore (Laterite)	Metric Ton	240	8	Road Transportation by Truck
4	Gypsum	Metric Ton	450	15	Road Transportation by Truck
5	Coal	Metric Ton	1250	42	Road Transportation by Truck
				582	

### 3.6.4 Storage Type of raw materials

Storage types of raw materials are shown in **Table 3.12**.

Table 3-12 Capacity and Storage Facilities for Raw Materials

Raw Material	Type of Storage	No. of Storage Facilities	Capacity of Storage, tons	Reference
Limestone	Warehouse (Open storage)	2	2000	Figure 3.9
Clay (Sandstone)	Warehouse (Open storage)	2	2000	Figure 3.10

Iron Ore	Warehouse (Open storage)	1	1000	Figure 3.11
Gypsum	Warehouse (Open storage)	1	1000	Figure 3.12
Coal	Storage Yard and Warehouse	3	3000	Figure 3.13

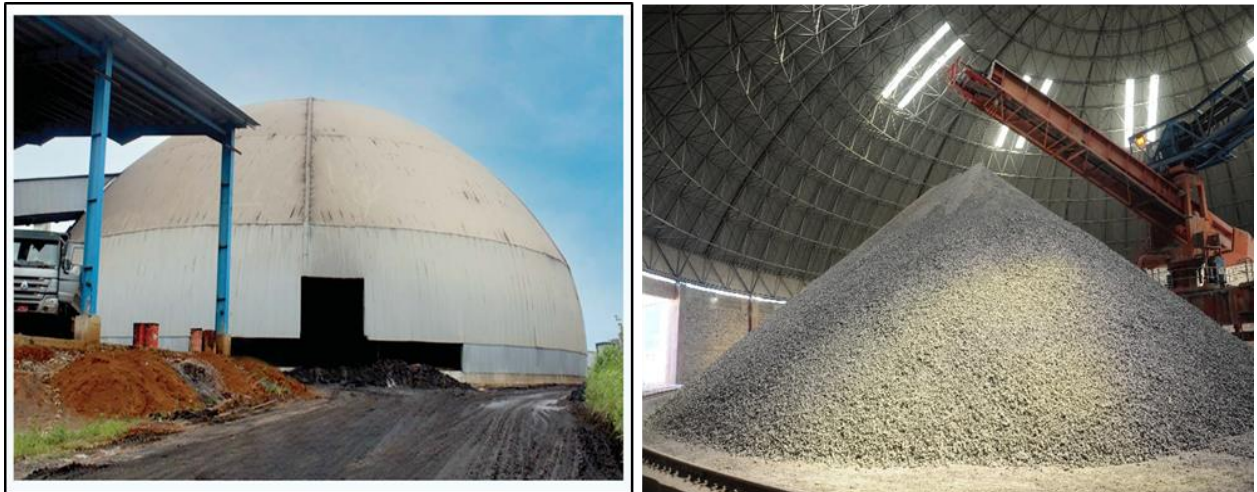


Figure 3-9 Limestone Storage and Preblending



Figure 3-10 Clay Storage





Figure 3-11 Iron Ore Storage



Figure 3-12 Gypsum Storage





Figure 3-13 Coal Storage

### 3.7 Manufacturing process

#### 3.7.1 Introduction

Cement manufacturing principally involves grinding and blending of raw materials in a definite proportion - a material containing calcium oxide (such as limestone, chalk, marl) with a siliceous material (such as clay, shale, sand) along with certain additive or corrective materials (such as laterite, Iron Ore) and then calcining the mixture at high temperatures in a kiln. The resulting ‘clinker’ is cooled and then ground with gypsum to produce the finished product, Ordinary Portland Cement (OPC). Gypsum is added to control the setting time of cement.

There are two processes namely Dry process and Wet process in cement manufacturing process. Nowadays wet process is obsolete because of high fuel consumption and higher time of process, and more affect to environment. Dry process of cement manufacturing offers more advantages, particularly in fuel consumption and is the most rational and logical choice.

In the operating plant of CROWN Cement Plant, dry process has been selected to manufacture clinker, which comprises of rotary kiln, preheater and pre-calciner.

In the manufacturing process, the significant manufacturing stages are namely;

- crushing,
- raw material grinding and blending,
- clinkerisation,
- cement grinding and packing

At crushing stage, run-of-mine limestone is crushed to desired size so as to achieve optimum grinding efficiency in the raw mill. Crushed limestone is stacked by stacker in a stockpile and reclaimed by means of reclaimer. The stockpile serves as a buffer stock storage.

Crushed limestone with additives is fed through weigh feeders to the raw mill. The feed quantity and ratio of feeds are controlled based on the chemical analysis results from laboratory.

The raw material is ground in closed circuit roller press and the fineness is controlled by separator. The ground meal is stored in raw meal storage silo. Hot gases from the kiln are used for raw mill and coal mill operations.

Clinkerisation is the heart of cement manufacturing process, where the raw meal is fed to the pre-heater at controlled rate through electronic weigh feeder. The feed enters the kiln through cyclones and the fuel is fired at the kiln outlet end and pre-heater. The counter current of hot gases against the material flow right from pre-heater top stage to kiln outlet converts raw mix to clinker by pyro-processing stages like calcinations and clinkerisation. The hot clinker discharged from the rotary kiln is cooled in the grate cooler by forced air, which is extracted from the outer atmosphere by grate cooling fans. Then cooled clinker is transported to covered clinker silo for storage.

Clinker and Gypsum in a definite proportion are ground for the production of Ordinary Portland Cement (OPC). Clinker from the clinker silo and gypsum are fed into cement mill hopper by belt conveyors. The proportioning of clinker & gypsum is done by weigh feeders. Clinker and gypsum are pre crushed in a roller press and subsequently fed into Cement mill for fine grinding.

The cement discharged from cement silo is transported to air slides and bucket elevator and discharge into a screen which is located above the receiving hopper of the packing machines to separate foreign matters. The cement is packed with the help of a rotary packer and finally dispatched to the market. The process flow diagram of CROWN Cement manufacturing process is shown in **Figure 3.14** and **Figure 3.15**.

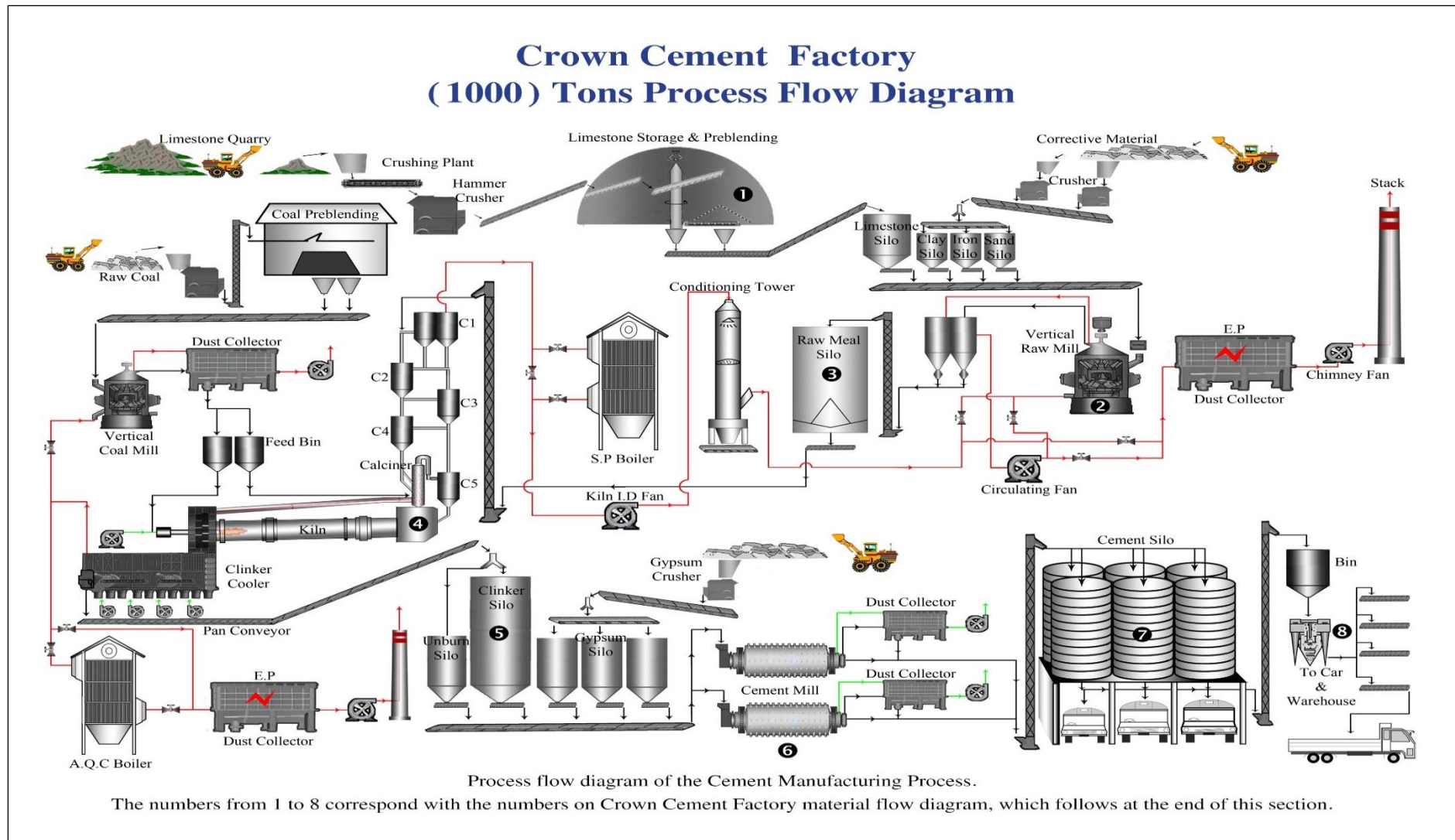


Figure 3-14 Process Flow Diagram of 1,000 TPD Cement Plant



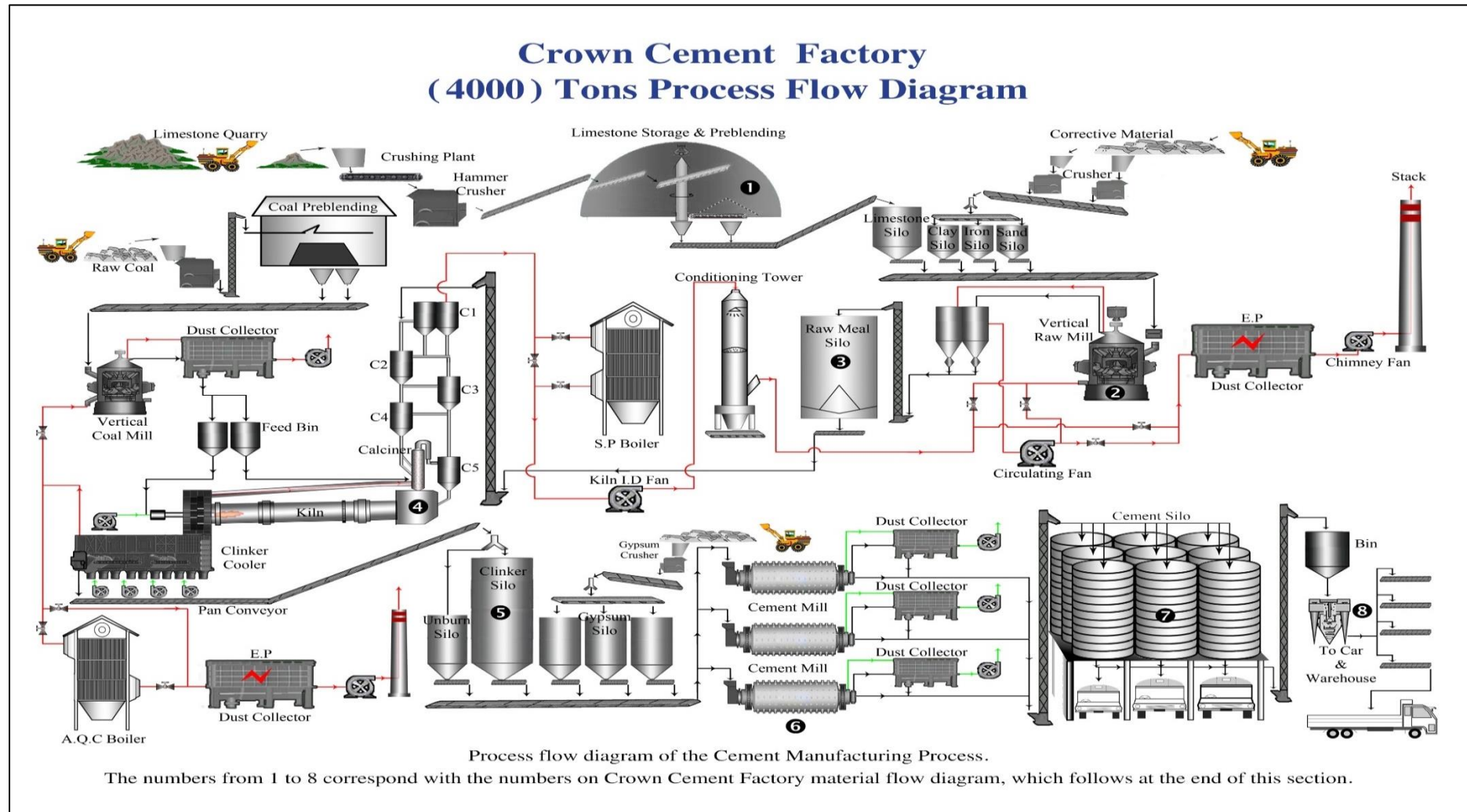


Figure 3-15 Process Flow Diagram of 4,000 TPD Cement Plant



### 3.7.2 Limestone Crushing

The run-of-mine limestone is carried by dump trucks to plant site. The crushed material from the crusher is transported by a set of belt conveyors to the limestone stockpile through a stacker. From stock pile, the material is reclaimed through a reclaimer and is transported to the limestone hopper. Material from the feed hopper discharge to raw mill is conveyed through weigh feeder and belt conveyor.

### 3.7.3 Additive Crushing & Storage

#### a) Corrective Material

Corrective material or other raw material such as clay, sand, iron ore are transported by truck and unload into stockpile. Wheel loader feed the materials into dump hopper, which are equipped with mechanical feeders for regulated discharge. The material is crushed and conveyed to the hoppers for feeding to the mills.

#### b) Gypsum

Gypsum good for the settling time of the cement is sourced from nearby. Gypsum received is unloaded by trucks and fed to the dump hopper of the gypsum crusher.

### 3.7.4 Raw Meal Grinding (Raw Mill)

The blended limestone from stockpile is fed into raw mill through weigh feeder provided beneath hopper. Corrective materials which are required in very small quantity, depending upon the quality of limestone are also fed thorough weigh feeders to raw mill and in required proportion. Vertical roller mill is adopted for raw meal grinding system with exterior circulating system, utilizing waste gas from pre-heater as the drying heat source. The raw mill works in close circuit and crushes the raw material to pulverized form. The raw meal thus obtained is then stored in raw meal silo which also further blends the meal. This type of silo ensures that continuous homogenizing of the raw meal takes place and the periodic samples are taken for detail analysis.

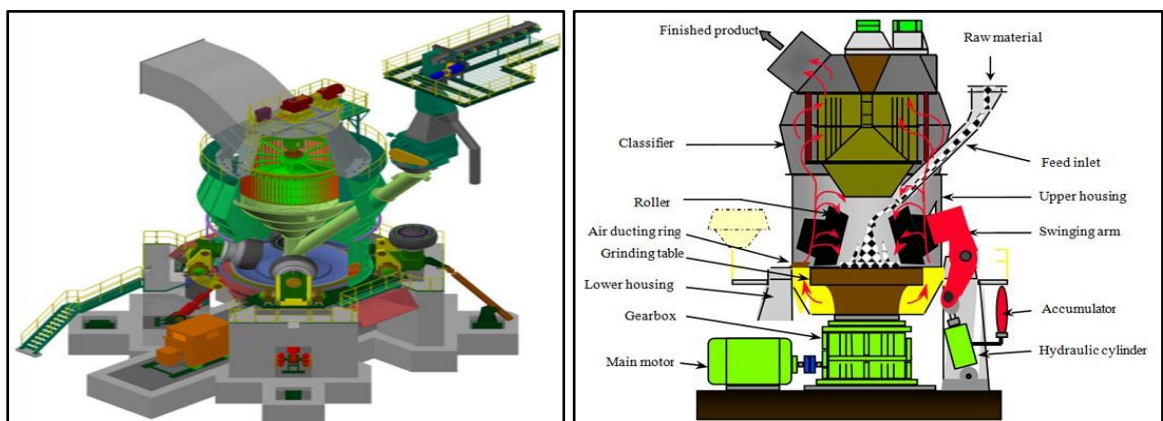


Figure 3-16 Typical Diagram of Vertical Raw Mill

### 3.7.5 Coal Grinding & Storage

Coal received by trucks from local mines in Shan State will be directly unloaded for storage in yard. Coal is reclaimed by wheel-mounted front-end loaders, which feed to a ground level dump hopper. Coal is crushed in an impact crusher and will be transported by a set of belt conveyors to coal stacker. The bridge type reclaimer reclaims the material and is transported to mill hoppers. An air swept vertical mill is employed for simultaneous drying and grinding of coal. Ground coal from the mill will be air swept to a bag dust collector for separation and de-dusting by an exhaust fan. The fine coal is stored in cylindrical bunker equipped with explosion vents as means of safety. The pulverized coal extracted with the help of gravimetric flow control system and conveyed pneumatically to the kiln and calciner for firing.

### 3.7.6 Pre-heating and Kiln Feed

The raw meal is then conveyed to preheater through bucket elevators. The bucket elevator, a mechanical transport system, has been selected to conserve energy. The preheater consists of multi-string cyclone system along with the calciners. The preheater is five-stage cyclone preheater which is composed of six cyclones in total and such a system has less thermal energy requirement. The raw meal flows down the cyclones in the control manner and the hot gases which are recovered from the cooler pass through preheater from the bottom stage. Thus, there is interaction between the raw meal and the material temperature keeps increases before its entry into the Kiln. The temperature of the raw meal is about 950 - 1000 degree centigrade before it enters the kiln.

### 3.7.7 Clinkering or Sintering

Qualified raw meal from the homogeneous silo after pre-calcination, calcination will take place in the rotary kiln at high temperature around 1300-1500 °C. The calcination is the core phase of the cement making dry process. The calcination of the preheated raw meal takes place in the rotary kiln of the cement plant.

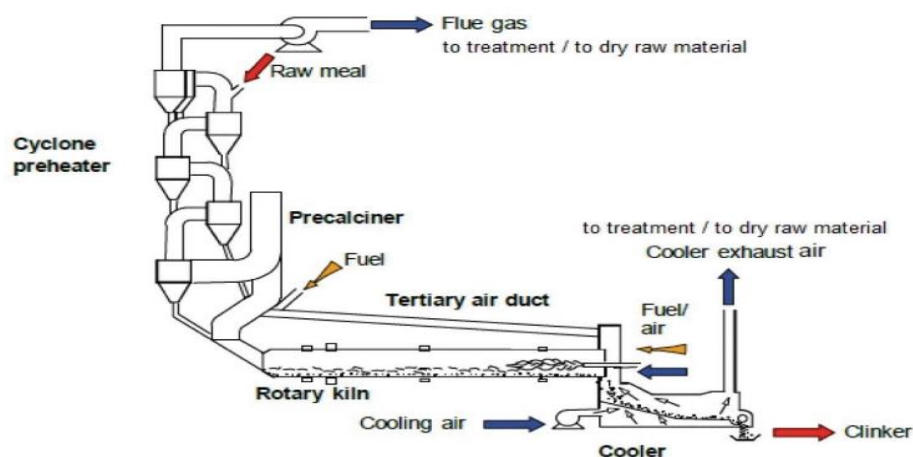


Figure 3-17 Diagram of Rotary Kiln (Five-Stage Cyclone Preheater)

### 3.7.8 Clinker Cooling and Storage

The hot clinker discharged from the rotary kiln is cooled in the grate cooler by forced air, which is extracted from the outer atmosphere by grate cooling fans. The temperature of the clinker after being cooled drops from **1500 °C to around 120°C**. The clinker from the grate cooler is stored in clinker silo before it is fed to the cement mill for conversion to cement. Silo type clinker storage has the advantage that there is no dust pollution and spillage of clinker. Clinker will be discharged from the clinker silo to clinker bin in cement mill by belt conveyer.

### 3.7.9 Clinker Grinding and Cement Storage

A cement mill is the equipment used to grind the hard, nodular clinker from the kiln area into the fine grey powder that is cement. The cement from mill is passed through bag filter. The heavy material is sent to separator where the coarse powder that does not meet the specifications to cement mill is again sent to cement mill for regrinding. The fine grinded material is sent to cyclone from separator. The fine powder will be sent to the finished product elevator through the conveying chute and finally enter the cement silo. During these processes, the gas discharged from the ball mill will be purified by the dust collector and discharged into the atmosphere by the air blower. The collected fine powder is then stored in the cement silo for packing.

A measured quantity of clinker and gypsum is fed into the closed-circuit ball mill which incorporates with a high-efficiency separator for better particle size distribution and quality control. Ordinary Portland Cement is produced by the inter-grinding and blending of 94% of clinker with 6% of gypsum (or) 91% of clinker with 9% of gypsum.

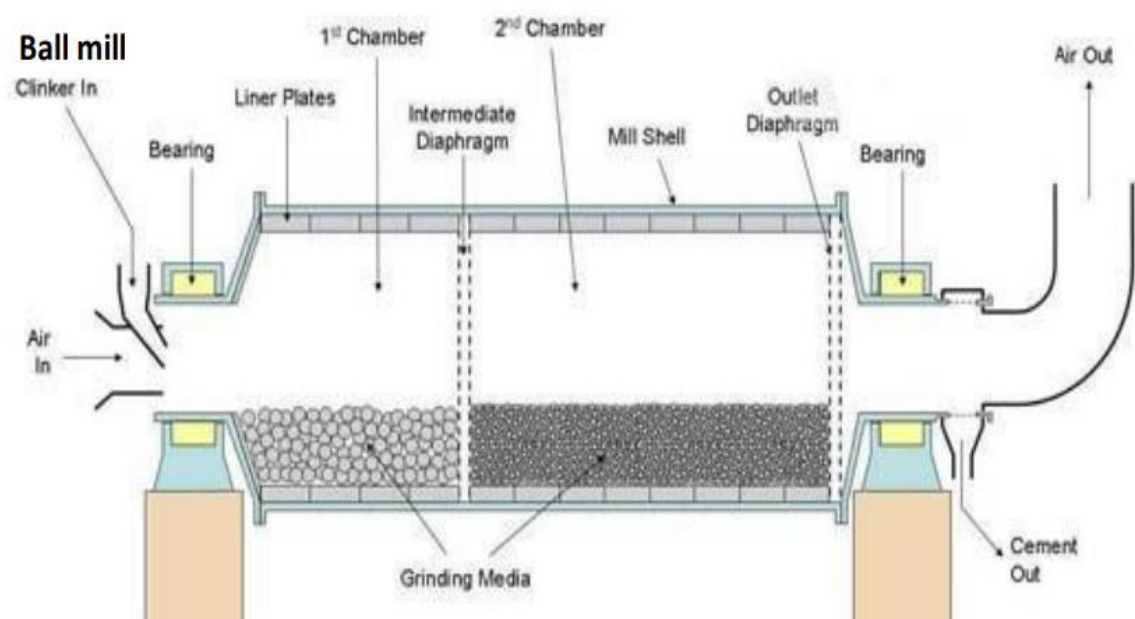


Figure 3-18 Ball Mill Diagram

### 3.7.10 Cement Packing

Cement is extracted from the silo bottom by aeration and then transported to electronic packing machines by air slides and bucket elevators. There are three (3) nos. of 8-Spout Rotary Packer in packaging system of 1000 TPD Cement plant and four (4) nos. of 10-Spout Rotary Packer in packaging system of 4000 TPD Cement plant. Each of 8-Spout Rotary Packers will pack cement 120 ton per hour and each of 10-Spout Rotary Packers will pack cement 150 tons per hour. Cement is packed in 50 kg packs, with HDPV bags or paper bags as per the customers’ requirement. Electronic packing machines are calibrated to deliver the correct weight. After packaging, the cement bags will be load on the truck automatically.

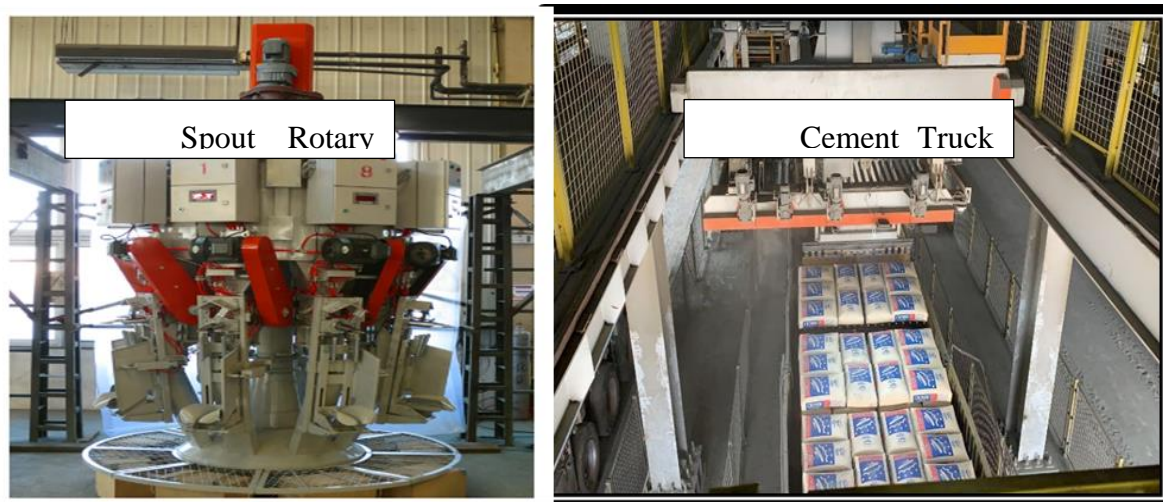


Figure 3-19 Photo of Spout Rotary Packer and Truck loading

## 3.8 Machinery and Equipment

The Crown Cement Plant will produce 1000 Tons per day in Phase I and 4000 Tons per day in Phase II. The main equipment and their capacity are listed in **Table 3.13** and **Table 3.14**.

Table 3-13 Main Equipment of 1000 TPD Cement Plant

No.	Equipment	Section	Model	Quantity
1	Single State Hammer Crusher (Limestone)	Limestone Crushing System	PCF-1818	1
			300~350 t/h	
2	Jaw Crusher (Ironstone)	Clay & Iron Crushing System	PE 600 * 900	1
			Capacity: 30~75 t/h	
3	New Impact Crusher (Sandstone)		CJ <sub>2</sub> 1250*1000	1
			Capacity: 60~90 t/h	
4	Vertical Roller Mill	Raw Material Grinding System	HRM 2800	1
			Capacity: 120~160 t/h	
5	Cyclone Preheater	Preheater & Precalcining	Type: FSY / 17	1

			Capacity: 1500 t/d	
			1-Cyclone: 2-Ø 4000 mm	
			2-Cyclone: 1-Ø 5700 mm	
			3-Cyclone: 1-Ø 5700 mm	
			4-Cyclone: 1-Ø 6000 mm	
			5-Cyclone: 1-Ø 6000 mm	
			Precalciner: Ø4600 *28000 mm	
6	Rotary Kiln	Rotary Kiln Heating System	Ø 3.6*54 m	1
			Capacity: 1500 t/h	
7	Air Quenching Cooler (A.Q.C)		LBTQ 2000	1
			2000 t / d	
8	Clinker Crusher	Clinker Cooling System	Φ1000*2700	1
			350 r.p.m	
			<25 mm	
9	Ring Hammer Crusher	Coal Crushing System	PCH 1010	1
			Capacity: 150~200 t/d	
10	Coal Vertical Roller Mill	Coal Grinding System	HRM 17-19 M	1
11	Jaw Crusher	Gypsum Crushing System	PE 600*900	1
			30~75 t/h	
12	Roller Press (1) (Pregrinding System)		HFCG 140-80	1
			1400 mm	
			800 mm	
			300~380 t/h	
13	Roller Press (2) (Pregrinding System)	Cement Grinding System	HFCG 140-80	1
			1400 mm	
			800 mm	
			300~380 t/h	
14	Cement Mill (1)		Ø 3.2*13 M	1
			Capacity: 45~50 t/h	
15	Cement Mill (2)		Ø 3.2*13 M	1

			Capacity: 45~50 t/h	
16	8-Spout Rotary Packer (1)	Cement Packing	BHYW 8 C	1
			Capacity: 120 t/h	
17	8-Spout Rotary Packer (2)		BHYW 8 C	1
			Capacity: 120 t/h	
18	8-Spout Rotary Packer (3)		BHYW 8 C	1
			Capacity: 120 t/h	

Table 3-14 Main Equipment of 4000 TPD Cement Plant

No.	Equipment	Section	Model	Quantity
1	Impact Hammer Crusher	Limestone Crushing System	PF 2020	1
2	Impact Crusher	Clay & Iron Ore Crushing and Conveying System	LPF 1616	1
			>300 t/h	
3	Jaw Crusher		PE 750*1060	1
		115~220 t/h		
4	Vertical Roller Mill	Raw Grinding System	TRM 50-4	1
			360 t/h	
5.00	Cyclone & Precliner	Preheater System	C1 : 4 - Ø 5000 mm	1
			C2 : 2 - Ø 6900 mm	
			C3 : 2 - Ø 6900 mm	
			C4 : 2 - Ø 7200 mm	
			C5 : 2 - Ø 7200 mm	
			PreCalciner : Ø 7200 *31000 mm	
6	Rotary Kiln	Rotary Kiln System	Ø 4.8*74 m	1
			5000 t/h	
7	Air Quenching Cooler (A.Q.C)	Clinker Cooling System	RTLf-5000	1
			5000 t/d	
8	Clinker Crusher		Ø 1050*3600	1
		1.5 m <sup>3</sup> /h		
9	Ring Hammer Crusher	Coal Crushing System	PCH 1016	1
			300~350 t/h	



10	Vertical Roller Mill	Coal Grinding System	HRM 2800 M	1
			>60 t/h	
11	Hammer Crusher	Gypsum Crushing System	PCF 1414	1
			140~160 t/h	
12	Roller Press (1) (Pregrinding System)	Cement Grinding System	HFCG 140-80	1
			300~380 t/h	
13	Roller Press (2) (Pregrinding System)		HFCG 140-80	1
			300~380 t/h	
14	Roller Press (3)		HFCG 140-80	1
			300~380 t/h	
15	Cement Mill (1)		Ø 3.2*13 m	1
			80~90 t/h	
16	Cement Mill (2)		Ø 3.2*13 m	1
			80~90 t/h	
17	Cement Mill (3)	Ø 3.2*13 m	1	
		80~90 t/h		
18	10-Spout Rotary Packer (1)	Cement Packing	BHYW10 C	1
			Capacity: 150 t/h	
19	10-Spout Rotary Packer (2)		BHYW10 C	1
			Capacity: 150 t/h	
20	10-Spout Rotary Packer (3)		BHYW10 C	1
			Capacity: 150 t/h	
21	10-Spout Rotary Packer (4)		BHYW10Q	1
			Capacity: 135 t/h	



Main Crusher



Vertical Raw Mill



Clinker



Preheater



Coal Mill





Figure 3-20 Main Equipment of CROWN Cement Plant

The Crown Cement Plant will construct the stacks in accordance with standard design. The required height of each stack is presented in **Table 3.15**.

Table 3-15 Required height of each stacks

Source	Stack Height (m)
Preheater Stack	300
Kiln Stack	320
Cooler Stack	285
Cement Mill Stack	290
Coal Mill Stack	300





Figure 3-21 Example of Preheater Stack and Cooler Stack

The following vehicles and heavy machinery will be used at the site of Crown Cement Plants are described in **Table 3.16**.

The following vehicles and heavy machinery will be used at the site of Crown Cement Plants are described in **Table 3.16**.

Table 3-16 Vehicles and Heavy Machinery

No.	Name	Quantity
1	Truck Mounted Crane	3
2	Wheel loader	6
3	Fork Lift	4
4	Oil Bowser	2
5	Water Bowser	2
6	Dumper (SINOTRUK/SHACMAN)	15
7	Prime Mover Head Truck (SINOTRUK/SHACMAN)	30
8	Backhoe/Excavator	6
9	Dozers	2

10	လုပ်ငန်းသုံး/သယ်ယူပို့ဆောင်ရေးယာဉ်၊ Double Cab, Pajero, atc.	20
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### **3.9 Utility Requirements**

#### **3.9.1 Energy Sources and Usage**

##### *Electricity Sources and Usage*

The electrical power will be sourced from the **Coal Power Plant** at the plant site and SINN SHWE LI Sugar Mill No.2 which is located in Inn Wine Village, Naung Hkio Township which is 20 km far from the Crown Cement Plant. Coal Power Plant at plant site will generate design capacity of 60 MW (see **Figure 3.22**). Another electrical power source will be SINN SHWE LI Sugar Mill No.2 which is used by-products of factory for the electricity generation and it can generate 30 MW (installed capacity) during the sugarcane season which is approximately four (4) months within one year.

During the sugarcane season, electrical power will be sourced from SINN SHWE LI Sugar Mill No.2 which will transmit 15 MW through a 33 KV transmission line and the other required power will be sourced from Coal power plant at plant site. During the rest period (after Sugar Cane season), the electrical power will be sourced from Coal power plants at plant site. (6) No. of Diesel generator will be set up for stand-by in emergency cases.

The electrical power consumption of 1000 TPD Cement Plant (Phase I) is 6 MW and 4000 TPD Cement Plant (Phase II) is 24 MW. Other electrical consumption of residential for worker and near village is 2 MW. The total electrical consumption of 5000 TPD Cement production and residential is 32 MW.

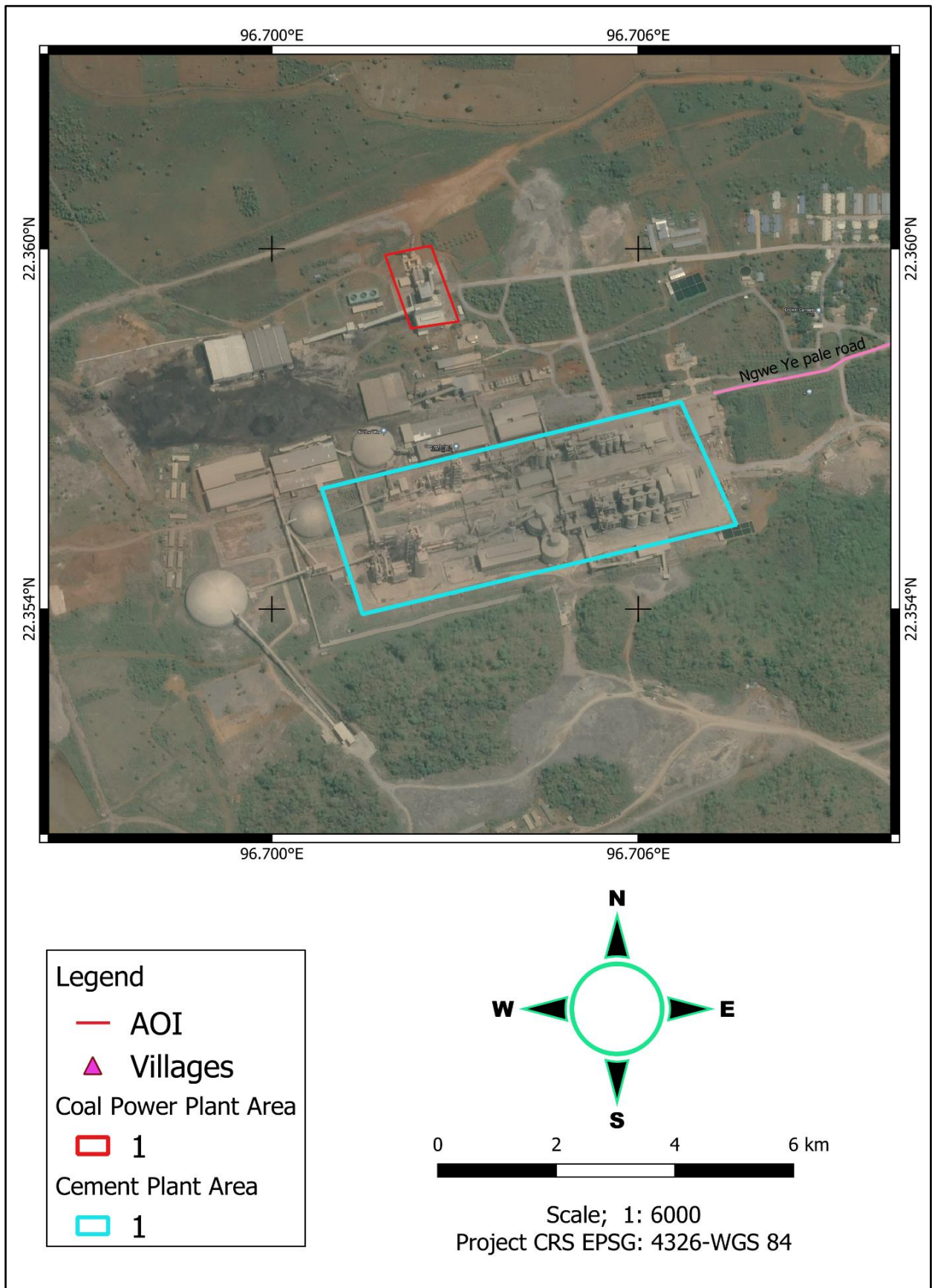


Figure 3-22 Location of Coal Power Plant (60 MW)



Figure 3-23 Photo of Stand by Diesel Generator

#### Fuel Usage

Diesel and Gasoline will be required for transport vehicles and generators. Specification of Diesel is described in **Table 3.17**. Generators for electricity will be diesel-powered. Coal will be used as the fuel to generate heat in order to produce the clink in rotary kiln. Fuel requirements of cement plants are listed as shown in **Table 3.18**. *(Note that the coal consumption of coal power plant is not a part of the EIA report and EIA report of Coal power plant will present it)*

Table 3-17 Specification of Diesel

Item	Specification
Specific gravity	0.88
Sulphur content	0.05% (wt)
Ash content	.20%
Calorific value	44.80 mj/kg

Table 3-18 Fuel requirement

Item	Consumption (Estimated Amount)
Diesel	70000 gallons/day
Gasoline	750 gallons/day (15 barrel)
Coal	1250 Tons/day (maximum)





Figure 3-24 Photo of Oil Storage Tank

### 3.9.2 Water Sources and Usage

Main water source for Crown Cement Plant is nearby stream which flows every season and the stream water will be collected with three (3) water collection ponds. The water will be supplied from these ponds to the tank through 6" x 1,782-meter (5849.73 ft.) pipe and will be stored 21, 15 and 1 million gallons of tanks. There is also 4" diameter tube-well from which water is supplied to the factory for landscaping and workers' quarters.

The water will be used in dust suppression area (i.e. raw material storage yard), cooling water in cement manufacturing process. The cooling water will be recycled through cooling tower. Total annual water requirement for cement plants is **9,250,000** gallons. Details of water requirement are present in **Table 3.19**.

Table 3-19 Water Requirement

No.	Area	Water Consumption (gallons/ year)	Source
1	Dust Suppression	<b>2,000,000</b>	Water Reservoirs collected from nearby streams
2	Cooling Water	<b>7,000,000</b>	
3	Domestic	<b>250,000</b>	Tube Well (Groundwater)
		<b>9,250,000</b>	





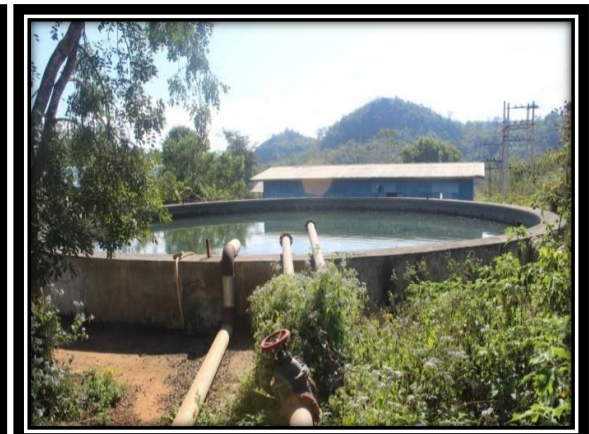
**Collection Pond**



**Water tank (21 million gallon)**



**Water tank (15 million gallon)**



**Water tank (1 million gallon)**

Figure 3-25 Photo of Water Pond and Tube-Well

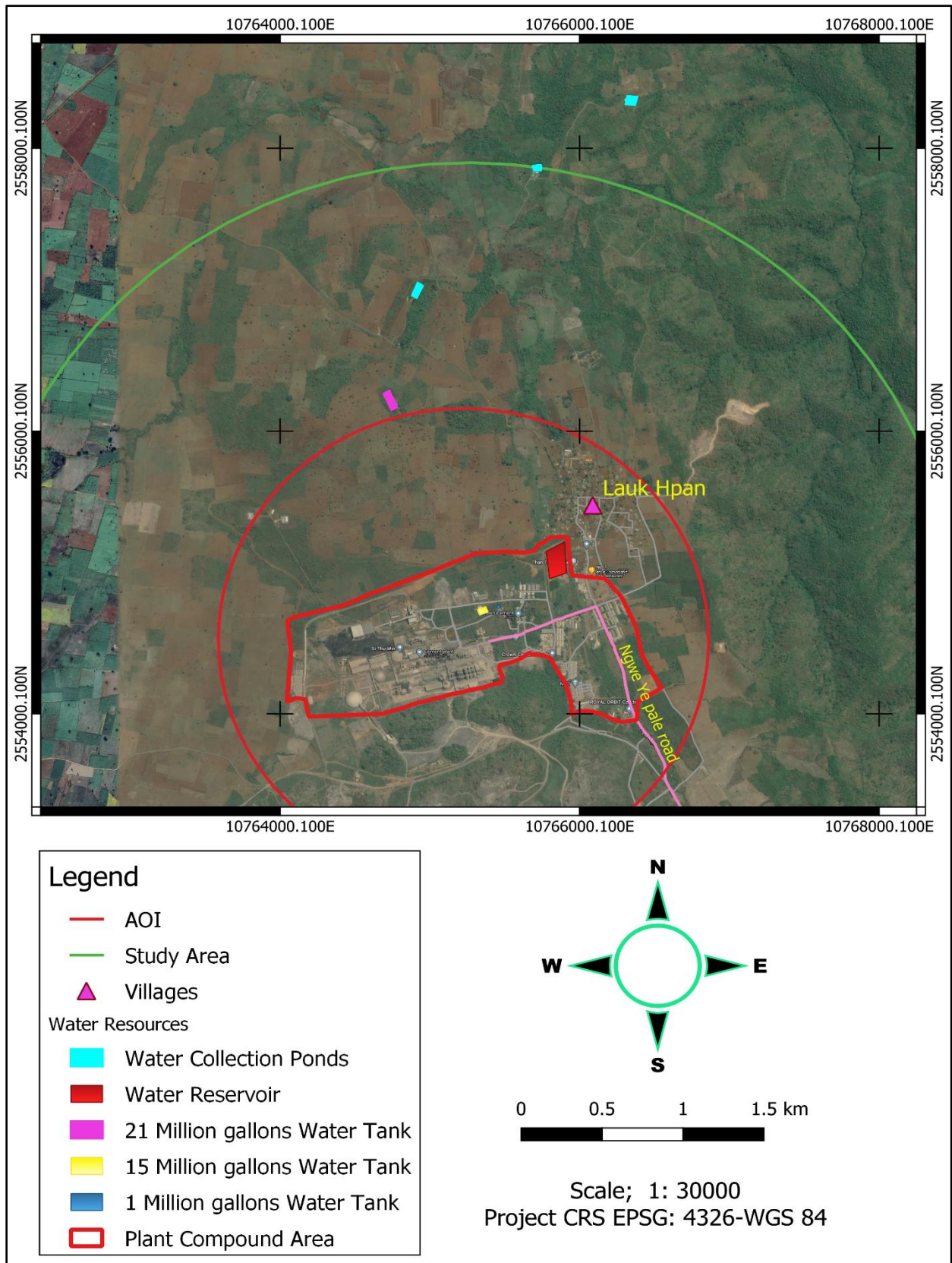


Figure 3-26 Location of Water Resources

### 3.9.3 Chemical Usage

Chemicals will be mainly used in cement quality testing and water treatment plant of boiler water. All of chemicals are imported or purchased from local market and kept them on shelves in a designated separate store. The type and consumption of chemicals is described in **Table 3.20** and **Table 3.21**.

Table 3-20 List of Chemicals used in Cement Testing

No.	Chemical Name	Type of Chemical	Purpose of Usage	Consumption / month
1	HCL	Hydrochloric acid	Cleaning and disinfects	200 g
2	EDTA	Ethylenediaminetetraacetic acid	Management and treatment of heavy metal toxicity	10 L
3	Ethanol	Ethynol	To prevent skin infection	8 L
4	Ethylene Glycol	Polyethylene glycol	Antifreeze in automobile cooling systems and in the manufacture of human-made fibres, low freezing explosives, and brake fluid.	10 L
5	Ammonia Solution	Ammonia	Wastewater treatment, Leather, rubber, papper, food and beverage industries	

Table 3-21 List of Chemicals used in Water Treatment Plant

No.	Chemical Name	Type of Chemical	Purpose of Usage	Consumption / month
1	A dianionic polyelectrolyte	Antiscalant	Corrosion inhibition effect on carbon steel	3 Ton
2	Quaternary ammonium compounds	Non oxidizing Bactericide and algaecide	Inhibit growth of bacteria and algae	1.5 Ton
3	Potassium permanganate and hydrogen peroxide	Oxidizing agent	Kill microorganisms	0.5 Ton
4	H <sub>2</sub> SO <sub>4</sub>	Sulphuric acid	PH adjustment, dissolve minerals, salts and organic waste in water	0.8 Ton
5	Hydrogen chloride (HCl)	Hydrochloric acid	PH adjustment and ion-exchange resins	200 Kg

			regeneration	
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### **3.10 Man Power**

The current assigned staff and workers for this factory are about 1203 persons. Working time is 8 hours a day and 48 hours per week. Accommodations are provided for all workers. The number of people assigned in Crown Cement Factory is as follows **Table 3.22**.

Table 3-22 Human Resources

Sr. No.	Designation	Number of people
1	Factory Manager	1
2	Deputy Factory Manager	2
3	Chief of Department	2
4	Head of Department	10
5	Deputy Head of Department	14
6	Head of Division	40
7	Head of subdivision	14
8	Secondary Head of subdivision	46
9	Class 2 workers	102
10	Class 3 workers	126
11	Class 4 workers	274
12	Class 5 workers	426
13	translator	11
14	Chef	5
15	Operator	110
16	Casual	2
<b>Total</b>		<b>1203</b>



### 3.11 Emission, Discharge and Waste Management

There are three forms of waste material in CROWN Cement Plant such as

- Air Emission
- solid waste and
- waste water

#### 3.11.1 Air Emission

Air pollutant emitted from **Crown Cement Plant** are summarized as

- Dust and particulate matter by transportation and processing of raw materials and packing products
- GHG Emission by coal burning, fuel combustion (especially diesel usage) and kiln production.

#### GHG Emission from Diesel Combustion

In **Crown Cement Plant**, Diesel will be used for transportation vehicles and stand-by generator. The diesel consumption is 70,000 gal (156,800 Liter)/day with specific gravity of diesel 0.9. The primary GHG emitted from the combustion of diesel fuel is carbon dioxide (CO<sub>2</sub>), although there can be other emissions such as methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), which are considered more potent but usually occur in smaller quantities. The GHG emission (CO<sub>2</sub>) will be calculated as per formula;

$$\text{Emissions GHG, fuel} = \text{Fuel Consumption fuel} \times \text{Emission Factor GHG, fuel}$$

Emissions GHG, fuel = emissions of a given GHG by type of fuel (kg GHG)

Fuel Consumption fuel = amount of fuel combusted (TJ)

Emission Factor GHG, fuel = default emission factor of a given GHG by type of fuel (kg gas/TJ)

Using unit conversion factors of 1 kg = 10<sup>-3</sup> tonne = 10<sup>-6</sup> Gg, and the IPCC default net calorific value for gas/diesel oil of 43.33 TJ/Gg, fuel consumption (in terms of energy) can be calculated as follows:

$$\begin{aligned} \text{Fuel Consumption Diesel} &= \text{Diesel Use (L/day)} \times \text{Diesel Density (0.9 kg/L)} \times 10^{-6} \\ &\quad \text{Gg/kg} \times 43.33 \text{ (TJ/Gg)} \end{aligned}$$

$$= 156,800 \text{ (L/day)} \times 0.9 \text{ kg/L} \times 10^{-6} \text{ Gg/kg} \times 43.33 \text{ (TJ/Gg)}$$

$$= 6.12 \text{ TJ/day}$$

Emission Factor CO<sub>2</sub>, Diesel = 74,346.6 kg CO<sub>2</sub> eq/TJ (IPCC 2006)

Emissions CO<sub>2</sub>, Diesel (kg) = 6.12 TJ/day x 74,346.6 kg CO<sub>2</sub> eq/TJ

$$= 455,000 \text{ kg CO}_2/\text{day}$$

$$= 455 \text{ tonnes CO}_2/\text{day}$$

### GHG Emission from Coal Burning

In **Crown Cement Plant**, Coal will be used as the fuel in Coal Power Plant and for the generation of heat in Clinker Section. daily consumptions of coal are approximately 3000 ton per day.

Emission factor CO<sub>2</sub>, Stationary Coal Combustion = **1676 kg CO<sub>2</sub>/short ton<sup>1</sup>**  
= **1847 kg CO<sub>2</sub>/metric ton**

(1 metric ton = 1.1023 short)

Emission CO<sub>2</sub> = Coal Consumption x CO<sub>2</sub> Emission factor, Coal  
= 1,250 metric ton/day x 1847 kg CO<sub>2</sub>/metric ton  
= **2,308,750** kg CO<sub>2</sub>/day  
= 2,309 ton CO<sub>2</sub>/day

### GHG Emission from Clink Production

#### *Estimation of GHG Gas Emission*

Estimating emissions generally involves two emission factors:

- an emission factor for clinker production and
- an emission factor for Cement Kiln Dust (CKD) production.

#### *Clinker emission factor*

The clinker emission factor is the product of the fraction of lime in the clinker multiplied by the ratio of the mass of CO<sub>2</sub> released per unit of lime. This is illustrated below:

#### **EQUATION 1**

$EF_{\text{clinker}} = \text{fraction CaO} \bullet (44.01 \text{ g/mole CO}_2 / 56.08 \text{ g/mole CaO})$

Or

#### **EQUATION 2**

$EF_{\text{clinker}} = \text{fraction CaO} \bullet 0.785$

The multiplication factor (0.785) is the molecular weight ratio of CO<sub>2</sub> to CaO in the raw material mineral calcite (CaCO<sub>3</sub>), from which most or all of the CaO in clinker is derived. CaO content can show variations by country of origin and facility.

<sup>1</sup> (Source: IPCC, 4<sup>th</sup> Assessment Report)



The IPCC Guidelines recommends two possible methods for calculating the emission factor.

The **Tier 1 method** uses the IPCC default value for the fraction of lime in clinker, which is 64.6 percent.

This results in an **emission factor of 0.507 tons of CO<sub>2</sub>/ton of clinker**, as illustrated below:

**EQUATION 3**

$$EF_{\text{clinker}} = 0.646 \bullet 0.785 = 0.507$$

The **Tier 2 method** is to calculate the average lime concentration in clinker by collecting data on clinker production and lime fraction by type. The difference between the default value and a value based on collected data is expected to be small.

So, CO<sub>2</sub> emission of clinker production as the calculation;

$$\begin{aligned} \text{Emission CO}_2 \text{ ton} &= 0.507 \times \text{ton of clinker (limestone)} \\ &= 0.507 \times 5000 \text{ ton/day (for 5000 Cement Production)} \\ &= 2535 \text{ ton/day} \end{aligned}$$

Total GHG Emission (CO<sub>2</sub>) from fuel usage is described in **Table 3.23**.

Table 3-23 Total GHG Emission (CO<sub>2</sub>) from fuel usage

Emission	GHG Emission, CO <sub>2</sub> (ton/day)			Total GHG Emission, CO <sub>2</sub> (ton/day)
	Diesel	Coal	Clink Production	
GHG Emission, CO <sub>2</sub>	455	2,309	2535	<b>5299</b>

**General Control Measures**

The complex would prevent fugitive emission from all active operation and storage piles, such that the emissions are not visible in the atmosphere beyond the boundary line of the emission source.

Apart from the specific control measures provided for some specific sections/areas, for all other fugitive dust emitting areas, following general control measures will be provided.

- The complex will conduct active operations by utilizing the applicable best available control measures to minimize the fugitive dust emission from each fugitive dust source type within active operation.

- Except for gypsum and clinker, all storage piles would be kept in moist condition by spraying water at regular intervals for controlling fugitive emission, wherever possible.
- The operation of the pay loaders will be slowed down whenever the average wind speed is high exceeding 50 km/h, which may cause fugitive emission.
- All storage silos will be vented to bag filters, which would have proper bag cleaning arrangement so as to avoid choking of filter bags, thereby to avoid pressurization of silos.

Regular inspection at a pre-determined frequency will be carried out of all fugitive dust control system and records be maintained of such inspection and corrective action taken if any.

#### ***Monitoring the Vapor Emitted from Cement Plant Site***

CROWN Cement Plant will not be monitored with guideline parameters of vapor emitted from cement plant [i.e., Cement and Lime manufacturing, Section 2.3.6.1 of NEQ(E)G]. because there were no laboratories and equipment to measure these parameters in Myanmar at current situation. So, we recognized that the parameters of vapor emitted from cement plant will be monitored in future.

#### ***Management of dust emission from the cement production process and coal power plant***

CROWN Cement Plant will control dust emission from the cement production process by installing dust control bag filter and electrostatic precipitator. In the cement plant, there will be installed one hundred and seventeen (113) bag fillers and four (4) are electrostatic precipitators. The installed bag filters and electrostatic precipitator's lists are described in **Table 3.24 and 3.25**.

**Table 3-24 Bag Filters and Electrostatic precipitator List for 1000 TPD Cement Plant**

No;	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Limestone Crushing System	Main Crusher	1	JPF 17*8*4-00	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Belt Conveyor	2	HMC 48 A	< 50 mg/Nm <sup>3</sup>	Bag Filter
2	Limestone Preblending System	Blending Inlet	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
3	Sand & Iron Crushing System	Belt Conveyor	2	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
4	Raw Material Proportioning Station	Corrective Silo Top	4	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Corrective Silo Side	1	JPF 4/8/4	< 30 mg/Nm <sup>3</sup>	Bag Filter
5	Raw Material Grinding System	Kiln Tail Dust Collector	1	WDJ 150-3	< 50 mg/Nm <sup>3</sup>	Electrostatic Precipitator
6	Homogenization System	Homo Silo up	1	JPF 4/8/3	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Homo Silo Bottom	1	JPF 4/8/5	< 30 mg/Nm <sup>3</sup>	Bag Filter
7	Kiln Hood System	Kiln Head Dust Collector	1	WDJ 150-3	< 30 mg/Nm <sup>3</sup>	Electrostatic Precipitator
		Clinker Conveyor	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
8	Clinker Storing System	Clinker Silo up	1	JPF 4/8/5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Unburn Silo up	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
9	Coal Crushing System	Crusher	2	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
10	Coal Grinding System	Coal Mill	1	JPF 16/8/2*7	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Fine Coal Hopper	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
11	Gypsum Crushing System	Crusher & Belt Conveyor	2	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
12	Cement Proportioning Station	Gypsum Silo up	3	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Gypsum Silo up	1	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Silo Side	2	JPF 4/8/4	< 30 mg/Nm <sup>3</sup>	Bag Filter
13	Cement Grinding System	Roller Press	2	PPC 96-7	< 50 mg/Nm <sup>3</sup>	Bag Filter
		Cement Mill	2	JPF 12/8/7	< 30 mg/Nm <sup>3</sup>	Bag Filter
14	Cement Storing System	Cement Silo Top	3	JPF 4/8/6	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Cement Silo Side	3	HMC 84 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
15	Cement Packing System	Main Packer	3	JPF 12/8/4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Total	43			

**Table 3-25 Bag Filters and Electrostatic precipitator List for 4000 TPD Cement Plant**

No;	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Limestone Crushing System	Main Crusher	1	LFGM 96-6	< 30 mg/Nm <sup>3</sup>	Bag Filter
2	Limestone Preblending System	Limestone Preblending Inlet	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Limestone Preblending Outlet	1	LPM 5A-150	< 30 mg/Nm <sup>3</sup>	Bag Filter
3	Clay & Iron Ore Crusheing System	Sandstone Crusher	1	PPW 32-6	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Belt Conveyor	3	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
4	Raw Material Propotioning Station	Corrective Silo Top	4	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Corrective Silo Side	1	LPM 5A-150	< 30 mg/Nm <sup>3</sup>	Bag Filter
5	Raw Material Grinding System	Kiln Tail Dust Collector	1	2*28/15/4*9/0.45	< 30 mg/Nm <sup>3</sup>	Electrostatic Precipitator
		Air Slide & Drag Chan Conveyor	1	LPM 5A-150	< 30 mg/Nm <sup>3</sup>	Bag Filter
6	Homogenization System	Silo up	1	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Silo Bottom	1	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
7	Kiln Hood System	Kiln Head Dust Collector	1	WDJ 216 32/15/3 *8/0.45	< 50 mg/Nm <sup>3</sup>	Electrostatic Precipitator
8	Clinker Storing System	Clinker Silo up (A)	1	PPCS 96-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Silo up (B)	1	PPCS 96-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Unburn Silo up	1	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Silo Side	3	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Conveyor	1	PPW 32-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Line 1&2 Belt Conveyor Support	1	PPCS 32-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Line 1&2 Belt Conveyor Support	1	JPF 4/8/4	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Silo (A) Outlet	1	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Silo (A) Outlet	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Clinker Silo (B) Outlet	2	PPW 32-6	< 30 mg/Nm <sup>3</sup>	Bag Filter
9	Coal Crushing System	Coal Crusher	1	PPW 32-4 (M)	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Belt Conveyor	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
10	Coal Preblending System	Coal PreBlendig Inlet	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Coal PreBlendig Outlet	1	LPM 5A-150	< 30 mg/Nm <sup>3</sup>	Bag Filter
11	Coal Grinding System	Coal Mill	1	PP 128-2*16 (M)	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Fine Coal Hopper	1	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Fine Coal Hopper	1	HMC 80	< 30 mg/Nm <sup>3</sup>	Bag Filter
12	Gypsum Crushing System	Crusher	1	LFGM 96-6 (*)	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Belt Conveyor	1	JPF 32-6	< 30 mg/Nm <sup>3</sup>	Bag Filter
13	Cement Proportioning Station(for Mill 3 &4)	Gypsum Silo up	4	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Gypsum Silo Side	2	PPCS 32-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
14	Cement Proportioning Station(for Mill 5)	Gypsum Silo up	3	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Gypsum Silo Side	1	PPCS 32-4	< 30 mg/Nm <sup>3</sup>	Bag Filter
15	Cement Grinding System (Cement Mill 3 , 4 & 5)	Cement Mill(Main Dust Collector)	3	JPF 128-2*8	< 50 mg/Nm <sup>3</sup>	Bag Filter
		Mill Air Flow Dust Collector	3	JPF 96-7	< 30 mg/Nm <sup>3</sup>	Bag Filter
16	Cement Storing System	Cement Silo Top	9	PPW 32-5	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Cement Silo Elevator Side	3	HMC 80	< 30 mg/Nm <sup>3</sup>	Bag Filter
17	Cement Packing System	Main Packer	4	JPF 12/8/4-00	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Car Boxer	2	HMC 112 A	< 30 mg/Nm <sup>3</sup>	Bag Filter
		Ton Bag Mechine	1	HMC 80	< 30 mg/Nm <sup>3</sup>	Bag Filter
		<b>Total</b>	<b>74</b>			





Figure 3-27 Photos of EP Dust Controller and Bag Filters

### **3.11.2 Effluents**

#### ***Process waste water***

The cement production process of Crown Cement Plant is dry process so that water will not be required in this cement production process. But water will be used for cooling system of the clinker cooler and boiler water, dust suppression and domestic uses. In cooling system of cement plant, water is circulated from cooler to cooling tower and but there is small amount of blowdown water released from the cooling tower will be discharged to the waste water pond through the plant’s drainage line.

In the Coal Power Plant, water will be mainly used for boiler. Boiler water will be treated with the water treatment plant by using the various chemicals and waste water of this treatment plant will be discharged to the waste water pond through the plant’s drainage line. In addition, water will be sprayed over raw materials to control dust suppression where there is no waste water comes out.

#### ***Sanitary Wastewater***

The worker accommodation and office will generate sewage accumulated from toilet facilities, as well as greywater from showers and kitchen. a sewage treatment system will be installed, consisting of a septic system. Domestic waste water (i.e. from washing, bathing) from worker’s accommodation and office will be generated about 10,000 gallons/day (i.e. waste water is generated estimate 60 gallons per day for one person and 720,000 gallons per 1200 workers) and will be discharged to the waste water pond through the drainage line.

#### ***Site Stormwater Runoff***

Stormwater will solute cement dust from plant site and leak raw material for the yard. Stormwater will be handled through drainage systems. Stormwater falling in unpaved areas will not be collected (as there’s no risk of oil contamination). Stormwater falling on concrete areas and raw material storage yard will be collected with the drainage lines. Any contaminated runoff (i.e., oil from machines and maintenance places) will pass through oil traps where oil will be captured before the runoff is drained into the drainage lines. All stormwater that enters the drainage line is released into waste water pond.

#### **Drainage System**

All waste water will be collected with the drainage line and discharged to the waste water pond with a capacity of 40,000 gallons. If any discharge form that pond is required, all effluent will be treated in accordance with NEQEG.





Figure 3-28 Drainage System of the Cement Factory



Figure 3-29 Wastewater Pond

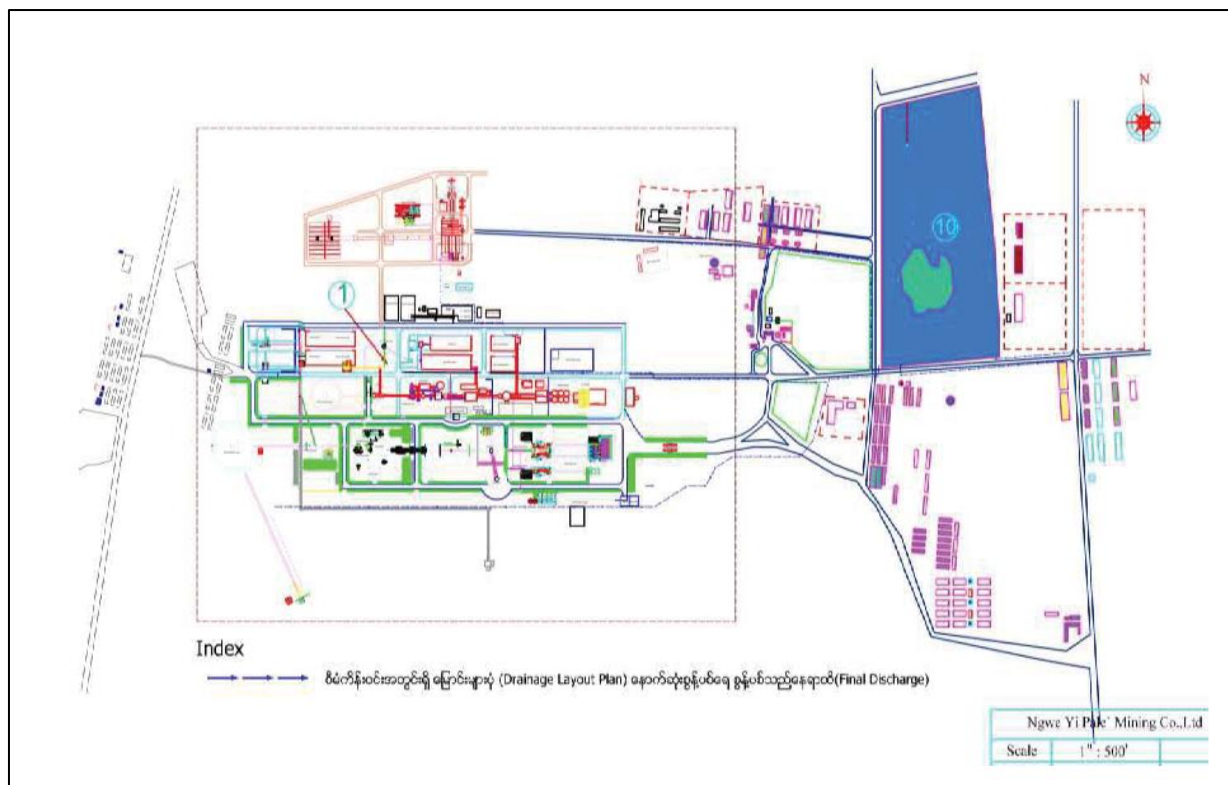


Figure 3-30 Layout plan of Drainage System

### 3.11.3 Solid Waste

Solid wastes from the Plant will be classified, segregated, and disposed of according to various solid waste categories. Various waste management/disposal methods will be implemented for each type of solid waste produced by the plant throughout the life of the plant.

Solid wastes generated from the plant are summarized as in **Table 3.26**.

Table 3-26 Solid wastes generated from the project

Waste type	Waste name	Weight (Estimated)	Waste Management/ Disposal Method
Process Wastes	<ul style="list-style-type: none"> <li>Suspended particulate matter and stone pieces from raw materials of cement manufacturing process</li> </ul>	5 Ton/yr	Recycle Suspended particulate matter and stone pieces in Cement Manufacturing Process
	<ul style="list-style-type: none"> <li>Coal Ash</li> </ul>	80 Ton/day	Reused Coal Ash in cement manufacturing process and brick manufacturing (see section 7.8.4; Coal Ash Utilization)

Domestic Wastes	<ul style="list-style-type: none"> <li>▪ Food scraps</li> <li>▪ Kitchen waste</li> <li>▪ Bottles, cans</li> <li>▪ Uncontaminated fabric or clothing</li> <li>▪ Packaging, paper</li> </ul>	30 Tons/yr	<ul style="list-style-type: none"> <li>▪ Some Recycle or reusable solid wastes will be sold to the recycling shop for further use, as appropriate or dispose to waste disposal site of plant.</li> <li>▪ Food waste shall be handed over to local villagers for livestock feeding if there is a demand. If no demand, this waste shall be disposed to waste disposal site of plant.</li> </ul>
Sewage	Sludge	1.5 Ton/yr	Use in Plantation as the fertilizer after mixing with soil
Maintenance Wastes	<ul style="list-style-type: none"> <li>▪ Iron, Scrap Metal, Used vehicle tyres, ruined machine parts and vehicle parts (damage),</li> <li>▪ Used welding electrodes etc. rubber gasket material</li> </ul>	7 Ton/yr	<ul style="list-style-type: none"> <li>▪ All reusable maintenance wastes will be sold to the recycling shop for further use, as appropriate.</li> <li>▪ Rest of waste with contaminated oil disposed to the plant disposal site or will be transferred to waste disposal site of Hopone City Development Committee.</li> </ul>
Hazardous Wastes	<ul style="list-style-type: none"> <li>▪ Used lubricating oil</li> <li>▪ Used hydraulic oil</li> <li>▪ Filters contaminated with oil</li> <li>▪ Drums and containers used for oil</li> <li>▪ Rags, paper, gloves, plastics and other materials contaminated with oil</li> <li>▪ bulb, fluorescence tube, LED bulb,</li> <li>▪ Used batteries</li> <li>▪ Medical Waste</li> </ul>	10 Tons/yr	Hazardous Waste Management (Section 7.7.3 Waste Management Plan)





Figure 3-31 Disposal Area for Solid waste

#### **3.11.4 Noise Levels**

The noise generation from the plant can be broadly categorized into two types viz. Area and Point sources. All the equipment is designed to meet Environmental Quality Standard for noise levels. It is environmentally friendly practice that loud sound equipment will be installed in specially designed sound proof buildings. All equipment to be employed for the proposed plant will be designed to operate with low noise levels and will not exceed the maximum allowable noise level for the surrounding receiving land use. Secondly, as the nearest residence is at a safe distance from proposed project site so no disturbance to community is envisaged.

## **3.12 Project Alternatives**

### **3.12.1 Consideration of Alternatives**

An analysis of alternative for this project is to determine the best method of achieving project objectives while minimizing environmental and social impacts. The analysis brings environmental and social considerations, providing the main opportunity to avoid and, if avoidance is not possible, minimize adverse environmental impacts and risks. Acceptance or rejection of a project alternative depends on a variety of factors. Analysis of each alternative is as follows.

### **3.12.2 Site Alternative**

Following are some of the parameters that favor cement plant establishment in the proposed site:

- The project operation doesn't involve human settlements displacement or relocation.
- The site already meets the necessary requirements for factory establishment;
- Cement production in the proposed site has provided job opportunities to local people and improved their socio-economic status.
- The transportation from plant to market road is easily available.
- No important religious, archaeological, recreational site, ecologically sensitive, declared protected area and human settlements exists within close vicinity of the selected site i.e., within 100 m which is considered to be a safe distance.

Considering the facts mentioned above that proposed site is already existence, at a safe distance from sensitive receptors, and creates job opportunities to local people. Therefore, given site is the most suitable.

### **3.12.3 Technology Alternative**

The production of cement includes crushing and grinding of raw materials; calcining the materials in a rotary kiln; cooling the resulting clinker; mixing the clinker with gypsum; and milling, storing and bagging the finished cement. Depending upon whether the mixing and grinding of raw materials is done in wet or dry condition, the mixing procedure of the manufacture of cement is done in two ways; wet process and dry process.

The primary difference between the dry process and the wet process of cement production is the way in which the raw materials are mixed and prepared before being burned in the kiln.

In the dry process, raw materials are ground and dried to a fine powder, which is then fed into the kiln in a dry state. In the wet process, raw materials are crushed and mixed with water to form slurry, which is then fed into the kiln in a liquid state.

One of the primary environmental issues associated with the dry process is the emission of dust and particulate matter, which can be a major source of air pollution. In contrast, the wet process generates large amounts of wastewater, which can contain high levels of pollutants such as heavy metals, and can also lead to groundwater contamination if not managed properly.

In terms of production cost, the dry process is generally considered to be more energy-efficient, as it requires less fuel to dry the raw materials before they are fed into the kiln. However, the wet process may be more cost-effective in areas where water is abundant and cheap, as the cost of drying the raw materials can be significant.

The output of both processes is similar in terms of the final product, which is Portland cement. Dry process is widely used to produce cement nowadays. It is more economical method since total consumption of coal in this process is only 100 kg against 350 kg in wet process. This is the major reason why wet cement processing plant is replacing by dry cement processing plants.

As regards technology alternative, Crown Cement Factory prefers “dry process” to “wet process” because of the following favors as shown in **Table 3.27**.

Table 3-27 Comparison of Dry Process and Wet Process of Cement Manufacture

<b>Dry Process</b>	<b>Wet Process</b>
Mixing of raw material in dry state in blenders.	Mixing of Raw materials in wash mill with 35 to 50% water.
The dry materials exiting the mill are called “kiln feed”.	Materials exiting the mill are called “slurry” and have flowability characteristics.
Fuel consumption is low i.e., 100 kg of coal per ton of cement produced.	Fuel consumption is high i.e., 350 kg of coal per ton of cement produced.
Size of the kiln needed for manufacturing of cement is smaller.	Size of the kiln needed for manufacturing of cement is bigger.
Difficult to control mixing of Raw materials, so it is difficult to obtain a better homogeneous material.	Raw material can be mixed easily, so a better homogeneous material can be obtained.
Lesser time of process.	Higher time of process.
Physical state is raw mix (solid).	Physical state is slurry (liquid).
Process time is less.	Process time is high.
Physical state is raw mix (solid).	Physical state is raw slurry (liquid).
Cost of production is less.	Cost of production is high.
Capital cost is high due to blenders.	Capital cost (Cost of establishment) is comparatively less.
Liquid waste may not be discharged to the environment.	Liquid waste may be discharged to the environment.



#### **3.12.4 The “No project” Alternative**

This option means that the project will not be undertaken. This implies that the proposed Cement Manufacturing plant establishment will not be undertaken. This implies that all possible rising of standards for safety, health and environment will not be affected. This option was not considered viable because:

- The alternative of not implementing the Project is not applicable because the project is an ongoing concern.
- Loss of direct employment and training opportunities for local people employed by the mine and cement plant;
- Loss of revenue by the regional government and central governments.

## 4.0 DESCRIPTION OF THE SURROUNDING ENVIRONMENT

### 4.1 Introduction

This section covers the surrounding environmental, social baseline describes the physical, biological and socio-economic resources which could be affected by Project activities.

The discussion of the baseline has been limited to the factors that could have a direct impact on the Project or be impacted by the Project. The baseline data presented in this EIA Report are generally those required to fully understand potentially significant Project impacts.

#### 4.1.1 Setting the Study Limit

The “Study Area” refers to the area considered to adequately understand and describe the baseline conditions likely to be affected by the Project. This is a typical study area based on examination of the project activities and their potential impact extent. The Study Area includes consideration for the environmental, social and health interactions associated with the project, and also consider downstream impacts, normally associated with aquatic discharges and air emissions. The study area is a reasonable distance from the project so that the potential impact can contribute to the surrounding.

For this Project, an overall Study Area boundary has been defined as a 3 km radius of the plantation area. However, it is noted that Study Areas for certain resources/receptors may vary depending on the nature of the resource/receptor, the change caused by the Project activities and the type of effect being considered.

The Crown Cement Factory is located Lauk Hpan Village, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, and Northern Shan State, Myanmar. A map of the overall Study Area including plantation area is shown in **Figure 4.1**.

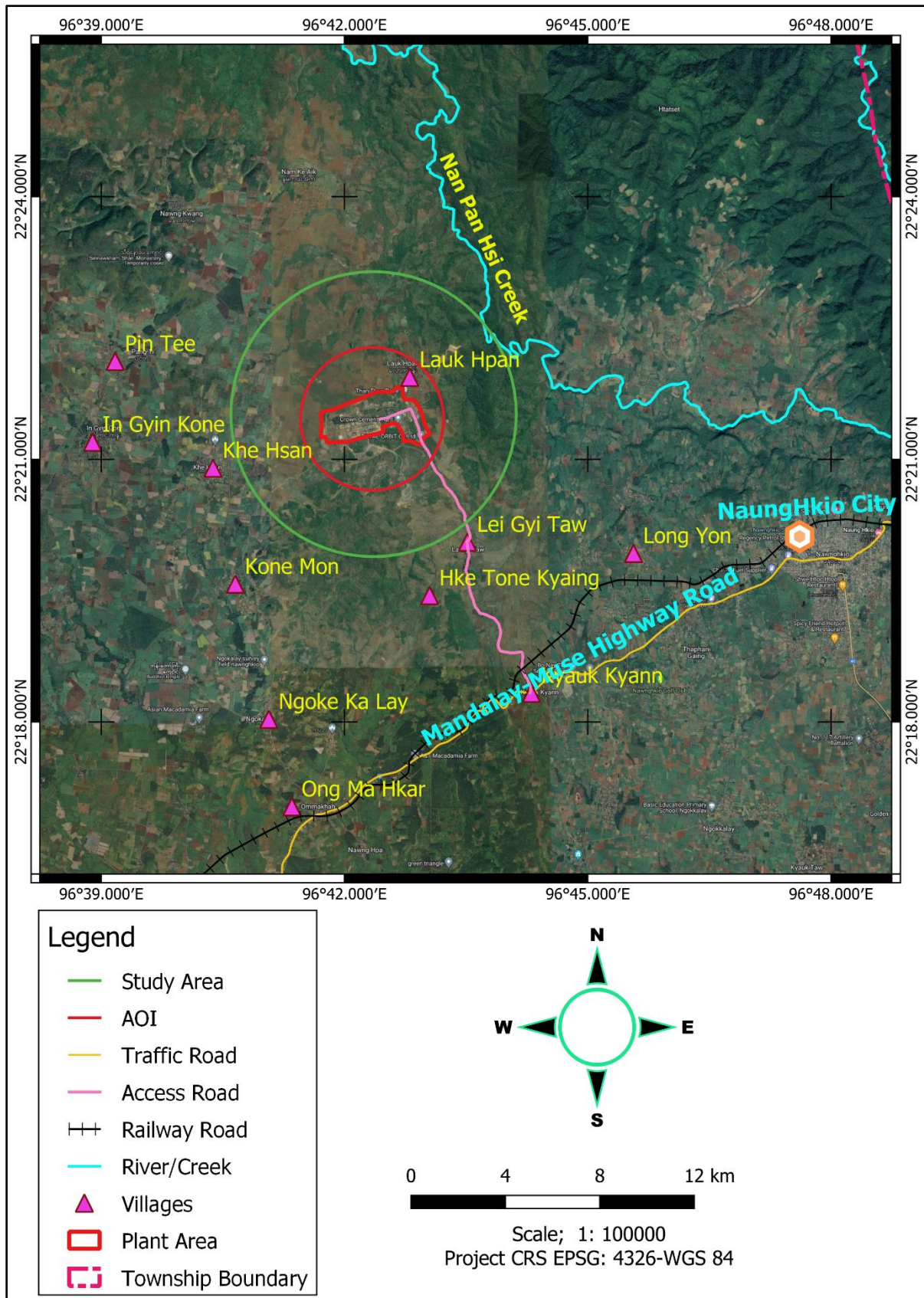


Figure 4-1 Map of Overall Study Area

## **4.1.2 Methodology for Data Collection**

Information on environmental and social baseline conditions in this report are based primarily on a desktop review of existing information on the natural environment through the following sources:

### **4.1.2.1 Secondary Data Collection**

- Existing reports and studies;
- Government/ authority data;
- Internet research; and
- Collation of in-house existing data archives.

### **4.1.2.2 Primary Data Collection**

Primary data pertaining to the existing conditions of the Project Study Area was collected during a number of baseline sampling surveys, as follows:

- Ambient Air quality – monitoring of air quality was conducted at four (4) locations around the project area. The monitoring was recorded continuously for 24 hours per station during 11<sup>th</sup> to 14<sup>th</sup> July 2023; and emission level were also monitored in one (1) location and others were from the continuous monitoring by the plant.
- Noise level and vibration – monitoring of ambient noise level and vibration was conducted at five (5) locations of project affected area and also in parallel to the air quality monitoring except one location at 11<sup>th</sup> to 14<sup>th</sup> October 2023.
- Surface water – Samples of surface water was collected at five (5) locations from water ponds located near the project site and two (2) samples of waste water within the project site at 12<sup>th</sup> to 15<sup>th</sup> October 2023;
- Soil – Individual grab soil samples were collected at locations throughout the hot spot within the Study Area. The totals of ten (10) samples was collected and analysis in lab of Landuse Division, Department of agriculture. A sample from a depth of 120 cm was collected at each location. All samples were collected at 8<sup>th</sup> July 2015; and
- Groundwater – groundwater sampling was conducted at four (4) locations from tube well located near the project site at 12<sup>th</sup> to 13<sup>th</sup> October 2023;

Further details of each data collection and results will be provided in individual sections.

## **4.2 Physical Resources**





### **4.2.1 Climate**

Temperatures are very warm throughout the year, although the winter months (December–February) are milder and nights can be quite cool. There is a winter dry season (December–March) and a summer wet season (April–November). It is commonly believed that the local weather is one of the nicest in the whole country. The Köppen-Geiger climate classification is Cwa (see **Figure 4.3**).



Naung Hkio gets monsoon climate with minimum temperature of 7.8°C and maximum of 32.3°C. Average number of raining days range from 73 to 105 days per year (from 2010 to 2013) and annual rain fall varies from 38.33 to 59.21 inches. Many small rivers and streams are running across the township throughout the year.

Table 4-1 Climate of Naung Hkio Township

Climate Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
 <b>Average Precipitation mm (in)</b>	5 (0)	5 (0)	7 (0)	51 (2)	166 (7)	217 (9)	230 (9)	303 (12)	281 (11)	200 (8)	76 (3)	11 (0)	1552 (61)
 <b>Average Max Temperature °C (°F)</b>	22 (71)	24 (75)	27 (81)	29 (84)	27 (80)	24 (76)	24 (75)	23 (74)	24 (76)	24 (75)	23 (73)	21 (69)	24 (76)
 <b>Average Temperature °C (°F)</b>	15 (58)	17 (62)	20 (68)	22 (72)	22 (71)	21 (70)	20 (69)	20 (68)	20 (69)	20 (68)	18 (64)	15 (58)	19 (66)
 <b>Average Min Temperature °C (°F)</b>	7 (45)	9 (48)	13 (55)	16 (60)	17 (63)	17 (63)	17 (63)	17 (63)	17 (62)	16 (61)	12 (54)	8 (47)	14 (57)

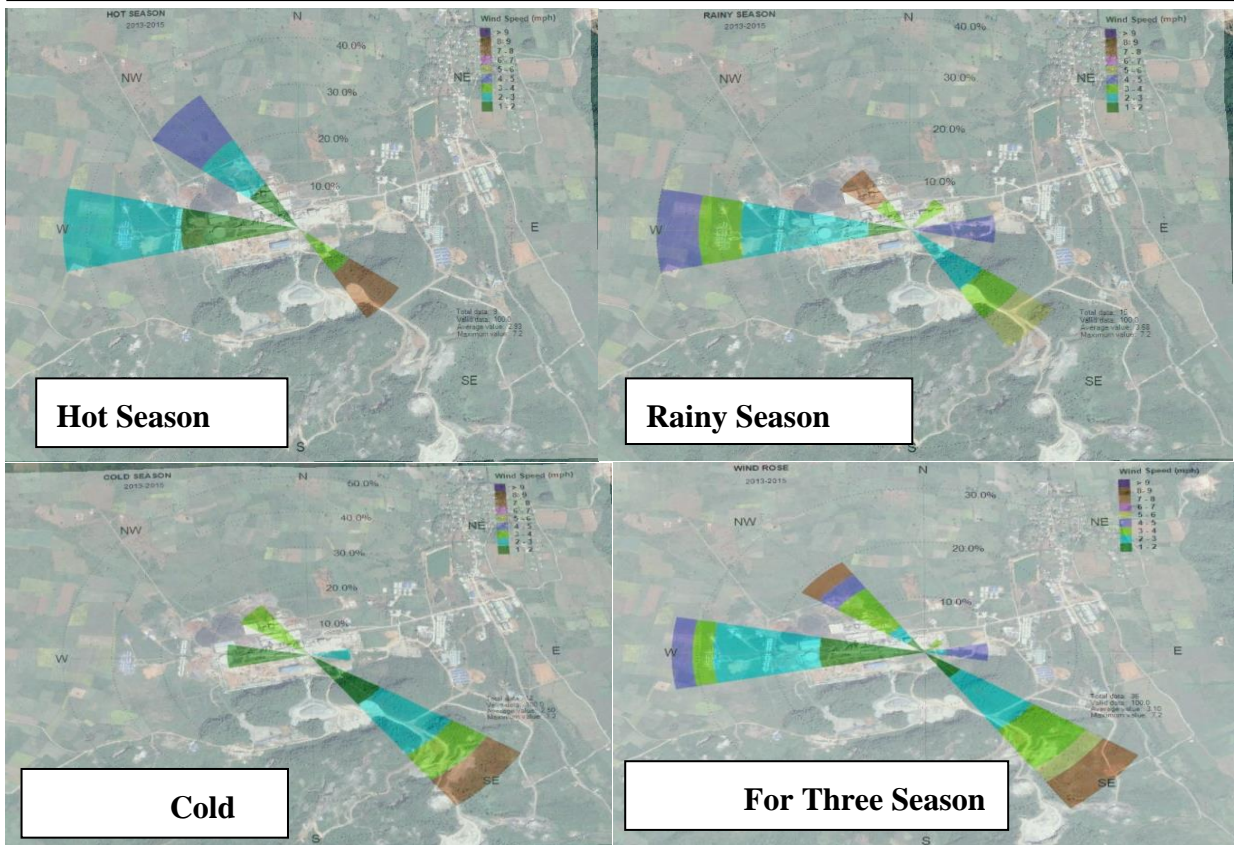


Figure 4-2 Wind Directions for Hot, Rainy and Cold Seasons and Three Seasons of Project Area

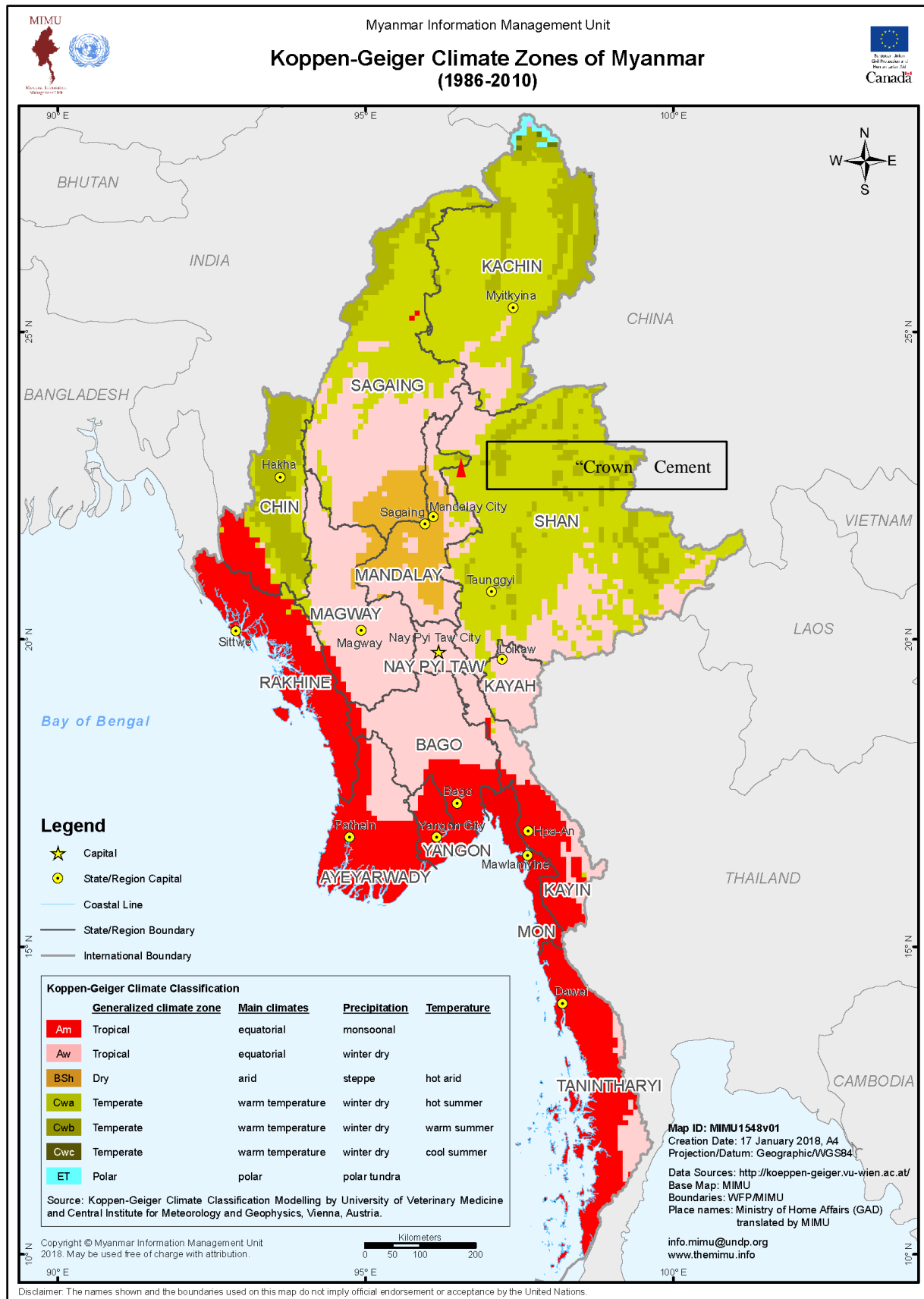


Figure 4-3 Koppen-Geiger Climate Zones of Myanmar with Reference to Project Area



#### 4.2.2 Topography

The project area is situated in the Naung Hkio Township, Northern Shan State. The topography of this region is represented by moderate hills, plain and valley. The elevation is 976 msl. Lauk Hpan village and limestone hills are located in the surrounding of the plant area. The topography of the region is shown in **Figure 4.4**.

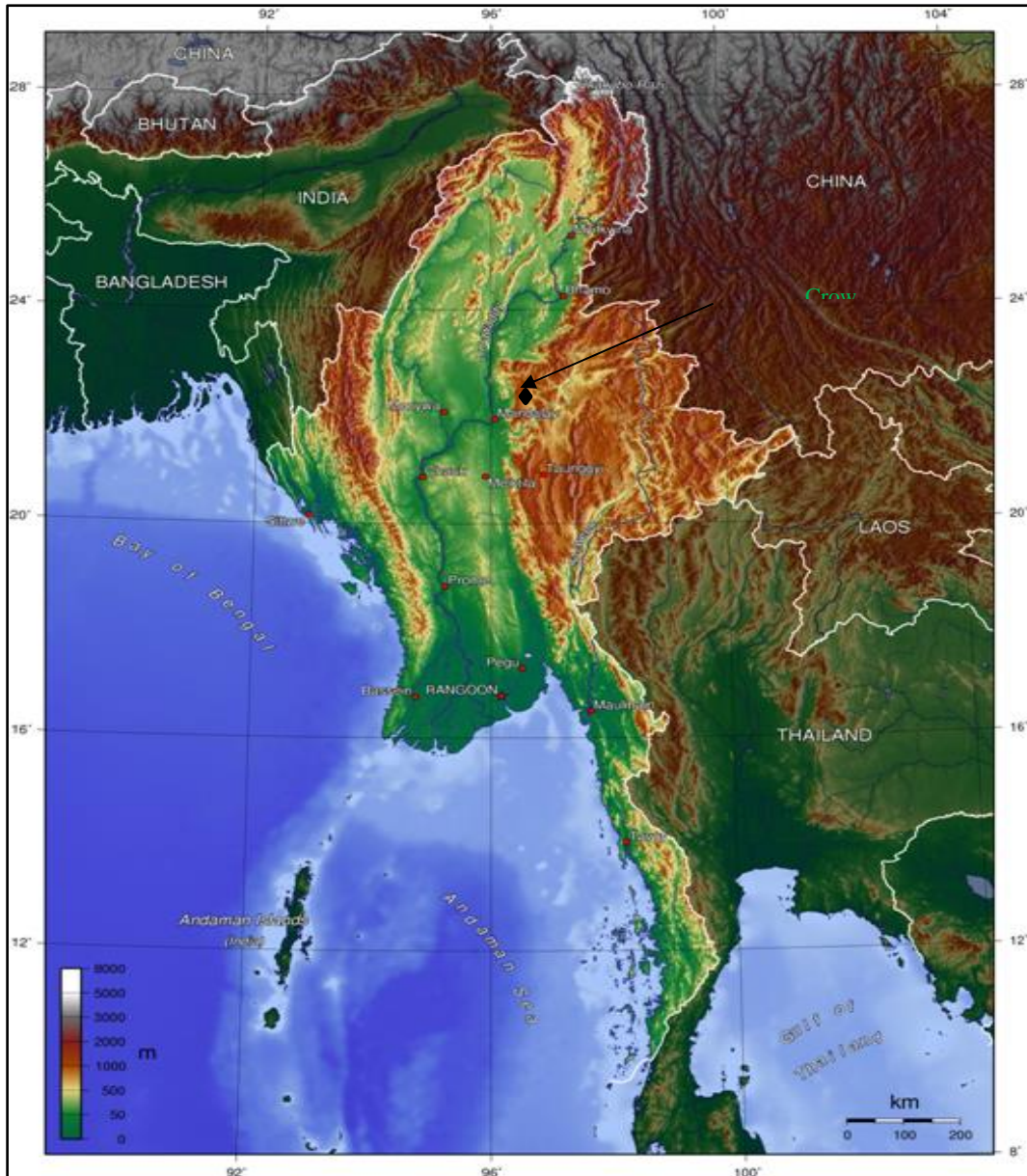


Figure 4-4 Topography of Project area

#### 4.2.3 Geology

Myanmar can be subdivided into six north-south trending tectonic domains: from west to east (a) the Arakan (Rakhine) Coastal Strip as an ensimatic fore deep; (b) the Indo-Buraman Ranges as an occur arc or core arc; (c) the Western Inner-Burma Tertiary Basin as an inter-arc basin, (d) the Central Volcanic Belt ( central volcanic line) as an inner

magmatic-volcanic arc; (e) the Eastern Inner-Burma Tertiary Basin as back-arc basin and (f) The Sino-Burma Ranges or Shan-Tenasserim Massif as an ensialic continental region. Rock types of project area are Paleozoic-Triassic (see **Figure 4.5**)

Myanmar's biggest earthquake, measuring 8.2 on the Richter scale, took place in 1912 along the Kyauk Kyan Fault in northern Shan State, another of the country's main faults (the first is the Sagaing Fault and the third is the Rakhine Fault). Kyauk Kyan fault is one of the prominent seismotectonic feature (Lat. 22° 18'N – Long. 96° 44'E). The large earthquake of 23 May 1912 (8.0 RM) with many foreshocks and aftershocks, seems to be associated with that fault. It runs nearly north–south direction. Kyauk Kyan fault is 800 kilometers long, stretching from Shan State to southern Kayah State.



## **4.2.4 Air Quality**

### **4.2.4.1 Overview**

Myanmar was ranked in a study conducted by World Health Organization (WHO), as a country with high levels of particulate matter. In the SIA survey, more than 90% of respondents reported the air quality they experienced as normal. Less than 10% (people in Lauk Hpan Village) revealed that they perceived bad odor from the burning of lime from existing cement factory.

### **4.2.4.2 Ambient Air Monitoring**

The air quality status with respect to the project area will form the base line information over which the predicted impacts due to the proposed plant can be superimposed to find out the net (Final) impacts on air environment. From the final impacts a viable Environmental Management Plan (EMP) can be prepared based on the impact statement for the air environment.

#### **Monitoring Methodology**

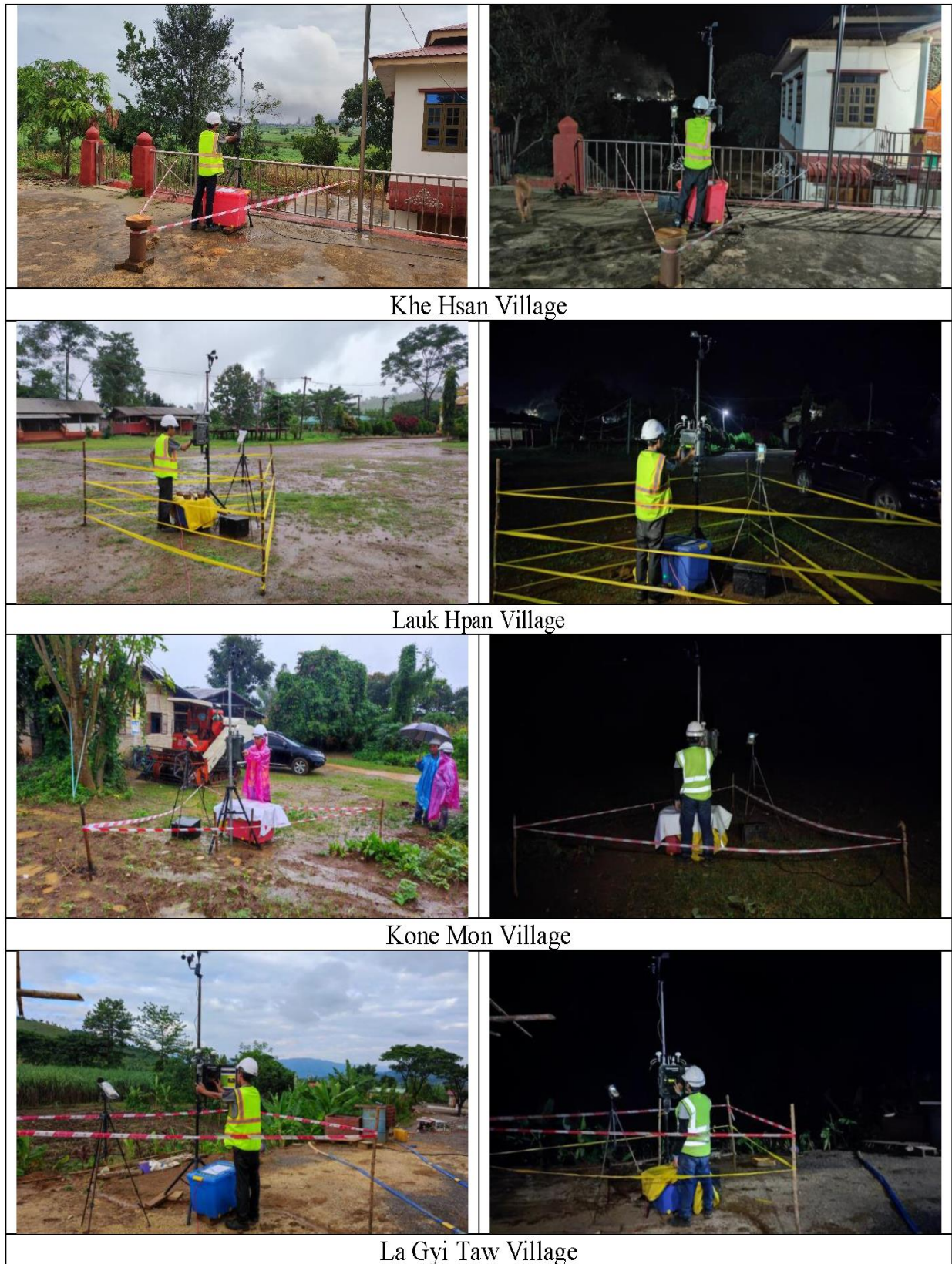
The targeted air quality parameters are Oxygen (O<sub>2</sub>), Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>), Sulfur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Particulate Matter (PM) and Total Volatile Organic Compound (TVOC).

KANE900 PLUS Combustion Analyzer, PHOTOVAC 2020 ComboPro™ Photoionization Detector and DUST TRAK™ 8532 AEROSOL MONITOR were used to measure existing ambient air quality (See **Figure 4.6**)



Figure 4-6 Equipment used for Survey the Air Quality





**Figure 4-7 Photos of Air, Noise and Vibration Monitoring  
Monitoring Location**

After reconnaissance of the project area and observing the topographical features and review of the available meteorological data and local conditions, the sampling sites were chosen which will be the representative of the project areas under study. Monitoring of ambient air quality was conducted at four (4) locations which were taken around the project site. The sampling points were selected based on their locations relative to key community receptors, as well as their current or potential for impairments. The monitoring was recorded continuously for 24 hours per station during 11<sup>th</sup> to 14<sup>th</sup> October 2023. The Ambient Air Quality monitoring locations are described in **Table 4.2** and geographical map as shown in **Figure 4.8**.

Table 4-2 Ambient Air Quality monitoring locations

Sample	Coordinate of Location		Description of Sampling Location
	Latitude	Longitude	
AMP-1	22°21'8.66"N	96°40'24.13"E	Khe Hsan Village
AMP-2	22°22'5.93"N	96°42'46.33"E	Lauk Hpan Village
AMP-3	22°19'32.54"N	96°40'43.24"E	Kone Mon Village
AMP-4	22°20'34.27"N	96°43'18.70"E	La Gyi Taw Village



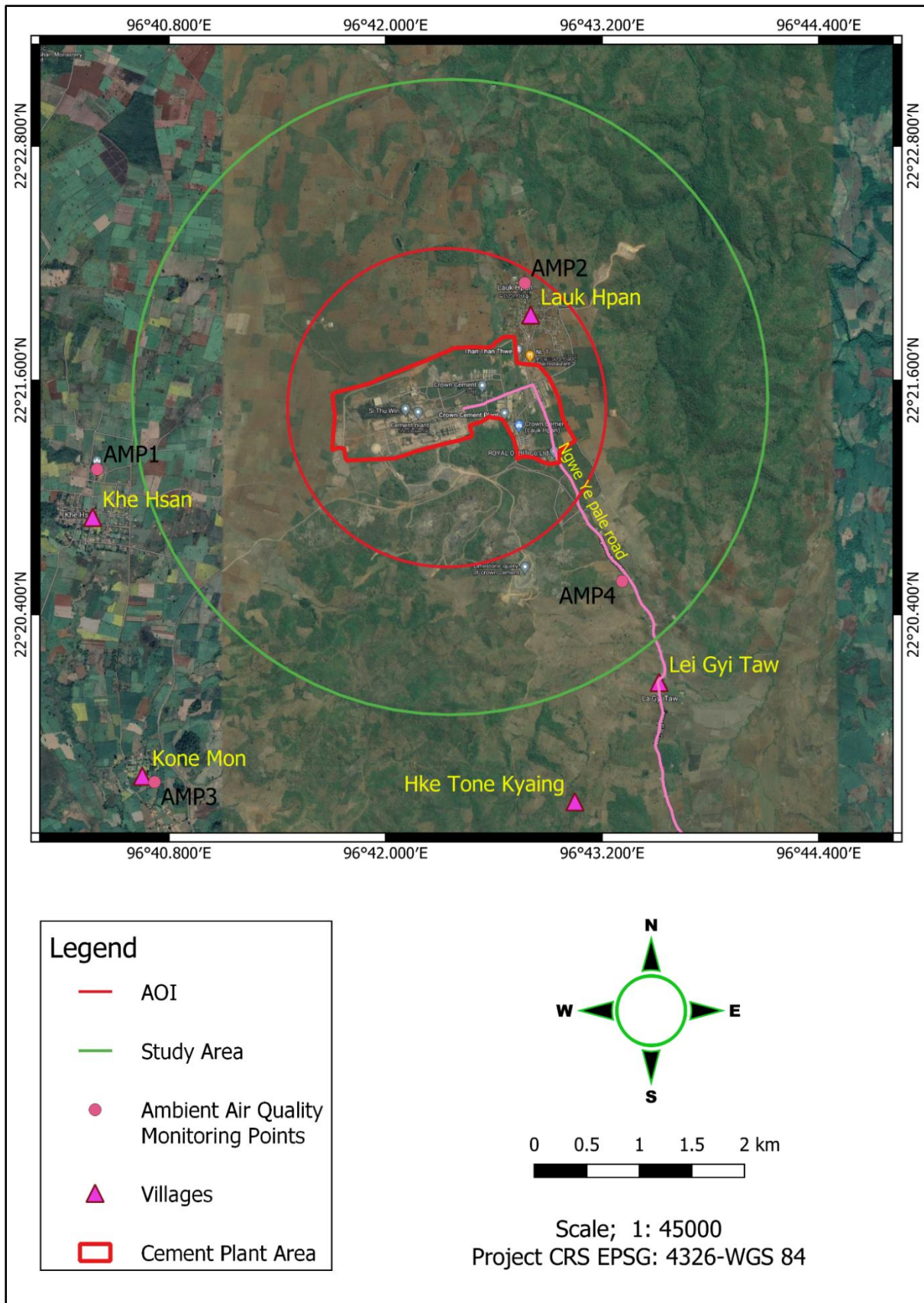


Figure 4-8 Ambient Air Quality Monitoring Locations

### **Monitoring Results of Ambient Air Quality and Discussion**

The monitoring results of **Ambient Air Quality** are as shown in **Table 4.3**. All parameters of Ambient Air Quality were compared with the threshold of NEQEG and have the limit of NEQEG.

**Environmental Impact Assessment Report  
For “Crown Cement Plant 5,000 TPD”**

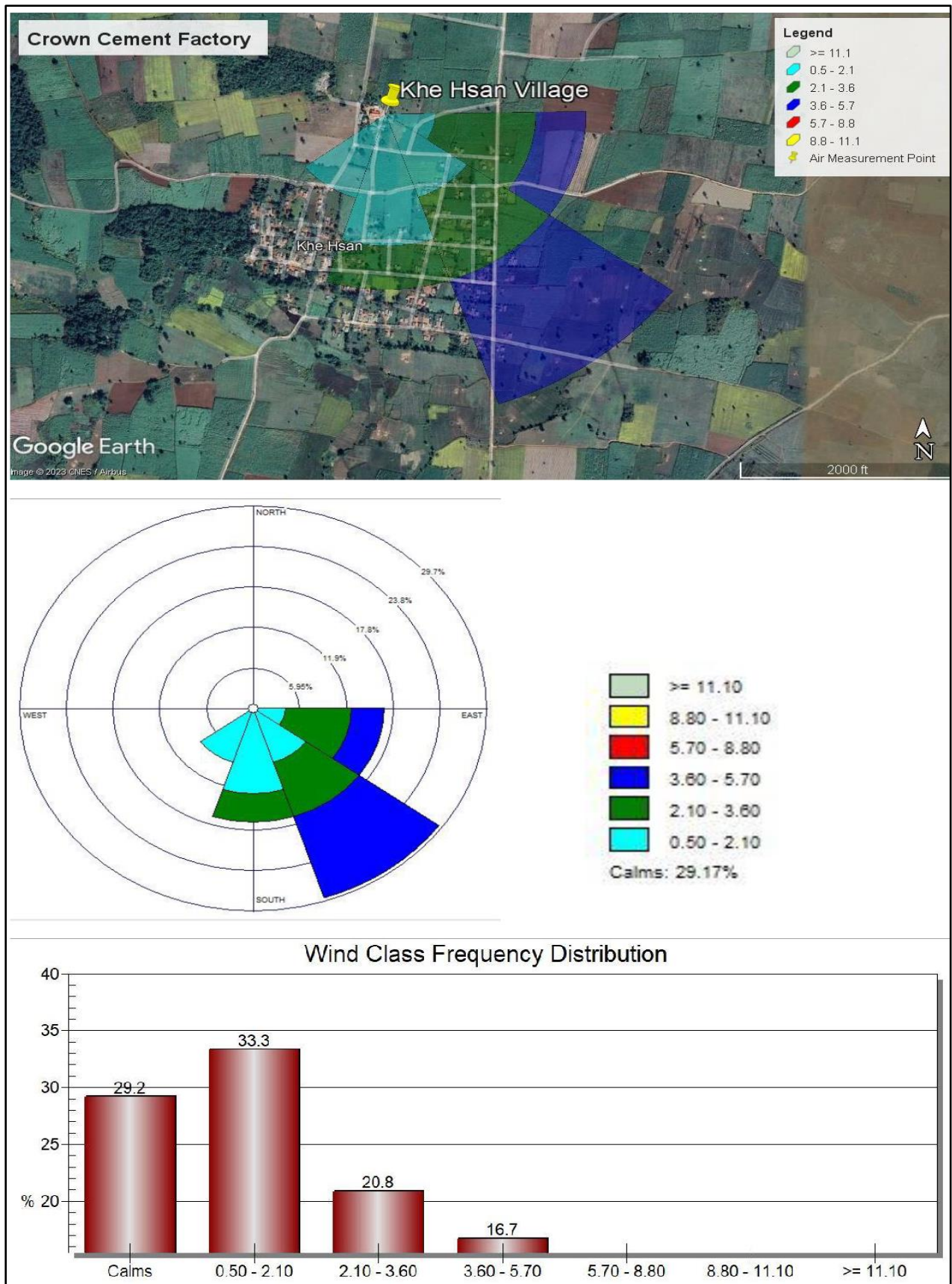
*Ngwe Yi Pale Cement Co., Ltd.*

Table 4-3 Ambient Air Quality Results

No.	Parameters	Unit	Results				Measuring Avg. Period	General Guideline Value (NEQEG)
			AMP-1	AMP-2	AMP-3	AMP-4		
1	Nitrogen Dioxide	µg/m <sup>3</sup>	5.07	8.10	9.64	3.86	1 hours	200µg/m <sup>3</sup>
		µg/m <sup>3</sup>	2.46	4.59	4.04	2.17	24 hours	-
2	Sulphur Dioxide	µg/m <sup>3</sup>	0.87	0.73	0.52	0.62	24 hours	20 µg/m <sup>3</sup>
3	Particulate matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	27.49	23.66	29.28	26.31	24 hours	50 µg/m <sup>3</sup>
4	Particulate matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	15.15	12.58	15.42	19.95	24 hours	25 µg/m <sup>3</sup>
5	Ammonia	mg/m <sup>3</sup>	0.42	0	0.72	0	24 hours	NG
6	Carbon Dioxide	ppm	262.22	270.46	266.08	258.50	24 hours	NG
7	Carbon Monoxide	ppm	0	0.08	0.04	0.50	24 hours	NG
8	O <sub>2</sub>	%	20.71	20.63	20.74	20.44	24 hours	NG
9	O <sub>3</sub>	µg/m <sup>3</sup>	0.85	1.06	0.8	0.92	8 hours	100 µg/m <sup>3</sup>
		µg/m <sup>3</sup>	0.84	0.90	0.8	0.99	24 hours	NG
10	VOC	ppb	0	0	0	0	24 hours	NG
11	Wind Direction	Deg	SE	SW	SW	SE	24 hours	NG
12	Wind Speed	mph	1.71	1.41	1.61	1.69	24 hours	NG

\*NG = No Guideline





**Figure 4-9 Wind Speed and Wind Direction at AMP-1 (Khe Hsan Village)**

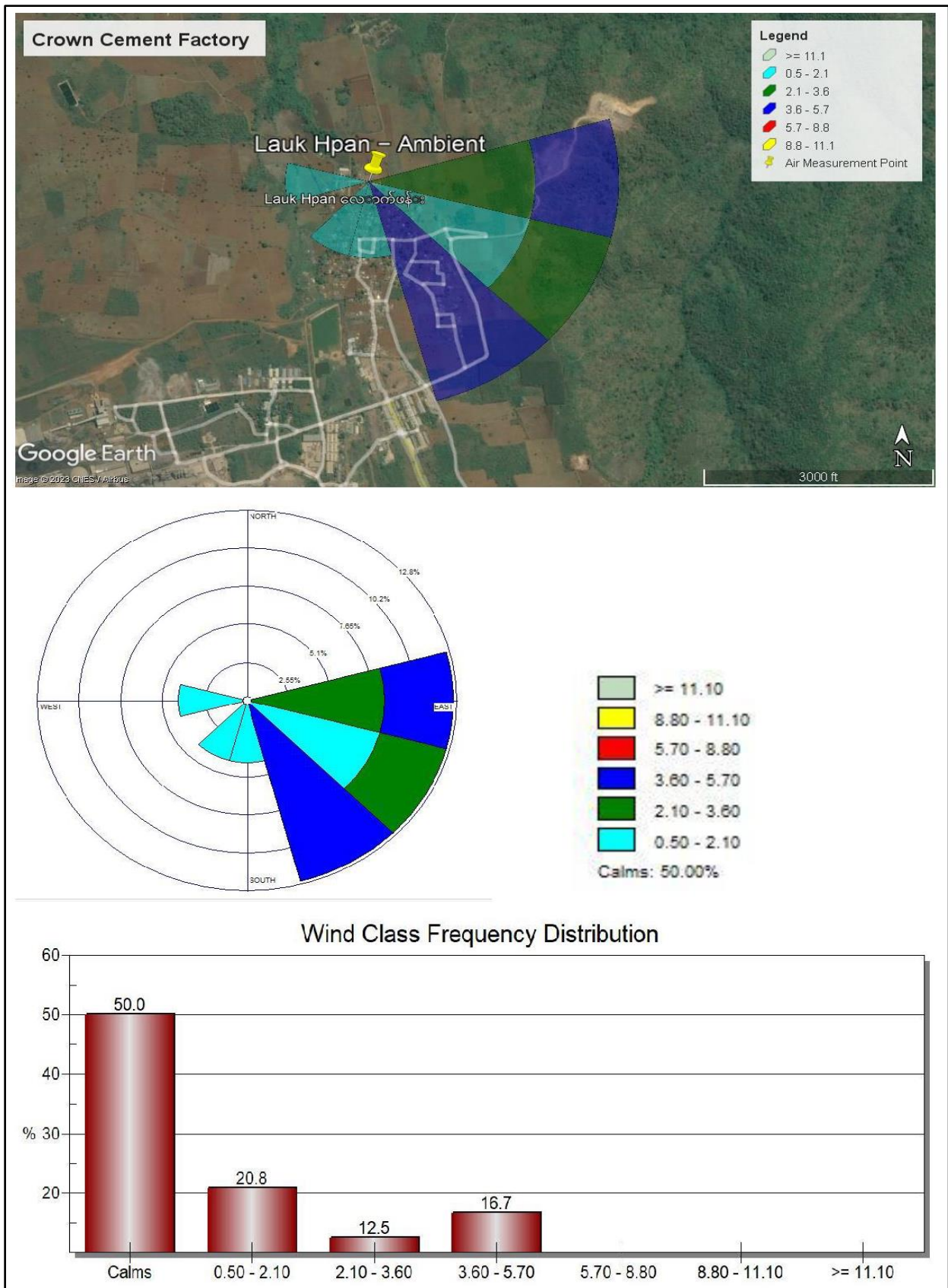


Figure 4-10 Wind Speed and Wind Direction at AMP-2 (Lauk Hpan Village)



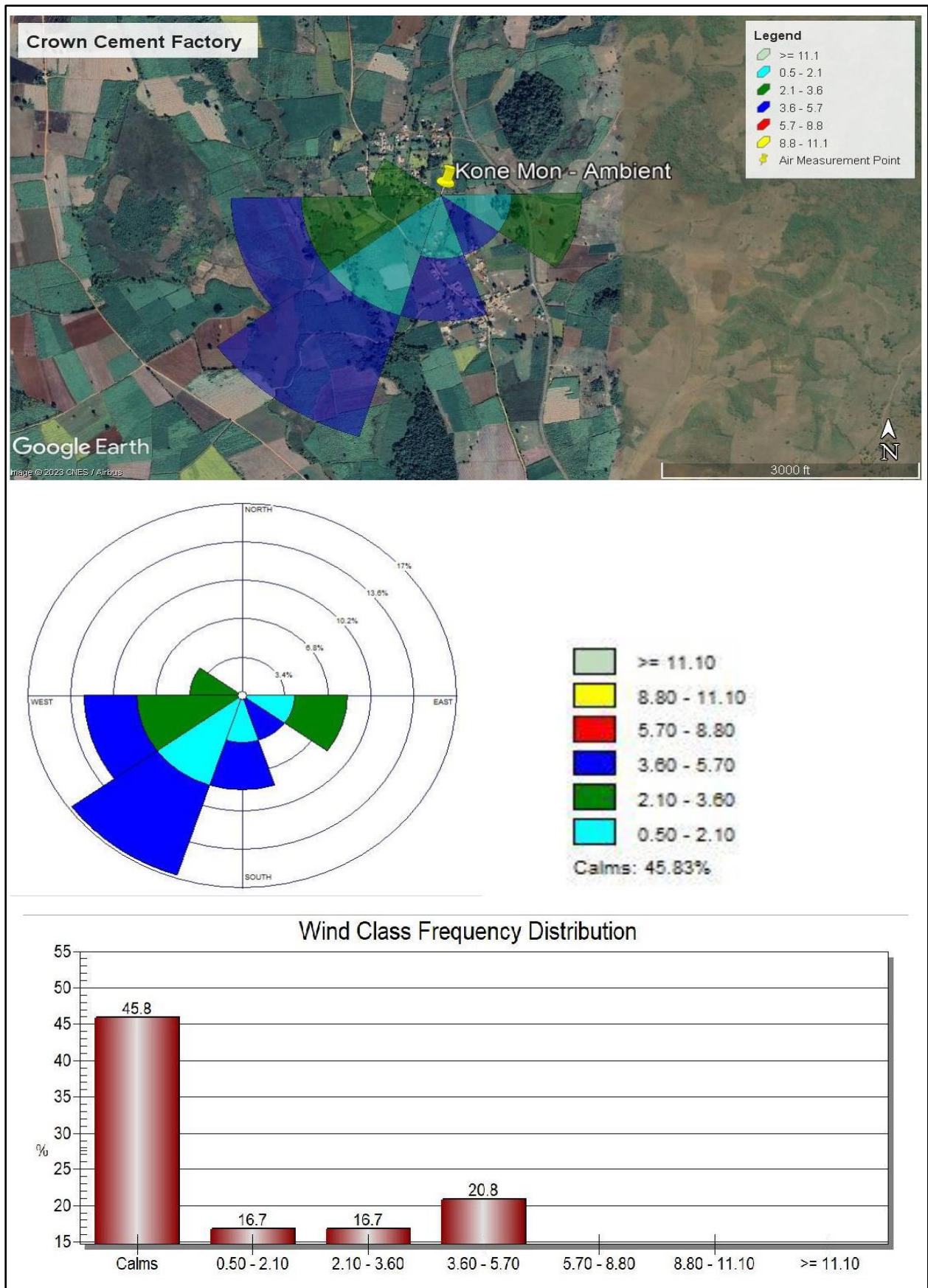


Figure 4-11 Wind Speed and Wind Direction at AMP-3 (Kone Mon Village)



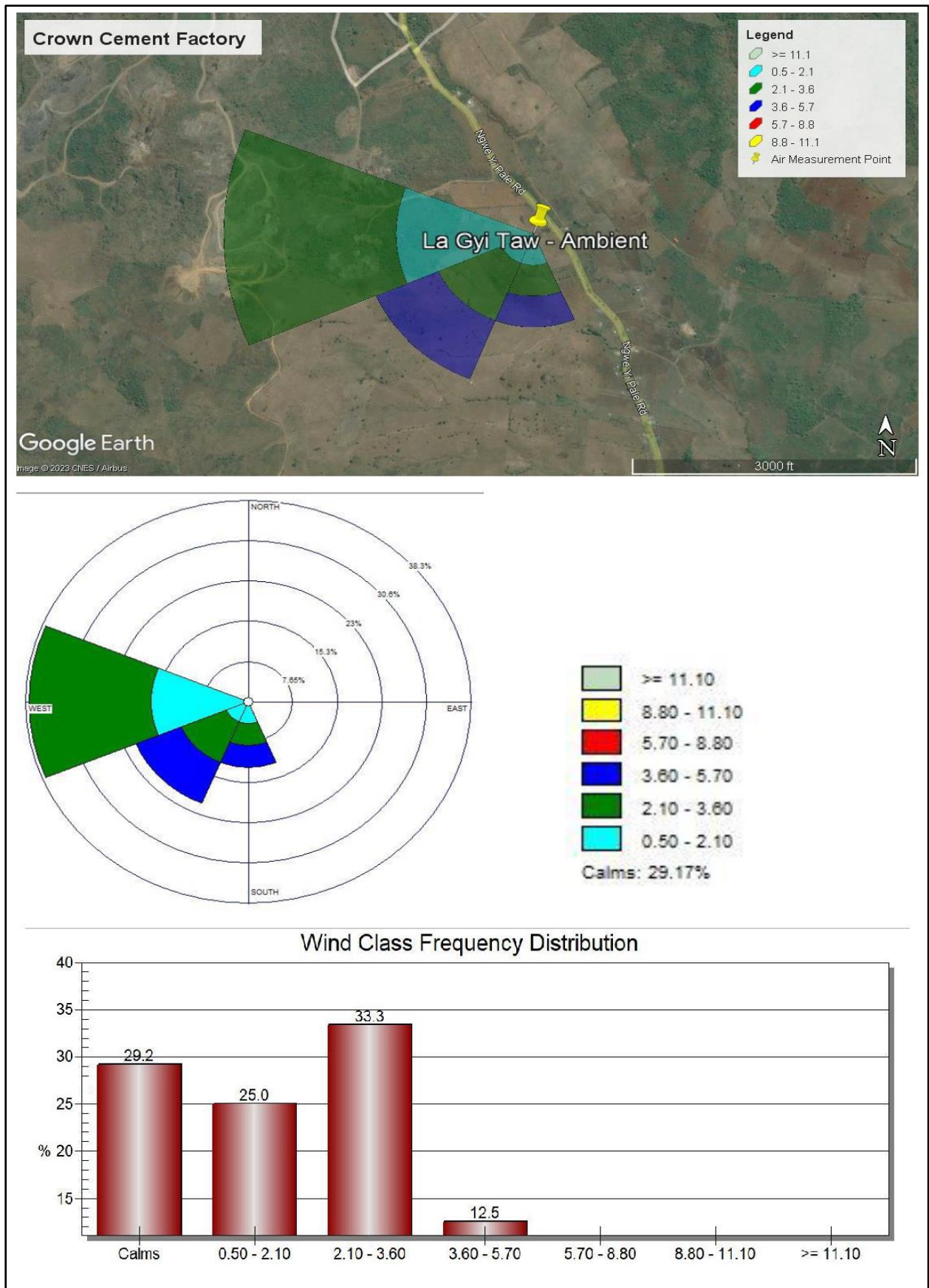


Figure 4-12 Wind Speed and Wind Direction at AMP-4 (Lei Gyi Taw Village)

**4.2.4.3 Air Emission Levels Monitoring**

NGWE YI PA LE' Cement Company Limited was first established on (March 3, 2014). The CROWN brand cement plant has been commercially produced on November 1, 2013. At the current stage, the plant is operating status. So, GMES survey team monitored emission level of plant according to the operation status of the project. The monitoring was recorded at stations during 12<sup>th</sup> to 13<sup>th</sup>, October, 2023. The emission monitoring locations are described in **Table 4.4** and geographical map as shown in **Figure 4.13**.

Table 4-4 Emission Levels monitoring locations

No.	Sample	Coordinate of Location		Description of Sampling Location
		Latitude	Longitude	
1	EMP-1	22°21'19.09"N	96°42'26.36"E	On Site (Crown Cement)
2	EMP-2	22°21'19.06"N	96°42'8.37"E	Boiler at 4000 TPD Cement Plant
3	EMP-3	22°21'23.17"N	96°42'10.93"E	Boiler at 1000 TPD Cement Plant

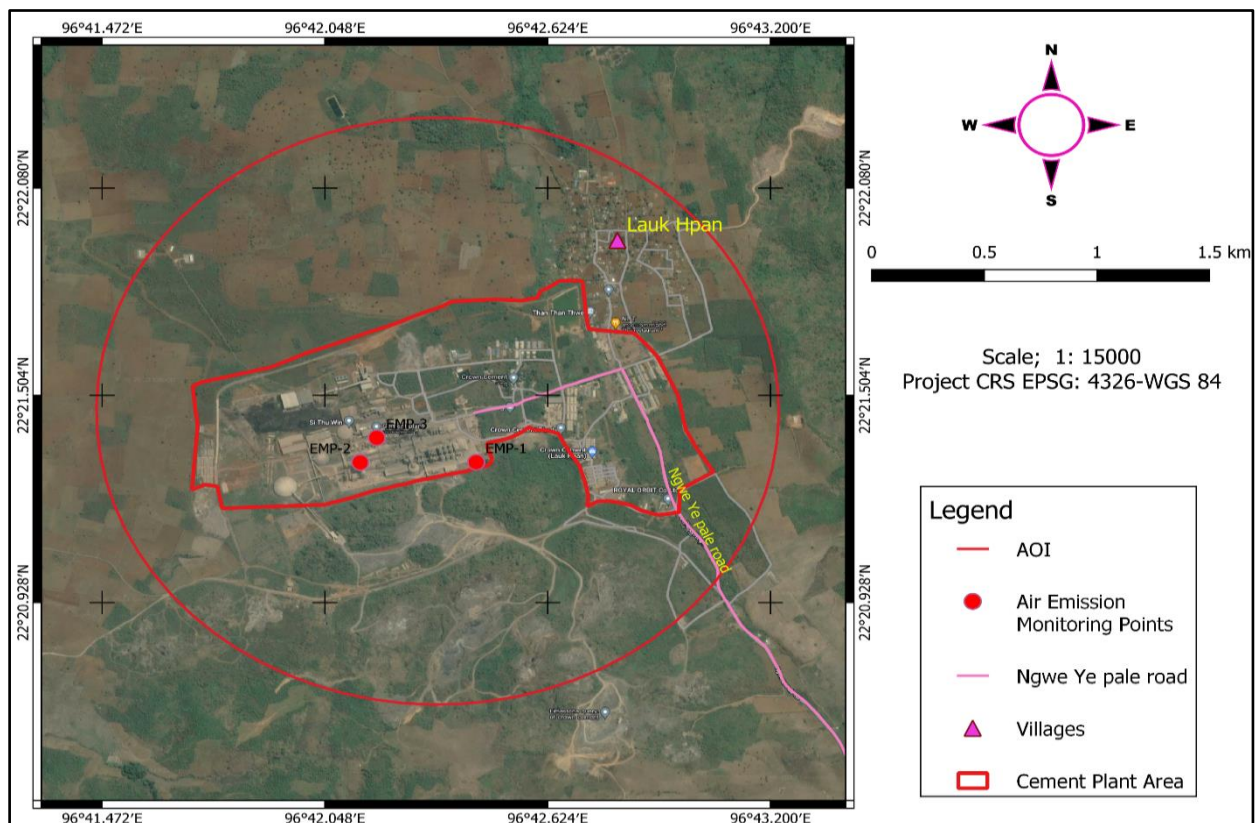


Figure 4-13 Air Emission Level Monitoring Points

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Table 4-5 Results of Emission Levels monitoring

No.	Parameters	Unit	Results			Measuring Avg. Period	National Environmental (Quality) Emission Guideline (NEQEG)	
			EMP-1	EMP-2	EMP-3		General Guideline Value	Industrial-specific Guideline Value (Cement Manufacturing)
1	Nitrogen Dioxide	µg/m <sup>3</sup>	<b>3.86</b>	<b>ND</b>	<b>ND</b>	1 hours	200µg/m <sup>3</sup>	600,000 µg/Nm <sup>3</sup> (600 mg/Nm <sup>3</sup> )
		µg/m <sup>3</sup>	<b>2.17</b>			24 hours	-	-
2	Sulphur Dioxide	µg/m <sup>3</sup>	<b>0.62</b>	<b>16</b>	<b>17</b>	24 hours	20 µg/m <sup>3</sup>	400,000 µg/Nm <sup>3</sup> (100 mg/Nm <sup>3</sup> )
3	Particulate matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	<b>26.31</b>	-	-	24 hours	50 µg/m <sup>3</sup>	100,000 µg/Nm <sup>3</sup> (100 mg/Nm <sup>3</sup> )
4	Particulate matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	<b>19.95</b>	-	-	24 hours	25 µg/m <sup>3</sup>	50,000 µg/Nm <sup>3</sup> (50 mg/Nm <sup>3</sup> )
5	Ammonia	mg/m <sup>3</sup>	<b>0</b>	-	-	24 hours	NG	-
6	Carbon Dioxide	ppm	<b>258.50</b>	<b>ND</b>	<b>ND</b>	24 hours	NG	-
7	Carbon Monoxide	ppm	<b>0.50</b>	<b>ND</b>	<b>ND</b>	24 hours	NG	-
8	O <sub>2</sub>	%	<b>20.44</b>	<b>20.99</b>	<b>20.98</b>	24 hours	NG	-
9	O <sub>3</sub>	µg/m <sup>3</sup>	<b>0.92</b>	-	-	8 hours	100 µg/m <sup>3</sup>	-
		µg/m <sup>3</sup>	<b>0.99</b>	-	-	24 hours	NG	-
10	VOC	µg/m <sup>3</sup>	<b>0</b>	-	-	24 hours	NG	10,000 µg/Nm <sup>3</sup> (10 mg/Nm <sup>3</sup> )

## 4.2.5 Noise and Vibration

### 4.2.5.1 Overview


Noise often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, disturb sleep, thus deteriorating quality of human environment. Noise emission from the project area will be usually from traffic, raw material crushing, mills, kiln and the generator, water compressors and pumps. The project is located near the worker’s camp and communities of Lauk Hpan Village but far from the main traffic road (Mandalay-Muse Highway road) (see **Figure 4.1**). The receptor will be the project workers, communities of Lauk Hpan Village and some wild life animals.

### 4.2.5.2 Noise Baseline Monitoring

#### Monitoring Methodology

Noise level measurements were conducted according to the relevant methods of the International Organization for Standardization (ISO). The equipment used for measurement is a Model GM 1356, S/N-CX sound level meter and is calibrated by Aeroqual Limited, New Zealand and Amigos International Co., Ltd, Myanmar (more details are shown in Appendix XI & XII). The Equipment for Noise and its Measurable Parameter is shown in **Table 4.6**.

Table 4-6 Equipment for Noise and its Measurable Parameter

Equipment	Measurable Parameters	Remark
	Noise (dBA)	(See Calibration Certificated Appendix (XI & XII))

#### Monitoring Locations

Noise baseline monitoring was conducted at five (5) locations, during 7:00 to 22:00 for daytime and during 22:00 to 7:00 for night time per location by GMS team at 11<sup>th</sup> to 14<sup>th</sup> October 2023. The Noise and Vibration monitoring locations are the same locations presented in shown in **Table 4.7** and **Figure 4.14**.

Table 4-7 Noise and Vibration Monitoring Locations

No.	Sample	Coordinate of Location		Description of Sampling Location
		Latitude	Longitude	
1	NV-1	22°21'19.09"N	96°42'26.36"E	On Site (Crown Cement)
2	NV-2	22°21'8.66"N	96°40'24.13"E	Khe Hsan Village

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3	NV-3	22°22'5.93"N	96°42'46.33"E	Lauk Hpan Village
4	NV-4	22°19'32.54"N	96°40'43.24"E	Kone Mon Village
5	NV-5	22°20'34.27"N	96°43'18.70"E	Lei Gyi Taw Village



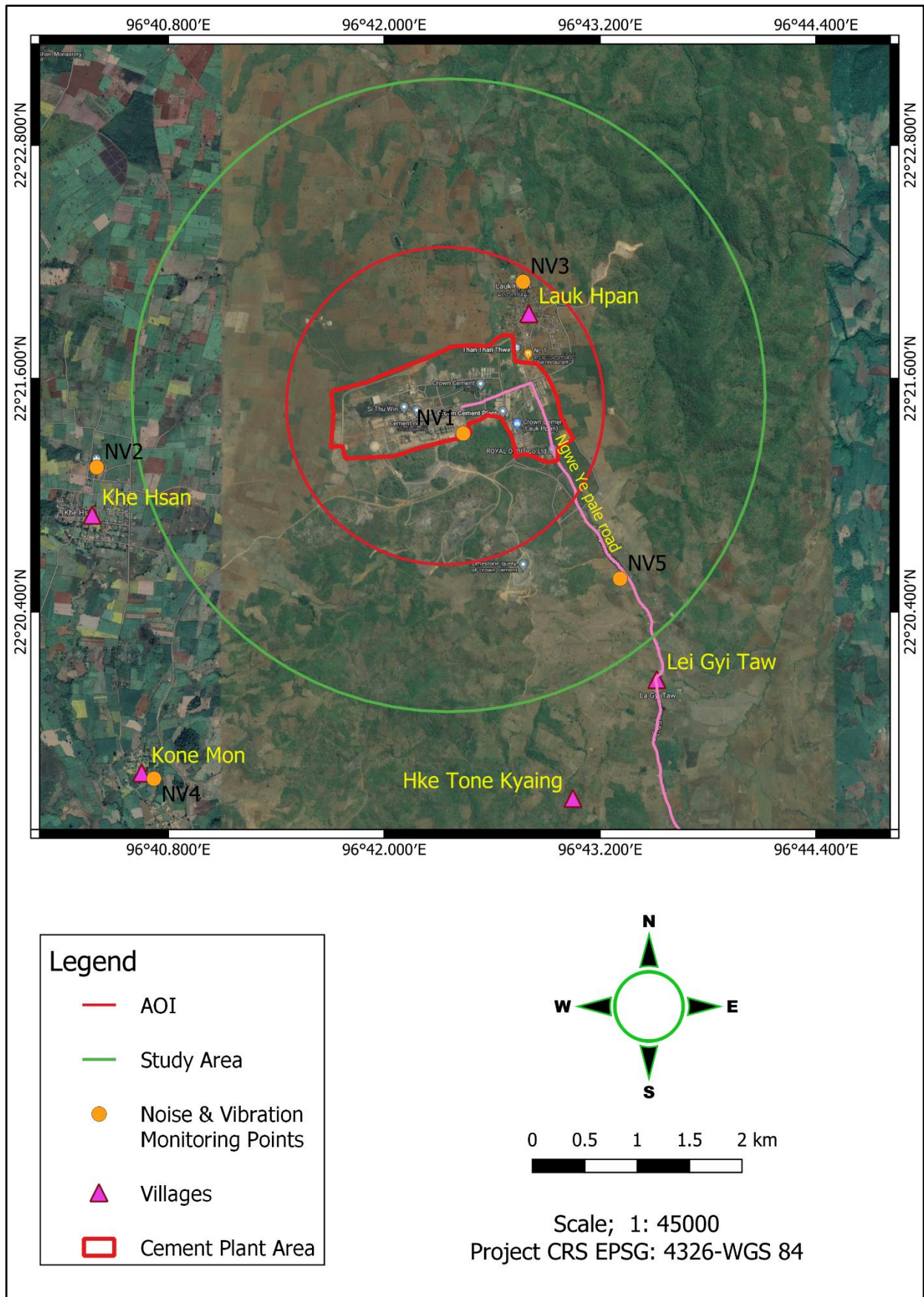


Figure 4-14 Noise and Vibration Monitoring Locations

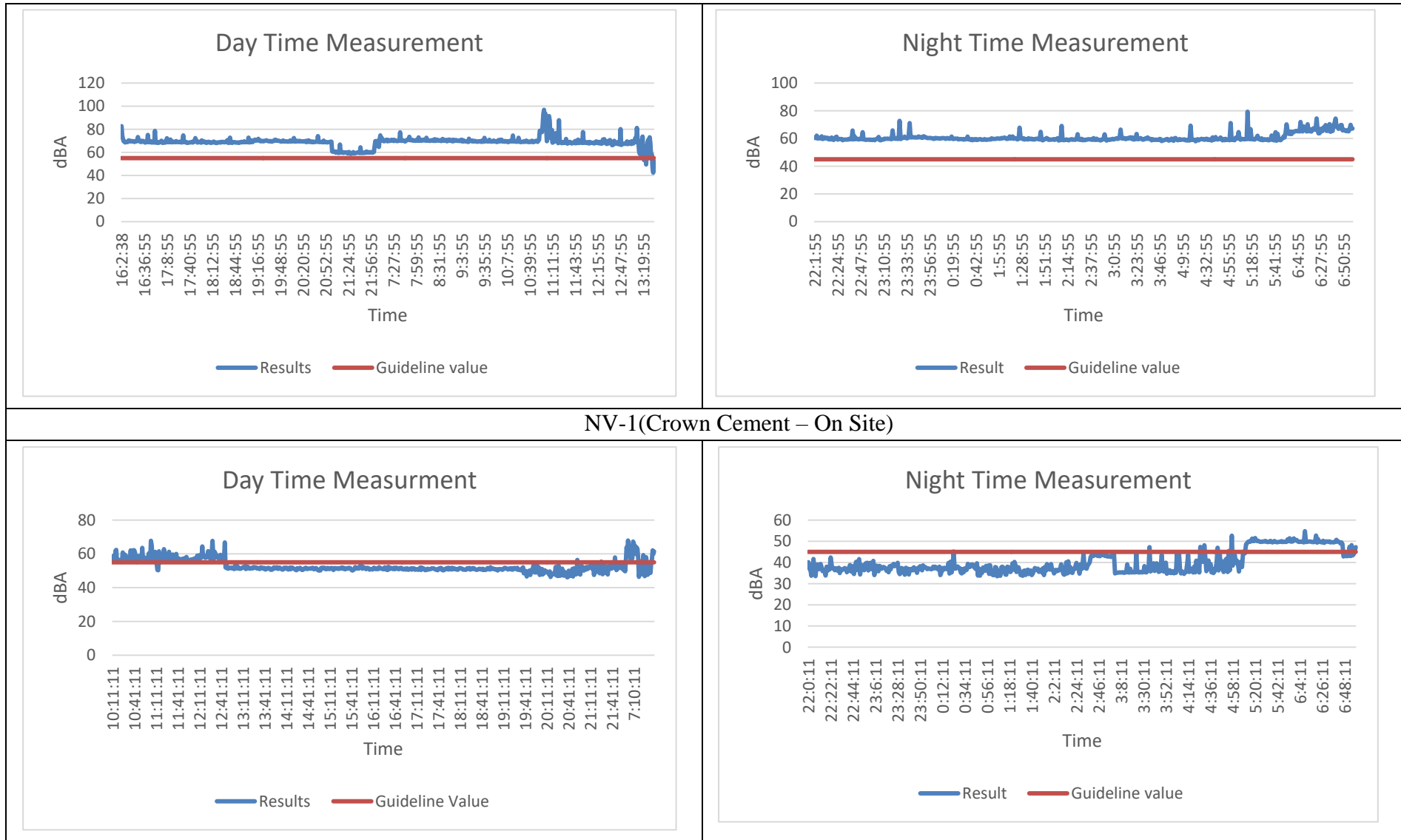


**Monitoring Results of Noise Level and Discussion**

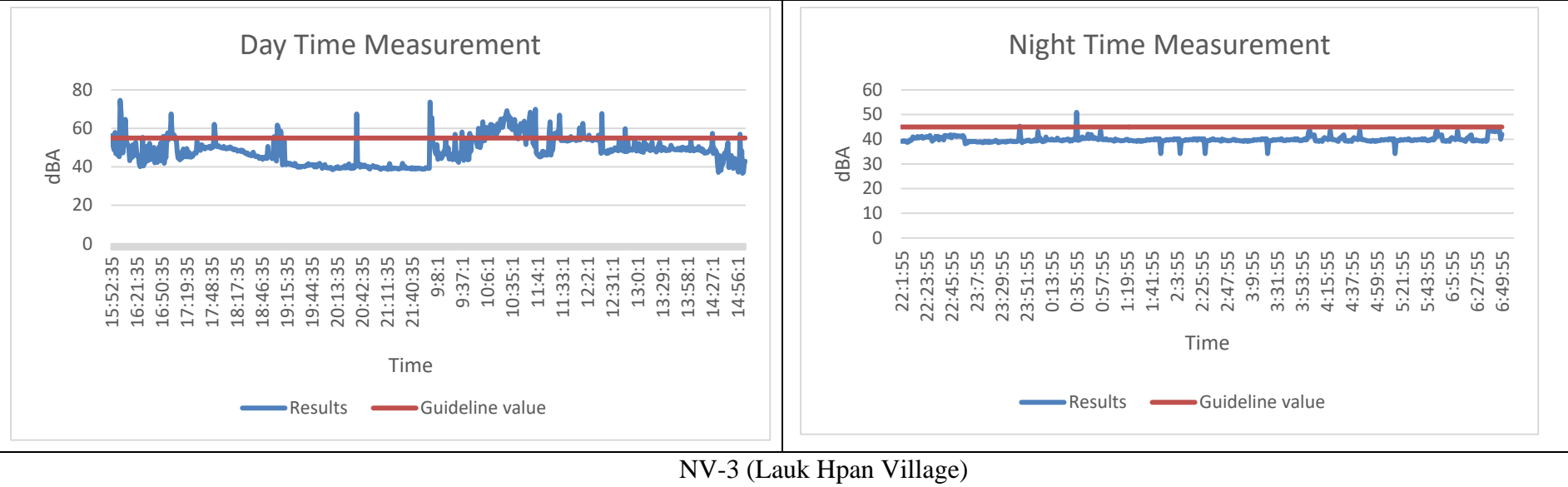
The monitoring results of Noise Level are as shown in **Table 4.8** and the Graph in **Figure 4.15**. All parameters of Noise Level have the threshold of EQEG.

Table 4-8 Results of Noise Level of Plantation Area

No	Description	Measurement	Results			Guideline Value	
			Avg	Max	Min	Industrial & Commercial	Residential
1	NV-1	Day	68.93	96.90	42.40	70	55
		Night	60.82	79.40	58.00	70	45
2	NV-2	Day	52.77	67.90	46.10	70	55
		Night	40.02	54.80	33.47	70	45
3	NV-3	Day	48.21	74.60	36.60	70	55
		Night	39.91	50.90	34.20	70	45
4	NV-4	Day	50.87	71.60	41.00	70	55
		Night	45.58	71.32	37.91	70	45
5	NV-5	Day	50.56	83.40	36.60	70	55
		Night	41.45	53.46	37.83	70	45



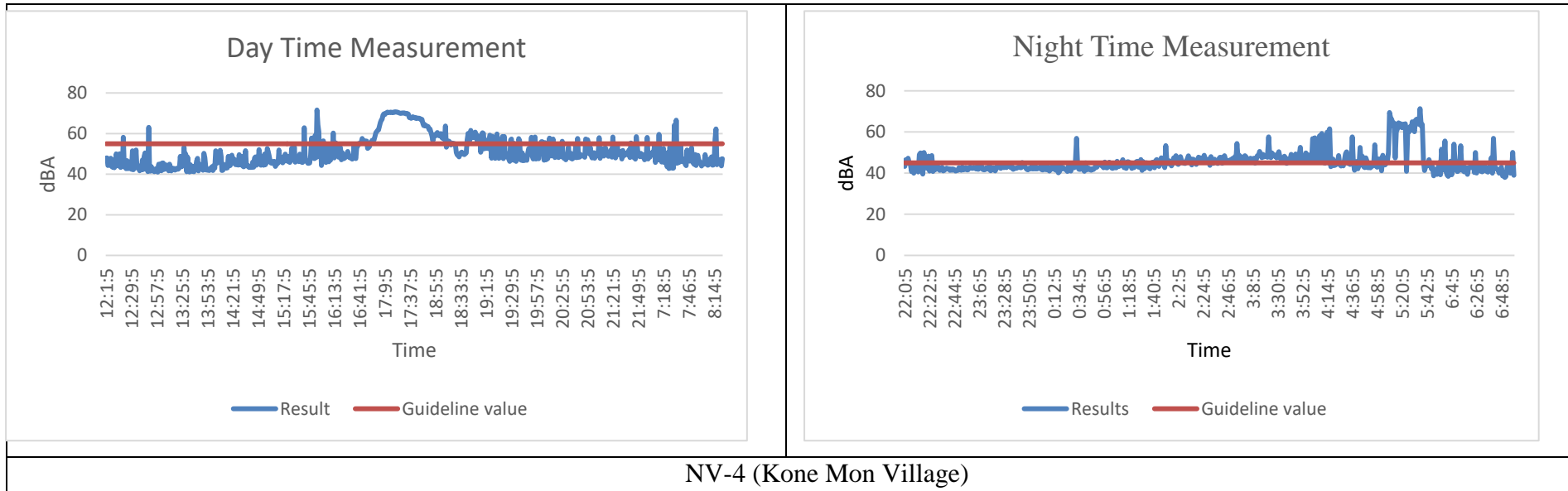
**NV-2 (Khe Hsan Village)**



**NV-3 (Lauk Hpan Village)**

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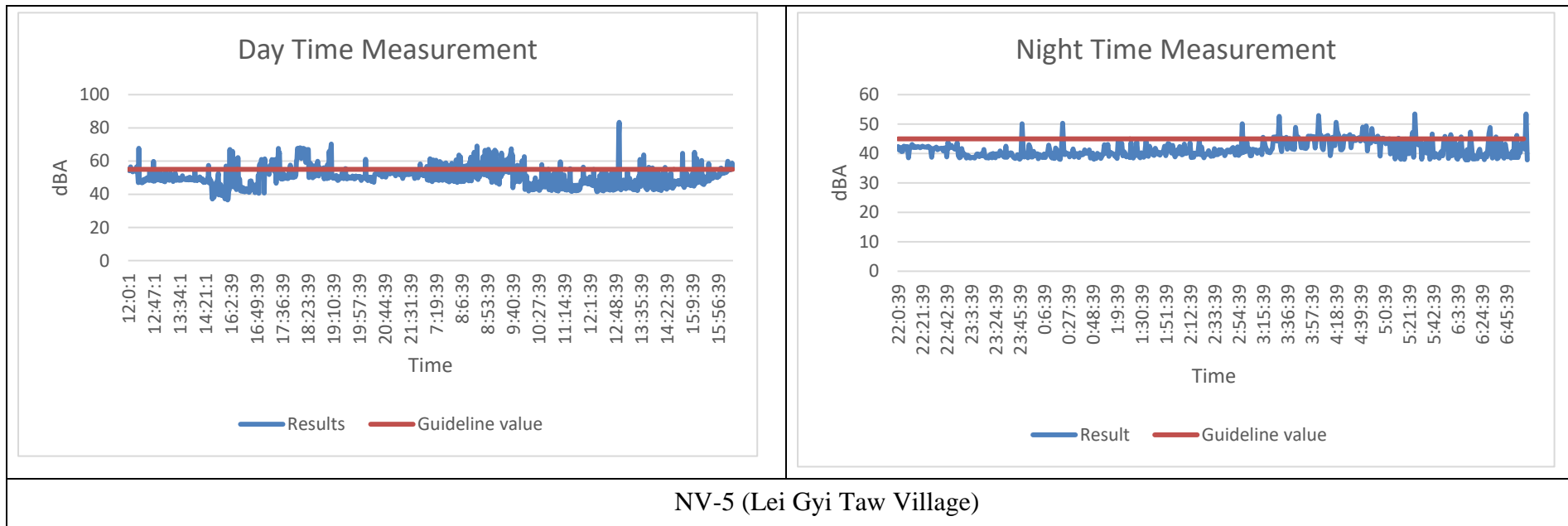


Figure 4-15 Graph of Noise Level

### 4.2.5.3 Vibration Monitoring

#### Monitoring Method

Vibration monitoring was conducted during 11th to 14th October 2023. The vibration data collecting was performed with three axes was (X, Y, Z). Vibrating measured instrument is shown in Figure 4.16.



Figure 4-16 Vibrating measured instrument

Vibrating standard guideline of DIN 4150: Part 3 “Structural Vibration in Buildings” was as follow.

DIN 4150			
Type of Structure	Peak Particle Velocity (mm/sec)		
Frequency	Acceptable Level	Moderate level	Extreme Level
Commercial and Industrial Building (Type-1)	20	20 ~ 40	40 ~ 50
Dwellings (Type-2)	5	5 ~ 15	15 ~ 20
Ancient and Historic Buildings (Type-3)	3	3 ~ 8	8 ~ 10

#### Monitoring Location

The coordination points of vibration monitoring are the same as noise monitoring locations as shown in Table 4.8 and Figure 4.14.



## **Monitoring Results**

The monitoring results are presented in Table 4.9.

Table 4-9 Vibration Measurement Results

<b>Summary of Vibration Monitoring Results</b>			
<b>No</b>	<b>Location</b>	<b>Maximum Peak Vector Sum (mm/s)</b>	<b>Remark</b>
1	On Site (Crown Cement)	13.79	Max: PVS on 12 <sup>th</sup> October, 2023 (10:25 AM)
2	Khe Hsan Village	ND	-
3	Lauk Hpan Village	ND	-
4	Kone Mon Village	0.85	Max: PVS on 13 <sup>th</sup> October, 2023 (4:45 PM)
5	La Gyi Taw Village	0.60	Max: PVS on 14 <sup>th</sup> October, 2023 (13:45 PM)

“ND” Not detected”

Remark: Vibration level is less than Threshold limit 0.5 mm/sec not recorded the data.

### **4.2.6 Surface Water**

#### **4.2.6.1 Overview**

The potential water resource volume is about 1082 km<sup>3</sup> for surface water (WEPA, 2018) . The Ayeyarwady basin has been divided into the following four sub-basins and the Crown Cement Factory is located the Upper Ayeyarwady as shown in Figure 4.17. The water resources of

Upper Ayeyarwady

Middle Ayeyarwady

Lower Ayeyarwady = Delta

Chindwin Basin

Goke Hteik Creek, a tributary flow to the Myintnge River from the Eastern part of Naung Hkio Township that is 3 km South-East of “Crown Cement Factory” and Ge Loung Creek, a tributary flow to the Myintnge River from 14 km apart from the South of “Crown Cement Factory”. Sedawgyi dam is located the Eastern part of Naung Hkio Township. Nan Pan Hsi Creek which is the nearest creek from the Factory flows to the Goke Hteik Creek and the distance is 4 km from the Factory. The main surface water body is as shown in Figure 4.18. There is no permanent creek within the Study Area.

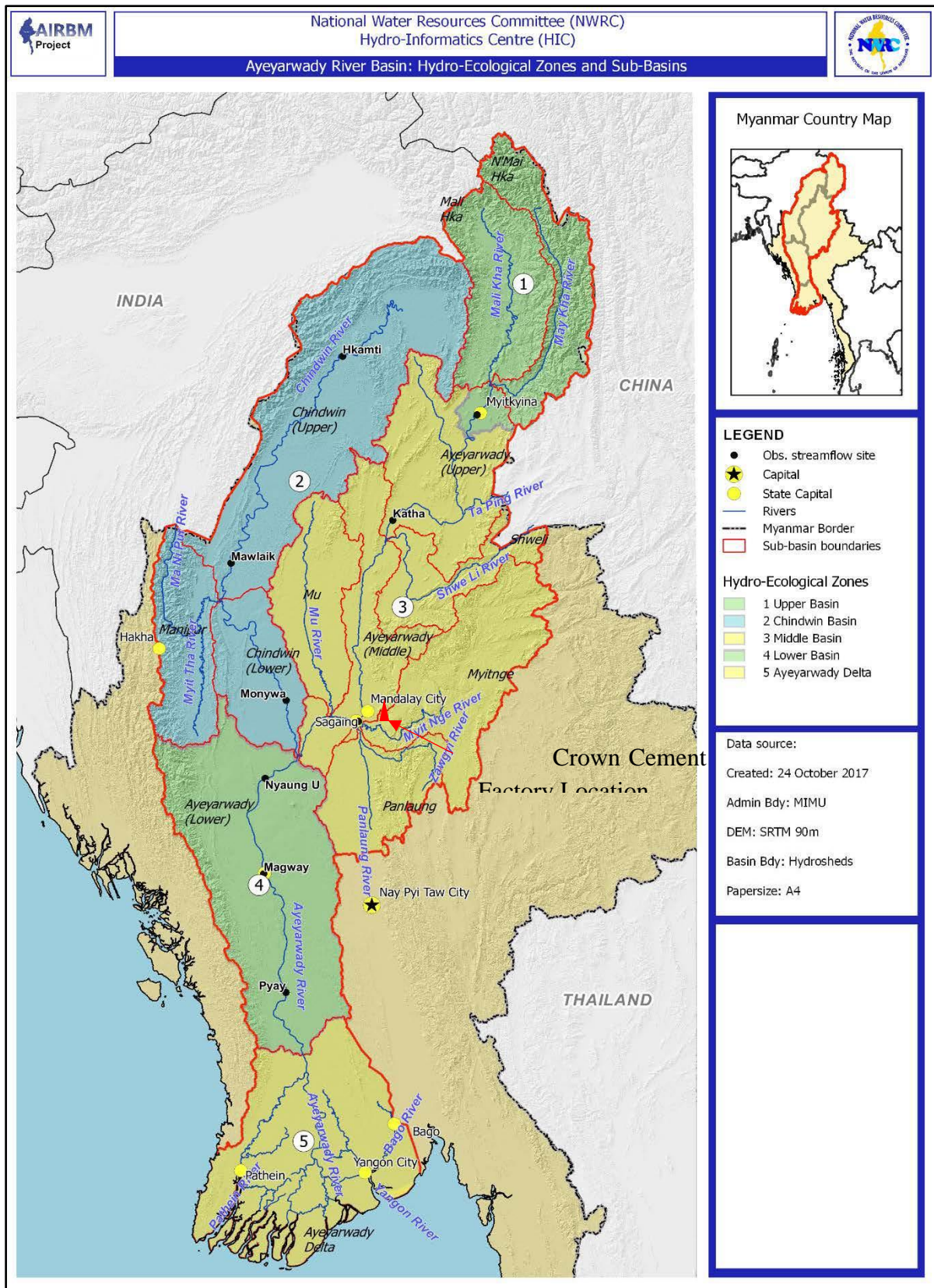


Figure 4-17 Map of Ayeyarwady Basin

Source: Ayeyarwady State of The Basin Assessment (SOBA), Modified by GMES



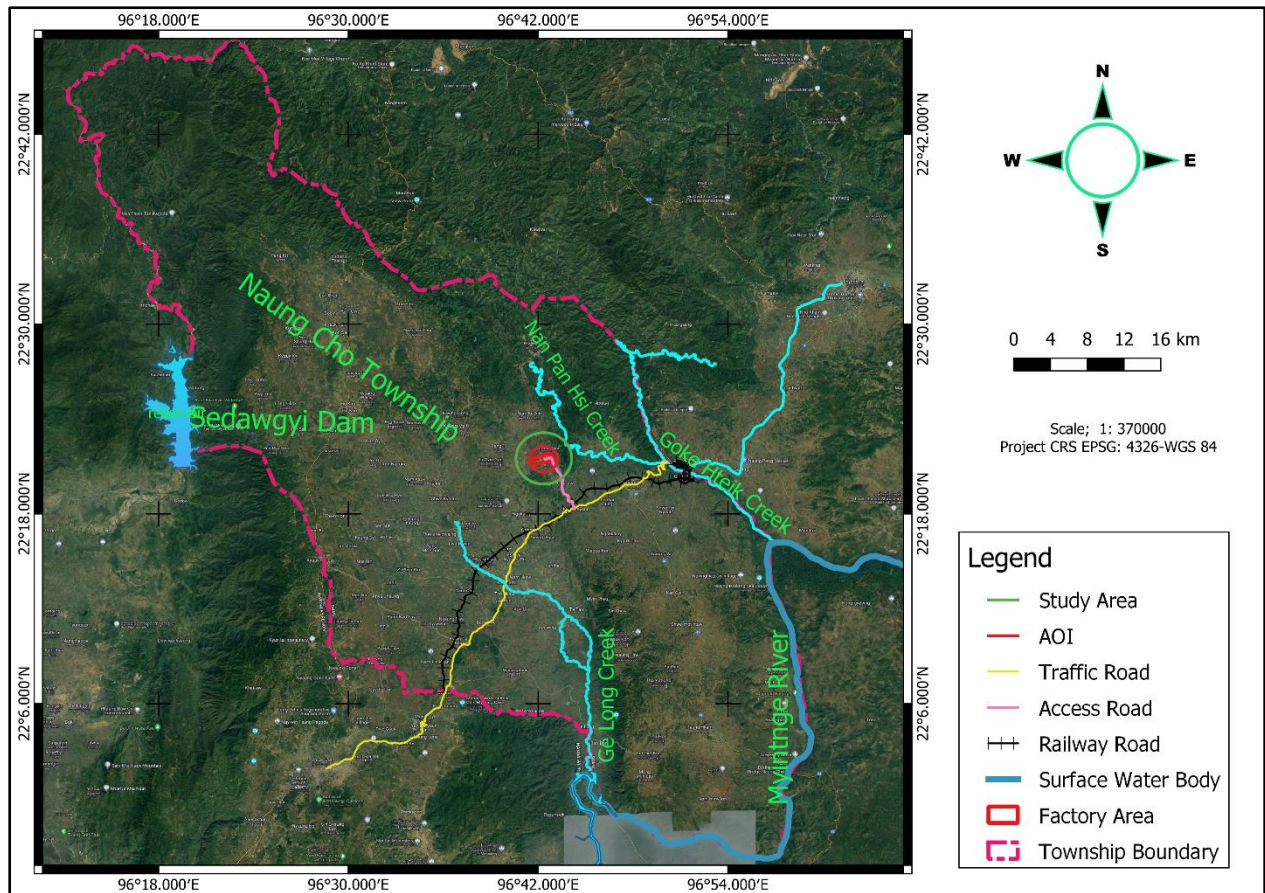


Figure 4-18 Surface Water body within Township Area

#### 4.2.6.2 Primary Baseline Sampling

##### Sampling Methodology

Surface water samples are collected from the water reservoirs supplied water to the Factory and these water reservoirs are located within the study area. Two (2) wastewater samples are also collected. Water samples were taken and filled into a sterilized plastic and glass sample containers (depending on the measuring parameters). All sampling procedures were conducted strictly according to relevant guidelines and standards with supervision of technical experts from GMES team. The sample was analyzed in ALARM Ecological Lab.

##### Sampling Location

All water samples were collected at the date of 12th to 15th October 2023. Five (5) samples were collected from the reservoirs and two (2) samples from the wastewater. The Sampling locations are as shown in Table 4.10 and Figure 4.19.

Table 4-10 Surface Water Quality Sampling Locations

Sampling Name	Coordination Points		Description of Location
	Latitude	Longitude	
<b>SW-1</b>	22°21'34.28"N	96°42'24.61"E	Water Reservoirs No-1
<b>SW-2</b>	22°23'6.74"N	96°42'35.59"E	Water Reservoirs No-2
<b>SW-3</b>	22°22'40.26"N	96°42'9.67"E	Water Reservoirs No-3
<b>SW-4</b>	22°22'17.52"N	96°42'5.38"E	Water Reservoirs No-4
<b>SW-5</b>	22°21'19.09"N	96°42'26.54"E	Before Treated (wastewater)
<b>SW-6</b>	22°21'26.83"N	96°42'22.50"E	After Treated (wastewater)
<b>SW-7</b>	22°21'29.22"N	96°42'12.19"E	Drinking Water



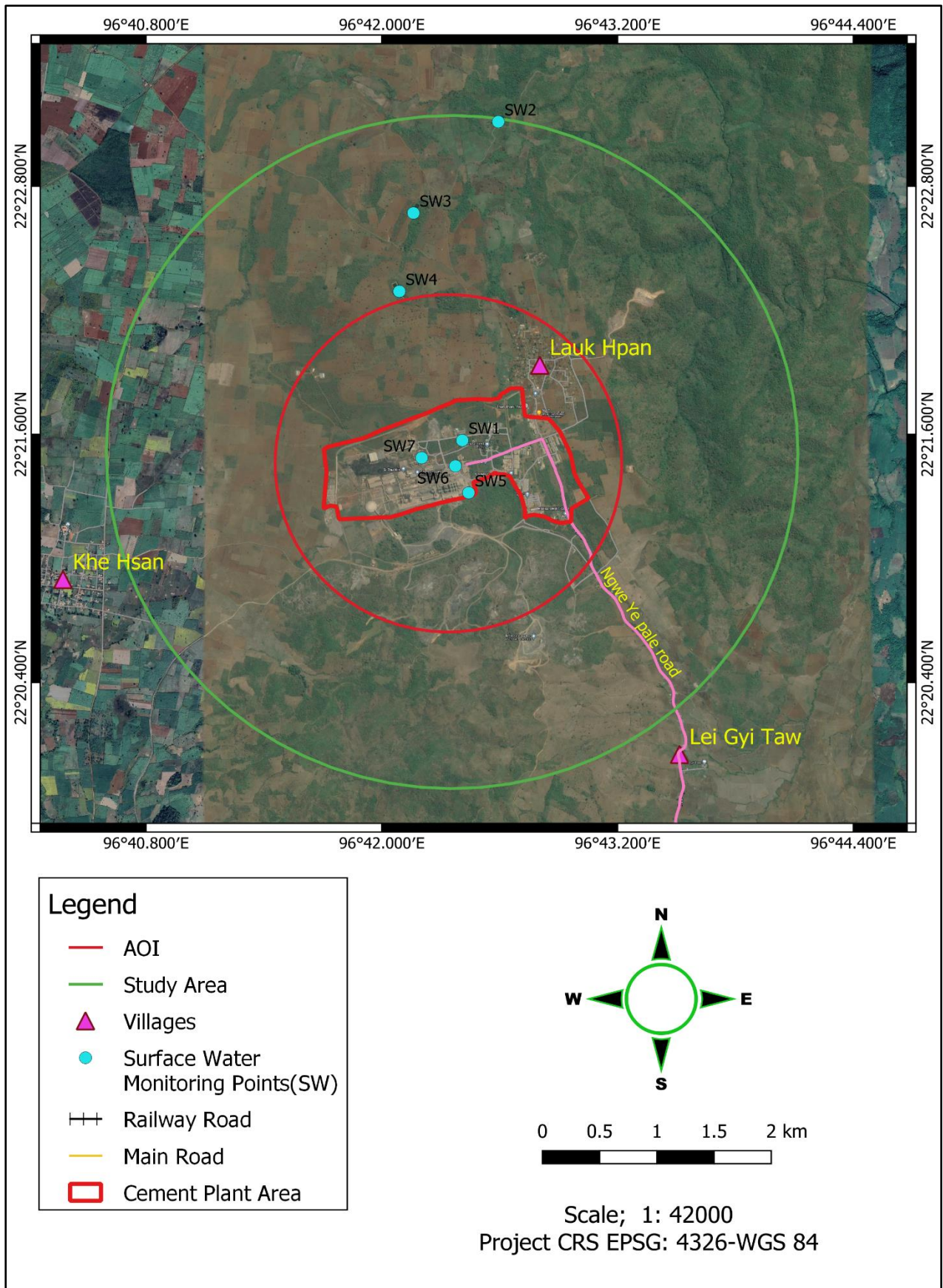


Figure 4-19 Surface Water Sampling Location



Figure 4-20 Photos of Taking Surface Water Samples

**Sampling Results of Water Quality from the reservoirs and Discussion**

All sample of surface water was analyzed in the in ALARM Ecological Lab and analysis results are shown in Table 4.11 and Appendix VIII. The contents of Aluminum and Manganese also exceeded the desirable limits at GW7 location. All other parameters were within the desirable limits as per Drinking Water Standards.



Table 4-11 Laboratory analysis of water quality from the reservoirs

Parameters	Units	Analysis Value					Drinking Water Standards		
		SW1	SW2	SW3	SW4	SW7	WHO_2011	US EPA_2018	Myanmar National
pH	S.U	7.6	7.3	7.6	7.6	8.4	-	-	6.5 – 8.5
Turbidity,	FAU	<5	<5	<5	<5	<5	-	-	≤ 5
Total Dissolved Solids (TDS)	mg/l	200	317	296	318	6	-	-	≤ 1000
Hardness	mg/l	150	156	147	120	30	-	-	≤ 500
Chloride (Cl)	mg/l	2.7	18	12.5	17.7	3.2	-	-	≤ 250
Cyanide (CN)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Aluminum (Al)	mg/l	0.02	0.01	0.02	0.03	0.04	-	≤ 0.2	-
Arsenic (As),	mg/l	0.005	0.005	0.005	0.012	0.005	≤ 0.05	-	-
Copper (Cu)	mg/l	0.13	0.12	0.11	0.1	0.19	-	≤ 2	-
Iron (Fe)	mg/l	0.35	0.36	0.38	0.31	0.31	-	-	≤ 1
Manganese (Mn)	mg/l	<0.1	<0.6	<0.1	<0.1	0.6	-	-	≤ 0.4
Alkalinity	mg/l	15	7	23	17	16	-	-	-
Sulphate (SO <sub>4</sub> )	mg/l	45.8	3.2	3.4	<2	51	-	-	≤ 250

“- “No reference standard

### **Sampling Results of Waste water**

All sample of waste water was analyzed in the in ALARM Ecological Lab and analysis results are shown in Table 4.12. All other parameters were within the desirable limits as per Drinking Water Standards.

Table 4-12 Analysis results of waste water

<b>Parameters</b>	<b>Units</b>	<b>Analysis Value</b>		<b>Effluent Levels (NEQEG)</b>
		<b>SW5</b>	<b>SW6</b>	
pH	S.U	8.4	9.3	6 – 9
Temperature	°C	29	29.8	<3 <sup>b</sup>
Total Suspended Solids (TSS)	mg/l	8	5	50

## **4.2.7 Soil**

### **4.2.7.1 Overview**

Myanmar has been classified into 10 main soil types; the categorization can be seen by the project location plotted on the Myanmar soil profile map, shown in Figure 4.21. Crown Cement Plant is situated on soil classified as AC-Acrisol.

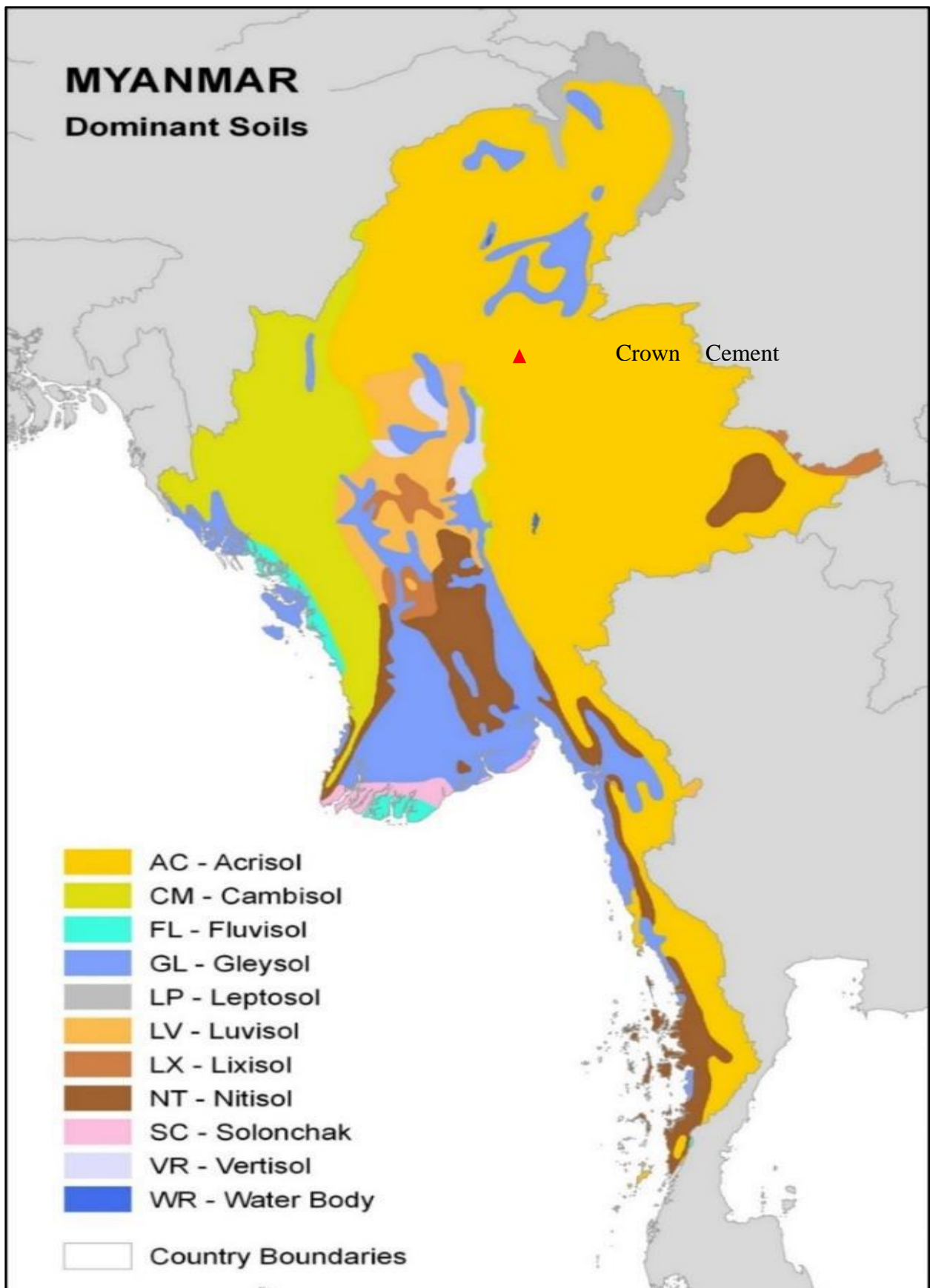


Figure 4-21 Soil type of Myanmar

The soil texture in the Crown Cement Factory location is Red Earths and Yellow Earths (Acrisol). The Yellow Earths occur on the lower slopes in the Shan Plateau, generally loamy to clayey, especially in Lixisol soil area. They occupy a relatively small area, changing the Red Earths down the slopes. The Red Earths have a very deep profile having the sandy and silty to silty clay loam and with good structure, well drained and easy to plough. The soil reaction is slightly acid to neutral with pH ranging from 6 to 7. However, the Yellow Earths soils are more acidic and have more clay percentage. Iron and aluminum contents are also very high.

#### **4.2.7.2 Primary Baseline Sampling**

Prior to the field visit to site, satellite imagery of the farm was obtained and examined to gain a preliminary overview of the soils that were likely to occur in the area as well as to determine if there are any major fatal flaw limitations to farming or irrigation such as rugged topography of extensive areas of drainage and collection ponds.

#### **Sampling Methodology**

Soil sampling locations were selected to cover the firm area based on potential Project interactions that may result or impact the soil. These soil samples were collected by auger borings to a depth of 120 cm unless stopped by rock or impenetrable gravels. The succession of horizons in each auger was studied and used to assess the suitability of the soils for farming and irrigation. The soil samples were analyzed in the Lab of GMES.

#### **Sampling Locations**

The total of five (5) samples were collected from the around the plant within the Study Area at the date of 12th to 13th October 2023. The soil sampling locations are presented in shown in Table 4.13 and Figure 4.22.

Table 4-13 Soil Quality Sampling Locations

<b>Sampling Name</b>	<b>Coordination Points</b>		<b>Description of Location</b>
	<b>Latitude</b>	<b>Longitude</b>	
SS-1	22°21'34.28"N	96°42'24.61"E	At Lauk Hpan Villlage
SS-2	22°23'6.74"N	96°42'35.59"E	Near the Factory Area
SS-3	22°22'40.26"N	96°42'9.67"E	Near the Lei Gyi Taw
SS-4	22°22'17.52"N	96°42'5.38"E	At the Kone Mone Villlage
SS-5	22°22'17.52"N	96°42'5.38"E	At the Khe Hsan Villlage

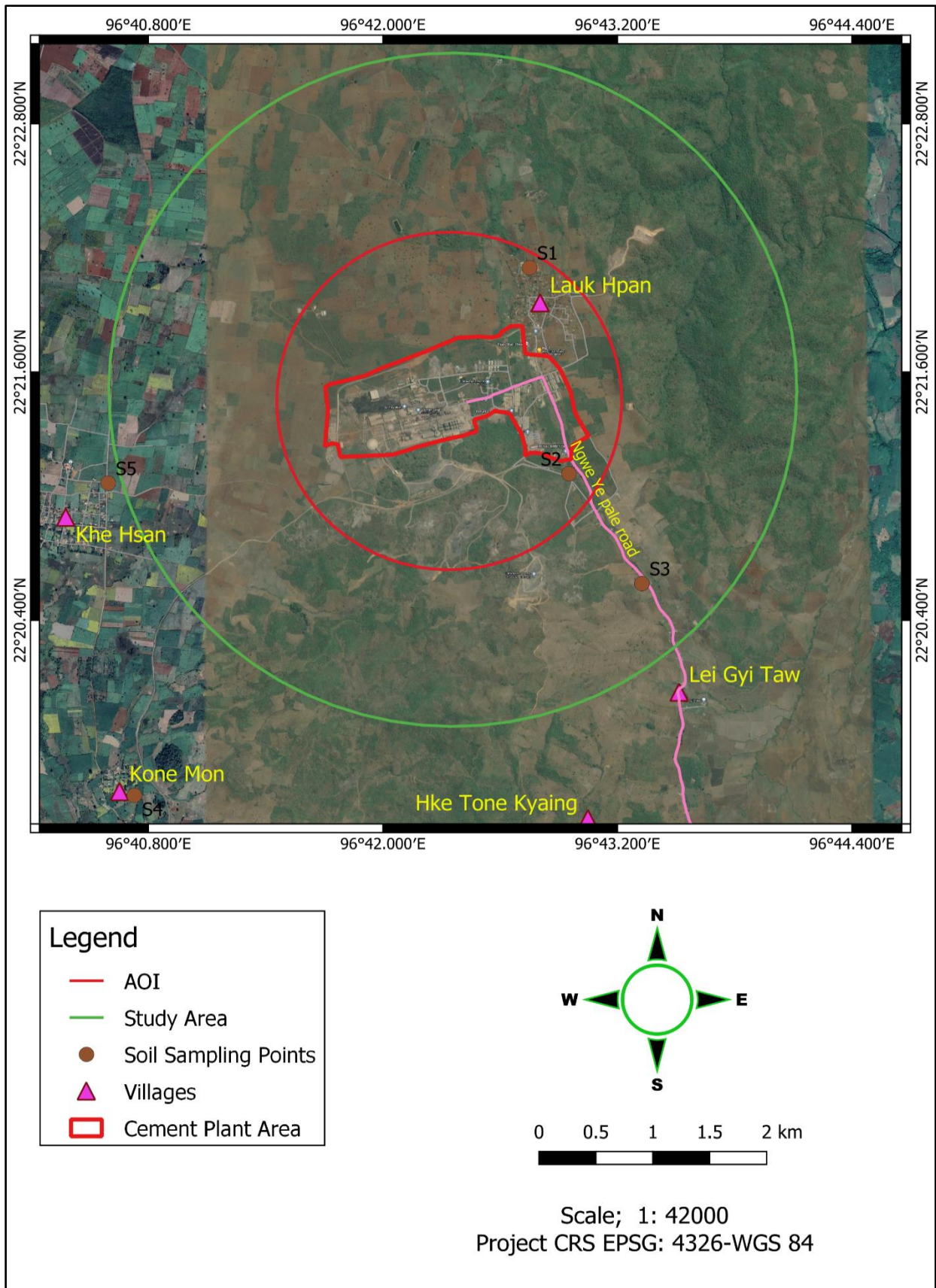


Figure 4-22 Soil Sampling Locations



**Baseline Sampling Results and Discussion**

There are no regulations or standards in Myanmar for ambient soil quality. In the absence of local or country standards, According to Lab Analysis, use the ASEAN Soil & Nutrient Management Guideline, 2017 and all parameters will not be exceeded to the maximum permissible limit. Laboratory analysis results of soil quality as shown in Table 4.14 and Appendix VIII.

Table 4-14 Results of Soil Quality

No .	Parameters	Unit	Analysis Value					Minimum Measurement Range of Methods
			S-1	S-2	S-3	S-4	S-5	
1.	Aluminum	mg/kg soil	<0.05	<0.05	<0.05	<0.05	<0.05	<b>0.05 mg/kg soil</b>
2.	Arsenic	mg/kg soil	<0.025	<0.025	<0.025	<0.025	<0.025	<b>0.025 mg/kg soil</b>
3.	Chloride	g/kg soil	0.07	0.09	0.13	0.04	0.2	<b>0.025 mg/kg soil</b>
4.	Copper	mg/kg soil	<2.5	<2.5	<2.5	<2.5	<2.5	<b>2.5 mg/kg soil</b>
5.	Cyanide	mg/kg soil	<0.05	<0.05	<0.05	<0.05	<0.05	<b>0.05 mg/kg soil</b>
6.	Extractable Acidity	cmol/kg soil	5.2	5.2	6.8	7.1	6.3	<b>0.25 cmol/kg soil</b>
7.	Manganese	mg/kg soil	<1	<1	<1	<1	<1	<b>1 mg/kg soil</b>
8.	P - Alkalinity	mmol/l extract	0	0	0	0	0	<b>0.2 mmol/l extract</b>
9.	pH	-	6.5	6.34	6.6	6.5	6.4	<b>0.1</b>
10.	Total Alkalinity	mmol/l extract	3.6	1.4	3.7	2.6	3.8	<b>0.2 mmol/l extract</b>
11.	Total Iron	mg/kg soil	<0.5	<0.5	<0.5	<0.5	<0.5	<b>0.5 mg/kg soil</b>

## 4.2.8 Groundwater

### 4.2.8.1 Overview

Groundwater occurrence is directly related to geology, as it provides the matrix for sub-surface storage and flow. Groundwater zones of Shan Plateau within the Mid-Ayeyarwady Basin of Myanmar 2(see figure 4.23). In terms of groundwater systems, the geological units of the Shan GWZ can be divided into six aquifer groups: (i) Alluvial aquifers, (ii) Plateau Limestone, (iii) Limestone/Sandstones, (iv) Sandstones and equivalents, (v) Metamorphic and meta-sedimentary aquifers, and (vi) Granitic aquifers. The Crown Cement Factory is located in Plateau Limestone aquifer, Shan Plateau (see figure 4.24). The Plateau Limestone aquifer unit represents the largest aquifer of the Shan Plateau within the Ayeyarwady Basin. With thickness up to several thousand metres, karst development and structures are often observed, including fractures, sinkholes, and caves. The aquifer is thick and drilling is usually to depths of 75 m to 130 m, occasionally deeper with a maximum of 250 m (800 feet). Groundwater use in the Shan Plateau is historically from springs flowing from mountain ranges and shallow wells in the alluvial aquifers in valley bottoms and along rivers. Approximately 57% of households depend on groundwater for domestic supply in rural areas.

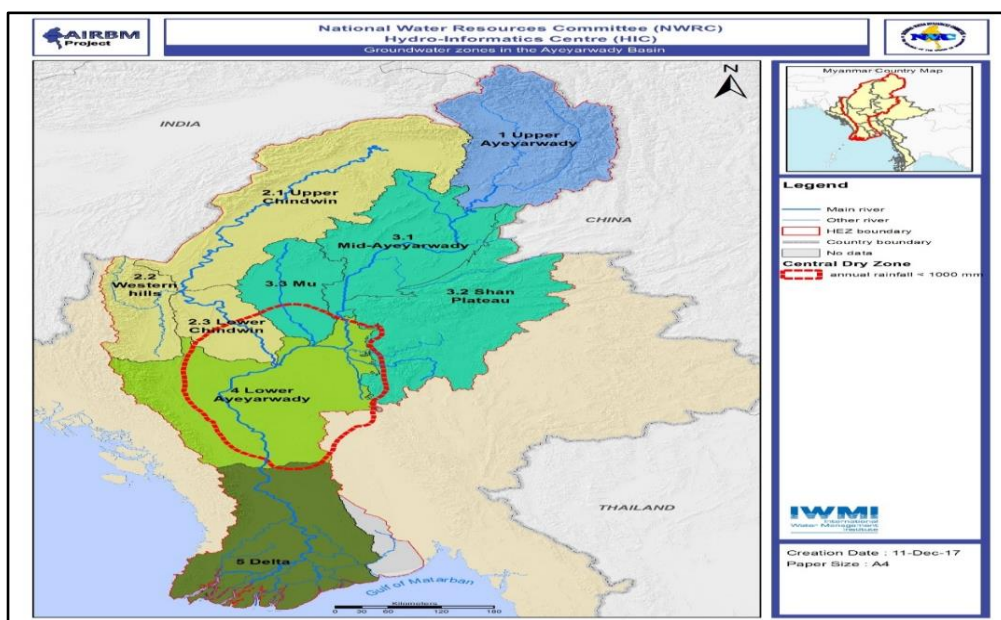


Figure 4-23 Groundwater Zones within the Ayeyarwady Basin

Source: Ayeyarwady State of The Basin Assessment (Soba) Report, Modified By GMES

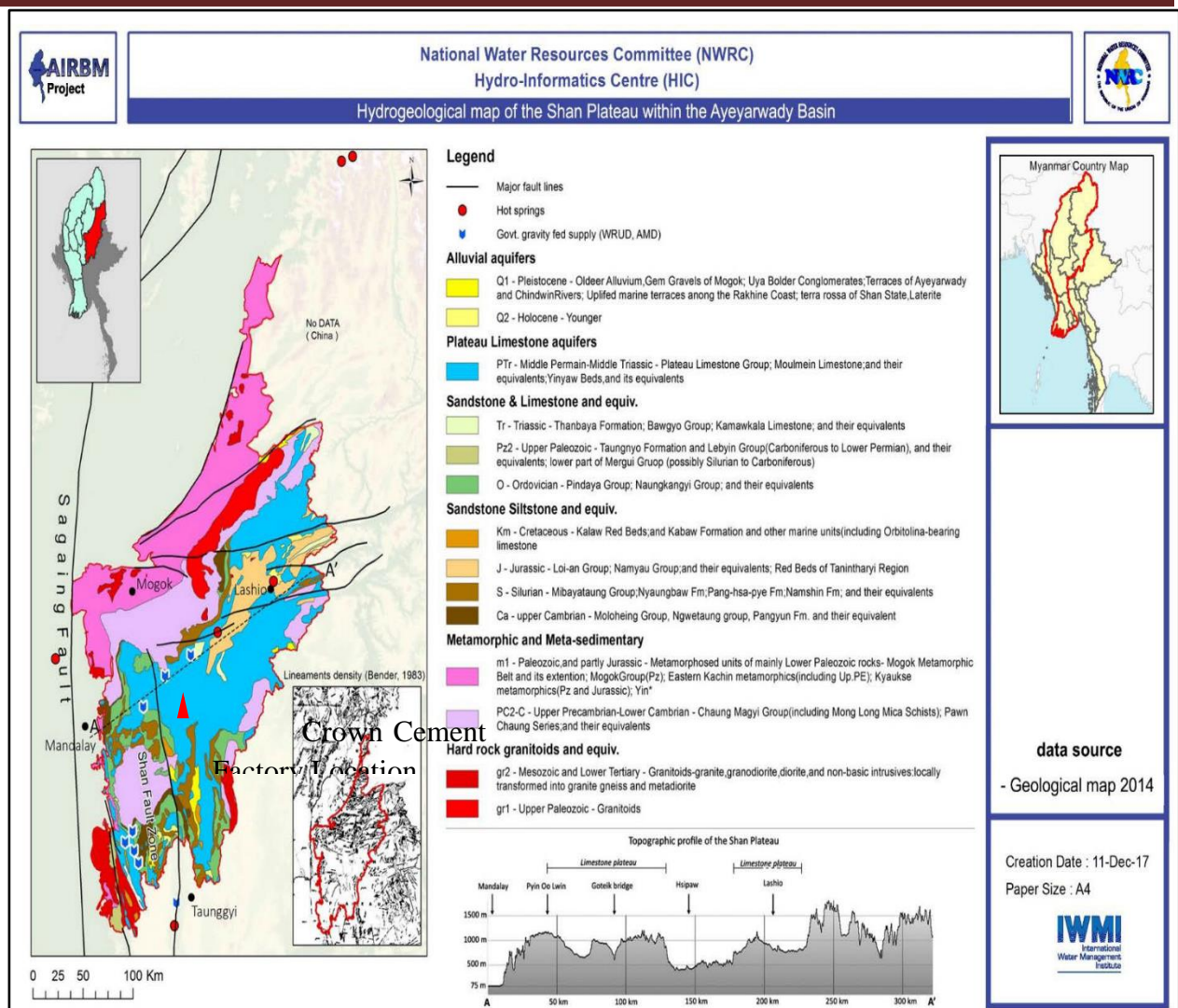


Figure 4-24 Hydrogeological map of the Shan Plateau within the Ayeyarwady Basin

Source: Ayeyarwady State of the Basin Assessment (Soba) Report, Modified By GMES

#### 4.2.8.2 Primary Baseline Sampling

##### Sampling Methodology

Groundwater sample was collected from tube well outside of the plant area. Samples were taken and filled into a sterilized plastic and glass sample containers (depending on the measuring parameters). All sampling procedures were conducted strictly according to relevant guidelines and standards with supervision from GMES team technical experts. All groundwater samples were analyzed in the ALAM Ecological Lab.

##### Sampling Locations

Groundwater sampling was conducted at four (4) locations near the plant site and all samples are collected at the date of 12th to 13th October 2023. The Sampling locations are as shown in Table 4.15 and in Figure 4.26. Photos of groundwater sampling activities are shown in Figure 4.25.

Table 4-15 Coordinates of water sampling locations



Sampling Name	Coordination Points		Description of Location
	Latitude	Longitude	
<b>GW1</b>	22°22'7.03"N	96°42'44.95"E	Tube Well at Lauk Hpan Village
<b>GW2</b>	22°20'34.68"N	96°43'20.46"E	Tube Well at Lei Gyi Taw Village
<b>GW3</b>	22°19'32.53"N	96°40'41.80"E	Tube Well at Kone Mon Village
<b>GW4</b>	22°21'9.48"N	96°40'23.22"E	Tube Well at Khe Hsan Village



Figure 4-25 Photos of Water Sampling

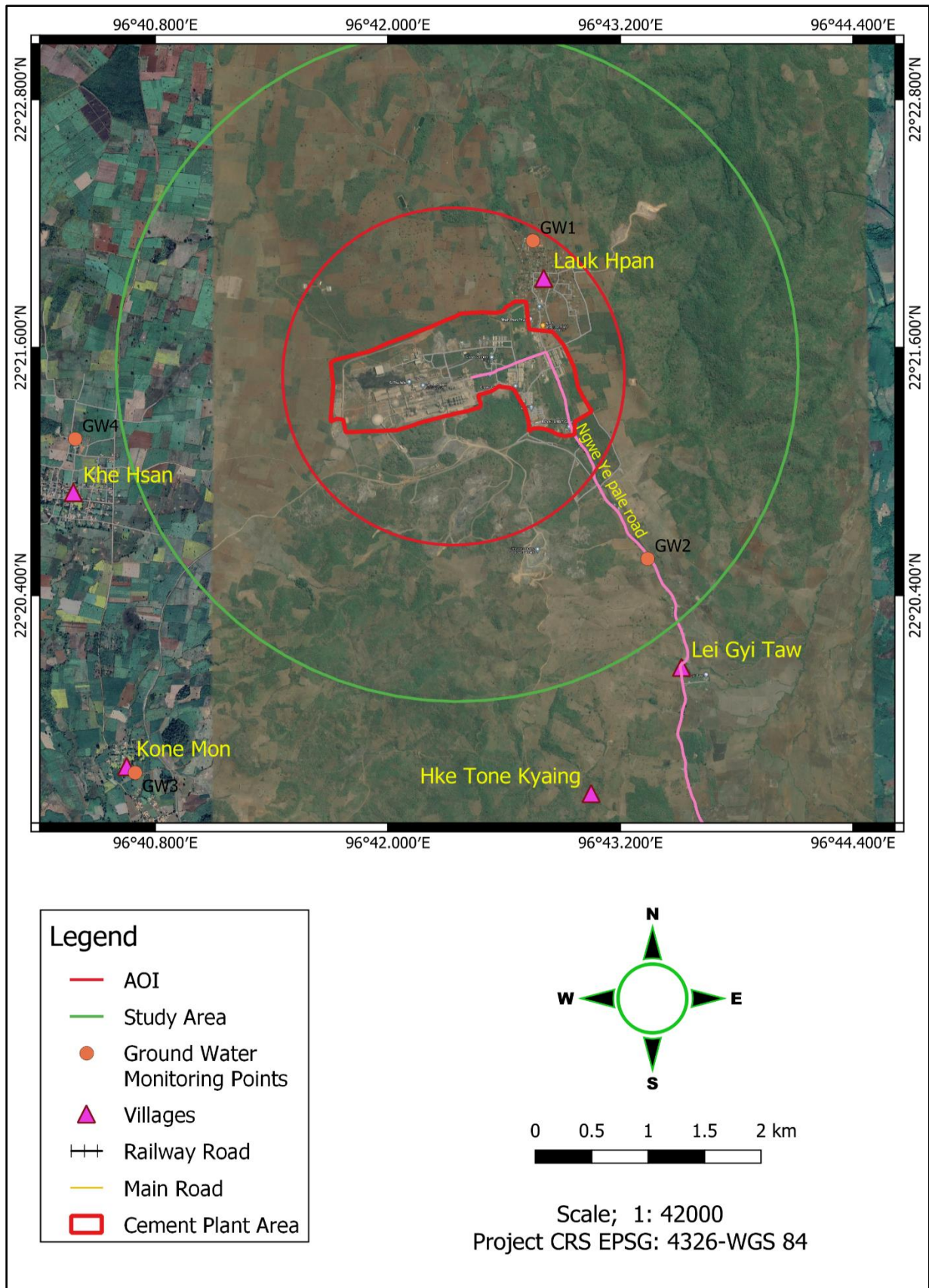


Figure 4-26 Map of Groundwater Sampling Locations



**Sampling Results**

Laboratory results of groundwater samples are shown in Table 4.16. Most of parameters were within the desirable limits as per Drinking Water Standards.

Table 4-16 Laboratory analysis of groundwater sampling

Parameters	Units	Analysis Value				Drinking Water Standards		
		GW1	GW2	GW3	GW4	WHO _2011	US EPA_2018	Myanmar National
pH	S.U	7.9	7.8	8	7.3	-	-	6.5 – 8.5
Turbidity,	FAU	<5	5	10	<5	-	-	≤ 5
Total Dissolved Solids (TDS)	mg/l	186	340	70	410	-	-	≤ 1000
Hardness	mg/l	81	168	33	174	-	-	≤ 500
Chloride (Cl)	mg/l	1.3	2	3.1	14.5	-	-	≤ 250
Cyanide (CN)	mg/l	<0.01	<0.01	<0.01	<0.01	-	-	-
Aluminum (Al)	mg/l	0.01	0.02	0.01	0.02	-	≤ 0.2	-
Arsenic (As),	mg/l	0.01	0.005	0.005	0.005	≤ 0.05	-	-
Copper (Cu)	mg/l	0.05	ND	0.03	0.05	-	≤ 2	-
Iron (Fe)	mg/l	0.21	0.32	0.22	0.34	-	-	≤ 1
Manganese (Mn)	mg/l	<0.1	<0.1	0.2	0.5	-	-	≤ 0.4
Alkalinity	mg/l	9	14	15	7	-	-	-
Sulphate (SO <sub>4</sub> )	mg/l	<2	<2	<2	<2	-	-	≤ 250

“ND” “Not Detected”

“-” “No reference standard

## **4.3 Biological Resources**

### **4.3.1 Introduction**

The project area, Crown Cement Factory, is located at Lauk Hpan Village, Long Yon Village Track, Naung Hkio Township, Kyauk Me District, and Northern Shan State. The Biological primary survey was undertaken from 4th July 2015 and 23rd-24th August 2015, during mild conditions to obtain information on terrestrial flora and fauna values within the Study Area. The nearest water body is Nan Pan Hsi Creek, which is 4.15 kilometers away. Upper Ayeyarwady Catchment Area Corridor and Mehon (Myintnge River) KBA as the type of Important Bird Area (IBA) are included within the Naung Hkio Township but there is no KBA within the Study Area (see in Figure 4.28).

### **4.3.2 Desktop Assessment (Secondary Data)**

#### **4.3.2.1 Ecoregion Description**

Myanmar has 14 major ecoregions, or relatively large areas of land or water which each contain characteristic, geographically distinct assemblages of plants and animals in Figure 4.27. More than half the country is covered by 3 of the 14 ecoregions - Ayeyarwady moist deciduous forest (20.6%), Northern Indochina subtropical forest (20.5%) and Mizoram-Manipur-Kachin rain forests (10.5%). Overall, 8 of the forest ecoregions (and 72% of Myanmar’s forest areas) were classified as either vulnerable or critically endangered some years ago. In this context, the 4 ecoregions classed as vulnerable (61%) are likely to become endangered unless the factors threatening their survival improve. The 4 ecoregions classed as critically endangered (11%) are facing an extremely high risk of extinction, as these habitats are extremely fragmented and continue to decline in area and quality. Less than 1% of these ecoregions are within Protected Areas. The project is located in Northern Indochina Tropical Forests.

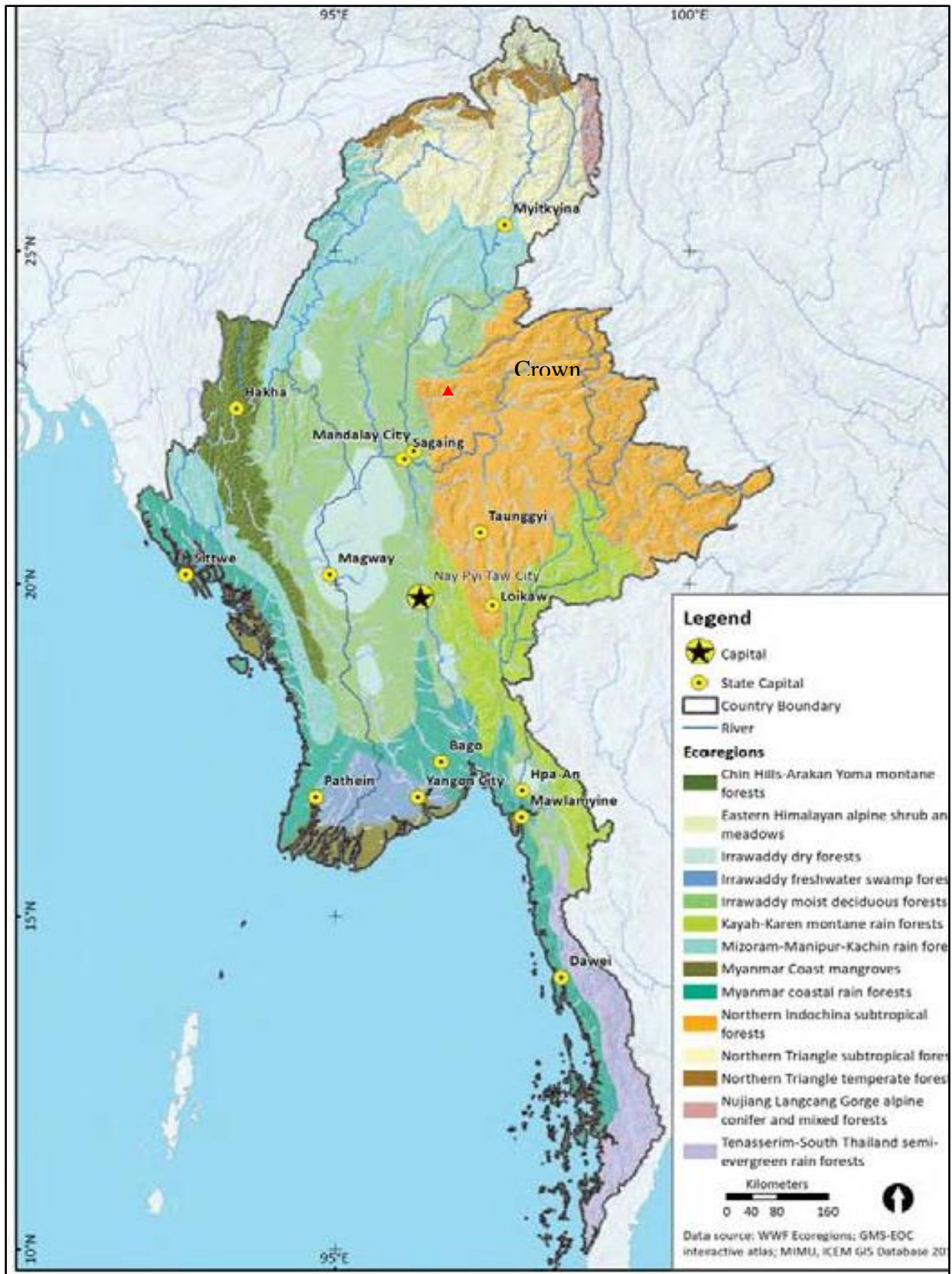


Figure 4-27 Ecoregion in Myanmar

Source: Supplement-Biodiversity-in-Myanmar-including-Protected-Areas-and-Key-Biodiversity-Areas.pdf (modify by GMES)



### 4.3.2.2 Key Biodiversity Area

Currently, there were 45 officially recognized Protected Areas<sup>3</sup> in Myanmar in which 8 are ASEAN Heritage Park–AHP as well as 76 KBAs<sup>4</sup> of which 54 are recognized as IBAs<sup>5</sup> but the majority has no legal status. KBA designation assists countries in identifying priority areas for future conservation efforts and protection; and supports development planning by highlighting the value of areas so that impacts on biodiversity can be avoided. KBAs are also being increasingly being targeted as potential areas for offset sites. Currently, KBAs cover 17% of the country.<sup>6</sup> Upper Ayeyarwady Catchment Area is included within the Naung Hkio Township and Mehon (Myintnge River) KBA as the type of Important Bird Area (IBA is located within the Naung Hkio Township which is 20 km apart from the Factory. There is no KBA within the Study Area (see in Figure 4.28).

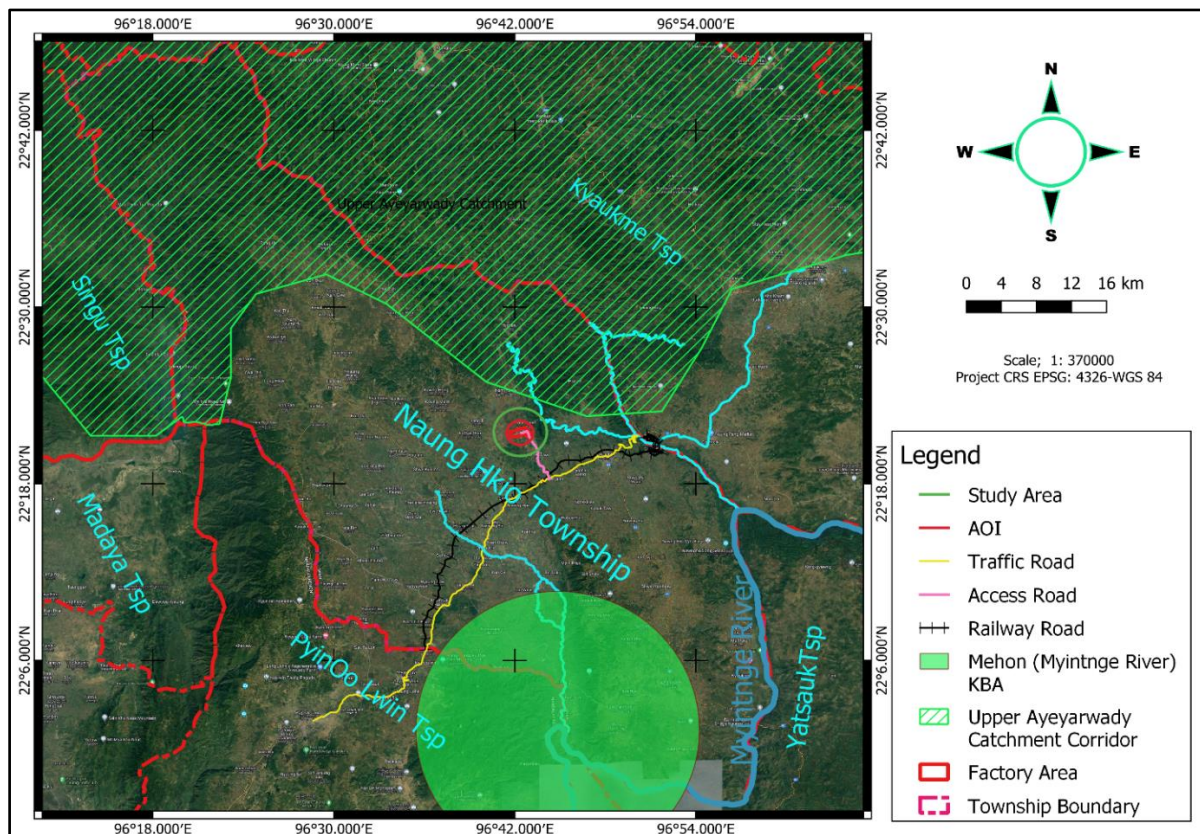


Figure 4-28 Key Biodiversity Area at Project Site

3 <https://www.forestdepartment.gov.mm/>

4 National Biodiversity Strategy and Action Plan-2011

5 IBAs are important areas for birds designated using internationally agreed criteria applied by local experts under the aegis of BirdLife International (see <http://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas>). Birds have been shown to be effective indicators of biodiversity in other animal groups and plants – especially when used to define a set of sites for conservation.

6 Supplement-Biodiversity-in-Myanmar-including-Protected-Areas-and-Key-Biodiversity-Areas.pdf

### **4.3.3 Biodiversity Field Survey (Primary Data)**

#### **4.3.3.1 Field Survey Area**

The biodiversity survey areas, shown in Figure 4.29 were determined based on knowledge of the significant biodiversity impact areas. In project surrounding area, data collection was taken within 3 km radius circular range of project site. In the data collection of flora and fauna, total of (22) sampling points were included in Table 4.17.

#### **4.3.3.2 Survey Methodologies**

Aerial image from Good Earth was used to provide a spatial understanding of the pattern of vegetation communities and human uses on the site, and to map access routes and internal tracks. Direct observation method is used to collect necessary data and information. Walking-through survey method was used to access for flora and fauna species in and around the project site (see Figure 4.30). Specimen collection was taken in and surrounding area of the project site. Identification and list of the plant and animal species inhabiting in the surrounding area were made.

The Field survey used the following sampling methodologies:

- Direct observation;
- Observation of fauna signs (e.g. footprints, scat, and feeding signs);
- Mist net survey; and
- Consultation with local residents

Further methodology on specific surveys will be provided in the sections below,

Table 4-17 Representative GPS points of Biodiversity Survey in Farm Area

<b>No.</b>	<b>Latitude</b>	<b>Longitude</b>
1	22°21'13.91"N	96°42'34.12"E
2	22°21'8.03"N	96°43'4.72"E
3	22°21'20.93"N	96°42'51.45"E
4	22°21'41.10"N	96°42'27.44"E
5	22°21'30.62"N	96°42'27.17"E
6	22°22'13.79"N	96°42'23.04"E
7	22°22'14.65"N	96°41'32.50"E
8	22°21'44.81"N	96°41'38.05"E
9	22°20'38.13"N	96°41'36.35"E
10	22°21'21.86"N	96°41'2.64"E



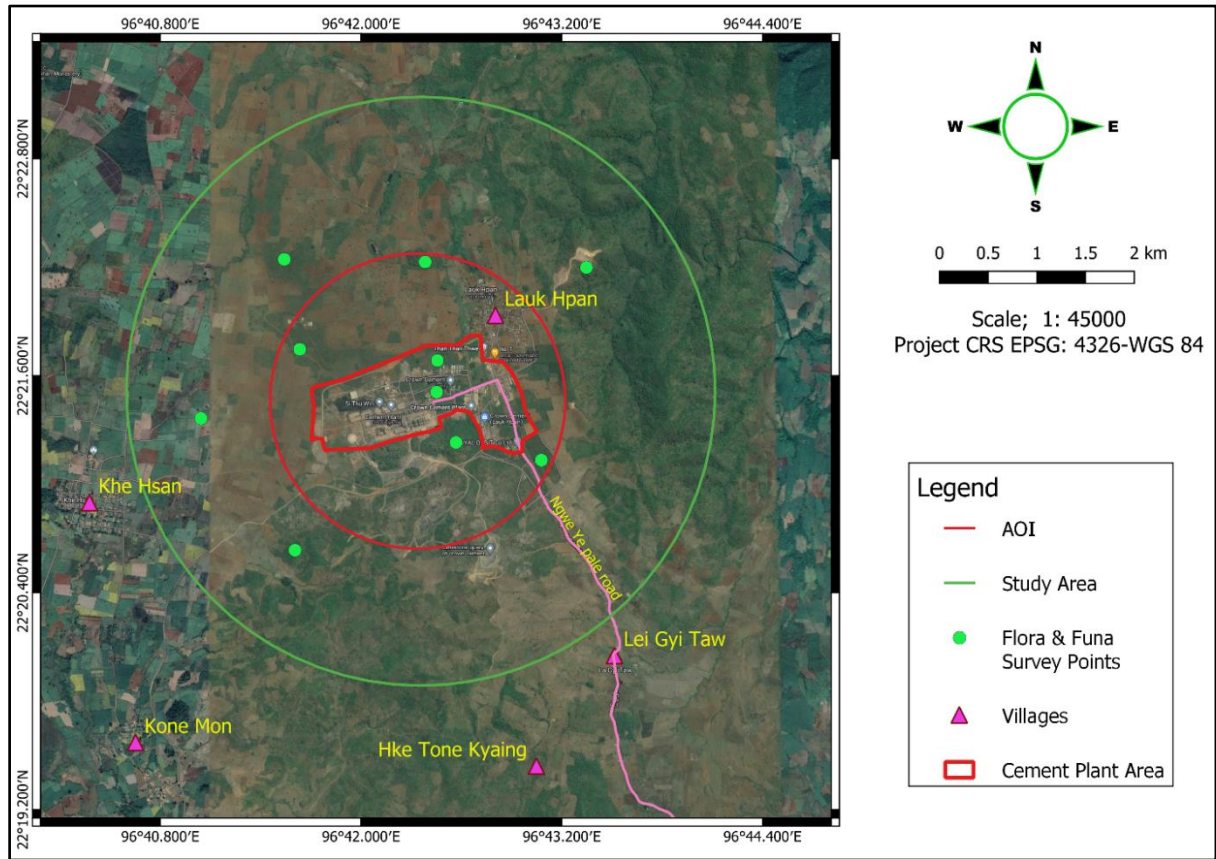


Figure 4-29 Map of Biodiversity Survey



(A-B) Survey in the project site area; (C) Taking photographs; D) Specimen collection for identification

Figure 4-30 Field activities:

**4.3.3.3 Flora  
Methods**

The Global Positioning System was used to navigate and mark the coordinates of the sample plots. The plant species in and around of the project site was observed and listed by walking –through in field area. It is approximately within 3 km radius of the project site. Specimen collections, press and taking photographs for some species were conducted for species identification (see Figure 4.30)., Generally, in the nos. of 10 coordinate points, 30x30 meter quadrants were set up and tree species in the plot were collected and population of each species were also counted. The species identification was carried out by using key to families of flowering plants and appropriate literature and confirmed by matching with herbarium specimens of Department of Botany, University of Yangon.

### **Materials**

Materials used for recording are strings for sample plotting and transecting, digital camera for recording, GPS, maps, heavy duty plastic bags, newspapers, alcohol, spray jug (for fixing specimens), 10 x lens, permanent marker, field note books, field press, drying press and dryers.

### **Survey Results**

The project area is located at Naung Hkio Township, Northern Shan state. The total area of project site including these building and dormitory may be 460 acres. There are 137,257 numbers of teak plants at near the Crown Cement Factory as Yesutan. Other cultivated plants as landscaping in the Crown Cement Plant and Yesutan are listed in Table 4.19.

There are some trees which were recultivated for shade and fruits trees. At presents there are 32 tree species, 5 small trees, 8 shrubs, 2 climbers, 4 herbs, and 1 bamboo and 1 saprophytic herb. Some species list in direct impact zone is shown in Table 4.18. (See Appendix XII)

Table 4-18 Some Species List in Direct Impact Zone

<b>No.</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Family Name</b>	<b>Habit</b>	<b>IUCN</b>
1.	Bambo	<i>Bambusa tuldoides</i> Munro.	Poaceae	Grass	
2.	Hin-nu-nwe	<i>Amaranthus mangostanus</i> L.	Amaranthaceae	H	
3.	Ingyin	<i>Shorea siamensis</i> (Kurz) Miq.	Dipterocarpaceae	T	LC
4.	Kadiba	<i>Diospyros discolor</i> Willd.	Ebenaceae	T	
5.	Kyan-pyuu	<i>Tectona grandis</i> L. f.	Verbenaceae	T	
6.	Kywe-gaw	<i>Citrus maxima</i> (Burm.) Merr.	Rutaceae	T	LC
7.	Kyetsu	<i>Jatropha pungenis</i> Forssk.	Euphorbiaceae	S	

8.	Khayae	<i>Mimusops elengi L.</i>	Sapotaceae	T	LC
9.	Kalamet	<i>Musa sapientum L.</i>	Musaceae	T	
10.	Lime	<i>Citrus aurantiifolia(Christm.) Sw.</i>	Rutaceae	S	
11.	Mykuklu	<i>Artocarpus gomeziana Wall</i>	Moraceae	T	
12.	Nanthaphu	<i>Musa sapientum L.</i>	Musaceae	H	
13.	Nay-kyar	<i>Tithonia diversifolia A. Gray</i>	Asteraceae	S	
14.	Shaw-phyu	<i>Sterculia versicolor Wall</i>	Sterculiaceae	T	
15.	Shaw-wah	<i>Talipariti macrophyllum ( Roxb).</i>	Malvaceae	T	
16.	Su-lar-na-phar	<i>Heracleum candicans Wall.</i>	Apiaceae	S	
17.	Tabin-shew-te	<i>Biophytum sensitivum (L.) DC.</i>	Oxalidaceae	S	
18.	Thityth	<i>Schima wallichii (DC.) Korth.</i>	Theaceae	T	LC
19.	Thit-hmwe	<i>Aquilaria agallocha Roxb.</i>	Thymelaeaceae	S	
20.	Rubber	<i>Ficus elastic (Roxb).</i>	Moraceae	T	
21.	Yaman-nge	<i>Arundinella bengalensis(Spreng.)</i>	Poaceae	Grass	
22.	Zi	<i>Ziziphus jujube Lam.</i>	Rhamnaceae	T	LC

CL=Climber, H=Herbs, S=Shrubs, ST=Small Tree, T=Tree

According to the list of IUCN (2019), there were no globally threatened and endemic species in the direct impact zone. Cultivated species list in direct impact zone is shown in Table 4.19.

Table 4-19 Cultivated Species List in Direct Impact Zone

No.	Common Name	Scientific Name	Family Name	Habit	IUCN
1.	Akyaw	<i>Plumeria obtusa L.</i>	Apocynaceae	S	
2.	Banda	<i>Terminalia catappaL.</i>	Combretaceae	T	LC
3.	Cherry	<i>Prunus cerasoides D. Don</i>	Rosaceae	T	LC
4.	Gangaw	<i>Mesua ferrea L..</i>	Hypericaceae	T	
5.	Hnin-si-ani	<i>Rosa indica L..</i>	Rosaceae	CL	
6.	Hnin-si-phyu	<i>Rosa alba L.</i>	Rosaceae	S	
7.	Htaw-bat-thi	<i>Persea americana Mill.</i>	Lauraceae	T	LC
8.	Khayay	<i>Manilkara hexandra(Roxb.)</i>	Sapotaceae	T	
9.	Ko-kko	<i>Samanea saman(Jacq.) Merr.</i>	Mimosaceae	T	LC

10.	Kyauk-kat-nyaung-nwe	<i>Ficus pumila</i> L.	Moraceae	CL	
11.	Kyun	<i>Tectona grandis</i> L. f.	Verbenaceae	T	
12.	Lale	<i>Meliosma simplicifolia</i> Walp.	Meliosmaceae	T	
13.	Magyi	<i>Tamarindus indica</i> L.	Caesalpiniaceae	T	LC
13.	Ma-ho-gany	<i>Swetenia macrophylla</i> King.	Meliaceae	T	
14.	Mezali	<i>Senna siamea</i> (Lam.)	Caesalpiniaceae	S	LC
16.	Nanat	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	H	
17.	Nanat-gamon	<i>Billbergia nutans</i> H. Wendl.	Bromeliaceae	S	
18.	Nantha	<i>Millettia peguensis</i> Ali.	Fabaceae	T	DD
19.	Nanthaphy	<i>Musa sapientum</i> L.	Musaceae	H	
20.	Nay-kyar	<i>Tithonia diversifolia</i> A. Gray	Asteraceae	S	
21.	Ngu	<i>Cassia fistula</i> L.	Caesalpiniaceae	T	LC
22.	Nwe-thar-gee	<i>Nerium oleander</i> L.	Apocynaceae	CL	LC
23.	Nyaung-gyat	<i>Ficus obtusifolia</i> Roxb.	Moraceae	ST	LC
24.	Okhne	<i>Streblus asper</i> Lour.	Moraceae	T	LC
25.	Padok	<i>Pterocarpus macrocarpus</i> Kurz.	Fabaceae	T	EN
26.	payuk	<i>Cinnamomum camphora</i> (L.)	Moraceae	T	
27.	Peinne	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	T	
28.	Pon-nyet	<i>Calophyllum inophyllum</i> L.	Hypericaceae	T	LC
29.	Pyinma	<i>Lagerstroemia speciosa</i> (L.)	Lythraceae	T	
30.	Seinpan	<i>Delonix regia</i> (Bojer ex Hook.)	Caesalpiniaceae	T	LC
31.	Seinpan-pyar	<i>Jacaranda acutifolia</i> Humb. &Bonpl.	Bignoniaceae	T	
32.	Sein-ta-kyu	<i>Tecoma stans</i> (L.) H.B.K.	Bignoniaceae	T	LC
33.	Shauk-cho	<i>Citrus aurantiifolia</i> (Christm.) Sw.	Rutaceae	S	
34.	Shaw	<i>Sterculia angustifolia</i> Jack	Sterculiaceae	T	
35.	Shaw-phyu	<i>Sterculia versicolor</i> Wall.	Sterculiaceae	T	
36.	Shwe-wa	<i>Bambusa vulgaris</i> var. <i>striata</i>	Poaceae	T	
37.	Sit	<i>Albizia procera</i> (Roxb.)	Mimosaceae	T	LC
38.	Su-la-na-phar	<i>Oldenlandia corymbosa</i> L.	Rubiaceae	H	
39.	Swe-daw	<i>Bauhinia acuminata</i> L.	Caesalpiniaceae	ST	LC
40.	Tabinding	<i>Schizostachyum distans</i> (C.E.Parkinson) H.B.	Poaceae	Saprophytic H	



41.	Tama	<i>Azadirachta indica</i> A. Juss.	Meliaceae	T	LC
42.	Taung-htan	<i>Livistona rotundifolia</i> (Lam.)	Arecaceae	T	
43.	Taung-mayo	<i>Alstonia scholaris</i> (L.)	Apocynaceae	T	LC
44.	Tayok-saga	<i>Plumeria rubra</i> L.	Apocynaceae	ST	LC
45.	Thabye-ga	<i>Grevillea robusta</i> A. Cunn. ex R. Br.	Proteaceae	T	
46.	Thanat-kha	<i>Chloranthus officinalis</i> Blume.	Chloranthaceae	ST	
47.	Thayet	<i>Mangifera indica</i> L.	Anacardiaceae	T	DD
48.	Thayin	<i>Gomphostemma strobilinum</i> var	Lamiaceae	H	
49.	Thinbaw	<i>Carica papaya</i> L.	Caricaceae	ST	DD
50.	Tulip tree	<i>Liriodendron tulipifera</i> L.	Magnoliaceae	T	LC
51.	U-clit	<i>Eucalyptus camaldulensis</i> Dehnh .	Myrtaceae	T	NT
52.	Wa-bo	<i>Dendrocalamus calostachyus</i> (Kurz).	Poaceae	Bamboo	
53.	Zalat	<i>Tabernaemontana divaricata</i> (L.)	Apocynaceae	S	
54.	Ziziwa	<i>Gardenia jasminoides</i> Ellis	Rubiaceae	S	

CL=Climber, H=Herbs, S=Shrubs, ST=Small Tree, T=Tree

According to the investigation in the list of IUCN, there were no endanger and endemic species in the direct impact zone.

Table 4.20 shows the cultivated plants in landscaping area of Crown Cement Plant and the total area is about 500 acres around the cement plant.

Table 4-20 Cultivated Plants for Landscaping in Crown Cement Plant

No.	Name of Tree	No. of Tree
1	Htin-shu	597
2	Kokko	2361
3	Yamanay	12996
4	Pyin-ma	20
5	Yu ka lip	51000
6	Pyinkatoe	4250
7	Kyun	86180



**Environmental Impact Assessment Report  
For “Crown Cement Plant 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd.*

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8	Tha-yet	571
9	Pein-nae	423
10	Sein Pane	838
11	Thit Mawe	3000
12	Nant Thar Ni	1000
13	Other	19921
<b>Total</b>		<b>137257</b>

*Source: Office of Crown Cement Factory in Naung Hkio Township, Northern Shan State*

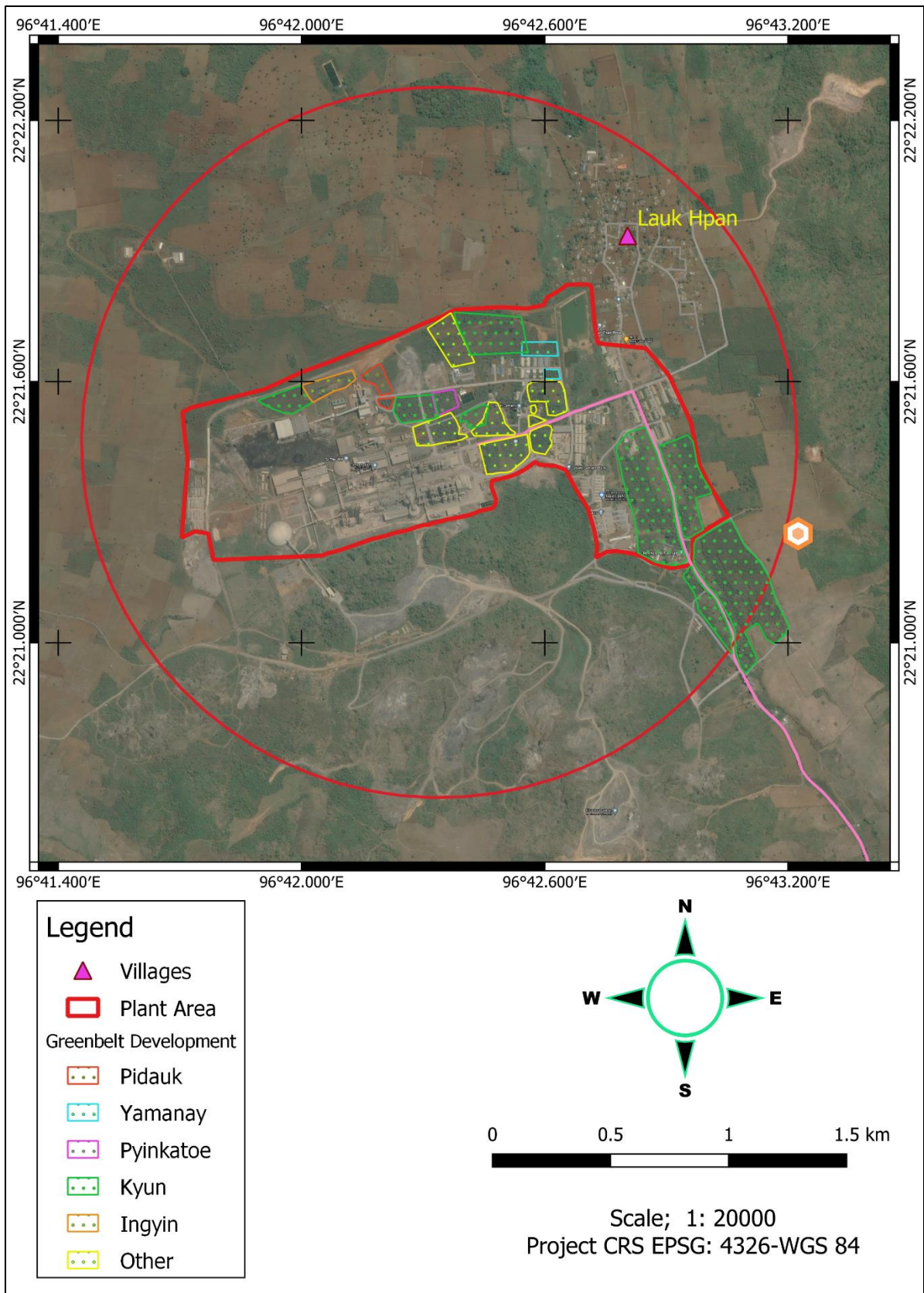


Figure 4-31 Cultivated Plots in Landscaping Area of Crown Cement Plant

#### **4.3.3.4 Fauna**

##### **Method**

Biodiversity of fish, amphibians, reptiles, birds and mammals are assessed at the present study. The survey is carried out by specimen collections for the insects (dragonflies and butterflies), fish, frogs, toads, snakes (Herpetofauna), rodents (mice and rats) as voucher specimens. Butterflies, dragonflies, amphibians, mammals and reptiles were caught for the voucher specimens to identify down to species taxonomic level. Birds were studied by watching with the aid of field guide book and binoculars. Voucher specimens of all taxa were identified based on systematic taxonomic keys. References for the specific fauna for taxonomic keys are included.

##### **Results**

According to the fauna survey for Ngwe Yi Pale Cement Plant, a total of 100 species representing butterfly (17 species), dragonfly and damselfly (15 species), bee (2 species), fish (11 species), frog and toad (9 species), lizard and skink (5 species), Snake (3 species), birds (24 species) and Mammals (14 species) are recorded as described in Table 4-21. There is no endangered and endemic species under IUCN Red list category. The significance of biodiversity in an ecosystem and complex interrelations with other components determines the structure and productivity of ecosystems, as well as contributing to their functionality. All living existing organisms inhabiting in the direct zones will disappear definitely after this project.

Table 4-21 List of Order, Family, Species for Fauna

<b>Species</b>	<b>Order</b>	<b>Family</b>	<b>Species</b>
Butterfly	1	7	17
Dragonfly and Damselfly	2	3	15
Honey Bee	1	1	2
Fish	2	7	11
Frog and Toad		2	9
Lizard and skink		2	5
Snake		1	3
Bird	7	16	24
Mammal	8	10	14
<b>Total</b>			<b>100</b>

## Reptiles and Amphibians Survey

### Survey Method

The Survey work mainly involved interview survey and visual inspection with active searching for amphibians and reptiles. No secondary data is available. These animals are observed in potential resting and foraging places, swamp area and hidden places under logs and among the bushes and trees and water edge. No specimen collection was made without necessary. Photographs were taken the specimen in the natural condition. Field guide books were used to identify the observed species by checking with taken photographs of the specimens. Observe frequency was counted to investigate the abundance and distribution. Interview survey was also used for additional information.

### Survey Result

A total of 17 species of 8 families of Class Amphibia (4 families & 8 species) and Reptilia (4 families & 9 species) of Herpetofauna are recorded from this survey area. All species are very few numbers of collected specimens in Table 4.22 and photos of some species are in Figure 4.32. It could be assumed that species, number and population size is locally disappeared due to discharge of waste from factory and human impacts. No endemic or endangered species is recorded.

Table 4-22 Systematic Position of Recorded Herpetofauna Collected from Survey Area

Family	Scientific Name	Common Name	Local Name	Habit
Bufonidae	<i>Bufomelanostictus</i>	Common toad	Phar-pyok	Near pond
	<i>Bufomacrotis</i>	Large ear toad	Hparpyokthay	On the ground
Microhylidae	<i>Kaloulapulchra</i>	Common bull frog	Phar-kyauung	On the ground
	<i>Microhyla ornate</i>	Ber narrow mouthed frog	The' phar	Near pond
Ranidae	<i>Rana limnocharis</i>	Paddy frog	Sar-phar	In the pond
	<i>Rana tigerina</i>	Khaing land frog	Kaing-phar	Mud
	<i>Ocidozyga sp.</i>	Swamp floating frog	Phar-han-lat	pond
Rhacophoridae	<i>Polypedatesleucomystax</i> <i>P. maculatus</i>	Common tree frog	Phar-pyan	Crevice of roof
Geckkonidae	<i>Hemidactylus frenatus</i>	Common house gecko	Eing-myaung	House
	<i>Tropidophoruspp</i>			



Agamidae	<i>Calotes versicolor</i>	Garden fence lizard	Tat-too	On the trunk
	<i>Calotesmystaceus</i>	Blue crested lizard	Poat-thin-nyo	On the trunk
Scincidae	<i>Mabuyamultifasciata</i>	Common sun skink	Kyal-pyar-kin-late-shaw	Storage house
Colubridae	<i>Xenochrophispiscstor</i>	Chequered keel back	Yal-mway-pyauk-ma	In the water
	<i>Ptyasmucosus</i>	Banded rat snake	Lin-mway	Pond
	<i>Ptyaskorros</i>		Lin-mway	pond



*Polypedatesleucomystax*



*Rana tigerina*



*Strongylopusgrayii*



*Amolops marmaratus*



*Microhyla ornate*



*KaloulapulchraPoly*



*Polypedates cruciger*



*Polypedates maculatus*





Tropidophorusppcalotesemma



Cerberus rhynchops



Ptyasmucosus(Lin Mway)



Ptyaskorros( Lin Mway)

Figure 4-32 Photos of recorded some frogs and snake nearby the project area

### **Bird Survey**

#### **Survey Method**

Random point count method was used for the bird survey and took the photograph of birds by use of Tele-Camera (Nikon D 7200 and lens Tamaron 150-600). Birds were observed with binocular (Nikon 10X40) and identified aided with field guided book for (Craig Robson 2011). Species identification, observed number and habitat utilization were recorded. Nocturnal birds were observed when it becomes dusk. Opportunistic method was also used to census the species richness. Point counting was used to get the relative measure of bird abundance. Information of migratory and threatened bird species were obtained as much as possible.

#### **Survey Results**

24 species of avifauna under 16 families 7 orders were collected in study area in Table 4.23 and Photos of recorded bird species are shown in Figure 4.33. According to their nature and behavior of birds, the survey area is not their original roosting and nesting sites, they come here from another place for foraging. In bird activity pattern, flying pattern is the most common than the others. There are not many tall trees for nesting in that area that means no good habitat is present for the birds. No endemic or endangered species was recorded.

Table 4-23 Systematic Position of Recorded Avifauna

<b>Order/Family</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Vernacular Name</b>
I. Anseriformes		Lesser whistling duck	Sit-sa-li

1. <b>Dendrocygridae</b>	<i>Dendrocygnajavanica</i>		
II. Piciformes 2. <b>Picidae</b> 3. <b>Megalaimidae</b>	<i>Dendrocopos macei</i> <i>Megalaima rubricapilla</i> <i>M. zeylanica</i>	Fulvous-breasted woodpecker	Thit-tauk-nghet
III. Coraciiformes	<i>Alcedo atthis</i>	Common kingfisher	Pain-nyin
IV. Columbiformes 3. <b>Columbidae</b>	<i>Columba livia</i>	Rock pigeon	Kho
V. Pelicaniformes 4. <b>Phalacrocoracidae</b>	<i>Phalacrocorax niger</i>	Little cormorant	Din -kyi
VI. Passeriformes 6. <b>Corvidae</b>  7. <b>Aegithinidae</b> 8. <b>Muscicapidae</b>  9. <b>Sturnidae</b> 10. <b>Hirundinidae</b> 11. <b>Sylviidae</b> 12. <b>Passeridae</b>  13. <b>Zosteropidae</b> 14. <b>Cisticolidae</b> 15. <b>Oriolidae</b>	<i>Corvus splendens</i> <i>Corvus macrorhynchos</i> <i>Copsychus saularis</i> <i>Aegithira tiphia</i> <i>Copsychus saularis</i>  <i>Acridotheres tristis</i> <i>Acridotheres fuscus</i> <i>Hirundo striolata</i> <i>Orthotomus sutorius</i> <i>Passer domesticus</i> <i>Ploceus philippinus</i> <i>Lonchura striata</i>  <i>Zosterops palpebrosus</i> <i>Cisticola juncidis</i> <i>Prinia inornata</i> <i>Oriolus xanthornus</i>	House crow Large –billed crow  Common iora Oriental magpie robin  Common myna Jungle myna Red-rumped swallow Common tailor bird House sparrow Baya weaver White-rumped-munia  Oriental white eye	Kyi-kan Taw-kyi-kan  Shwe-pyi-soe Tha-paik-lwe  Myo-za-yet Taw-za-yet Pyan-hlwar Hnan-pyi-soak Eain-sar Sar-wa-tee Sar-pa-tee  Sar –pa tee
VII. Apodiformes 16. <b>Apodidae</b>	<i>Cypsiurus balasiensis</i>		



*Coraciiformes (King fisher)*



*Dendrocygnajavanica (Sit-sa-li)*



*Cypsiurus balasiensis*



*Columba livia (Kho)*



*Corvus splendens (Kyi-kan)*



*Acridotherestritys (Myo-za-yet)*



*Copsychus saularis (Tha-paik-lwe)*



*Oriolus xanthornus*



*Cypsiurus balasiensis*



*Cisticolajuncidis*



*Prinia inornata*



*Megalaime zeylanica*



*Megapodius nicobariensis*

Figure 4-33 Recorded bird species in and surrounding area of the project site

**Mammal survey**

**Survey Method**

Interview and Direct observation method were used to survey on small mammals in the field. Track and signs of mammals were traced along the trails and water edge. In addition, the presence of mammal species (diurnal and nocturnal species) and threatened species were confirmed by interviewing to local people who are already familiar with those species and location and checked with field guide book with the pictures.

**Survey Result**

Fourteen species of cow, buffalo, monkey, rat, deer, and under 10 families and 8 orders were collected in study area in Table 4.24 and photos of some mammal species are shown in Figure 4-34. Farmers used cows and buffaloes land preparation of paddy fields for rice cultivation.

Table 4-24 Systematic Position of Class Mammalian Fauna Collected from Indirect Impact Zone

<b>Order/Family</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Vernacular Name</b>
I.Cetartiodactyla 1. <b>Bovidae</b>	<i>Bostaurus</i>	Bovine	Cow
II. Artiodactyla 1. <b>Bovidae</b>	<i>B. bubalis</i> <i>B. bubalis .arnee</i>	Bovine	Water Buffalo
III. Primates 1. <b>Lorisidae</b> 2. <b>Cercopithecidae</b>	<i>L.tardigradus</i> <i>Rhiropithecusstrykeri</i>	Monkey	Tree monkey
IV.Rodentia 1. <b>Sciuridae</b> 2. <b>Muridae</b>	<i>Funambuluspalmarum</i> <i>Bandicotabengalensis</i> <i>Mus mucclus</i> <i>Rattusrattus</i>	squirrel rat rat rat	Palm squirrel Lesser bandicoot rat
V. Lagomorpha 1. <b>Leporidae</b>	<i>Lepus nigricollins</i>	deer	Black neck hare
VI. Carnivora 1. <b>Herpestidae</b>	<i>Herpestesfuscus</i>		



VII. Artiodactyla <b>1. Tragulidae</b>	<i>Traguluskanchil</i> <i>Tragulusemminna</i>	deer	Mouse deer
VIII. Soricomorpha <b>1. Soricidae</b>	<i>Suncusmurinus</i>	rat	rat



*BosTaurus*(Cow)



*B.bubalis* (Water Buffalo)

*Mus musculusRattusrattus*







*Tragulus kanchil*



*Tragulus meminna*

Figure 4-34 Photos of Recorded Mammal species in and surrounding area of the project site

### Fish Survey

#### Survey Method

Observation and fish specimens were collected with the help of local people along the small stream/creek nearby the project area. Fish specimen/sample collection was made by use of traditional hook fishing and bamboo fish traps in the creek. Interview to local people was conducted in the field. Some fish samples were obtained from local people who are fishing in the creek.

#### Survey Result

A total of 11 fish species representing 7 families under 2 fish orders, Cypriniformes, and Ophiocephali forms are recorded. The recorded number is only 4 species as specimen vouchers and remaining 6 species are observed from interview survey, meaning that all species are of very small population size in the nature before implementation in Table 4.25 and photos of some fish species in Figure 4.35. No endangered species is recorded.

Table 4-25 Systematic Position of Fish Fauna Collected from Survey Area

No.	Family Name	Scientific Name	Common Name	Local Name
1	<b>I.Cypriniformes</b>	<i>Mystus bleekeri</i>	-	Nga-zin-yine
	Bagridae	<i>Johnius gangeticus</i>		Nga-pot-thin
2	Cyprinidae	<i>Puntius clavatus</i>	-	Nga-khone-ma
		<i>Labeorohita</i>	Rohu	Nga-myit-chin
		<i>Amblypharyngodon mola</i>	-	Nga-bae
3	Anabantidae	<i>Anabas testudineus</i>	Climbing perch	Nga-pya-ma
4	Cobitidae	<i>Nemachelus rubidipinnis</i>	-	Nga-tha-lae-hto
5	Exocoetidae	<i>Exocoetus poecilopterus</i>		Nga-pyan
6	<b>II.Ophiocephaliformes</b>			
	Ophiocephalidae	<i>Monoptera javanensis</i>	Eel	Nga-shint

		<i>Puntius gonionotus</i>	-	Nga-khone-ma
8	Clariidae	<i>Clariasbatracus</i>	Cat fish	Nga-khu



A. *Monopterus javanensis* (Eel)



B. *Exocoetus poecilopterus* (Nga-pyan)



C. *Polynemus paradiseus* (nga-pon-nar)



D. *Channa argus* (Nga-yant )



E. *Oreochromis* (Black Tilapia)  
*Clariasbatracus* (Cat fish, Nga – khu )



H. *Puntius clavatus* (Nga-khone-ma)



F.



G. *Mystus bleekeri* (Nga-zine-yine)

Figure 4-35 Photos of Some recorded fish species from the creek nearby the project area.

## **Insect Survey**

### **Survey Method**

Literature review about insect biology and ecology was conducted to refer in the impact analysis section. Field observation was made to survey on butterfly, dragon fly and bees as an indicator species as they are very sensitive to expose to the pesticides and chemical fertilizers. Random sampling method and sampling encountered rate method were used to collect the sample. Those species were identified by visual observation at the natural condition (flying, feeding and resting position) by use of guide book in the field. Small numbers were collected by aerial net and some collected specimens were packed by triangle paper for further identification.

### **Survey Results**

Thirty-four insect species under Order Odonata (7 families, 17 species) and Order Lepidoptera (3 families, 17 species) are recorded. Since the collected numbers of each species are not many, population size is relatively small and all species are rear species, hence they are vulnerable and easy to disappear. No endemic or endangered species is recorded in Table. 4.26 and Table 4.27. Photos of insect species are shown in Figure 4.36.

Table 4-26 Butterfly Species (Order Lepidoptera) Collected from Survey Area

<b>No.</b>	<b>Family Name</b>	<b>Scientific Name</b>
1	Danaidae	<i>Danausgenutiagenutia</i> <i>Danauslimniacelimniace</i> <i>Danausplexippus</i>
2	Pieridae	<i>Euremahecabecontubernalis</i> <i>Leptosianinanina</i> <i>Euremalaetapseudolaeta</i> <i>Atrophaneuralatreilleikabrua</i>
3	Satyridae	<i>Lethe philemon</i>
4	Nymphalidae	<i>Junoniaatlites</i> <i>Junoniaalmana almanac</i> <i>Hypolimnasbolinajacintha</i> <i>Orsotrienameus</i>
5	Papilionidae	<i>Papiliocresphontes</i>
6	Lycaenidae	<i>Jamidescoruscans</i> <i>Zizulahylax</i>

		<i>Arhopalaamantes</i>
7	Hesperiidae	<i>Megathymusyuccae</i>

Table 4-27 Dragonfly & Damsely of Lepidoptera Collected from Survey

<b>Order/ Suborder</b>	<b>Family</b>	<b>Scientific Name</b>
<b>Order-Odonata</b> <b>Sub-order Zygoptera</b>	<b>Coenagriidae</b>	<i>Ceriagrioncoromandelinum</i> <i>Ceriagrionpraetermissum</i> <i>Ceriagrionnigroflavum</i> <i>Ischnurasenegalensis</i> <i>Agriocnemisdabreui</i>
<b>Sub- order</b> <b>Anisoptera</b>	<b>Libellulidae</b>	<i>Orthetrum Sabina</i> <i>Acisomapanorpoides</i> <i>Diplacodestrivalis</i> <i>Bradinopyga geminate</i> <i>Neurothemistullia</i> <i>Brachythemis contaminate</i> <i>Rhodothemisrufa</i> <i>Trithemiskirby</i> <i>Rhyothemisphyllis</i> <i>Pantalaflavesscens</i>
<b>Order-Hymenoptera</b> <b>Sub-O-Apocrita</b>	<b>Apidae</b>	<i>Apiscerana</i> <i>Apismellifera</i>

There are many Honey Bee farm around Naung Hkio and Honey production is one of the economy in Northern Shan State. It is more benefit for pollination across plants breeding and maintains the ecosystem of the surrounding area.

**Some Butterfly species collected from survey area**





*A. Eurema hecabe contubernalis* *B. Danaus genutiagenutia* *C. Orsotriaena medus*



*D. Jamidescoruscans*



*E. Leptosianina*



*F. Hypolimnas bolina jacinta*



*Junonia atlites*



*H. Atrophaneura latreillei*



*I. zizulahlax*

G.

**Some Damselfly species and bee species collected from survey**



*A. Ceriagrion coromandelianum*



*B. Ceriagrion praetermissum*



*C. Ceriagrion nigroflavum*



*D. Ischnur senegalensis*



*E. Agriocnemis*



*F. Bee Farm*





*G. Honeybee-Worker-Full-pollen-baskets*



*H. Apismelli*



*I. Apiscerana*



*J. Apismellifera*

**Some Dragonfly species collected from survey area**



*A. Orthetrum savanna*



*B. Acisomapanorpoide*



*C. Diplocodestrialis*



*D. Neurothemistulia*



*E. Rhythemis Phyllis*



*F. Thrithemiskirbyi*



*G. Rhyothemis Phyllis*



*H. Pantalaflavescens*



*I. Anisopteraspp*( Dragonfly nymph)



*J. Brachythemis contaminate*

Figure 4-36 Photos of Some recorded insect species from the creek nearby the project area

## 4.4 Social Resources

### 4.4.1 Project Social Area of Influence

The Project site and its surrounding area are referred to as the ‘Study Area’, which stretches 3 km around each of the project site as previously described in **Section 4.1.1**.

The socio-economic baseline will be collected base on the Social Area of Influence (SAoI), which have to be positively or negatively affected by the Project. The Project SAoI of the Project is also defined Naung Hkio Township, and the villages of surrounding project which are based on examination of the project activities and their potential impact extent, concerns of stakeholders.

Based on concerns of stakeholders, Lauk Hpan Village, Lei Gyi Taw Village, and Khe Hsan Village, can impact due to increase in traffic and road accident, noise at night, particulate matter emission, pressure on social services, etc. All of these villages are located within **3 km radius** of the proposed project. So, the SIA team decided the study area should be within **3 km radius** around the proposed project.

### 4.4.2 Data Collection

The information presented in this Section was gathered initially through a desktop review of publicly available sources. In addition, primary data have been collected just

after the Public Consultation session between March 19th and March 23th 2019. The following methods are used for social baseline information;

- (a) ***Drawings and Maps***: Published maps and Google map are used to anticipate impacts on nearest villages, farm lands, daily movement pattern of local people, and potential to blockage of existing draining system.
- (b) ***Site Visits***: A number of visits to the study areas were made to verify the information and data already collected through other sources;
- (c) ***Interviews with Residents and Officials of Local Authorities***: Information and data which are not readily available from official records and databases are sourced from interviews with key informers. Such information and data should include community needs, public concerns, and existing culture and social conditions;
- (d) ***Consultations with Experienced Officials***: Interpretation by professionals and experienced people from developer and local communities are sourced in-depth information and data valuable for choice of alternatives.
- (e) ***Interaction with Government Departments***: Interaction with key government departments such as general administrative office, department of agricultural, department of health etc. are conducted to identify constraints and additional information specific to the individual departments and ministries;
- (f) ***Household Surveys***: Questionnaires and surveys are employed to obtain public needs and concerns from a representative sample household.

Primary and secondary data for socio-economic conditions of local communities were collected from the following data sources.

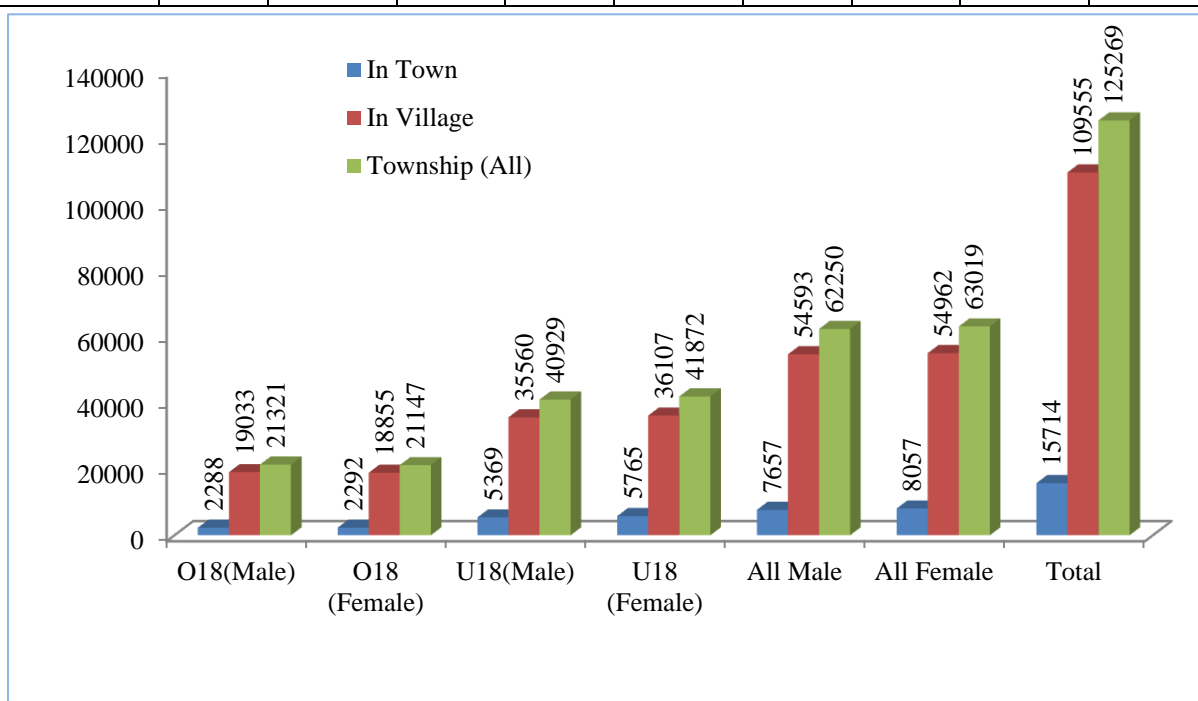
- (a) Review of Ngwee Yi Pale’s policies for local development;
- (b) Regional data from local administrative office;
- (c) Group discussions with key informers,
- (d) Community feedback from household surveys,
- (e) Feedback from government and non-government stakeholders, and
- (f) Public meetings.

### 4.4.3 Demographic Profile

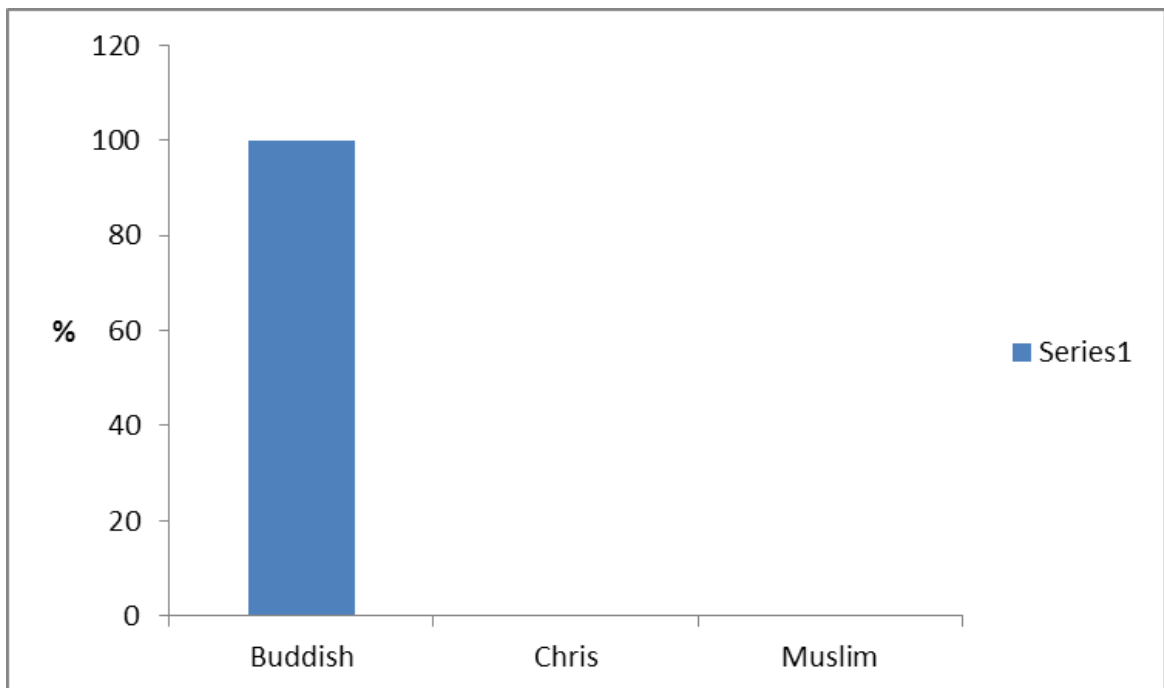
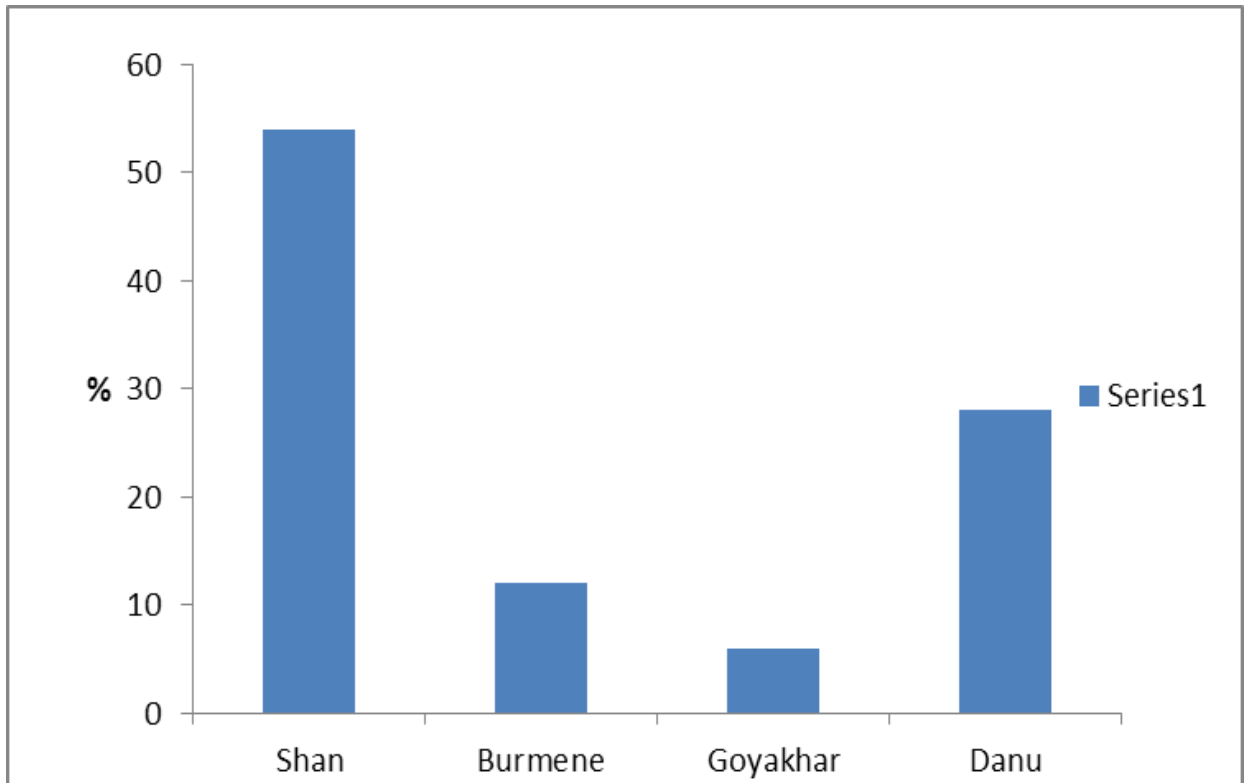
Household information and population details of the overall township (up to the middle of 2015) are described in Table 4.28. As indicated in the table, majority of township population live in rural area. Female population slightly outnumbered males. Over 66% of township population was persons younger than 18 years of age. According to the 2014- Union Census, total dependency ratio of Naung Hkio Township was 49.3. Population density is estimated as 226 persons per sq. mile in the township.

Table 4-28 Household and Population of Township

Residence	Older than 18			Younger than 18			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<b>Urban</b>	2288	2292	4580	5369	5765	11134	7657	8057	15714
<b>Rural</b>	19033	18855	37888	35560	36107	71667	54583	54962	109555
<b>Total</b>	21321	21147	42465	40929	41872	82801	62250	63019	125269



From Household Survey, within the project affected villages, the dominant ethnic group is Shan (54%), followed by Danu (30%), Myanmar (10%), and Goyakhar (5%). The only one dominant religion of the people in the project area is Buddhism nearly 100%.

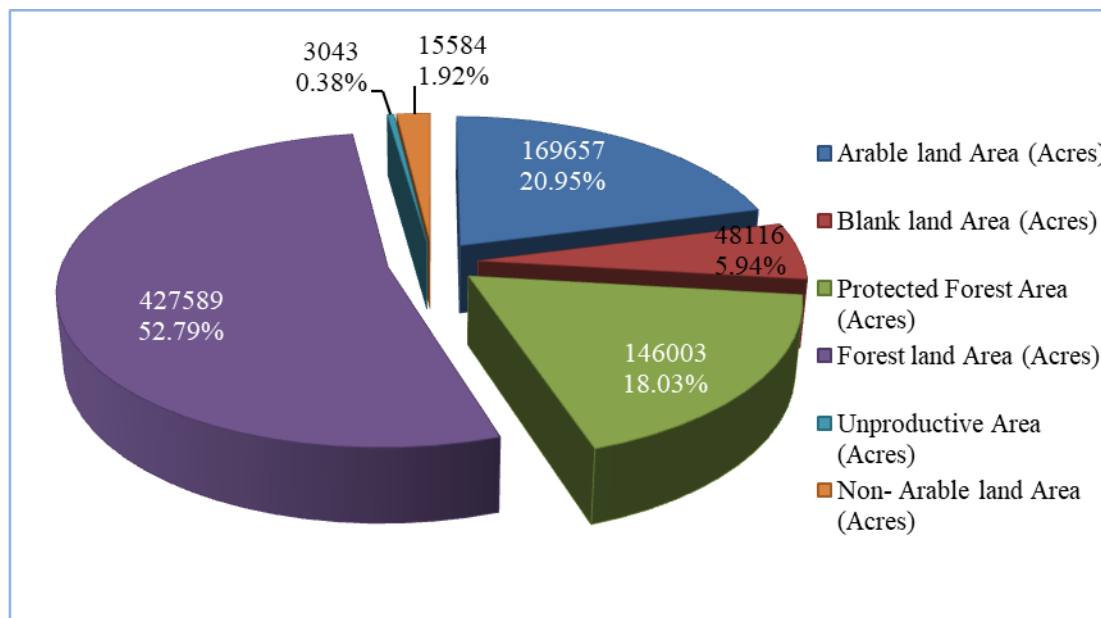




#### 4.4.4 Economic Characteristics

##### 4.4.4.1 Land Use

Naung HKio Township has 169,657 acres of cultivated land area, of which 15,110 acres are paddy cultivated land and 131,238 acres are farmland and 21,910 acres orchards. Key crops of the township are maize and sugarcane.



Source: MIMU; Tsp profiles\_GAD\_Naung Hkio-2019\_MMR.pdf

Figure 4-36 Land use in Naung Hkio Township

##### 4.4.4.2 Occupational Patterns

Agriculture is the major economy of the township and Maize, sugarcane and rice are main crops grown in the township. Agricultural-based industry, timber extraction, charcoal production, burnt lime production, apiculture, and animal husbandry are other economies of the township. The volume of maize production and paddy production in 2014-15 is described in **Table 4.29**. Beans and pulses, rubber, coffee, and tea are also key agricultural products in the township. Livestock husbandry is also found to be a component of local economic activities as shown in **Table 4.30**.

Table 4-29 Major Agricultural Products in Naung Hkio Township

No.	Crop	Plan 2014-15 (Acre)	2014-15 Achieved			Production (Basket)	Remark
			Sown Acre	Harvest Acre	Rate		
1.	Maize	59580	61382	61382	75.50	4634341	

2.	Paddy	26160	25160	25160	97.01	2440821	
3.	Sugarcane	18088	23996	23996	34.12	696926	Ton
4.	Groundnut	11020	10670	10670	56.70	604989	

Table 4-30 Livestock Farming in Naung Hkio Township

Year	Buffalo	Bull & cow	Pig	Chicken	Duck	Goat/ sheep
2013-14	16096	32653	8057	139149	297	501
2014-15	21677	48554	13088	134912	561	1945

Small-scale garment industries, goldsmith and blacksmith were also found in the township. There are mineral productions and lead is the major mineral product in Naung Hkio Township. The other main economic activities in the area are services, trade, industry, and public services as shown in **Figure 4.37**. According to official statistics, unemployment rate in Naung Hkio Township is estimated as 4.04% (see **Table 4.31**). Domestic net production and value of services of the township in 2013-14 FY is estimated to be 98, 473.2 million kyats and per capita income is estimated to be 858,318 Kyats in 2012-13 and 932,473 Kyats in 2013-14 (see **Table 4.32**).

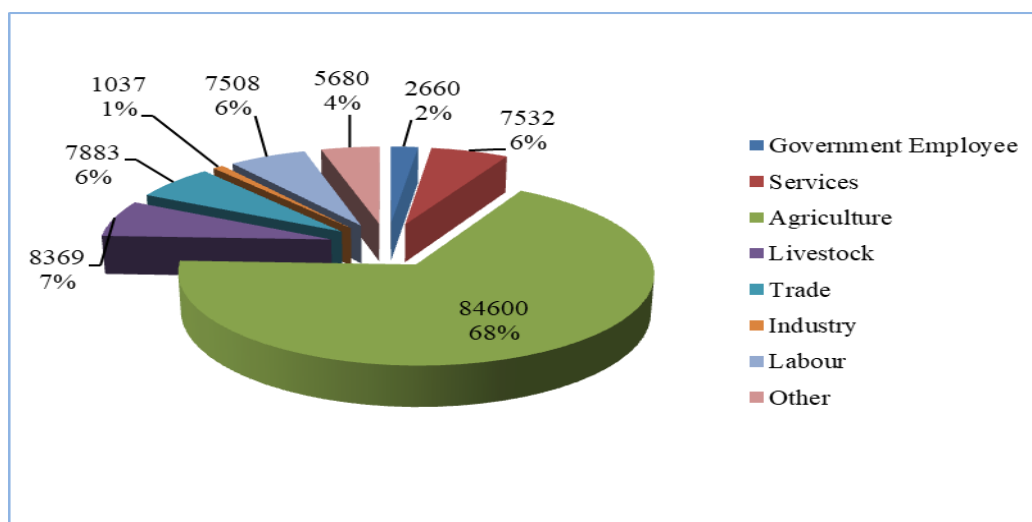


Figure 4-37 Economic activities in Naung Hkio Township

Table 4-31 Unemployment rate

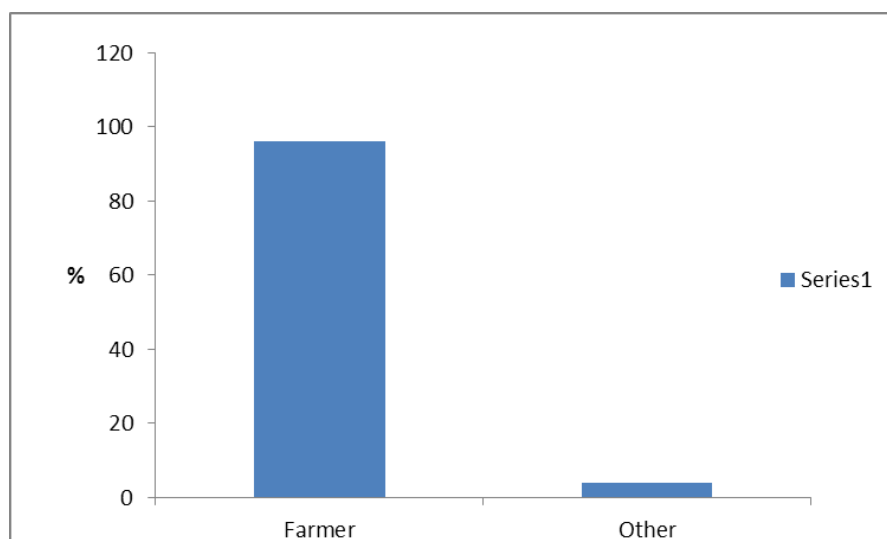
Workforce	Employed	Unemployed	Unemployment rate
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<b>82,801</b>	79, 456	3,345	4.04%
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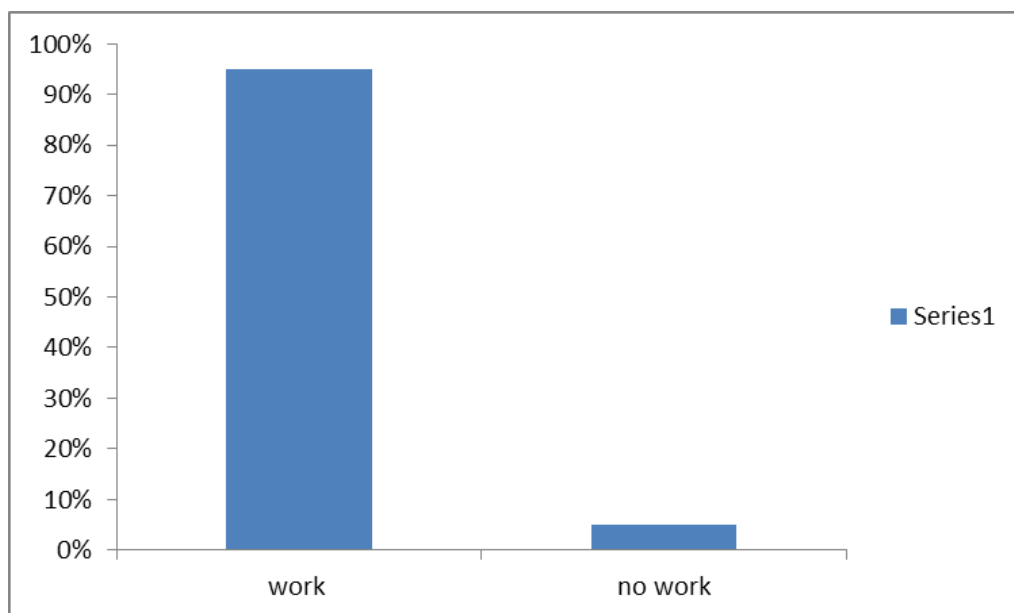
Table 4-32 Per Capita Income

Year	Income
<b>2012-13</b>	858,318 Ks.
<b>2013-14</b>	932,473 Ks.

In the project area (97%) of the household population enumerated in the household survey reported that their main occupation was farming. The largest proportion of households in the area is rural based, and farming is the major source of household income. Other occupational categories (trade and services) represent a small portion of the sample households in the survey (3%).



Employment status of respondents was also recorded in the household survey. The following figure indicates the results. More than 90% of respondents were found to have employment while less than 5% reported engaging in no work.



#### 4.4.4.3 Economic Infrastructure

One hundred and twenty-nine cooperative organizations have already been established in Naung Hkio. However, limited banking facilities are found in the region. There are one private bank in the township and two Myanmar Economic Bank in the township (**Table 4.33**). There are also eight principal markets in the overall township. **Table 4.34** lists markets in Naung Hkio.

Table 4-33 Banks

Township	Government	Private	Total
Naung Hkio	2	1	3

Table 4-34 Markets

No.	Name	No. of shops	Ownership
1	Myoma Market	52	Government
2	Kan Gyi Market	25	Government
3	Taung Kham Market	32	Government
4	Sam Sal Market	30	Government
5	Thone Sal Market	30	Government
6	Ho Kho Market	28	Government
7	Ban Bwe Market	25	Government
8	Tharatkone Market	17	Government

#### **4.4.5 Education**

In primary education, school enrollment rate of 5-year-olds is 99.22% in the overall township. Percentage of students passing the matriculation is 29.28%. The teacher-student ratios are 1:32 in Post-Primary schools, 1:32 in BEMS, and 1:38 in BEHS. Data on education and literacy report that literacy rate of persons 15 years and older in Naung Hkio Township was 99.89%.

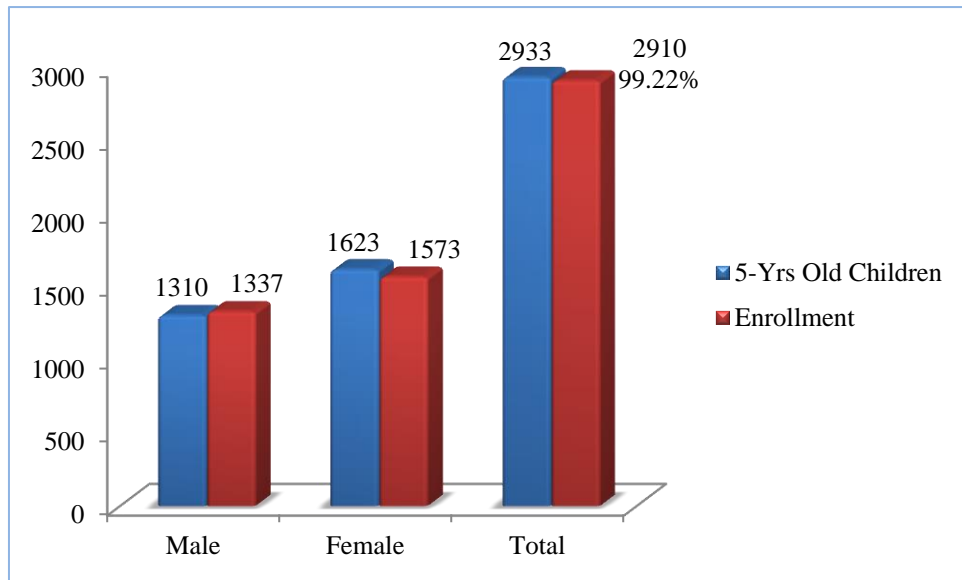
Table 4-35 Educational Infrastructure

<b>School</b>	<b>No. of Schools</b>	<b>No. of Teachers</b>	<b>No. of Students</b>	<b>Teacher/ Student Ratio</b>
<b>BEHS</b>	11	233	8845	1:38
<b>BEMS</b>	14	135	4316	1:32
<b>BEPPS</b>	149	729	23301	1:32
<b>Monastic school</b>	2	15	495	1:35

Table 4-36 School Enrollment

<b>No. of 5 Yrs.-old children</b>			<b>Enrollment</b>			<b>Enrollment Rate</b>
<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>99.22</b>
<b>1310</b>	1623	2933	1337	1573	2910	





**School Enrollment**

Table 4-37 Matriculation Pass Rate

2013-14		
Sit	Pass	Pass Rate
994	291	29.28

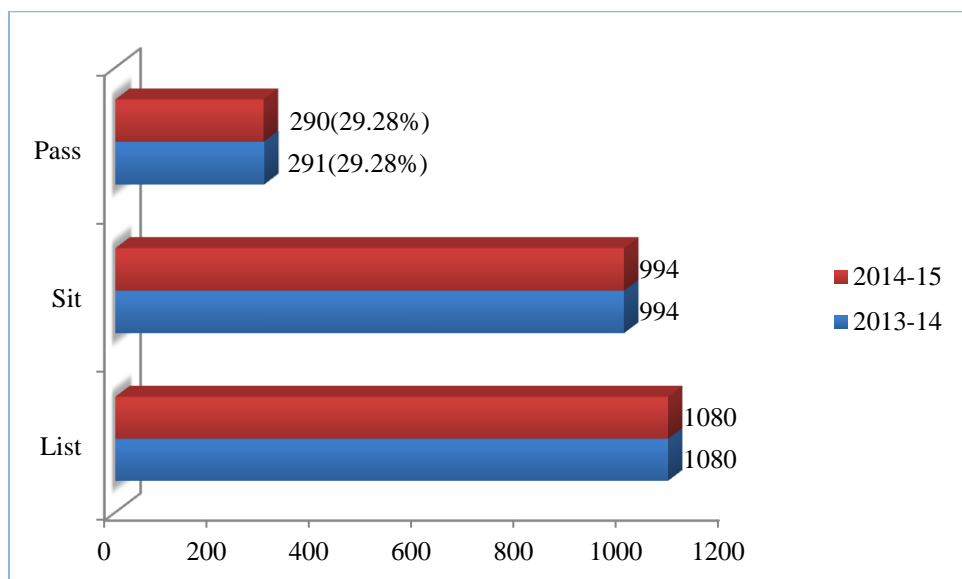
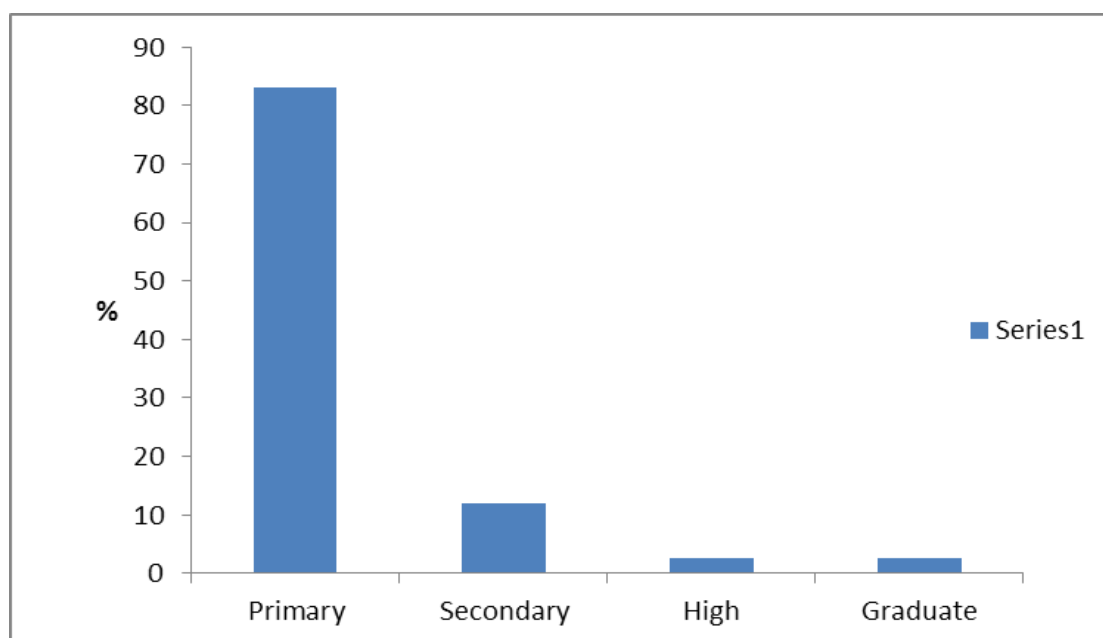


Table 4-38 Literacy Rate

<b>Township Population</b>	<b>Population 15 Years and Older</b>	<b>Literate Population</b>	<b>Literacy Rate</b>
125269	81766	81680	99.89

The educational attainment of respondents enumerated in the household socioeconomic survey in the project area is reported in the following figure.



Overall, educational attainment of local residents in the project area was found to be relatively low. More than 80% of the total sample had some form of primary education, and 10 % proceeded to middle school education. Of the sample, only (4%) completed high school while (3%) graduated a bachelor degree.

#### **4.4.6 Energy**

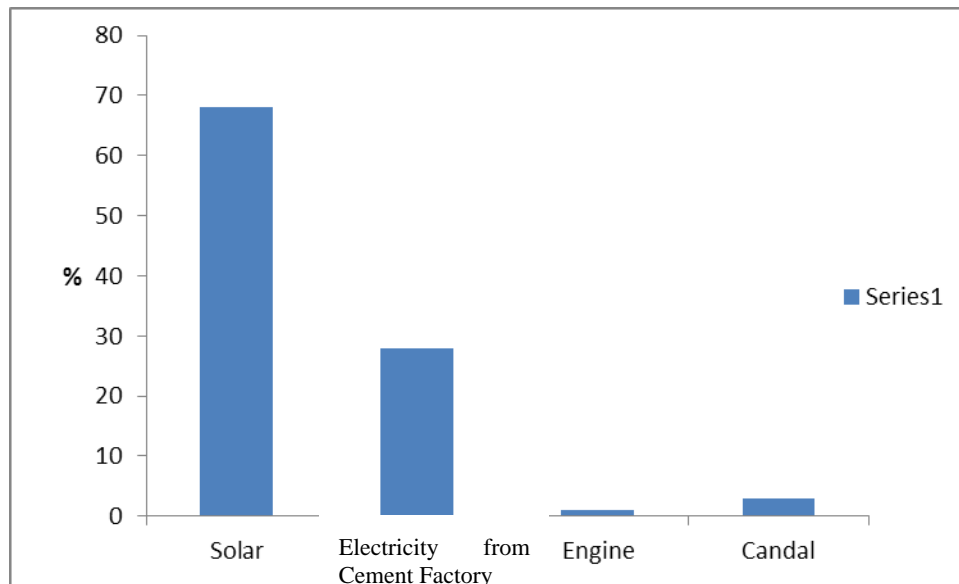
According to official statistics (Table 4.39), there are two power sub-stations and 76 transformers for distributing electricity in Naung Hkio Township. There is also a mini-hydropower plant generating 192, 000 kW per year. According to official data, the amount of electricity distributed in the township is 4800 kW and consumed electricity is just 2400 kW.

Table 4-39 Electricity

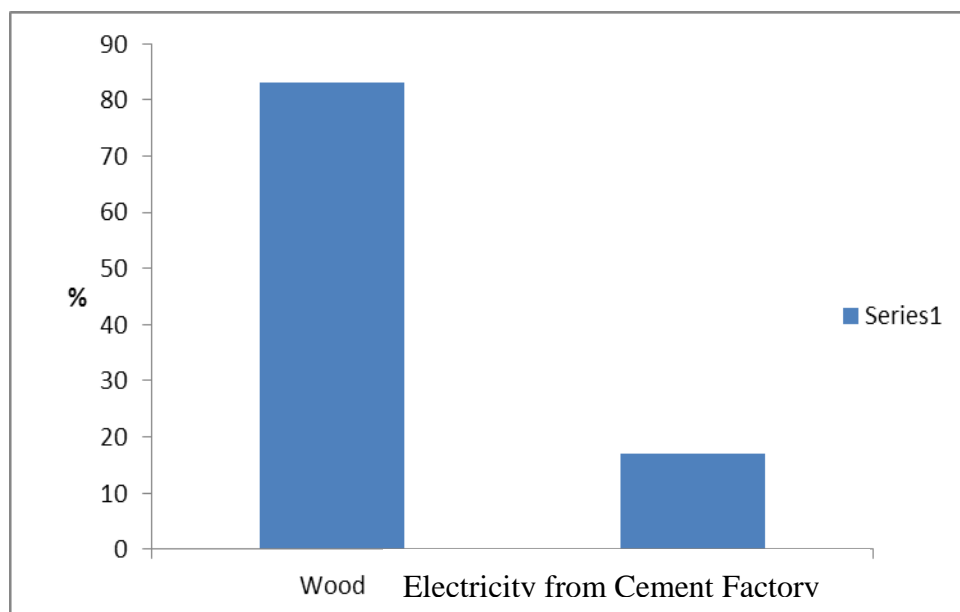
<b>No. of substations</b>	<b>Mini- Hydropower</b>	<b>No. of Transformers</b>	<b>Distributed Electricity</b>	<b>Consumed Electricity</b>
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2	1	76	4800 kW	2400 kW
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Primary data from household survey revealed that the two main sources of energy for lighting in the project area are solar (68%) and electricity provided by Crown Cement Factory (29%). Few households used generator and candle for lighting.



Primary data from field survey show that firewood was the main source of cooking in the entire project area standing at (82%), followed by use of electricity from the cement factory (18%).



#### 4.4.7 Healthcare Services

In public health sector, the ratios of medical service personnel and local population indicate the existing conditions of the insufficient healthcare facilities particularly for rural people. According to secondary data available, the most common diseases include Diarrhea, Malaria, stomach ailment, Tuberculosis, and Hepatitis. It was also found out that there were substantial amount of incidence of Diarrhea, Malaria, Tuberculosis and stomach ailment in the township. HIV/AIDS prevalence is significantly increased in 2014-15 than in 2013-14. As also noted in Table 4.41, there are one 25-bed hospital and two 16-bed hospitals in the township. There are also 6 rural healthcare centers and 24 rural health sub-centers.

Table 4-40 Healthcare Facilities

No. of Doctors	Ratio of doctor and population	No. of Nurses	Ratio of nurse and population	No. of Healthcare Assistant	Ratio of assistant and population
7	1:17895	24	1:5219	5	1:2505

Table 4-41 Healthcare Infrastructure

25-Beded Hospital	16-beded Hospital	RHC	RHS
1	2	6	24

Table 4-42 Common Diseases

Sr. No.	Disease	Incidence
1.	Malaria	337
2.	Diarrhea	1896
3.	TB	60
4.	Stomach Ailment	576
5.	Hepatitis	30

Table 4-43 HIV/AIDS

2013-14		2014-15	
Infected	Dead	Infected	Dead
13	-	23	-

Table 4-44 Health Indices

Maternal population	Infant population	Per 1000			
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
31392	3085	22.8	1.6	13.3	5.3

#### 4.4.8 Transportation and Communication

Road transport is the common form of public transportation mode in the area by means of buses, automobiles, and motor cycles. There are three public transportation services composed of 31 buses for transporting to regional areas and Mandalay and Lashio. There are 30-mile railway line and one railway station in the township transporting Mandalay and Lashio. There is also a bridge with length over 180'. Naung Hkio has a total population of 125, 269 and 55.78% of them have access to use auto and mobile phones. There are four post offices and one telegraph stations in the township.

Table 4-45 Communication

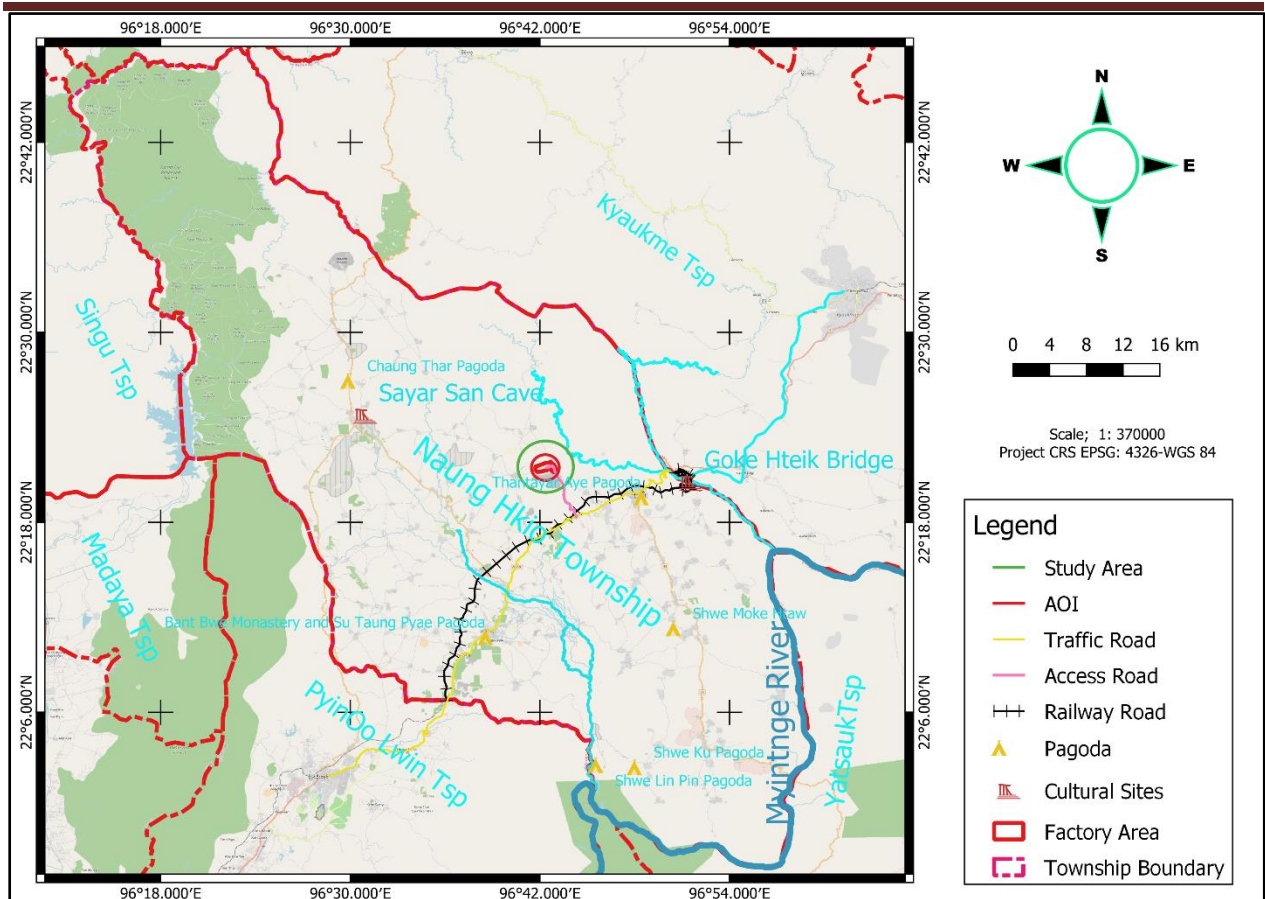
Maternal population	Infant population	Per 1000			
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
31392	3085	22.8	1.6	13.3	5.3

#### 4.4.9 Cultural Components

There are two cultural sites in Nawng Hkio Township<sup>7</sup>, namely Sayar San Cave and Goke Hteik Bridge. **Saya San** is the leader of the **Saya San Rebellion** of 1930–1932 in British Burma and the leader of the first concerted effort to forcefully resist British domination. **Sayar San Cave** is located at near Hoko Village which is 21 km to the northwest from the Factory. **Goke Hteik Bridge** is a railway trestle on Mandalay-Lasio

<sup>7</sup> MIMU; Tsp profiles\_GAD\_Naung Hkio-2019\_MMR.pdf





Road. The bridge was constructed in 1899 and opened in 1900. Gote Hteik Bridge is located at near Gote Hteik Village in Naung Hkio Township which is 50 km to the southeast from the Factory. The significant cultural sites and pagodas in Naung Hkio Township are as shown in **Table 4.46**, **Table 4.47** and **Figure 4.38** but there are no any significant cultural or religious places within the “Study Area” so that there is no adverse impact on culture or religious places due to the project implementation.

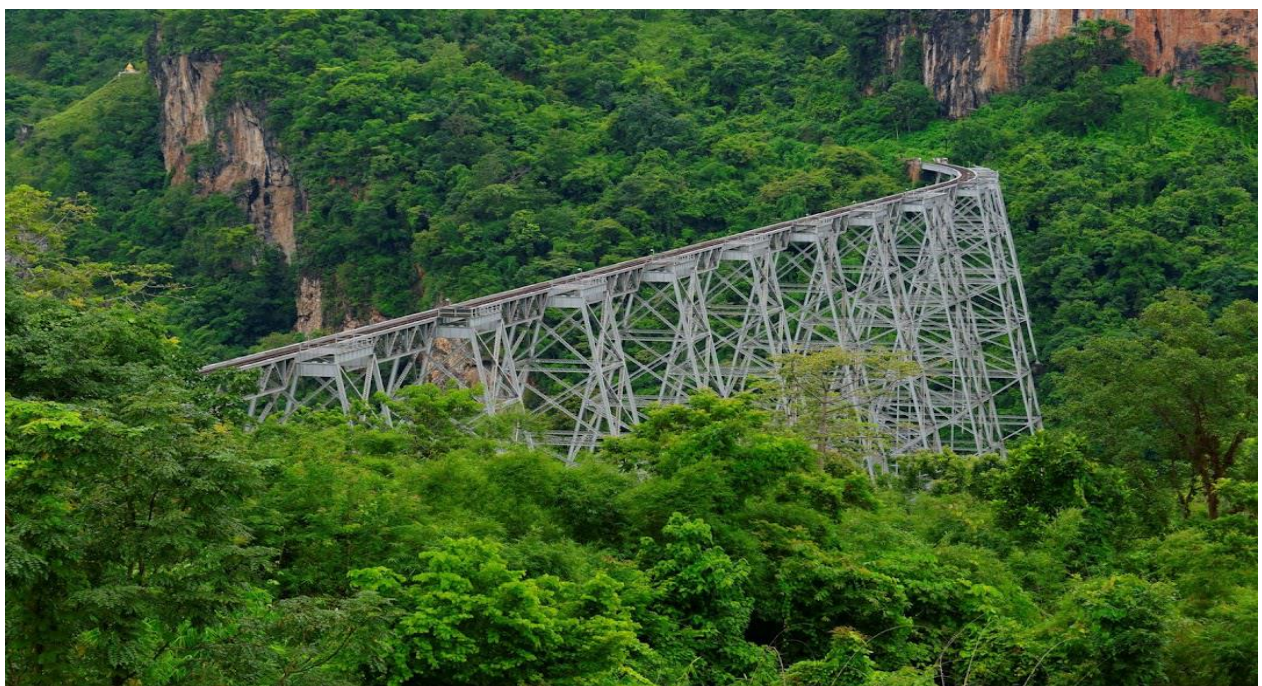


Figure 4-38 Significant cultural and religious places in Naung Hkio Township

Table 4-46 Significant cultural sites in Naung Hkio Township

Culture Site	From the Factory	Coordinates
Sayar San Cave	21 km to the northwest from the Factory	22°24'45.25"N 96°30'57.47"E
Goke Hteik Bridge	50 km to the southeast from the Factory	22°20'31.32"N 96°51'33.46"E

Source: MIMU; Tsp profiles\_GAD\_Naung Hkio-2019\_MMR.pdf (modified by GMES)

Table 4-47 Significant Pagodas in Naung Hkio Township

Pagoda	Coordinates	
	Latitude	Longitude
Chaung Thar Pagoda	22°26'54.95"N	96°30'27.44"E
Su Taung Pyae Pagoda	22°10'44.17"N	96°39'9.56"E
Shwe Ku Pagoda	22° 2'30.79"N	96°48'34.84"E
Shwe Moke Htaw Pagoda	22°11'17.21"N	96°51'2.94"E
Thantayar Aye Pagoda	22°19'33.81"N	96°49'0.84"E
Shwe Lin Pin Pagoda	22° 2'39.33"N	96°46'7.90"E

Source: MIMU; Tsp profiles\_GAD\_Naung Hkio-2019\_MMR.pdf (modified by GMES)

#### 4.4.10 Visual Components

Naung Hkio Township occupy nearly half of the center of the land is highly productive plane surrounded by mountains in north, east, south and west. Mountains of the southern region are the highest. Many small rivers and streams are running across the township throughout the year forming, in some places, beautiful waterfalls. Inn Wine waterfall, Namngo waterfall, Inn Hpo waterfall, Chaunggyi Yay Pyan Taung waterfall and Thabyedoe waterfalls are famous (see Figure 4.39).

The existing visual landscape of the Project Study Area consists of open landscape, with vegetation, and limited forested and hilled areas. The elevation is hilly terrain. In terms of man-made structures, the only significant visual components across



the Project Study Area are residential area of Lauk Hpan Village. **Figure 4.40** presents typical visual conditions within the Project area.

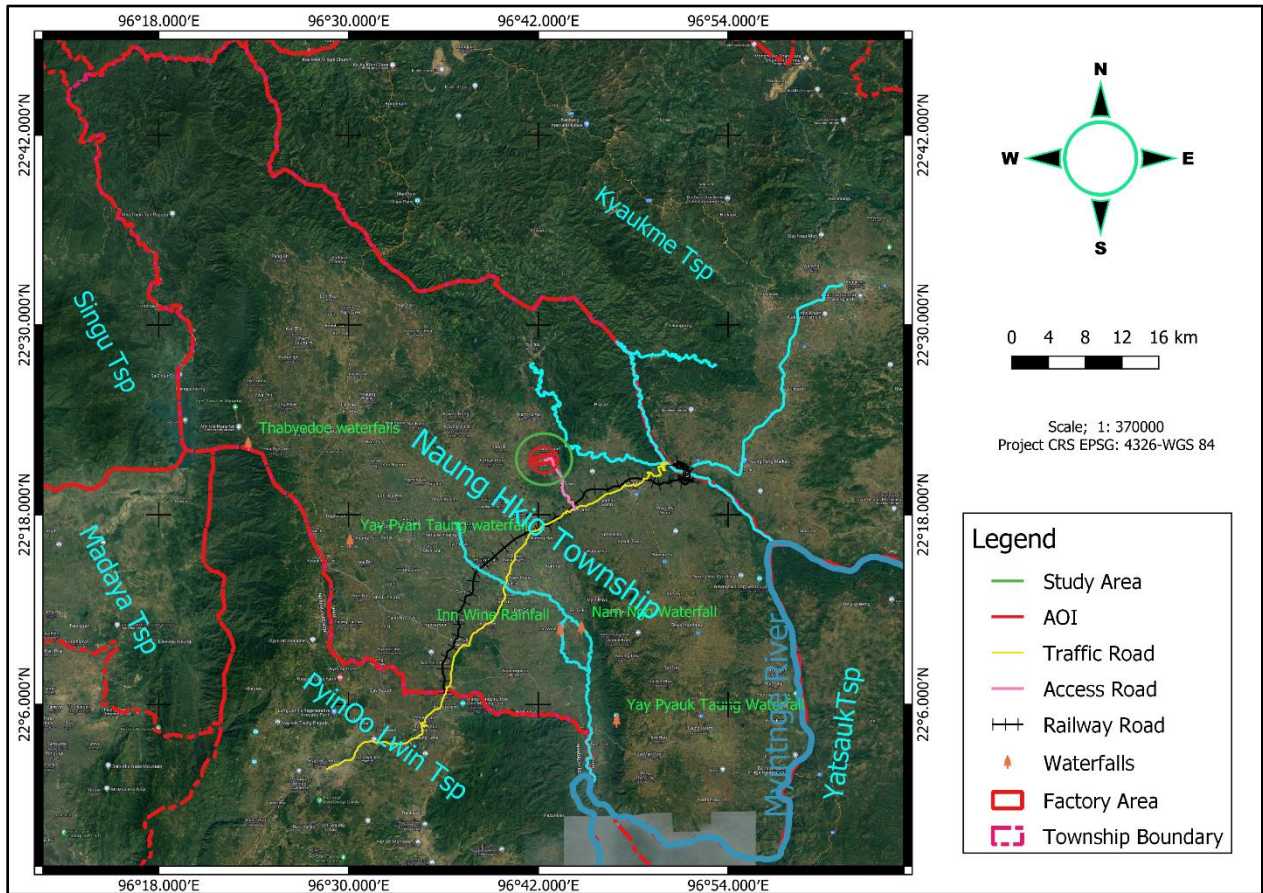


Figure 4-39 Waterfalls in project area



Figure 4-40 typical visual conditions within the project area



## **5.0 ENVIRONMENTAL IMPACTS & MITIGATION MEASURES**

### **5.1 General**

Generally, the environmental impacts can be categorized as either primary or secondary. Primary impacts are those, which are attributed directly by the project and secondary impacts are those, which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities. Likely impacts of the project development on various environmental attributes have been identified considering the nature and extent of the activities associated with the project implementation and operation, assessed and presented. In order to mitigate likely environmental impacts during construction and operation phases due to the proposed development suitable mitigation measures are framed and incorporated as a part of planning process. The impacts have been assessed qualitatively for various environmental components and impact specific mitigation measures are proposed.

The CROWN Cement plant will be operated with long time. So, decommissioning phase of the plant will become after many years. With current conditions, it is not logical to identify and assess the environmental impacts of decommissioning phase.

At present, there are no plans or schedule for decommissioning of CROWN Cement plant. It is likely that the Project components will only be decommissioned/ abandoned once it is no longer economical to continue operation; the plant is rendered redundant and/or no longer required for various reasons, or is unsafe to operate. Given the current stage of the Project components, detailed decommissioning plans have not yet been formulated. Impacts during decommissioning are expected to be assessed in detail in the Decommissioning Environmental Assessment (DEA) Report; therefore, this ESIA Study will not provide a assessment of impacts for the decommissioning phase.

### **5.2 Identification of Impacts**

This chapter describes the identification of impacts, appraisal of various impacts and mitigation measures during construction phase and operational phase. Any developmental activity will bring about some impacts associated with its origin, which can be broadly classified as reversible, irreversible, long and short-term impacts. In this chapter, an endeavor has been made to identify various Environmental Impacts associated with the plant operation and other activities wherein, there may be a chance of pollution.

Based on the possible worst-case emissions and waste generation from the proposed project and also taking into consideration the baseline Environmental status at the proposed project site, the environmental factors that are likely to be affected are assessed. The prediction of impacts helps in the preparation of Environmental Management Plan, which has to be executed during the on-going activities for the proposed project to minimize the adverse impacts on environmental.



### **5.3 Impact Assessment Methodology**

The significance of the aspects/ impacts of the process were rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts. The significances of the impacts were determined through a synthesis of the criteria below:

#### **5.3.1 Probability**

Probability is a description of the probability of the impact actually occurring as improbable, probable, highly probable or definite.

Table 5-1 Rating for Probability

<b>Attribute</b>	<b>Description</b>	<b>Weight</b>
Improbable	The possibility of the impact occurring is very low, due to the circumstances, design or experience.	1
Probable	There is a probability that the impact will occur to the extent that provision must be made therefore.	2
Highly Probable	It is most likely that the impact will occur at some stage of the development.	4
Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.	5

#### **5.3.2 Duration**

Duration refers to the length of time over which an environmental impact may occur.

Table 5-2 Rating for Duration

<b>Attribute</b>	<b>Description</b>	<b>Weight</b>
Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.	1
Medium term	The impact will last up to the end of the phases, where after it will be mitigated.	3
Long term	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time	5

	span that the impact can be considered transient.	
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### 5.3.3 Scale

Scale refers to the area that could be affected by the impact and is classified as site, local, regional, national or international.

Table 5-3 Rating for Scale

Attribute	Description	Weight
Site	The impacted area extends only as far as the activity, e.g. footprint.	1
Local	The impact could affect the whole, or a measurable portion of the above-mentioned properties.	2
Regional	The impact could affect the area including the neighboring residential areas.	3

### 5.3.4 Magnitude/ Severity

Magnitude is a measure of the degree of change in a measurement or analysis and is classified as low, medium or high.

Table 5-4 Rating for Magnitude or Severity

Attribute	Description	Weight
Low	The impact alters the affected environment in such a way that natural processes are not affected.	2
Medium	The affected environment is altered, but functions and processes continue in a modified way.	6
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	8

### 5.3.5 Significance

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

$$\text{Significance} = (\text{Duration} + \text{Scale} + \text{Magnitude}) \times \text{Probability}$$

Table 5-5 Rating for Significance

Attribute	Description	Weight
Negligible	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.	< 20
Low	The impact is limited in extent, has low to medium intensity;	< 40

	whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.	
Moderate	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.	< 60
High	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/ or the cost of management intervention will be a significant factor in mitigation.	> 60

#### **5.4 Identification of Mitigation Measures Principles**

Once the significance of an impact has been characterized, the next step is to evaluate which mitigation and enhancement measures are warranted. For the purposes of this impact assessment, the following mitigation hierarchy has been adopted:

- **Avoid at Source, Reduce at Source:** avoiding or, when it is not possible, reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- **Repair or Restore:** some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Compensate and/or Offset** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory

measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

## **5.5 Potential Impact and Mitigation measure during Construction Phase**

Ngwe Yi Pa Le' Cement Company Limited constructed 1000 Ton per day of Cement plant as phase I and has been commercially produced on November 1, 2013, with the approval of the Myanmar Investment Commission.

Due to high demand and annual shortage of cement supply in Myanmar, the company is aggressively moving forward to meet the requirements of the country by upgrading more efficient cement plants. So, the company decided to expend the capacity of cement production from 1,000 TPD to 5,000 TPD with permission by MIC on 25<sup>th</sup> July 2015.

The expansion line of the plant (Phase II) will be established adjacent to the existing line plant within the premises. The construction activities are confined within the project site area of 250 acres and the construction period is estimated about 23 months.

Some infrastructures are already finished during the Phase I such as for instance, site preparation, construction/upgrading of access road, worker accommodation, raw material storage and yard, water pond. Therefore, some activities will not consider in the impact assessment of construction phase. The impact of construction activities of Phase II (4000 TPD) will be assessed and presented in the section of Impact Assessment of Construction Phase.

The following activities will involve during the construction phase;

- Construction of Foundation
- Transportation of equipment
- Erection of plant equipment like vertical roller mills, pre-calciner, rotary kiln, clinker cooler, cement mills, packing units, coal mill and other related equipment.
- Other related facilities,

### **5.5.1 Impact on Air Quality**

#### ***Source of Impact***

Potential impacts to air quality and greenhouse gas emissions may occur due to the plant construction, vehicle movement. This may involve the use of tractor/bulldozers, backhoes, compactors, jack-hammers, heavy trucks and dump trucks. The main cause of dust generation is vehicle movement and construction of foundation. Other pollutants can emit from the fuel combustion of engine of vehicles and machinery.

The primary pollutants emitted will include particulate matter (PM), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), hydrocarbons (HC), and volatile organic compounds (VOCs). Combustion of fossil fuels in stationary and mobile combustion sources will produce greenhouse gases (e.g. carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).

Dust dispersion can impact on air quality have the potential impact nearby communities, as well as biodiversity due to settling of dust on vegetation adjacent to the

project area. Excessive dust deposition on flora may act to suppress growth through limiting photosynthesis and the dusted foliage may also become unpalatable to foraging fauna. It is important to note that not every activity will be carried out simultaneously. For instance, the erection of plant equipment will occur after construction of foundation, whereby dust concentrations from a particular section will disperse before the next section is constructed. Air pollutants such as carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), Sulphur Dioxide (SO<sub>2</sub>) generated from combustion of fossil fuels in stationary and mobile combustion sources such as vehicles, generators, machinery and equipment may cause a significant impact to ambient air quality.

***Impact Assessment***

The impact on air quality will be take place highly probable according to the activities and project location. *Hence, the probability (P) is P=4.*

The impact to air quality during Field Preparation and Construction Phase is short term, as the activity takes place over a short period of time (approximately 4-5 months), and air quality will return to existing condition after the Field Preparation and Construction Phase are finalized. *Hence, the duration (D) is medium, D=3.*

Impacts would primarily be limited to the Project Area and hence would be considered to be local; however winds may potentially carry pollutants and dust into surrounding areas. *Hence, the scale(S) is local, S=2.*

The project area is far from the community and there is no large agriculture firm at near. The nearest receptor will be worker on site. So, impact area is considered at project site and air quality will return to existing condition after the Field Preparation and Construction Phase had finalized. *Hence, the magnitude (M) is medium, M=6.*

Table 5-6 Assessment of Impact on Air Quality

Environmental Component	Potential Impact	Score =P x (D+S+M)					Significance
		P	(D)	S	M	Score	
Air quality	<ul style="list-style-type: none"> <li>✓ Dust (PMs) dispersion in air is expected from movements of vehicles, site preparation and construction, access road construction/ upgrading, such as excavating, grading, filling and compacting</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in engine of vehicles, machinery.</li> </ul>	4	3	2	6	44	Moderate (-)

***Mitigation Measures***



With the purpose to reduce the emissions of gaseous pollutants during the construction phase from the equipment used for the cement plant, the following mitigation measures and good practice are taken into account:

- vehicle engines and other machinery turn off while not in use avoiding any unnecessary emission;
- machines and equipment will be periodically checked and maintained to ensure their good working condition;
- all equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications;
- activities will be conducted trying to use the minimum required number of means at the same time;
- electric small-scale mechanization and technical tools will be used when available and feasible; and
- repair and maintenance of construction equipment and vehicles will be performed outside of the construction site by at specialized enterprises.

Concerning dust control methods and measures, the following actions are recommended to reduce the generation of dust:

- sprinkling of water on dust generating areas;
- watering or increase of the moisture level of the open materials storage piles to reduce dust levels (especially during dry season);
- enclosure or covering of inactive piles to reduce wind erosion;
- loads in all trucks transporting dust-generating materials will be sprayed with water to suppress dust, as well as wheels of means moving inside and outside of the construction site;
- speed reduction for the means travelling inside the construction site; and
- Maintain appropriate buffers between the site and receptors.

#### ***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

#### **5.5.2 Impact of Noise**

##### ***Source of Impact***

The use of heavy equipment during site clearance and construction works will inevitably generate noise, which may create a temporary nuisance for people in the vicinity. During the Construction Phase the source of noise are from using of heavy equipment such as dozer, loader, crane during the construction period for site clearance and earth moving, will inevitably generate the noise, which create nuisance for person working around and local people passing through. This is negative impact but duration is short and considered as insignificant. Potential impacts on noise environment generated by the construction phase of the cement plant are discussed in the following;

- Earthwork: the main noise sources are related to the use of equipment and earthwork machinery such as: bulldozers, excavators, loaders, and various transport vehicles.
- Groundwork: the main noise sources are pile hammers, and excavators. It has been noted that the pile hammers noise is characterized by an impulse noise.
- Structure installation: the main noise sources during the structure installation stage are concrete mixer, vibrating machine, electric saw, etc., and collision noise impact during the load and unload of materials. And;
- Equipment installation: the main noise source during the equipment stage is crane elevator.

***Impact Assessment***

Noise will occur likely due to installation of heavy machinery and equipment for cement plant and captive power plant and movement of heavy machinery at site during construction works. *Hence, the probability (P) is definite, P = 5.*

The impact will occur during construction activities is short term, as the activity takes place over a short period of time (approximately 23 months), and It is note that the activities will not take the same time. *Hence, the duration (D) is Short term, D=1.*

The impact area is at project site. *Hence, the scale(S) is S=1.*

Installation of machinery and equipment for cement production, movement of heavy machinery and traffic will generate the significance noise. The receptors (residential houses and monastery) are not located within 1 km of the project area. *Hence, the magnitude (M) is Medium, M = 6.*

**Table 5-7 Significance Impact on Noise**

<b>Environmental Component</b>	<b>Potential Impact</b>	<b>Score=P x (D+S+M)</b>					<b>Significance</b>
		<b>P</b>	<b>(D)</b>	<b>S</b>	<b>M)</b>	<b>Score</b>	
Noise	✓ Increased background noise level cause of construction activities. ✓ Disturbance to	5	1	1	6	40	Moderate

	<p>workers and local residents (if any). ✓ Reduced hearing issues for workers and staff.</p>						
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**Mitigation Measures**

***Mitigation at Working Time***

- Limiting site construction activities to the working hours (7:00 am to 4:00 pm) and noisy activities to morning hours (8:00 am to 12:00 am).
- Whenever feasible, schedule different noisy activities (e.g., piling and earthworking) to occur at the same time; since additional sources of noise generally do not add a significant amount of noise.
- Avoid nighttime activities. Sensitive to noise increase during the nighttime hours in residential neighborhoods.

***Mitigation at the Source***

- Usage of quiet, properly maintained equipment or machinery in good condition.
- All noisy machines and equipment should be fitted with noise muffler or silencers.
- Sensitization of construction truck drivers to switch off vehicle engines while offloading materials avoid running of vehicle engines or hooting especially.

***Mitigation along the path***

- Install temporary noise barrier - a 2 m high temporary wall or pile of excavated material between noisy activities and noise-sensitive receivers during construction work.
- Provide adequate PPE such as ear muffs, ear plugs etc. to workers at all activities/ locations that exceed permissible occupational noise level limit standards [85 dB (A)].

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.5.3 Impact of Vibration**

***Source of Impact***

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations which spread through the ground and diminish in strength with distance. Buildings founded on the soil in the vicinity of the construction site respond to these vibrations, with varying results ranging from no perceptible effects at the lowest

levels, low rumbling sounds and feel able vibrations at moderate levels and slight damage at the highest levels.

Ground vibrations from construction activities very rarely reach the levels that can damage structures, but can achieve the audible and feel able ranges in buildings very close to the site. A possible exception is the case of old, fragile buildings of historical significance where special care must be taken to avoid damage. The construction vibration criteria include special consideration for fragile historical buildings. The construction activities that typically generate the most severe vibrations are blasting and impact pile driving.

Construction vibration should be assessed in cases where there is a significant potential for impact from construction activities. Such activities include blasting, pile driving, demolition and drilling or excavation in close proximity to sensitive structures. The recommended procedure for estimating vibration impact from construction activities is as follows:

$$PPV_{equip} = PPV_{ref} \times \left(\frac{25}{D}\right)^{1.5}$$

Where:  $PPV_{equip}$  is the peak particle velocity in in/sec of the equipment adjusted for distance

$PPV_{ref}$  is the reference vibration level in in/sec at 25 feet from Table

D is the distance from the equipment to the receiver.

The applicable vibration damage threshold criterion is 0.20 in/ sec (approximately 100 VdB) for fragile buildings, or 0.12 in/ sec (approximately 95 VdB) for extremely fragile historic buildings.

***Reference of Vibration Level***

<b>Vibration Source Levels for Construction Equipment (From measured data. <sup>(8)</sup><sup>(9)</sup><sup>(10)</sup><sup>(11)</sup>)</b>			
<b>Equipment</b>		<b>PPV at 25 ft (in/sec)</b>	<b>Approximate L<sub>v</sub><sup>†</sup> at 25 ft</b>
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

<sup>†</sup> RMS velocity in decibels (VdB) re 1 μinch/second

***Impact Assessment***

Vibration will occur likely due to piling activities, heavy machinery operating and vehicles during construction period. Hence, the probability (P) is Highly Probable, P = 4.

The impact will occur during construction period as the activity takes place over a short time (approximately 23 months), and It is note that the activities will not take the same time Hence, the duration(D) is Short term, D=1.

The impact area is at project site. Hence, the scale(S) is local, S=2.

Unlike noise, vibration dissipates rapidly over a distance such that the magnitude and extent of vibration impacts are commonly very minimal when compared to noise and the receptors (residential houses and monastery) are not located within 1 km from the project area. Hence, the magnitude (M) is Low, M = 2.

Table 5-8 Significance Impact of Vibration

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D	S	M)	Score	Significance
Vibration	Vibration from vehicles, piling activities and heavy machinery operating	4	1	2	2	20	Low

***Mitigation Measures***

***Mitigation at Design Consideration***

- Route heavily loaded trucks away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available.
- Operate earthmoving equipment on the construction lot as far away from vibration-sensitive sites as possible.

***Mitigation at Operation Sequences***

- Earthmoving and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be significantly less when each vibration source operates separately.
- Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours.
- Vehicles speed limit will be maintained to avoid excessive vibrations.

***Mitigation by Using Alternative Methods***



- Avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver causes vibration levels where the geological conditions permit their use.
- Avoid vibratory rollers and packers near sensitive areas.

#### ***Significance of Residual impacts***

Residual impacts would be expected to be of **negligible** significance.

#### **5.5.4 Impact on Water Environment**

##### ***Source of Impact***

During the construction period, raw water is supplied from creak nearby project site and pumped into raw water pond inside area plant. Water requirement during Construction Phase will be less than that of during the Operation Phase. However, a relatively large quantity of water has to be used in mason work or concrete work. Suppression of dust and watering of plants as well as washing vehicles and machineries need quite a lot of water. Potential impacts on water resources due to construction activities can be divided into the following types:

- Construction site surface runoff
- Wastewater from vehicle washing
- Wastewater from workers

There can be potential contamination of the surface water due to spillages of oil, chemicals and contaminated runoff sources from contaminated soil. The dumping of debris by undisciplined workers can also have certain impact on the surface water. The domestic water consumption of presence of the staff and construction workers can have certain impact on the water. However, no wastewater will be generated from installation activities and therefore there will be no adverse impact on environmental setting due to this parameter.

##### ***Impact Assessment***

Impacts on water sources could be possible cause of highly water consumption and directly discharged effluent to the water environment without proper treatment. *Hence, the probability (P) is definite, P = 5.*

The impact on water resources due to construction activities is considered to be short term, as the activity takes place over a short period of time (approximately 1-2 yrs.). *Hence, the duration(D) assume medium term, D=3.*

The impact on water resources is supposed to be limited at project area but this is likely to impact on surrounding water bodies around the project area and access road by changing the flow path. *Hence, the scale(S) is local, S=2.*

The impact on water resources during construction phase would be short term and limited at the surrounding project area. *Hence, the magnitude (M) is medium, M=6.*

Table 5-9 Significance Impact of Water Environment

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D	S	M)	Score	
Water Environment	Impact on water environment cause of water usage and run off water, waste water by construction activities	5	3	2	6	55	Moderate

***Mitigation Measures***

As discussed above, during the construction phase, the potential impacts on water resources are expected to be limited, because wastewater discharges from the construction site will be considered as a temporary event.

The potential contamination during construction phase related construction activities shall be mitigated by the following management practices.

- Wastewater generated from offices, canteens, and worker accommodation is treated by septic-sewage system.
- Temporary drainage system will be provided for collecting drain water from construction activity and rain to sediment pond and reuse inside construction area.
- Create a special storage for fuel and lubricants/oil. The storage is a closed building and it is protected from rainwater.
- Provide grease and oil trap for workshop and maintenance area.
- Direct runoff away from disturbed areas by means of temporary drainage ways, utilizing for example cut-off drains.
- Provide containment measures for hazardous material and storage areas to prevent spills or leakage of fluid materials which may soak into the ground and reach the groundwater table.
- Design of store hazardous material providing suitable reception facility with impervious flooring, roofing and suitable drainage control.
- Regular maintenance and checking of all plants and machinery to minimize the risk of fuel or lubricant leakages.

- No discharge of untreated wastewater to soil and groundwater and onto surficial water bodies.
- As construction activities typically generate disturbed soil, concrete fines, oils and other waste, on-site collection and settling of storm water, prohibition of equipment washdowns, and prevention of soil loss and toxic releases from the construction site are necessary to minimize water pollution.

### ***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

#### **5.5.5 Impact on Soil Quality**

##### ***Source of Impact***

The earth work which is an integral part of construction work can alter the profile and structure of soil. The increasing of soil erosion could be caused by the excavation activities for the construction of the cement plant. As concern the cement plant, all the construction activities will be performed within the present boundaries of the project. Regarding to the excavation activities, top-soil and sub-soil will be removed especially at the foundations area. The excavated soil will be temporary stored using the best available procedure and techniques to avoid soil degradation. After the construction works are completed, soil cover shall be placed back on for reinstatement activities.

Pollution could affect soil in case of accidental spillage of oil from vehicles used for transportation of construction material and accidental spillage from the building material used for construction purposes. To prevent soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention.

##### ***Impact Assessment***

The impact on soil can be caused by construction activities and spillage of oil. *Hence, the probability (P) is highly probable, P =4.*

The impact on soil during construction works is considered to be short term, as the activity takes place over a short period of time (approximately 1-2 yrs.), *Hence, the duration(D) is medium term, D=3.*

The impact area would be at the project site and access road. *Hence, the scale(S) is site, S=1.*

The impact on soil will occur during construction phase and soil erosion and soil stability will be limited at the project area. *Hence, the magnitude (M) is medium, M=6.*

Table 5-10 Significance Impact on Soil Quality

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D	S	M)	Score	Significance
Soil Quality	Soil degradation and contamination	4	3	1	6	40	Moderate

***Mitigation Measures***

The following environmental protection and mitigation measures will be implemented in order to reduce or prevent potential impacts on soil;

- Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated properly before disposal.
- Construction waste and debris shall be collected on a regular basis, covered by roof and disposed of at designated landfills.
- It must be prohibited to operate with equipment and vehicles outside the designated work areas and roads.
- Training and equipment will be in place to minimize the potential environmental impact in the case of accidents (for example through the use of spill kits).
- To prevent soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.5.6 Impact of Solid Waste**

***Source of Impact***

The construction phase will be carried out through different activities as civil, mechanical, electrical installation operations and liquid effluents which in turn will generate volumes of waste with typology characteristic of the nature of each activity. Solid waste generated during the construction phase will be large quantity of debris in the form of bits and pieces of building materials, iron materials, timber, soft wood, bamboo, used as scaffolds, left over bricks, sand, gravel, and so on.

Domestic waste will be generated by the workers at the construction camp. It may comprise non-hazardous materials including for example paper, food residues, used containers (bottles, can, etc.), broken furniture and packaging, and sanitary effluent.

***Impact Assessment***

The impact of solid waste can be caused by construction activities and worker activities. *Hence, the probability (P) is definite, P =5.*

The impact of solid waste during construction works is considered to be short term, as the activity takes place over a short period of time (approximately 1-2 yrs.), *Hence, the duration(D) is medium term, D=3.*

The impact area would be at the project site and near communities. *Hence, the scale(S) is site, S=1.*

The impact of solid waste will occur during construction phase and will be limited at the project area. *Hence, the magnitude (M) is medium, M=6.*

Table 5-11 Significance Impact of Solid Waste

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D	S	M)	Score	Significance
Solid Waste	✓ If not properly handled, it has the potential to degrade the quality of land. ✓ Odor problem ✓ Breeding of flies, birds, rodents etc. ✓ Nuisance to the nearby communities if present within the proximity of the project area.	5	3	1	6	50	Moderate

***Mitigation Measures***

The overall impacts during construction should be considered as negligible if the following mitigation measures are exercised;

- a waste management plan shall be developed including requirements for separation, handling and disposal of all waste generated;
- all hazardous materials shall be stored in clearly labeled containers;
- storage and handling of hazardous materials should be in accordance with national and local regulations appropriate to their hazard characteristics;
- waste shall be separated on site and waste storage areas shall be roofed and bounded to prevent potential cross-contamination;



- used oils (including transformer oil) shall be recycled;
- fire prevention systems and secondary containment shall be provided for storage facilities, where necessary, to prevent fires or releases of hazardous materials;
- all waste shall be disposed of in line with local requirements at a suitable and licensed waste disposal facility;
- suitable disposal sites shall be identified with capacities for disposal for general and hazardous waste prior to the operation phase;
- containers will be emptied before they reach their carrying capacity;
- littering will be prohibited at the site; and
- awareness will be given to the staff and workers about handling of solid waste at site.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.5.7 Impact on Ecology**

***Source of Impact***

The main cause of impact on Ecology is noise and light generation. During the Construction Phase, Potential impacts on noise environment generated by the construction phase of the cement plant are discussed in the following;

- Earthwork: the main noise sources are related to the use of equipment and earthwork machinery such as: bulldozers, excavators, loaders, various transport vehicles.
- Groundwork: the main noise sources are pile hammers, and excavators. It has been noted that the pile hammers noise is characterized by an impulse noise.
- Structure installation: the main noise sources during the structure installation stage are concrete mixer, vibrating machine, electric saw, etc., and collision noise impact during the load and unload of materials. And;
- Equipment installation: the main noise source during the equipment stage is crane elevator.

During operation phase, noise and vibration, as well as light contamination from the construction activities will cause impacts which may negatively influence the distribution and habits of endemic or endangered fauna, in particular avifauna, which may avoid feeding grounds and usage of certain corridors due to disturbance. Furthermore, noise and light associated with the Construction activities could potentially disturb local nocturnal species, and light contamination may attract insects and birds and disturb wildlife in general.

The transportation of construction materials can increase traffic on new roads/ existing roads, presents a risk of accidental mortality or injury to fauna as a result of collision with moving vehicles.

The close proximity of project site to the aquatic environment increases the likelihood that spilled contaminated material could enter the water bodies via runoff. Inappropriate management and disposal of hazardous or non-hazardous waste could lead to impacts to physical receptors which, in turn may impact biological receptors and biodiversity.

Labour influx may lead to unauthorized hunting and harvesting of plants and animals by workers which could impact biodiversity. Hunting, poaching and wildlife trade are critical issues for the conservation of species; unsustainable hunting to obtain meat, animal parts or live individuals for the pet trade can cause population declines and local extinction.

***Impact Assessment***

Impacts to Biodiversity could be direct, indirect and induced impacts with potential degradation of habitat and direct disturbance to species. The loss of vegetation and impact on biodiversity during the Field Preparation and Construction will be take place. *Hence, the probability (P) is highly probable, P = 4.*

The loss of vegetation and impact on biodiversity from the installation of equipment is considered to be short term, as the activity takes place over a short period of time (approximately 1-2 yrs.). *Hence, the duration (D) is medium term, D=3.*

The clearing vegetation would be limited at the project area. Minimal disturbance and/or loss of habitat due to the construction are expected within the 1.5 km radius, but there is no endanger fauna species. *Hence, the scale(S) is local, S=2.*

The loss of vegetation and impact on biodiversity will occur during the construction phase (approximately 1-2 yrs.) and clearing vegetation will be limited at the project area. The loss of vegetation will recover after plantation process. *Hence, the magnitude (M) is medium, M=6.*

Table 5-12 Significance Impact on Ecology

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D	S	M)	Score	Significance
Ecology	✓ Flora and Fauna can be affected due to construction activities ✓ Temporary migration of birds	4	3	2	6	44	Moderate

	and mammals from the area.						
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***Mitigation Measures***

Mitigation measures to minimize potential impacts on fauna and flora due to construction activities include:

- routine checking of ditches and escape routes to minimize, if not prevent, entrapment of fauna;
- washing down of vehicles in place and prior to commencing work;
- preservation of excavated topsoil for future site restoration procedures particularly in highly disturbed areas;
- limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures;
- reporting of any violation relating to hunting and trading activities;
- implementing good housekeeping practices on the field and implementing good Solid Waste Management Plan in order to eliminate any source of hazard to the native fauna;
- giving awareness training to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area;
- site specific instruction for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs;
- excessive plantation shall be done in and around the boundary of the project area as a potential environmental enhancement measure.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.5.8 Impact on Occupational Health and Safety**

***Source of Impact***

When human ware and machinery ware are involved at work always there are potential occupational health hazards. Some of the hazards are obvious which require some management; issues like excessive noise levels from the machinery, excessive dust emission from earth works. Injuries to construction workers may result from moving equipment.

There is various occupational health and safety risks are likely to happen during the construction and operation period. Exposure problems to noise, dust, and heat are the major occupational hazards. Personal injuries and illnesses arising out of work situations

impose a substantial burden in terms of lost production, wage loss, medical expenses, and disability compensation payments. Proponent has to take effort to reduce the number of occupational safety and health hazards at the places of employment.

Poor working conditions could deteriorate workers’ safety and health. Occupational hazard such as falling from height, hit by fallen objects, injure by sharp objects, electric shock, and slipping etc., will be associated with the project construction works.

***Impact Assessment***

Occupational health and safety risks to workers may cause by construction activities, loading and unloading materials, earthwork activities, vehicle and heavy machinery movement. *Hence, the probability (P) is highly probable, P = 4*

Occupational health and safety risks to workers are likely to happen during both construction and operation phases. *Hence, the duration (D) is medium term, D=3.*

Impacts would be considered to be site. *Hence, the scale(S) is site, S=1.*

The impact magnitude is potentially medium with long term and potentially permanent impact but with a rare frequency. *Hence, the magnitude (M) is permanent, M=8.*

Table 5-13 Significance Impact of Occupational Health & Safety

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D)	S	(M)	Score	Significance
Occupational Health & Safety	<ul style="list-style-type: none"> <li>• Health and safety risks to workers due to high levels of dust and noise.</li> <li>• Respiratory problems</li> <li>• Hearing issues</li> </ul>	4	3	1	8	48	Moderate

***Mitigation Measures***

Mitigation measures of occupational health and safety risks to workers to be taken during construction and operation phases:

- Provide safe, secure and healthy camps for construction workers adequately.
- Provide necessary training on OSH for workers and supervise their implementation at work place.
- Implement of OSH programs systematically by appointing a safety officer.
- Plant personnel working in dust prone areas will wear personnel protective equipment like air filters over their nose.

- Job rotation schemes will be practiced for over-exposed persons.
- Provision of first aid box at site.
- Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.5.9 Impact on Community Health and Safety**

***Source of Impact***

The movement of workers to and from the place of work and the movement of vehicles carrying equipment and construction material is expected to increase the stress on the local transport and road network. Traffic hazard will also increase.

Dust and particulate emissions, wastes generations, noise and vibrations could occur during the construction of the project. Contaminated runoff could be adverse impact on public health.

However, considering the number of people deployed, the impact on road/traffic is marginal and temporary.

Emission of Dust and Exhaust Gases, Accident, Migrant employees’ case, use local road network.

***Impact Assessment***

Community health and safety issues may occur during Site Preparation and Construction. *Hence, the probability (P) is highly probable, P = 4.*

Community health and safety are likely to happen during both construction and operation phases. *Hence, the duration (D) is medium term, D=3.*

Impacts would be considered to be local. *Hence, the scale(S) is local, S=2.*

The impact magnitude is potentially medium with long term and potentially permanent impact but with a rare frequency. *Hence, the magnitude (M) is permanent, M=8.*

Table 5-14 Significance Impact of Community Health & Safety

Environmental Component	Potential Impact	Score=P x (D+S+M)					
		P	(D)	S	(M)	Score	Significance
Community Health & Safety	✓ Reduced visual amenity						Moderate
	✓ Excessive dust impacts may be harmful for some	4	3	2	8	52	



	people, for example, with some experiencing respiratory conditions.						
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***Mitigation Measures***

Mitigation measures of community health and safety to be taken during construction and operation phases:

- Adopt and maintain good management practices.
- Maintain appropriate buffers between the site and receptors.
- If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.
- Transportation during weekend and off-peak hours as much as possible.
- Ensuring that construction vehicles preferably deliver materials during off-peak hours when traffic volume is low.
- Water sprinkles will be used not to disperse dust around environment.
- Covering of materials to be done during transportation.
- Strict enforcement of on-site speed controls.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.6 Potential Impact and Mitigation Measures during Operation Phase**

During operation phase of Crown Cement Factory, potential impacts are throughout the lifetime of the project or long term. The potential negative impacts associated with the project are cement production activities inside the factory and power plant to supply for running the cement plant and other facilities.

**5.6.1 Impact on Air Quality**

***Source of Impact***

Air emissions may originate from different points in cement production processes, depending on the raw materials, preparation procedures, kiln type and emissions control systems used and electric power generation. The main manufacturing steps where dust, particles and gaseous pollutants can be generated include:

- Preparation of raw material including crushing and grinding,
- Loading and unloading of materials,
- Clinker production,

- Finish grinding, Blending, Packaging, Storage, and Transport.
- Burning of fuels (coal & diesel)

The largest volume of substances emitted during the production of cement and coal power plant are carbon dioxide (CO<sub>2</sub>), particulate matter (dust), oxides of nitrogen (NO<sub>x</sub>), and Sulphur dioxide (SO<sub>2</sub>). Trace quantities of volatile organic compounds (VOCs), acid gases (HCL and HF), and some trace metals may also be emitted.

**(i) *Impact from Dust Emissions***

Major pollutant emitted is particulate matter (dust) from stacks attached to the following equipment's:

- a) Raw Mill
- b) Rotary Kiln
- c) Coal Mill
- d) Cement Mills

Other sources of particulate matter include ventilation systems from limestone weigh feeder, raw material storage silo, raw meal blending silo, raw coal hopper, clinker transport to cement mill and packing machines.

Dust is mainly in the form of suspended particulate matter (SPM or PM) which are mainly larger particles. However, the smaller respiratory particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>) is sometimes associates with dust and poses more health hazard than the larger PM.

The main environmental concerns associated with dust emissions are centered on occupational health risk and irritation to human health. Dust imposes health hazard for the employees and also health concern for the neighbors. Strong wind can spread dust to the village and onto the agricultural land.

**(ii) *Impact from Sulphur Dioxide (SO<sub>2</sub>) Emissions***

Sulphur Oxide (SO<sub>x</sub>) emissions are generally formed from the combustion of Sulphur (S) in the fuel (coal in this case) and from the oxidation of Sulphur present in the raw materials and are predominantly (99%) released as Sulphur Dioxide (SO<sub>2</sub>). The main sources of SO<sub>2</sub> emissions during the operation would be from:

- The pyritic Sulphur in the kiln feed; and
- The combustion of Sulphur present in coal fed to the cement kiln and the power plant

The cement kiln is known to be an excellent scrubber for acid gases, due to the presence of alkalis & free lime generated by the raw materials. This is especially the case for modern kiln technologies and for situations with no pyretic Sulphur in raw materials.

Sulphur Dioxide (SO<sub>2</sub>) is known to contribute to acid deposition (dry and wet) resulting in subsequent damages to ecosystem while in reference to human health impacts from exposure to Sulphur dioxide concentrations, the main impact relates to repercussions induced on the respiratory system through inhalation since it does not accumulate in the body. Sulphur dioxide in ambient air mostly affects the elderly, children, and people with

bronchial and asthmatic disorders (i.e. the most sensitive and vulnerable groups in the community).

According to the WHO Air Quality Guidelines (AQG) for Europe (2000), it is noted that the lowest observed-adverse-effect levels of SO<sub>2</sub> for which effects on the most sensitive population groups (people suffering from asthma) were:

- 1,000 µg/m<sup>3</sup> (10 minutes) for changes in lung function in asthmatics; and
- 250µg/m<sup>3</sup> (24-hr) and 100 µg/m<sup>3</sup> (annual) for exacerbation of respiratory symptoms.

Sulphur Dioxide (SO<sub>2</sub>) emissions from combustion sources were not provided at this stage of the study. But there are no high levels of gaseous contents in air around the project site and SO<sub>2</sub> concentrations are under the detectable limit (1ppm) according to the ambient air quality result.

**(iii) *Impact from Oxides of Nitrogen (NO<sub>x</sub>) Emissions***

NO<sub>x</sub> emissions are formed by the reaction of nitrogen (N<sub>2</sub>) in air with oxygen (O<sub>2</sub>) at the high temperatures reached during the clinker production process. Oxides of nitrogen (NO<sub>x</sub>) can be formed from the oxidation of organic nitrogen present in the fuel. With regards to the power plant, NO<sub>x</sub> emissions are mainly influenced by the efficiency of NO<sub>x</sub> burners as well as the flue gas treatment.

NO<sub>2</sub> is a toxic gas, even at relatively low concentrations contributing as well to the formation of acidic species, which can be deposited by wet and dry processes. NO<sub>x</sub> can also increase the formation of ozone at ground level when mixed with VOCs in the sunlight atmosphere. NO is a relatively innocuous species, but is of interest as a precursor for NO<sub>2</sub>. The main adverse health effect caused by exposure to nitrogen dioxide (NO<sub>2</sub>) is damage to the respiratory system.

**(iv) *Greenhouse Gas Emissions***

Climate change should be recognized when the project activities are related with the Greenhouse gases emissions (GHGs) such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>), etc. Cement manufacturing contributes the greenhouse gases, CO<sub>2</sub> emission mainly from fossil fuel combustion wherever using energy, coal burning and clinker production. The primary GHG emitted from the “Crown Cement Plant” is carbon dioxide (CO<sub>2</sub>), although there can be other emissions such as methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), which are considered more potent but usually occur in smaller quantities. The total GHG emission (CO<sub>2</sub>) of 5299 tons per day will be produced from the “Crown Cement Plant”. The greenhouse gas contribution mainly concerned with the climate change impact.

**(v) *Heavy Metals and Other Pollutants Emissions***

Cement dust contains heavy metals like chromium, nickel, cobalt, lead and mercury, which are harmful to the biotic environment like soil with impact on vegetation, human health, animal health and ecosystem. The concentration level of these elements in

the clinker is influenced by their concentrations in different input materials and by their volatility at the operating conditions. The majority of (non-volatile) metals are incorporated into the clinker, while the remainder, particularly volatile and semi-volatile metals (Cd, Hg), accumulate in the cement dust. Depending on the efficiency of the factory's existing filters, volatile and semi-volatile metals, as well as fine particles of cement dust, may broadcast the gaseous products. Thus, it can be concluded for any metal added to the cement kiln with raw materials, the most of them will be retained by cement kiln process solids, while the less of them will appear in the stack gas stream. (Amira Cipurkovic et al).

***Impact Assessment***

The impact on air quality during operation phase could be mainly caused by emissions of fuel combustion, coal burning and clinker production. *Hence, the probability (P) is definite, P= 5.*

The impact on air quality during operation phase would be the whole life of plant operation. *Hence, the duration (D) is long term, D=4.*

The impact area is mostly at project site and its surrounding. *Hence, the scale(S) is local S=2.*

The impact on air quality could be affected significantly by stack emissions of cement plant and captive power plant. Impact area is not only at project site but also its surrounding areas. *Hence, the magnitude (M) is high, M=8.*

Table 5-15 Significance Impact on Air Quality

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Air Quality	<ul style="list-style-type: none"> <li>✓ Dust is generated from loading and unloading, crushing/ grinding and blending/mixing of raw materials, packing and vehicle movements.</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in power plant, clink production and engine of vehicles,</li> </ul>	5	4	2	8	70	High (-)





- The state-of-the-art dry process technology with five stage pre-calciner will lead to increased energy efficiency, thereby reducing GHG emissions.

### ***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

#### **5.6.2 Impact of Noise and Vibration**

##### ***Source of Impact***

During operation, the major noise generating sources are coal mill, kiln, raw mill, cement mill, packing plant, compressor house, and pump house. These sources are located far off from each other. Noise levels which are likely to be generated from noise generating sources will be in the range of 73~100 dB(A) as presented in Table 5.16 below.

Table 5-16 Sources of Noise and Associated Noise Levels at Cement Plant

<b>Operation</b>	<b>Sound Level dB(A)</b>
<b>Cement Plant</b>	
Raw mills	95-100
Kilns	80-85
Cement mills	95-100
Coal Mill	90-95
Coal Crusher	90-95
Limestone Crusher	95-100

Offsite noise impacts are most likely to occur along the road networks that will be used for the transportation of raw material, manpower and final product to end users crossing nearby communities. The significance of the impact is related to the anticipated high traffic volume (hundreds of round trips) and nature of vehicles (mostly heavy trucks) entering and existing the cement plant site during the project lifetime. Typical noise levels from trucks could range between 75 and 85 dB(A) based on vehicle condition and speed. The flow of large volume of trucks at close proximity from communities will be a major source of noise pollution in addition to high safety risk to pedestrians and motorists.

##### ***Impact Assessment***

Noise will occur due to operation of cement plant and power plant, and vehicle movement at site and its surrounding during the project lifetime. *Hence, the probability (P) is definite, P = 5.*

The impact of noise generated from the operation of cement plant will occur throughout the lifetime of the project. *Hence, the duration (D) is long term, D=4.*

The impact area of noise would be supposed to be at site with the noise mitigation measures to be carried out by project. *Hence, the scale(S) is site, S=1.*

Manufacturing process of cement plant, power plant and vehicular movement will generate the significance impact noise at site. But, the receptors to be affected of noise by the cement plant are not located within 1 km of the project area. *Hence, the magnitude (M) is medium, M = 6.*

Table 5-17 Significance Impact on Noise and Vibration Level

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Noise and Vibration	<ul style="list-style-type: none"> <li>✓ Increased background noise level due to operation of cement plant and power plant, and vehicle movement.</li> <li>✓ Disturbance to workers and local residents (if any).</li> <li>✓ Reduced hearing issues for workers and staff.</li> <li>✓ Crack due to the vibration from movement of heavy vehicles.</li> </ul>	5	4	1	6	55	Moderate (-)

***Mitigation Measures***

The following environmental protection and mitigation measures will be implemented in order to reduce or prevent potential impacts of noise emissions during operation phase of the cement plant and the power plant, and vehicular movement.

- Equipment/ machinery will be selected with low noise and will be housed in insulated ceiling;
- Select low noise equipment and ensuring encasement of noise generation sources to control the noise levels;
- Install mufflers at air inlets and outlets of the fans and air compressors;

- Install sound insulation cover (room) for equipment with higher noise;
- Providing adequate personal protective equipment like earmuffs & earplugs to all operations and maintenance personnel working near noise prone areas;
- Providing permanent enclosures around the heavy noise producing equipment;
- Ensuring good maintenance and repair of the heavy equipment;
- All equipment shall be switched off when not in use. Equipment and trucks used shall use the best available noise control techniques (e.g., improved mufflers; equipment redesign; use of intake silencers, ducts, engine enclosures and/or acoustically attenuating shields or shrouds) wherever feasible and necessary;
- Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and enclosed within temporary shed;
- Provision of buffer zone of green areas consisting of tall and thick bushes and trees plantation in and around the plant as an effective noise barrier;
- No workers will be allowed working in noise level >85 dB (A) that exceed permissible occupational noise level limit standard without adequate personal protective equipment; and
- Under any circumstances the noise level at plant boundary will not exceed 70 dB (A) at day time and night time.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.6.3 Impact on Water Environment**

***Source of Impact***

The cement manufacturing process of Crown Cement Plant is dry process technology. In the Cement Plant, water is used only for cooling water such as bearings, kiln rings, cooling tower blowdown, and in power plant water is used for cooling water and steam generation. The other areas of water consumption are dust suppression and domestic purposes such as canteen, accommodations and also greenbelt development. During the project’s operation phase, the total water demand at plant site will be about 9,000,000 gallons/yr, and water consumption of domestic purposes is not expected to exceed 250,000 gallons/yr. The main water consuming activities during the operation phase are described in Table 5-18 below.

Table 5-18 Water Demand and Distribution

No.	Area	Water Consumption (gallons/ year)	Source
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1	Dust Suppression	2,000,000	Water Reservoirs collected from nearby streams
2	Cooling Water	7,000,000	
3	Domestic	250,000	Tube Well (Groundwater)
Total		9,250,000	

No wastewater is generated from cement production process. The wastewater streams typical generated from cement plant and coal power plant based on air cooled condenser system mainly generated from utility operations for cooling purposes in different phases of the process (e.g. bearings, kiln rings, cooling tower blowdown). Domestic wastewater will be generated from the worker accommodations and office facilities.

The runoff from operation area might also be contaminated with the raw materials sediments and oil and grease for use of machines to operate well conditions, which are also from workshop and raw materials storage area as well. Improper disposal of generated wastewater could result in groundwater contamination with chemical as well as biological contaminants. Also, secondary impacts from mixed wastewater discharge and storage can include odor generation, and attraction of flies and incidence of associated vector diseases.

***Impact Assessment***

The impact on water quality will be take place by water consumption for cooling and steam generation and effluents from blowdown water and domestic. *Hence, the probability (P) is highly probable, P=4.*

The impact on water quality should be considered as long-term throughout the lifetime of project if contaminations to water resource occur. *Hence, the duration (D) is long term, D=4.*

The impact area will be restricted at project site but its surrounding can be reached due to the runoff water. *Hence, the scale(S) is local, L= 2.*

The impact on surface water during operation phase would be lifetime of the project. Wastewater generated from cement plant will be discharged after treated and impact area is restricted at project site *Hence, the magnitude (M) is medium, M=6.*

Table 5-19 Significance Impact on Water Environment

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	M)	Score	
Water Environment	Impact on water environment cause of water usage, wastewater and runoff from cement plant, power plant and domestic	4	4	2	6	48	Moderate

### ***Mitigation Measures***

Mitigation measures to be taken during operation phases are;

- Cement production is dry process technology and water mainly used for cooling and steam generation is reused or circulated in cooling water system. Therefore, no wastewater generated from the process and no cause water pollution.
- The power plants are based on air cooled condenser system and the wastewater generated from boilers and auxiliary cooling will be controlled by installation of treatment system such as use of closed system, grease and oil trap, aeration pond, sediment pond, septic tank and reused in the power plant.
- Wastewater generated from offices, canteens, and staff accommodation will be treated by septic-seepage system before discharge. Treated effluent will be used for dust suppression and plantation/ greenbelt development.
- The runoff from uncontaminated areas will be used for irrigation of greenbelt area.
- Construction of suitably designed drains all along the roads and boundary of the plant premises.
- A storm water drainage system will be developed for the entire project site.
- Provide separated water drainage and treatment system for outdoor coal storage. Compact the storage ground with clay to prevent seepage into the ground.
- Ensure effective waste water management as guided by law.
- Avoid as much pollution on the drainage system in the area.
- Rain water harvesting will be practiced inside the plant premises.
- Management of water usage. Avoid unnecessary wastage.
- Install water saving devices or water-conserving taps that turn off automatically when water is not being used.

### ***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

#### **5.6.4 Impact of Solid Waste**

##### ***Source of Impact***

The type of wastes generated from Crown Cement Factory during operation phase is process waste and non-process waste. Wastes generated from operation process are dust from various air pollution control equipment, used oil and air filters from machinery and vehicles, used batteries from vehicles and trucks, chemical container, and other maintenance waste (i.e., oily rags, paint residues, etc.). Non-process wastes include



wastes such as sewage, food waste, paper and other associated wastes from the office and residential buildings.

If not controlled properly and proper disposal of those wastes could result in potential contamination for surface water, groundwater resources and soil, which could have negative impacts on ecosystem functioning and on human health for those living close to the dump sites.

***Impact Assessment***

The impact of solid waste could be dust from air pollution control equipment, process waste and non-process waste during operation phase. *Hence, the probability (P) is highly probable, P=4.*

Solid waste generated from cement plant would be throughout the lifetime of project. *Hence, the duration (D) is long term, D=4.*

The impact area will be restricted at project site. *Hence, the scale(S) is site, L= 1.*

The impact of solid waste during operation phase would be lifetime of the project. For each kind of wastes generated from cement plant will be disposed by suitable method. *Hence, the magnitude (M) is high, M=8.*

Table 5-20 Significance Impact of Solid Waste

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	M)	Score	
Solid Waste	<ul style="list-style-type: none"> <li>• Dust from air pollution control equipment may impact respiratory diseases in employees/ nearby persons.</li> <li>• Used oil &amp; waste residue containing oil, may lead to contamination of soil and groundwater, if leakage or evaporation from storage occurs accidentally.</li> <li>• Open dumping of domestic solid waste generated from plant canteen may create environmental impacts like infectious diseases,</li> </ul>	4	4	1	8	52	Moderate

	obstruction of drains and loss of biodiversity.						
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***Mitigation Measures***

Mitigation measures to reduce the impact due to waste generation during operation phase are as follows.

- dust collected from various air pollution control equipment’s like Bag House / Bag Filters will be recycled back into the process.
- waste generated from different unit will be collected in the segregated manner. The biodegradable waste will be compost and then will be used as manure for greenbelt plantation, whereas the non-biodegradable waste will be disposed scientifically.
- waste storage areas will be roofed and bounded to prevent potential cross-contamination and waste will be disposed of in line with local requirements at a suitable waste disposal facility.
- used oil/ spent oil will be generated as hazardous waste and will be stored in labelling containers or vessels and sold to recycler.
- sewage treatment plant sludge will be used as manure in greenbelt development/ plantation.
- avoid open dumping of domestic solid waste and set up separate bins.
- follow the 5Rs principles of waste minimization (reduce, reuse, recycle, recover and redesign).

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.6.5 Impact on Ecology**

***Source of Impact***

There may be impact on the biological environment during the Cement Plant operation phase, if proper care will not be taken. The impacts are as follows:

- Particulate matter emissions from stack and fugitive emissions due to transportation activity and material handling may degrade the soil quality of surrounding environment that may affect the biodiversity of surrounding environment. Particulate matter emission may cause migration of wild animals and birds.
- Fugitive emissions (dust) may impact the terrestrial flora. The settlement of dust on the laminar surface of plants can impede the efficiency of photo-transduction and thereby, affect the productivity of plants. In some of the plant, it may also smother the leaf surface blocking stomata, resulting in reduced transpiration.

- Increased noise level due to running of machinery may scare the wild fauna and force them to migrate to other areas.
- During operation phase, noise and vibration, as well as light contamination from manufacturing activities will cause impacts which may negatively influence the distribution and habits of endemic or endangered fauna, in particular avifauna, which may avoid feeding grounds and usage of certain corridors due to disturbance. Furthermore, noise and light associated with the Cement production could potentially disturb local nocturnal species, and light contamination may attract insects and birds and disturb wildlife in general.
- The transportation of raw materials and products can increase traffic on new roads/ existing roads, presents a risk of accidental mortality or injury to fauna as a result of collision with moving vehicles.
- The close proximity of project site to the aquatic environment increases the likelihood that spilled contaminated material could enter the water bodies via runoff. Inappropriate management and disposal of hazardous or non-hazardous waste could lead to impacts to physical receptors which, in turn may impact biological receptors and biodiversity.
- Labour influx and worker accommodation may lead to unauthorized hunting and harvesting of plants and animals by workers which could impact biodiversity. Work camps may also disturb sensitive fauna by light and noise disturbance. Hunting, poaching and wildlife trade are critical issues for the conservation of species; unsustainable hunting to obtain meat, animal parts or live individuals for the pet trade can cause population declines and local extinction.

***Impact Assessment***

Impacts to Biodiversity would be direct, indirect and induced impacts with potential degradation of habitat and direct disturbance to species during the Operation Phase but the Cement Process is dry process and no process waste water will no produce and there is no critical species at project area. *Hence, the probability (P) is highly probable, P = 4.*

The impact on biodiversity during Operation phase is considered to be long-term because the project will implement thirty-year terms. If the appropriate measure didn't apply, the impact on biodiversity will be long term. *Hence, the duration (D) is long term, D=4.*

The impact on biodiversity during Operation phase is considered as Regional, *Hence, the Scale, S = 3.*

Cement Process is dry process and no process waste water will be produced, but there is KBA near the plant site and some species such as birds may be disturbance because of noise and light of plant. *Hence, the magnitude (M) is Medium, M=6.*

Table 5-21 Significance Impact on Ecology

Environmental	Potential Impact	Score=P x (D+S+M)	Significance
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Component		P	(D	S	M)	Score	
Ecology	<ul style="list-style-type: none"> <li>✓ potential degradation of habitat</li> <li>✓ Ecosystem service and biodiversity</li> </ul>	4	4	3	6	52	Moderate (-)

***Mitigation Measures***

- Apply all relevant mitigation measures of Noise and Vibration, Soil Quality and Surface Water Quality Section.
- Induction training for workers will include;
  - (a) Ban on foraging, fishing and hunting;
  - (b) Protected plant and animals to be aware of;
- Restrict speed of vehicles to reduce risk of collision;
- Develop Green Belt Program

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.6.6 Impact on Resource**

***Source of Impact***

In cement production process, four kinds of raw materials such as Limestone, Clay, Laterite and Gypsum will be required as main raw materials and Coal will be used as the fuel for the heat generation in Clinker Section and for the steam generation in Power Plant. The consumption of raw materials are 2,217,600 tons per year of limestone, 343,200 tons per year of Clay, 79,200 tons per year of Iron ore, 148,500 tons per year of Gypsum, 412,500 tons per year of Coal.

Each of raw material reserve has 155 million tons of lime stone, 118 million tons of Clay, 1.25 million tons of Iron ore, 3.37 million tons of Gypsum and 0.3 million tons of Coal.

According to the raw material consumption and reserve, 16 mine life of lime stone, 195 mine life of Clay, 26 mine life of Iron ore, 27 mine life of Gypsum and 4 mine life of Coal.

Water will be required 9,250,000 gallons per day (Maximum demand in Dry season) from the water pond which is collected surface water nearby. The water resource will mainly depend on rain water and will be enough according to the rainfall status of the plant location.

***Impact Assessment***

The impact on Natural resource will be take place. *Hence, the probability (P) is 5.*

The impact on Natural resource during the operation phase should be consider as long-term. *Hence, the duration (D) is long term, D=4.*

The impact area will be restricted at mining site. Hence, the scale (S) is local, L= 2.

The raw material consumption is very low if compare with reserve and water demand is enough according to flow rate of creek. Hence, the magnitude (M) is Low, M=2.

Table 5-22 Significance Impact on Resource Use

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Resource	Depletion of Natural Resource	4	4	3	6	52	Moderate (-)

***Mitigation Measures***

- Raw material reserves shall be estimated properly,
- Continuous attempt to control wastages during transportation, storage and handling of raw materials,
- Regular monitoring of availability of stocks and consumption of raw materials, dispatch of products and loss of material,
- Power saving measures including usage of the multi-stage cyclone pre-heater (most efficient pre-heater technology) as well as the reuse of the heat content of the exhaust gas for drying raw materials.
- Water conservation measures using closed loop water recovery systems as well as providing provisions for the collection and use of rainwater (harvesting).
- Training and awareness program on water conservation measures will be organized for the employees.

***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

**5.6.7 Impact on Socio-economic**

***Source of Impact***

The proposed project is the long-term investment and it has significant impact on socio-economic in the study area. During the operation phase, the Cement Plant will operate with about 1203 employees and will create direct or indirect employment opportunities to the local residents, which will help to increase their earning and better living standard as well as further socio-economic status of the area. Other impacts, associated with the project will create positive impact as it will result in the overall development of the area in respect to the infrastructure development, educational growth,



health facilities etc. Consequently, socio-economic standards of local people will be increased and eventually it may lead to the economic growth at local and regional level.

***Impact Assessment***

Potential impacts on social economy during the Operation Phase would likely be direct and indirect positive impacts because local people and business will have opportunity to get jobs. Hence, the probability (P) is P = 5.

Impact on social economy should be considered as long-term, the project will operate with thirty (30) years terms. Hence, the duration (D) is long term, D=4.

The most of workforce will be sourced from close to the project area but skill worker will be sourced from the whole country. The impact area is considered as regional. Hence, the scale(S) of impacts is S=3.

The project can create job opportunities for 400 employees and can promote domestic business. Hence, the magnitude (M) is medium, M=6.

Table 5-23 Assessment of Impacts on Social Economy

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Social-economy	<ul style="list-style-type: none"> <li>✓ Job opportunity</li> <li>✓ Promote local business</li> </ul>	5	4	3	6	75	High (+)

***Mitigation Measures***

- Ensure a fair hiring process.
- Create job opportunity for local people
- Priority employ local people

**5.6.8 Impact on Occupational Health and Safety**

***Source of Impact***

**Activities**

Cement Manufacturing Process, Transportation of raw materials and products. Incidents and injuries resulting in burns arise from contact with hot clinker or cement powder. Hazards are particularly associated with hot cement kiln dust (CKD), and dust on pre-heater systems. Chemical (alkali) burns may also result from contact with CKD.

During normal operation the hot raw, intermediate and final products are contained or highlighted. There is far greater risk when contact is possible during abnormal operation of the plant, when clearing blockages, carrying out maintenance or in emergency situations. It is not always obvious when something is hot, the risks include personal injury – severe burns and fire – from contact with combustible materials; oils, scaffold boards, ladders, electrical cabling, etc.

**Raw Mill and Pre-heater Tower:**

Material in the mill is at temperatures up to 120°C; in the tower the material can be as hot as 900°C. Contact with the material is more likely when:

- Clearing blockages in the tower where there is the potential for it to flush through the process
- During rodding and cardoxing where it can be ejected over a wide area.

**Hot Clinker:**

Contact is possible in the:

- in the clinker cooler building
- along the clinker pan conveyors
- in the clinker dome
- along the belts to the cement mills

**Precipitator and By-Pass Dust:**

Contact is possible when:

- access is required to the precipitator hoppers
- working on the screws and drag chain conveyors
- maintaining the dust transfer pumps

**Hot Cement:**

Contact is possible when:

- accessing the cement transfer lines
- working on the packers
- carrying out work on the cement screw conveyor and drag chains

**Hazards**

- The most significant hazards occur during the operational phase of cement production primarily include dust, toxic gas, heat radiation and noise.
- There are potential hazards like falling from height; entanglement with machinery; slipping on greasy walkways; falling objects; electric shock; lifting excessive weights; etc.
- During the transportation of raw materials and products, that there is the potential for accidents and injuries to occur if occupational health and safety systems are not developed and strictly enforced for all Project personnel.

***Impact Assessment***

Occupational health and safety issues may occur during Operation Phase. *Hence, the probability (P) is highly probable, P = 4*

Impact has the potential to have a long-lasting effect with injured workers being unable to work for a long time or even permanent in case of accident crippling or killing workers for worse case. *Hence, the duration (D) is permanent, D=5.*

Impacts would be considered to be local. *Hence, the scale(S) is S = 2.*

The impact magnitude is potentially medium with long term and potentially permanent impact but with a rare frequency. *Hence, the magnitude (M) is 6.*

Table 5-24 Assessment of Impacts for occupational health and safety

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	M)	Score	
Occupational health and safety	<ul style="list-style-type: none"> <li>✓ Health on workers.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>	5	5	2	6	60	Moderate (-)

### ***Mitigation Measures***

- Apply relevant mitigation measures from Air Quality Impact.
- On starting operations, a noise level measurement should be conducted to determine the noise levels. Where the noise levels are found to be in excess, an appropriate noise control and hearing conservation program should be designed and implemented.
- Provide First aid training, safety training.
- A first-aid kit should be provided within the site and should be fully equipped at all times and managed by qualified and trained first aider(s).
- Conduct medical examination of workers. The workers should undergo the regular medical examinations.
- Follow the safety rules.
- Keep workshop clean and tidy.
- Turn off machines when not in use.
- Wear safety goggles where needed.
- Put maintenance tools away systematically after use.
- Inspect and maintain the vehicles, machines, emergency generators and boiler regularly
- Provide Health care insurance for workers
- Capacity building and training of staff/workers with respect to Occupational Health, Safety and Environment.
- Effective Emergency Response Plans-ERPs to cater for various eventualities such as fire outbreaks, oil spills and other incidences that are likely to occur. These should be taught to all the workers.
- Proper documented possible action plans need to be put in place in case of any incidences occurring.

### ***Significance of Residual impacts***

Residual impacts would be expected to be of **Low** significance.

### **5.6.9 Impact on Community Health and Safety**

#### ***Source of Impact***

During the operation phase, the main activities are raw material preparation and cement production by using crushing/grinding and clinkering. The transportation of vehicles will use for personnel, raw materials and equipment. During the operation phase, approximately 140 staff will be working at the plant site and office. Workers accommodation will be situated near the plant site area. The plant will produce industrial wastes and domestic wastes, and waste management will be implemented.

The interaction of plant workers and local people may happen social issue and communicable diseases as discussed in Site preparation and Construction Phase. The transportation of workers, materials and products is expected to increase the stress on the local transport and road network. Traffic hazards, the risk of accidents and injuries will also increase. Dust and particulate emissions, wastes generations may also result in risks to public health due to pollution of air, contamination of water resources and spread of

disease carrying species such as rats. The manufacturing process will create environmental emissions which may impact on community health and safety, in particular disruption of sleep (noise), impact to structure integrity (vibration) or aggravation of respiratory illness (dust).

***Impact Assessment***

Community health and safety issues may occur during Operation. *Hence, the probability (P) is highly probable, P = 4*

Impact has the potential to have a long-lasting effect with injured workers being unable to work for a long time or even permanent in case of accident crippling or killing workers. *Hence, the duration (D) is permanent, D=5.*

Impacts would be considered to be regional. *Hence, the scale(S) is 3.*

The impact magnitude is potentially medium with long term and potentially permanent impact with a rare frequency. However, local people and new workers (migrated workers) are low awareness on transmittable communicable disease. *Hence, the magnitude (M) is High, M= 8.*

**Table 5-25 Assessment of Impact of Community Health and Safety**

Environmental Component	Potential Impact	Score =P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Community health and safety	<ul style="list-style-type: none"> <li>✓ Health issue on community.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>	4	5	3	8	64	High (-)

***Mitigation Measure***

- Undertake pre-employment screening to ensure fitness for work and to minimize the transmission of communicable diseases;
- Implement appropriate education on infectious and sexually transmitted diseases.
- All vehicles used for the project should be regularly serviced and maintained;
- Local speed limits should be adhered to when travelling through communities by all Project related traffic. Such speed limits will have the added advantage of reducing dust emissions;
- Water sprinkles shall be used as possible.
- Covering of materials to be done during transportation.
- Ensure that signs are put up around construction sites advising people of the risks associated with trespass.
- Ensure that there is adequate fencing around construction site to minimise the risk of trespass. Fencing will be checked daily to ensure that it is in good condition and to look for any signs of entry;
- Implement all the mitigation measures from Air and Noise impact sections;



*Significance of Residual impacts*

Residual impacts would be expected to be of **Low** significance.

**5.7 RISK ASSESSMENT (due to the unplanned events)**

An unplanned event is defined as an incident that is not planned to occur as part of the Project (e.g., accidents), but that can potentially occur. accidental events may still occur due to human error, equipment failure, natural disasters or other unforeseen circumstances. The primary unplanned events that could adversely affect the physical, biological and human environment are:

- Natural disasters e.g. earthquake, flooding, landslide.
- vehicles accident
- fire and explosion

**5.7.1 Natural Disaster (i.e. Earthquake, Flooding, Landslide)**

*Source of Impact*

Natural disasters e.g. earthquake or flooding, landslide events may impact project activities.

According to the Plant site location, the region of plant site will not occur flooding. The mountain which can be extracted limestone is located near plant site area which is about 400 meters apart from that mountain. So, even landslide from that mountain, the plant site will not be impacted.

Myanmar's biggest earthquake, measuring 8.2 on the Richter scale, took place in 1912 along the Kyauk Kyan Fault in northern Shan State, another of the country's main faults (the first is the Sagaing Fault and the third is the Rakhine Fault). Kyauk Kyan fault is one of the prominent seismotectonic feature (Lat. 22° 18'N – Long. 96° 44'E). The large earthquake of 23 May 1912 (8.0 RM) with many foreshocks and aftershocks, seems to be associated with that fault. It runs nearly north–south direction. Kyauk Kyan fault is 800 kilometers long, stretching from Shan State to southern Kayah State.

*Impact Assessment*

Natural disasters, earthquake are relatively unlikely occurrences. *Hence, the probability (P) is probable, P = 3*

Impacts from an earthquake or flooding could potentially be long-term or even permanent due to subsequent effects to biodiversity, residential housing areas, and/or due to fatalities. *Hence, the duration (D) is long term, D=4.*

Impacts would be considered to be local and regional. *Hence, the scale(S) is 2.*

The impact magnitude is potentially medium with long term and potentially permanent impact but with a rare frequency. *Hence, the magnitude (M) is 6.*

Table 5-26 Assessment of Impacts due to Natural Disaster (Earthquake)

Environmental	Potential Impact	Score=P x (D+S+M)	Significance
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<b>Component</b>		<b>P</b>	<b>(D</b>	<b>S</b>	<b>M)</b>	<b>Score</b>	
Natural Disasters	subsequent effects to biodiversity, infrastructure, as well as potential injuries or fatalities to workers	3	4	2	6	36	Low (-)

***Mitigation Measures***

- Mitigation measures for other Unplanned Events (including fire and explosion) are also applicable;
- Implement Emergency Response Plan
- Avoid construction of buildings and access roads in areas that may landslide and flooding.
- Buildings, plant and equipment design must be durable to withstand earthquake;
- Check weather forecasts daily to ensure there are no major storms or weather events foreseen which could affect the safety of Project activities

***Significance of Residual Impact***

Residual impacts would be expected to be of **Negligible** significance.

**5.7.2 Fire and Explosion**

***Source of Impact***

**Fire Hazards**

Five fire hazards associated with the cement manufacturing process are outlined in the following sections.

***Coal Storage***

On average 0.2 – 0.3 tonnes of coal are consumed in the kiln per kilogram of clinker cement production. As such coal storage during cement manufacturing is an important component to consider in hazard analysis.

Among the various causes of coal fires, spontaneous combustion during storage results in a large number of losses. Spontaneous combustion is caused by adsorption of oxygen at the outer and inner surface of coal which results in oxidation. Oxidation is an exothermic reaction which causes the temperature of the coal stack to rise gradually. As the pile exceeds approximately 800C ignition can occur. Spontaneous combustion of the coal depends on many factors and critical among these is the type, age and composition of coal.

***Coal Conveying***

The combustible nature of crushed coal poses a fire hazard in the conveying system. Frictional resistance between idlers and rollers, insufficient lubrication, belt misalignment, and faulty bearings can generate sparks or heat, which can ignite the crushed coal.

### ***On-Site Power Plants***

Cement manufacturing is a very energy intensive process. As such, on-site power plants are increasingly being used to meet energy demands of the cement plant.

Some of the fire hazards associated with on-site power plants include fire in power house buildings due to ignition of lube oil. Fuel oil fires and fire in the power plant boiler can also occur, as well as cable gallery fires.

### ***Electrical Equipment & Cables***

Cement plants are energy intensive industries and have a large number of heavy-duty electrical equipment used for distribution, control, and electric power utilization. Large quantities of insulation oil used in equipment like switchgears, transformers, and capacitors are combustible in nature and pose a major fire hazard. Fire hazards also arise from large-scale electrical cabling carried out between various substations and equipment.

Various modifications and capacity enhancements may occur in the cement plant over time, requiring installation of new cable layouts. This can give rise to multiple cable joints which decreases fire safety. Since most of these substations are unmanned this can increase the fire risk.

### ***Empty Bag Storage***

Lastly, storage of empty bags are a large fire hazard due to the combustible nature of the material used. Fires in bag storage areas can spread to adjoining areas in the plant like the cement bagging station, increasing the potential loss of these fires.

### ***Explosion Hazards***

In addition to fire hazards there are several explosion hazards that can arise in cement manufacturing. Five of these potential explosion hazards are listed in the following.

### ***Coal Pulverizing***

Coal is often the main fuel source used to heat the cement kiln. Coal pulverizers are required to grind the coal from the bulk storage size to a smaller particle diameter to use in the kiln.

Coal pulverizers significantly reduce the mean particle size of the coal, drastically increasing the fire/explosion hazard risk. This risk is present inside the pulverizing equipment and during transport to the kiln for burning.

### ***Bag Filters***

Fire and explosion hazards in bag filters can arise due to any of the following factors: spontaneous combustion, dust explosion, static electricity, and high temperature materials passing through the filters. Bag filters used for the coal mill rank as one of the highest fire and explosion hazards in cement plants, due to the small particle size of the crushed coal.

***Storage and Handling of Explosives***

Most cement plants own limestone quarries that are located nearby. Limestone quarrying involves the use of explosives and as such, it is vital that they are stored and handled in a safe manner to avoid unexpected detonation.

The magnitude of impact depends on type of fire as detailed below.

- 1) Fire with no explosion: the hazards of this type include generating heat radiation, causing burned skin. Long exposure to smoke could result in failure of respiratory system.
- 2) Fire with other incidents: Explosion and toxic materials release may occur along with fire. Hazards of this type are from heat radiation, pressure from explosive waves, and exposure to toxic chemicals.
- 3) Fire after explosion: Explosion usually occurs with no warning sign and fire would start immediately if fuel is available nearby. Hazards of this type are from pressure of explosive waves and high heat radiation.

***Impact Assessment***

Fire and explosion event are unlikely but may occur at some time during normal operating conditions, (i.e. the event has occurred within industry). Hence, *the probability (P) is probable, P = 2*

Duration would be short-term in the event of a fire/explosion, although the risk of such an occurrence will be present throughout the duration of the Project. Impacts from a fire/explosion could also potentially be long-term or even permanent due to subsequent effects to biodiversity residential housing areas, and/or due to fatalities. *Hence, the duration (D) is long term, D=4.*

Although fire/explosion is an unlikely occurrence, the scale of a potential impact is large, as it could result in extensive damage to biodiversity or housing complex, as well as potential injuries or fatalities to workers. *Hence, the scale(S) is 3.*

Although the occurrence is unlikely, the scale of impact due to fire or explosion would be potentially large, including major damage, and potential injuries or fatalities to workers. However, the scale of the impact will be mitigated significantly by factory’s existing fire control system. The impact magnitude will be medium. *Hence, the magnitude (M) is 6.*

**Table 5-27 Assessment of Impacts due to Fire and Explosion**

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Fire and Explosion	subsequent effects to biodiversity residential housing areas, and fatalities	2	4	3	6	26	low (-)

***Mitigation Measures***

- Make ensure safe operation of coal fired systems such as *Inerting, Removal of ignition sources, Good Housekeeping, Equipment design, Education and training*
- Inspect electrical wiring system and repair or replace with any damage wire.
- Make ensure that availability and reliability of electricity and monitoring over voltage usage.
- Make ensure that transferring, refilling, and storage of fuel and chemicals. If accidental spill occurs, clean surface immediately.
- Prohibit smoking or assign the smoking area.
- Provide warning signage;
- Pre-communicate and coordinate with local firefighting brigade/station;
- Regular inspection of existing firefighting equipment, water storage and fire hydrant to ensure that all are ready to use for emergency cases.
- The main entrances and emergency exits of the factory are in clearance and not to be blocked with materials or machines.
- Provide trainings on fire-fighting for the workers and Fire drill must be done biannually.
- Provide first aid training, first aid kit and first aid room at the factory.
- The assembly point for emergency cases has been defined in front of the factory.
- Fire extinguishers and instructions for fire-fighting must be checked regularly.

***Significance of Residual Impact***

Residual impacts would be expected to be of **Negligible** significance.



### 5.7.3 Vehicle Accidents

#### *Source of Impact*

There will be transportation of raw materials and cement products. Raw materials will be transported from quarry sites to plant by Dump Trucks. Some quarry sites are located near the plant and some are far from the plant as shown in Figure 3.4, 3.5, 3.6 and 3.6. The cement products will be distributed to the whole country of Myanmar according to the demand of customers and transported by the private trucks of customers.

During the transportation of workers, materials and products, that there is the potential for accidents and injuries or death, in addition to causing damage to vehicles, loss of inventory, fuel spill to occur if road safety rules did not comply.

#### *Impact Assessment*

Vehicles accidents may unlikely occur during the operation. *Hence, the probability (P) is probable, P = 2*

Impact has the potential to have a long-lasting effect with injured workers being unable to work for a long time or even permanent in case of accident crippling or killing workers. *Hence, the duration (D) is long term, D=4.*

Impacts would be considered to be local. *Hence, the scale(S) is 2.*

The impact magnitude is potentially medium with long-term and potentially permanent impact but with a rare frequency. *Hence, the magnitude (M) is 6.*

Table 5-28 Assessment of Impacts due to Vehicle Accidents

Environmental Component	Potential Impact	Score=P x (D+S+M)					Significance
		P	(D)	S	(M)	Score	
Vehicle Accidents	injuries or death, in addition to causing damage to vehicles, loss of inventory, fuel spill	2	4	2	6	24	Low (-)

#### *Mitigation Measures*

- Implement driving safety standards and enforced speed limits;
- Provide training to drivers, including training the drivers about presence of sensitive traffic areas, e.g. location of schools, shrines, pagodas, temples, mosques, health clinics, hospitals, markets etc. along the transportation route and impose and enforce reduced speed limits for these areas.
- Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times;
- Avoid drinking alcohol while driving time.

- Use only properly licensed drivers.;
- All vehicles shall use designated roads only as soon as possible.
- Routine maintenance of all vehicles

***Significance of Residual Impact***

Residual impacts would be expected to be of **Negligible** significance.

## 6.0 CUMULATIVE IMPACT ASSESSMENT

### 6.1 Introduction

The IFC (2012) defines cumulative impacts as impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities.

Cumulative impacts summarised in this section refer to the additional impacts that may be caused by other developments or activities in the vicinity of the Project Area, that, when added to the impacts of the proposed Project, combine to cause a greater impact. Such impacts may arise due to spatial overlap.

The methodology used in the setting of the spatial and temporal boundaries for this CIA was largely qualitative. The following factors have been considered within the methodology:

- Temporal boundaries have been set based on desktop review of available information pertaining to other proposed Projects within the area (see below), the present Project schedule, understanding of Government strategy with regards to the long-term development of the area, and the continual nature of some of the external stressors; and
- Spatial (or Geographic) boundaries are a composite of the location of sensitive receptors, assessed impacts of the Project and the degree to which they may overlap with other external projects and stressors to impact upon an identified sensitive receptor.

For this project, the spatial boundary would consist primarily of the Project Study Area, but for some potential impacts it may extend beyond this if the Project activities overlap with other project’s activities (for example utilization of public roadways).

### 6.2 Identification of Other Projects

Through a thorough review of publically available information of existing project located within the spatial and temporal boundaries of the Project (CROWN Cement Factory), which may potentially result in cumulative impacts are identified.

Ngwe Yi Pa Le’ Cement Co., Ltd had been constructed 60 MW Coal Power Plant at the Cement Compound area and Lime stone mine is located beside the cement plant as shown in **Figure 6.1**. And also Sin Shwe Li Sugar Mill No.1 and Sin Shwe Li Sugar Mill No.2 are located which are 13 miles far from the Cement plant. Potential impacts from these projects are related to increase air emission as well as the physical presence of the Projects during operation phase.

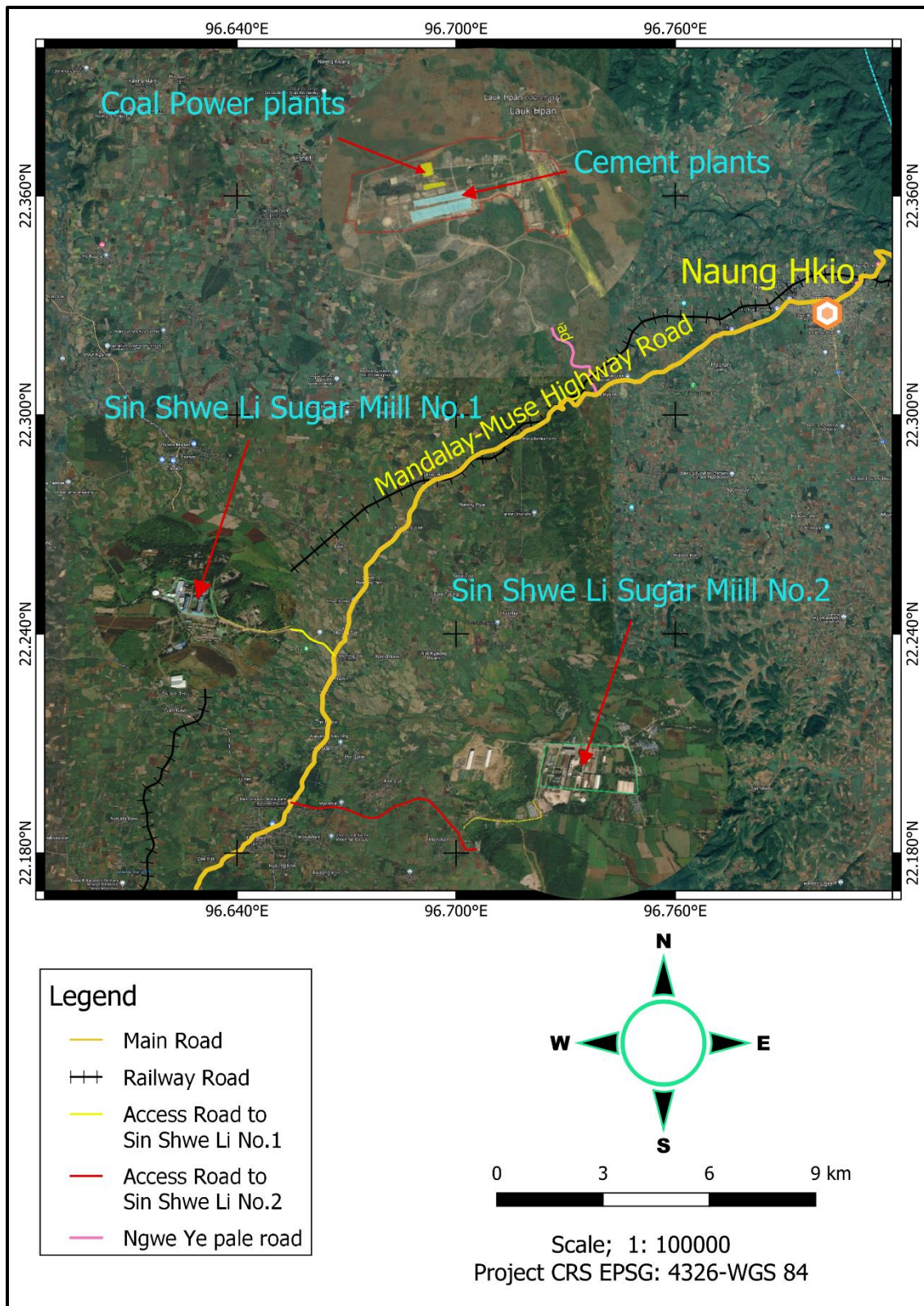


Figure 6-1 Other Existing Projects with Cement Plants

### **6.3 Scoping of Potential Cumulative Impacts**

Prior to assessing cumulative impacts, the project interactions and sensitive receptors that could potentially be affected by cumulative interactions from the other projects discussed in Section 6.12.2.

By the nature of projects, air emission would overlap throughout the operation phase. According to the location of projects, the projects have to use the same primary road and the same landscape area.

Based on the above, the following potential cumulative impacts and receptors have been included in this CIA:

- Cumulative impacts due to combined air emissions on representative air sensitive receptors;
- Cumulative impacts due to utilisation of public infrastructures and amenities (primarily roads);

### **6.4 Assessment of Cumulative Impacts**

#### **Air Emission**

CROWN Cement Plant will use coal as fuel for generation of heat in kiln production. CROWN Cement plant will consume 1,250 tons per day for the combined production of 5,000 tons of cement (i.e., full load production).

60 MW Coal Power plant will consume 1008 Ton per day for full load capacity of 60 MW generations. Coal consumption can vary depending on the power generation (such as 20 MW, 40 MW, 60MW), but the company expect the mostly generation of power will be 40 MW. So, the coal consumption of 40 MW power generations will be 672 tons per day during the operation.

The total consumption of coal for cement plants and coal power plant will be 1,922 tons per day.

The main greenhouse gases whose concentrations are rising are carbon dioxide, methane, nitrous oxide, hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and ozone in the lower atmosphere. Climate change should be recognized when the project activities are related with the Greenhouse gases emissions. Cement manufacturing contributes the greenhouse gases, CO<sub>2</sub> emission mainly from fossil fuel combustion wherever using energy, coal burning and clinker production. The primary GHG emitted from the “Crown Cement Plant” is carbon dioxide (CO<sub>2</sub>), although there can be other emissions such as methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), which is considered more potent but usually occur in smaller quantities.

The total of CO<sub>2</sub> generation will be 2,309 tons per day from the “Crown Cement Plant” (see **Chapter 3, Section 3.11.1**).

From the Coal Power Plant, Coal combustion will generate 1,241ton CO<sub>2</sub> per day as per formula: 672 ton per day of coal consumption x 1.847 ton (1847 kg CO<sub>2</sub>) of Coal Emission factor (reference of **Chapter 3, Section 3.11.1**).

Assumption (1): If Cement plants and Coal power plant are operated simultaneously; the total generation of CO<sub>2</sub> will be 3,550 ton per day.



Assumption (2): Without Coal power plant, if Cement plants are operated only, the generation of CO<sub>2</sub> will be 2,309 ton per day.

So, air emission of these plants leads to significant cumulative impacts to air quality and climate change. But if all these plants are conducted and managed in compliance with emissions threshold values of NEQEG guideline, the magnitude and extent of cumulative impacts is expected to be **moderate**. Significance of cumulative impacts due to air emissions are expected to be **minor**.

Cement plants and Coal power plant are operating under the management of Ngwe Yi Pale’ Cement Co., Ltd. The company provided that the respective management plans to reduce air emission of cement plants as discussed in **Chapter 5 & 7**.and also had conducted EIA of Coal power plant particularity. In addition, if the electricity of cement plants will supply from National Grid in future, the impact of air emission will be mitigated.

### **Use of Raw Material Resource (especially Coal)**

Large quantity of coal is required every day for incineration and generation of electricity. The requirement of coal is huge (1500 tons of coal per day for the combined production of 5,000 tons of cement and 672 tons of coal per day for coal power plant). The annual combined requirement of coal for the three factories is nearly 300,000 tons of coal per year (operational day of 330). The cement plant will operate 30 years of operation phase.

Due to use of coal for these plants for long term, the magnitude and extent of cumulative impacts on coal mine is expected to be **High**. The cement company shall well-manage coal usage effectively and also coal mine company shall well-calculate extraction of coal (not to overexploit or over extract, more than necessary; follow sustainable extraction as far as possible for the long run). So, the significance of cumulative impact on coal mine is expected to be **moderate**.

In addition, if the electricity of cement plants will be supplied from National grid in future, the coal usage will decrease and the impact on coal mine will mitigate. So, the company shall encourage use of electricity from national-grid. The company shall implement rehabilitation program (i.e. soil restoration, replanting trees) in coal mine area while coal extraction. After 30 years of operation phase, the company shall implement Restoration Program (i.e. green zone is effectively created and rehabilitation of the ecology is achieved in the coal mine area and the result will be quite satisfactory and acceptable from environmental point of view).

### **Utilisation of Public Infrastructure and Amenities**

CROWN Cement plant, Sin Shwe Li No.1 and Sin Shwe Li No.2 exist beside the Mandalay-Muse Highway. The location of Crown Cement plant is anticipated to have both spatial and permeant overlap in term of utilization of public infrastructure and amenities (primarily transportation) with other projects (i.e. Sin Shwe Li No.1 and Sin Shwe Li No.2 Sugar Mill)

Transportation of raw materials and products such as coal, limestone, sugarcane, cement and sugar etc. from those factories will be required during operation period. CROWN Cement plant will transport raw materials of Coal and Limestone and will distribute cements to the whole country. Sin Shwe Li Sugar Mills will also transport raw material of sugarcane and will distribute sugar to the whole country.

Crown Cement plants will use 200 trucks per day (i.e. at least 200 trips per day) for transportation of raw material and products. And also, two sugar mills will use 200 trucks per day (i.e. at least 200 trips per day) for transportation of sugarcane and sugar. There will be 400 trucks per day (i.e. 16 trucks per hour). There will be increased 16 trucks on the public traffic especially Mandalay-Muse Highway which is the main road for export and import from china.

Therefore, the combined transportation requirements may lead to cumulative impacts on the infrastructure (due to potential simultaneous use of same transport routes), as well as potential secondary health and safety impacts. Increased traffic volume may be noticeable on major transport routes, mainly Mandalay-Muse (**Figure 6-22**). It is expected that the potential cumulative impacts on traffic, if properly mitigated, and with implementation of traffic management plans will be localised and the impact will be of minor significance.

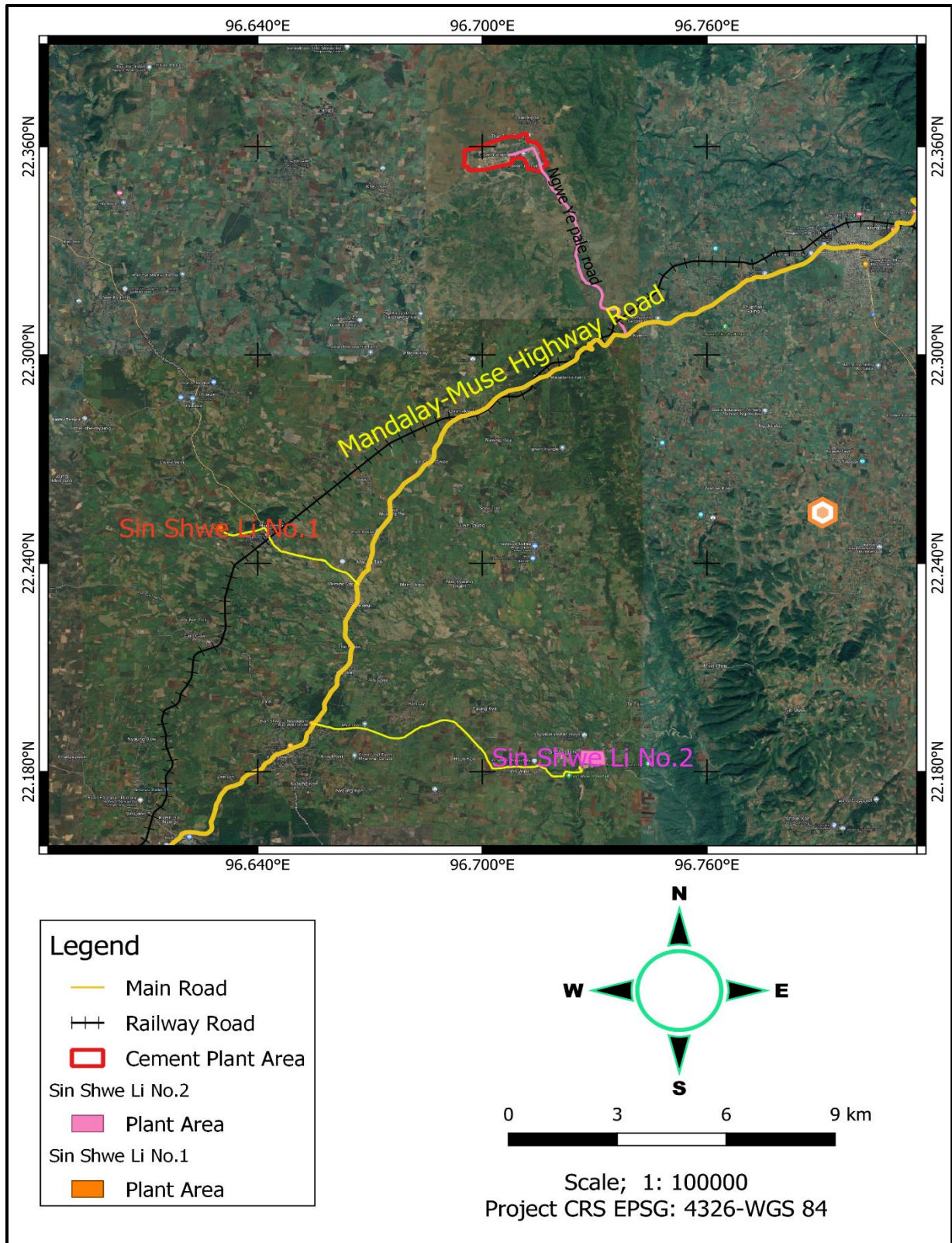


Figure 6-2 Transportation Routes within the Study Area

## **7.0 ENVIRONMENTAL MANAGEMENT PLAN**

### **7.1 Introduction**

The management action plan aims at controlling pollution at the source level to the extent possible, with the available technology, followed by treatment measures before they are discharged. The environmental management plan consists of a set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation of a plant to eliminate adverse environmental impacts or reduce them to acceptable levels.

During the construction phase, the impact will be minimal and temporary in nature. So, the scope of EMP during the construction phase will be limited to dust suppression and noise attenuation. Care has to be taken to reduce the SPM level of the project area within the stipulated norms.

The major sources of pollution in a cement plant are particulate matter. Air pollution is the major concern to be looked upon for the project activity. Water, noise & soil pollution from the project activity are not as important as air pollution. Various mitigation measures have been proposed to take care of the environment in respect of air, water, noise, soil & the green cover of the project site & nearby villages.

The environmental management plan addresses the components of environment affected during the different activities forming part of the processes of proposed project. Based on the evaluation of impacts and baseline conditions, an Environmental Management Plan (EMP) has been delineated to mitigate the adverse impacts on environment of the area due to the proposed project. EMP includes planning, implementation, monitoring & data analysis & corrective action. The EMP is herein outlined after taking into account the various Acts, Rules and Regulations / Standards concerned with the environmental management.

### **7.2 Project Description**

Ngwe Yi Pale’ Cement Company Limited implemented a cement plant with a minimum production capacity of 1,000 tons per day and has been commercially produced on November 1, 2013, with the approval of the Myanmar Investment Commission.

Due to high demand and annual shortage of cement supply in Myanmar, the company is aggressively moving forward to meet the requirements of the country by upgrading more efficient cement plants. So, the company decided to expand the capacity of cement production from 1,000 TPD to 5,000 TPD with the approval by MIC on 15<sup>th</sup> July 2015. So, the maximum production capacity of 4,000 tons per day of cement plant is constructed within the plant site area.

The Crown Cement plant is located at Lauk Hpan Village, Lone Yone Village Tract, Naung Hkio Township, Kyauk Me District, and Northern Shan State in Myanmar. The plant is situated on the side of Mandalay-Lashio- Muse Highway and can be entranced from the Ngwe Yi Pale Road which is connected to that Highway which is the distance of 4 miles 3 furlongs from the Plant as shown in **Figure 7.1**.



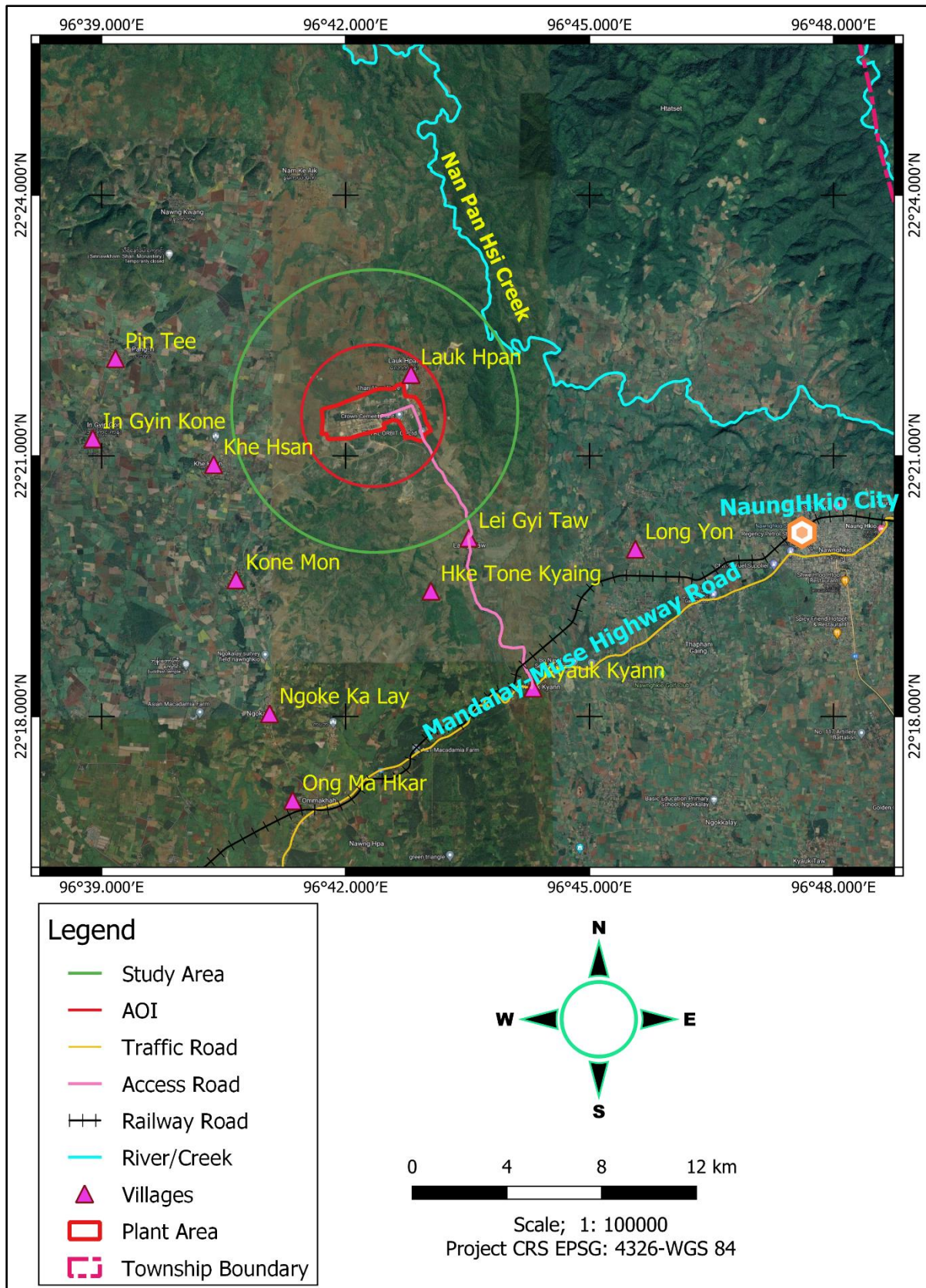


Figure 7-1 Overview Map of Crown Cement Plant and its Vicinities



The geographical coordinate of the plant site is shown in **Table 7.1**. The project area comprises of 250 acres of plant site and 210 acres of associated area for residential which were permitted as industrial lands.

Table 7-1 Coordination of Plant Site

Name	Latitude	Longitude
Location Plant Site	22° 21' 22.65" N	96° 42' 11.68 " E

### **7.3 Key Commitment of Proponent for Environmental Management Plan**

Ngwe Yi Pale’ Cement Company Limited will comply policy, Myanmar laws and rules, international conventions and agreements, requirements of government institutions as details in chapter 3.

Ngwe Yi Pale’ Cement Company Limited is committing to:

- Comply with all mitigation/enhancement measures identified in this EIA
- Designate a Environmental Officer (EO) to handle the environmental management programs
- Submit regular environmental monitoring reports
- Construct, maintain and properly operate adequate and appropriate air pollution control systems
- Strictly implement a contingency management plan and safety program
- Organize and conduct information, education and communication (IEC) activities on environmental, health and other civic issues.

Crown Cement Plant’s sets a high standard for working conditions and job satisfaction. Employees are educated about the entire manufacturing process and cross-trained to perform multiple functions of the cement factory.

### **7.4 Summary of impacts and mitigations measures**

The mitigation measures will be integrated into project design and documents for contractor. Using this approach, the mitigation measures will automatically become part of the project construction and operation phase. By including mitigation measures in the contract, monitoring and supervision of mitigation implementation could be covered under the normal engineering supervision provisions of the contract.

The impacts and mitigation measures for the Environmental Management Plan for all phases summarizes as shown in **Table 7.2**.

Table 7-2 Summarizes of Impacts and Mitigation Measures

<b>Environmental Component</b>	<b>Potential Impacts</b>	<b>Mitigation Measures</b>
<b>Construction Phase</b>		
Air quality	<ul style="list-style-type: none"> <li>✓ Dust (PMs) dispersion in air is expected from movements of vehicles, site preparation and construction, access road construction/upgrading, such as excavating, grading, filling and compacting</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in engine of vehicles, machinery.</li> </ul>	<p>With the purpose to reduce the emissions of gaseous pollutants during the construction phase from the equipment used for the cement plant, the following mitigation measures and good practice are taken into account:</p> <ul style="list-style-type: none"> <li>▪ vehicle engines and other machinery turn off while not in use avoiding any unnecessary emission;</li> <li>▪ machines and equipment will be periodically checked and maintained to ensure their good working condition;</li> <li>▪ all equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications;</li> <li>▪ activities will be conducted trying to use the minimum required number of means at the same time;</li> <li>▪ electric small-scale mechanization and technical tools will be used when available and feasible; and</li> <li>▪ repair and maintenance of construction equipment and vehicles will be performed outside of the construction site by at specialized enterprises.</li> </ul> <p>Concerning dust control methods and measures, the following actions are recommended to reduce the generation of dust:</p> <ul style="list-style-type: none"> <li>▪ sprinkling of water on dust generating areas;</li> <li>▪ watering or increase of the moisture level of the open materials</li> </ul>

		<p>storage piles to reduce dust levels (especially during dry season);</p> <ul style="list-style-type: none"> <li>▪ enclosure or covering of inactive piles to reduce wind erosion;</li> <li>▪ loads in all trucks transporting dust-generating materials will be sprayed with water to suppress dust, as well as wheels of means moving inside and outside of the construction site;</li> <li>▪ speed reduction for the means travelling inside the construction site; and</li> <li>▪ Maintain appropriate buffers between the site and receptors.</li> </ul>
<p><b>Noise</b></p>	<ul style="list-style-type: none"> <li>✓ Increased background noise level cause of construction activities.</li> <li>✓ Disturbance to workers and local residents (if any).</li> <li>✓ Reduced hearing issues for workers and staff.</li> </ul>	<p><b><i>Mitigation at Working Time</i></b></p> <ul style="list-style-type: none"> <li>▪ Limiting site construction activities to the working hours (7:00 am to 4:00 pm) and noisy activities to morning hours (8:00 am to 12:00 am).</li> <li>▪ Whenever feasible, schedule different noisy activities (e.g., piling and earthworking) to occur at the same time, since additional sources of noise generally do not add a significant amount of noise.</li> <li>▪ Avoid nighttime activities. Sensitive to noise increase during the nighttime hours in residential neighborhoods.</li> </ul> <p><b><i>Mitigation at the Source</i></b></p> <ul style="list-style-type: none"> <li>▪ Usage of quiet, properly maintained equipment or machinery in good condition.</li> <li>▪ All noisy machines and equipment should be fitted with noise muffler or silencers.</li> <li>▪ Sensitization of construction truck drivers to switch off vehicle engines while offloading materials avoid running of vehicle engines or hooting especially.</li> </ul> <p><b><i>Mitigation along the path</i></b></p>

		<ul style="list-style-type: none"> <li>▪ Install temporary noise barrier - a 2 m high temporary wall or pile of excavated material between noisy activities and noise-sensitive receivers during construction work.</li> <li>▪ Provide adequate PPE such as ear muffs, ear plugs etc. to workers at all activities/ locations that exceed permissible occupational noise level limit standards [85 dB (A)].</li> </ul>
Vibration	<p>✓ Demolish or crack the building due to the vibration from vehicles, piling activities and heavy machinery operating</p>	<p><b><i>Mitigation at Design Consideration</i></b></p> <ul style="list-style-type: none"> <li>▪ Route heavily loaded trucks away from residential streets, if possible. Select streets with fewest homes, if no alternatives are available.</li> <li>▪ Operate earthmoving equipment on the construction lot as far away from vibration-sensitive sites as possible.</li> </ul> <p><b><i>Mitigation at Operation Sequences</i></b></p> <ul style="list-style-type: none"> <li>▪ Earthmoving and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration level produced could be significantly less when each vibration source operates separately.</li> <li>▪ Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours.</li> <li>▪ Vehicles speed limit will be maintained to avoid excessive vibrations.</li> </ul> <p><b><i>Mitigation by Using Alternative Methods</i></b></p> <ul style="list-style-type: none"> <li>▪ Avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of a sonic or vibratory pile driver causes vibration levels where the geological conditions permit their use.</li> <li>▪ Avoid vibratory rollers and packers near sensitive areas.</li> </ul>
Water Environment	<p>✓ Impact on water environment cause of water usage and run off water, waste water by</p>	<ul style="list-style-type: none"> <li>▪ Wastewater generated from offices, canteens, and worker accommodation is treated by septic-sewage system.</li> </ul>

	<p>construction activities</p>	<ul style="list-style-type: none"> <li>▪ Temporary drainage system will be provided for collecting drain water from construction activity and rain to sediment pond and reuse inside construction area.</li> <li>▪ Create a special storage for fuel and lubricants/oil. The storage is a closed building and it is protected from rainwater.</li> <li>▪ Provide grease and oil trap for workshop and maintenance area.</li> <li>▪ Direct runoff away from disturbed areas by means of temporary drainage ways, utilizing for example cut-off drains.</li> <li>▪ Provide containment measures for hazardous material and storage areas to prevent spills or leakage of fluid materials which may soak into the ground and reach the groundwater table.</li> <li>▪ Design of store hazardous material providing suitable reception facility with impervious flooring, roofing and suitable drainage control.</li> <li>▪ Regular maintenance and checking of all plant and machinery to minimize the risk of fuel or lubricant leakages.</li> <li>▪ No discharge of untreated wastewater to soil and groundwater and onto surficial water bodies.</li> <li>▪ As construction activities typically generate disturbed soil, concrete fines, oils and other waste, on-site collection and settling of storm water, prohibition of equipment washdowns, and prevention of soil loss and toxic releases from the construction site are necessary to minimize water pollution.</li> </ul>
<p>Soil Quality</p>	<p>✓ Soil degradation and contamination</p>	<ul style="list-style-type: none"> <li>▪ Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated properly before disposal.</li> <li>▪ Construction waste and debris shall be collected on a regular basis, covered by roof and disposed of at designated landfills.</li> <li>▪ It must be prohibited to operate with equipment and vehicles outside the designated work areas and roads.</li> </ul>



		<ul style="list-style-type: none"> <li>▪ Training and equipment will be in place to minimize the potential environmental impact in the case of accidents (for example through the use of spill kits).</li> <li>▪ To prevent soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention.</li> </ul>
Solid Waste	<ul style="list-style-type: none"> <li>✓ If not properly handled, it has the potential to degrade the quality of land.</li> <li>✓ Odor problem</li> <li>✓ Breeding of flies, birds, rodents etc.</li> <li>✓ Nuisance to the nearby communities if present within the proximity of the project area.</li> </ul>	<p>The overall impacts during construction should be considered as negligible if the following mitigation measures are exercised;</p> <ul style="list-style-type: none"> <li>▪ a waste management plan shall be developed including requirements for separation, handling and disposal of all waste generated;</li> <li>▪ all hazardous materials shall be stored in clearly labeled containers;</li> <li>▪ storage and handling of hazardous materials should be in accordance with national and local regulations appropriate to their hazard characteristics;</li> <li>▪ waste shall be separated on site and waste storage areas shall be roofed and bounded to prevent potential cross-contamination;</li> <li>▪ used oils (including transformer oil) shall be recycled;</li> <li>▪ fire prevention systems and secondary containment shall be provided for storage facilities, where necessary, to prevent fires or releases of hazardous materials;</li> <li>▪ all waste shall be disposed of in line with local requirements at a suitable and licensed waste disposal facility;</li> <li>▪ suitable disposal sites shall be identified with capacities for disposal for general and hazardous waste prior to the operation phase;</li> </ul>

		<ul style="list-style-type: none"> <li>▪ containers will be emptied before they reach their carrying capacity;</li> <li>▪ littering will be prohibited at the site; and</li> <li>▪ awareness will be given to the staff and workers about handling of solid waste at site.</li> </ul>
Ecology	<ul style="list-style-type: none"> <li>✓ Flora and Fauna can be affected due to construction activities</li> <li>✓ Temporary migration of birds and mammals from the area.</li> </ul>	<ul style="list-style-type: none"> <li>✓ routine checking of ditches and escape routes to minimize, if not prevent, entrapment of fauna;</li> <li>✓ washing down of vehicles in place and prior to commencing work;</li> <li>✓ preservation of excavated topsoil for future site restoration procedures particularly in highly disturbed areas;</li> <li>✓ limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures;</li> <li>✓ reporting of any violation relating to hunting and trading activities;</li> <li>✓ implementing good housekeeping practices on the field and implementing good Solid Waste Management Plan in order to eliminate any source of hazard to the native fauna;</li> <li>✓ giving awareness training to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area;</li> <li>✓ site specific instruction for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs;</li> <li>✓ excessive plantation shall be done in and around the boundary of the project area as a potential environmental enhancement measure.</li> </ul>
Occupational health and safety	<ul style="list-style-type: none"> <li>✓ Health and safety risks to workers due to high levels of dust and noise.</li> <li>✓ Respiratory problems</li> <li>✓ Hearing issues</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide safe, secure and healthy camps for construction workers adequately.</li> <li>▪ Provide necessary training on OSH for workers and supervise their implementation at work place. Implement of OSH programs systematically by appointing a safety officer.</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Plant personnel working in dust prone areas will wear personnel protective equipment like air filters over their nose.</li> <li>▪ Job rotation schemes will be practiced for over-exposed persons.</li> <li>▪ Provision of first aid box at site.</li> <li>▪ Provision of Personal Protective Equipment (e.g. dust masks, ear muffs etc.) to workers and staff.</li> </ul>
Community health and safety	<ul style="list-style-type: none"> <li>✓ Reduced visual amenity</li> <li>✓ Excessive dust impacts may be harmful for some people, for example, with some experiencing respiratory conditions.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adopt and maintain good management practices.</li> <li>▪ Maintain appropriate buffers between the site and receptors.</li> <li>▪ If these buffers include vegetative screens, they have the added benefit of providing improvements in visual amenity.</li> <li>▪ Transportation during weekend and off-peak hours as much as possible.</li> <li>▪ Ensuring that construction vehicles preferably deliver materials during off-peak hours when traffic volume is low.</li> <li>▪ Water sprinkles will be used not to disperse dust around environment.</li> <li>▪ Covering of materials to be done during transportation.</li> <li>▪ Strict enforcement of on-site speed controls.</li> </ul>
<b>Operation Phase</b>		
Air quality	<ul style="list-style-type: none"> <li>✓ Dust is generated from loading and unloading, crushing/ grinding and blending/mixing of raw materials, packing and vehicle movements.</li> <li>✓ Air pollutants emission of SO<sub>2</sub>, NO<sub>x</sub>, CO, CO<sub>2</sub>, from Combustion of fossil fuels in power plant, clink production and engine of vehicles, machinery.</li> </ul>	<ul style="list-style-type: none"> <li>▪ High efficiency bag house will be installed for the raw mill, cement mill and clinker cooler. Electrostatic precipitator is installed to power plant.</li> <li>▪ Low NO<sub>x</sub> burner with multichannel burner technology will be provided in the kiln and Pre-heater calciner which is specially designed for low NO<sub>x</sub> which control the NO<sub>x</sub> emission.</li> <li>▪ Select coal with low Sulphur content and raw material feeding into</li> </ul>

	<p>✓ Increase GHG Emission.</p>	<p>the rotary kiln and the decomposing furnace to reduce emission of SO<sub>2</sub> and NO<sub>x</sub>.</p> <ul style="list-style-type: none"> <li>▪ Continuous emission monitoring system will be installed to assess the quality of the stack emission.</li> <li>▪ Routine maintenance of air pollution control equipment.</li> <li>▪ Dust collectors and extraction system will be installed to control fugitive dust at coal and limestone unloading points and at all the transfer points to arrest dust.</li> <li>▪ Chimneys and Stacks are designed and constructed to have sufficient heights to effectively vent dust, smoke and odors to the atmosphere.</li> <li>▪ All transfer points and storage silos will be provided with dust collection and extraction systems for effective control of fugitive emissions.</li> <li>▪ Bag filters designed to control dust emission up to 30 mg/ Nm<sup>3</sup> at various transfer points will be installed to keep the emissions within the permissible limits.</li> <li>▪ The dust collected from the pollution control equipment will be recycled back into the process.</li> <li>▪ Clinker will be stored in clinker silo to control fugitive emissions.</li> <li>▪ Gypsum and additives will be stored in covered storage sheds.</li> <li>▪ Fly ash from the power plant is transported to ash storage silos through pneumatic system.</li> <li>▪ All internal roads in the plant and all the movement area will be concerted.</li> <li>▪ All raw materials will be transported through covered conveyor belts</li> </ul>
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		<p>within the plant premises.</p> <ul style="list-style-type: none"> <li>▪ Regular cleaning and sweeping of roads and nearby area of storage facilities will be done.</li> <li>▪ A closed shed with all round high concrete side wall are provided to clinker stock pile.</li> <li>▪ The state-of-the-art dry process technology with five stage pre-calciner will lead to increased energy efficiency, thereby reducing GHG emissions.</li> </ul>
<p>Noise and Vibration</p>	<ul style="list-style-type: none"> <li>✓ Increased background noise level due to operation of cement plant and power plant, and vehicle movement.</li> <li>✓ Disturbance to workers and local residents (if any).</li> <li>✓ Reduced hearing issues for workers and staff.</li> <li>✓ Crack due to the vibration from movement of heavy vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Equipment/ machinery will be selected with low noise and will be housed in insulated ceiling;</li> <li>▪ Select low noise equipment and ensuring encasement of noise generation sources to control the noise levels;</li> <li>▪ Install mufflers at air inlets and outlets of the fans and air compressors;</li> <li>▪ Install sound insulation cover (room) for equipment with higher noise;</li> <li>▪ Providing adequate personal protective equipment like earmuffs &amp; earplugs to all operations and maintenance personnel working near noise prone areas;</li> <li>▪ Providing permanent enclosures around the heavy noise producing equipment;</li> <li>▪ Ensuring good maintenance and repair of the heavy equipment;</li> <li>▪ All equipment shall be switched off when not in use. Equipment and</li> </ul>



		<p>trucks used shall use the best available noise control techniques (e.g., improved mufflers; equipment redesign; use of intake silencers, ducts, engine enclosures and/or acoustically attenuating shields or shrouds) wherever feasible and necessary;</p> <ul style="list-style-type: none"> <li>▪ Stationary noise sources shall be located as far from sensitive receptors as possible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and enclosed within temporary shed;</li> <li>▪ Provision of buffer zone of green areas consisting of tall and thick bushes and trees plantation in and around the plant as an effective noise barrier;</li> <li>▪ No workers will be allowed working in noise level &gt;85 dB (A) that exceed permissible occupational noise level limit standard without adequate personal protective equipment; and</li> <li>▪ Under any circumstances the noise level at plant boundary will not exceed 70 dB(A) at day time and night time.</li> </ul>
<p>Water Environment</p>	<p>✓ Impact on water environment cause of water usage, wastewater and runoff from cement plant, power plant and domestic</p>	<ul style="list-style-type: none"> <li>▪ Cement production is dry process technology and water mainly used for cooling and steam generation is reused or circulated in cooling water system. Therefore, no wastewater generated from the process and no cause water pollution.</li> <li>▪ The power plants are based on air cooled condenser system and the wastewater generated from boilers and auxiliary cooling will be controlled by installation of treatment system such as use of closed system, grease and oil trap, aeration pond, sediment pond, septic tank and reused in the power plant.</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Wastewater generated from offices, canteens, and staff accommodation will be treated by septic-seepage system before discharge. Treated effluent will be used for dust suppression and plantation/ greenbelt development.</li> <li>▪ The runoff from uncontaminated areas will be used for irrigation of greenbelt area.</li> <li>▪ Construction of suitably designed drains all along the roads and boundary of the plant premises.</li> <li>▪ A storm water drainage system will be developed for the entire project site.</li> <li>▪ Provide separated water drainage and treatment system for outdoor coal storage. Compact the storage ground with clay to prevent seepage into the ground.</li> <li>▪ Ensure effective waste water management as guided by law.</li> <li>▪ Avoid as much pollution on the drainage system in the area.</li> <li>▪ Rain water harvesting will be practiced inside the plant premises.</li> <li>▪ Management of water usage. Avoid unnecessary wastage.</li> <li>▪ Install water saving devices or water-conserving taps that turn off automatically when water is not being used.</li> </ul>
<p style="text-align: center;">Solid Waste</p>	<ul style="list-style-type: none"> <li>✓ Dust from air pollution control equipment may impact respiratory diseases in employees/ nearby persons.</li> <li>✓ Used oil &amp; waste residue containing oil, may lead to contamination of soil and groundwater, if leakage or evaporation from</li> </ul>	<ul style="list-style-type: none"> <li>▪ dust collected from various air pollution control equipment’s like Bag House / Bag Filters will be recycled back into the process.</li> <li>▪ waste generated from different unit will be collected in the segregated manner. The biodegradable waste will be compost and then will be used as manure for greenbelt plantation, whereas the non-</li> </ul>

	<p>storage occurs accidentally.</p> <p>✓ Open dumping of domestic solid waste generated from plant canteen may create environmental impacts like infectious diseases, obstruction of drains and loss of biodiversity.</p>	<p>biodegradable waste will be disposed scientifically.</p> <ul style="list-style-type: none"> <li>▪ waste storage areas will be roofed and bounded to prevent potential cross-contamination and waste will be disposed of in line with local requirements at a suitable waste disposal facility.</li> <li>▪ used oil/ spent oil will be generated as hazardous waste and will be stored in labelling containers or vessels and sold to recycler.</li> <li>▪ sewage treatment plant sludge will be used as manure in greenbelt development/ plantation.</li> <li>▪ avoid open dumping of domestic solid waste and set up separate bins.</li> <li>▪ follow the 5Rs principles of waste minimization (reduce, reuse, recycle, recover and redesign).</li> </ul>
<p>Ecology</p>	<p>✓ potential degradation of habitat</p> <p>✓ Ecosystem service and biodiversity</p>	<ul style="list-style-type: none"> <li>▪ Apply all relevant mitigation measures of Noise and Vibration, Soil Quality and Surface Water Quality Section.</li> <li>▪ Induction training for workers will include; <ul style="list-style-type: none"> <li>(a) Ban on foraging, fishing and hunting;</li> <li>(b) Protected plant and animals to be aware of;</li> </ul> </li> <li>▪ Restrict speed of vehicles to reduce risk of collision;</li> <li>▪ Develop Green Belt Program</li> </ul>

Resource	✓ Depletion of Natural Resource	<ul style="list-style-type: none"> <li>▪ Raw material reserves shall be estimated properly,</li> <li>▪ Continuous attempt to control wastages during transportation, storage and handling of raw materials,</li> <li>▪ Regular monitoring of availability of stocks and consumption of raw materials, dispatch of products and loss of material,</li> <li>▪ Power saving measures including usage of the multi-stage cyclone pre-heater (most efficient pre-heater technology) as well as the reuse of the heat content of the exhaust gas for drying raw materials.</li> <li>▪ Water conservation measures using closed loop water recovery systems as well as providing provisions for the collection and use of rainwater (harvesting).</li> <li>▪ Training and awareness program on water conservation measures will be organized for the employees.</li> </ul>
Social-economy	<ul style="list-style-type: none"> <li>✓ Job opportunity</li> <li>✓ Promote local business</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure a fair hiring process.</li> <li>▪ Create job opportunity for local people</li> <li>▪ Priority employ local people</li> </ul>
Occupational health and safety	<ul style="list-style-type: none"> <li>✓ Health on workers.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>	<ul style="list-style-type: none"> <li>▪ Apply relevant mitigation measures from Air Quality Impact.</li> <li>▪ On starting operations, a noise level measurement should be conducted to determine the noise levels. Where the noise levels are found to be in excess, an appropriate noise control and hearing conservation program should be designed and implemented.</li> <li>▪ Provide First aid training, safety training.</li> <li>▪ A first-aid kit should be provided within the site and should be fully equipped at all times and managed by qualified and trained first aider(s).</li> <li>▪ Conduct medical examination of workers. The workers should undergo the regular medical examinations.</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Follow the safety rules.</li> <li>▪ Keep workshop clean and tidy.</li> <li>▪ Turn off machines when not in use.</li> <li>▪ Wear safety goggles where needed.</li> <li>▪ Put maintenance tools away systematically after use.</li> <li>▪ Inspect and maintain the vehicles, machines, emergency generators and boiler regularly</li> <li>▪ Provide Health care insurance for workers</li> <li>▪ Capacity building and training of staff/workers with respect to Occupational Health, Safety and Environment.</li> <li>▪ Effective Emergency Response Plans-ERPs to cater for various eventualities such as fire outbreaks, oil spills and other incidences that are likely to occur. These should be taught to all the workers.</li> <li>▪ Proper documented possible action plans need to be put in place in case of any incidences occurring.</li> <li>▪ Capacity building and training of staff/workers with respect to Occupational Health, Safety and Environment.</li> <li>▪ Effective Emergency Response Plans-ERPs to cater for various eventualities such as fire outbreaks, oil spills and other incidences that are likely to occur. These should be taught to all the workers.</li> <li>▪ Proper documented possible action plans need to be put in place in case of any incidences occurring.</li> </ul>
<p>Community health and safety</p>	<ul style="list-style-type: none"> <li>✓ Health issue on community.</li> <li>✓ injuries/fatalities due to accidental cases</li> </ul>	<ul style="list-style-type: none"> <li>▪ Undertake pre-employment screening to ensure fitness for work and to minimize the transmission of communicable diseases;</li> <li>▪ Implement appropriate education on infectious and sexually transmitted diseases.</li> <li>▪ All vehicles used for the project should be regularly serviced and maintained;</li> <li>▪ Local speed limits should be adhered to when travelling through communities by all Project related traffic. Such speed limits will have the added advantage of reducing dust emissions;</li> </ul>



		<ul style="list-style-type: none"><li>▪ Water sprinkles shall be used as possible.</li><li>▪ Covering of materials to be done during transportation.</li><li>▪ Ensure that signs are put up around construction sites advising people of the risks associated with trespass.</li><li>▪ Ensure that there is adequate fencing around construction site to minimise the risk of trespass. Fencing will be checked daily to ensure that it is in good condition and to look for any signs of entry;</li><li>▪ Implement all the mitigation measures from Air and Noise impact sections;</li></ul>
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## 7.5 Environmental Management Organization, Role and Responsibility

### 7.5.1 Organization

Ngwe Yi Pale’ Cement Company Limited will implement the Environmental Management Plan-EMP with the following organization structure as shown in **Figure 7.2**.

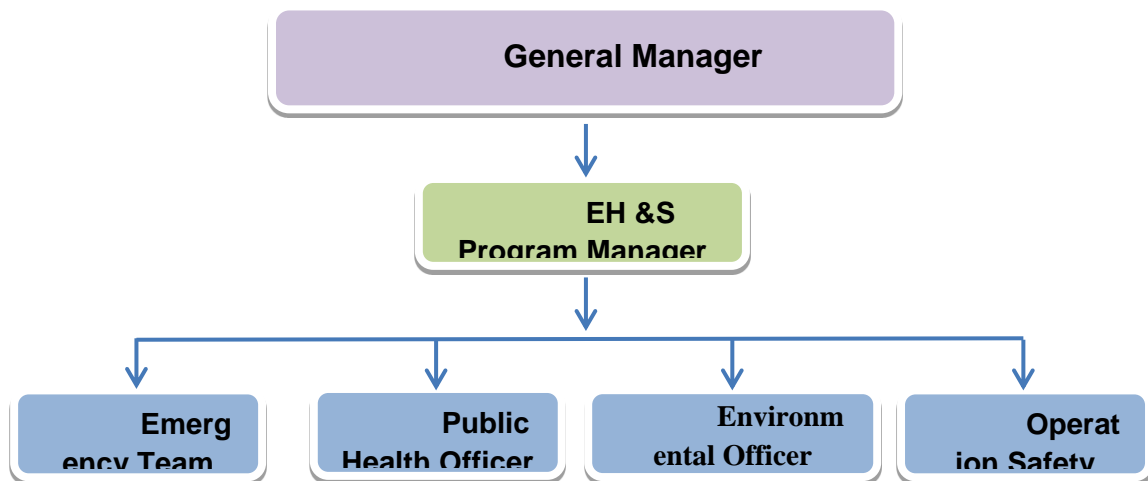


Figure 7-2 Organization Chart for Environmental Management

The Organization will perform the followings:

- Implementation of Environmental Management Plan.
- take mitigation or corrective measures as required or suggested by the Government authorities
- Keep the management updated on regular basis about the conclusions / results of monitoring activities and proposes measures to improve environment preservation and protection.
- Conduct regular safety drills and training programs to educate employees on safety practices.
- Identification of the hazardous conditions and unsafe acts of workers and advise on corrective actions, organize training programs and provide professional expert advice on various issues related to occupational safety and health.
- Management for environmental monitoring of the project site and its related area.
- Organizing meetings of the Environmental Management and reporting to the committee.
- Conduct and submit annual Environmental Audit regularly.

### 7.5.2 Roles and responsibilities

The role and responsibilities of member of organization from Ngwe Yi Pale’ Cement Company Limited are described in **Table 7.3**.

Table 7-3 Role and Responsibilities of member of organization

<b>Role</b>	<b>Responsibilities</b>
General Manager	<ul style="list-style-type: none"> <li>• To support the implementation of the environmental management plan and monitoring plan</li> </ul>
EHS Program Manager	<ul style="list-style-type: none"> <li>• To monitor and assess the implementation of EMP</li> <li>• To discuss the results of EMP with the environmental team</li> <li>• To prepare the monitoring report</li> </ul>
Emergency Team	<ul style="list-style-type: none"> <li>• To give suggestions for improving EMP</li> <li>• To participate in any environmental and emergency activities</li> </ul>
Public Health Officer	<ul style="list-style-type: none"> <li>• To communicate with residents</li> <li>• To response the accident, incident, injuries and complaints from local residents</li> <li>• To participate in any health-care activities for both employees and communities.</li> </ul>
Environmental Officer	<ul style="list-style-type: none"> <li>• To monitor the parameters described in EMP and ECC</li> <li>• To implement the mitigation measures</li> <li>• To report the results of EMP</li> <li>• To inform the EHS Program Manager at one when find out some problems to occur</li> </ul>
Operation Safety Officer	<ul style="list-style-type: none"> <li>• To follow the EMP and aware of environmental impacts</li> <li>• To participate in any environmental and emergency activities</li> </ul>

The role and responsibilities of contactor for Environmental Management are described in **Table 7.4**.

Table 7-4 The role and responsibilities of contactor

<b>Role</b>	<b>Responsibilities</b>
<b>Construction manager</b>	<p>the construction manager will be accountable for environmental and social management during the construction phase. Specific responsibilities will include:</p> <ul style="list-style-type: none"> <li>✓ The effective implementation of the E&amp;S</li> <li>✓ Regular (monthly) performance reviews</li> <li>✓ Corrective and/or remedial action where this may be required</li> </ul>
<b>EH&amp;S Manager</b>	<p>The EH&amp;S Manager will be responsible for the coordination of the various environmental management requirements that need to be met by the project as well as the various other contractors that will be operating on the site. This function will include regular inspections, coordination of reporting, and site wide environmental monitoring.</p>

<b>Site community liaison officer</b>	to support the EH&S Manager it will be necessary to have a full-time site community liaison officer. The site community liaison officer will be responsible for all contractor-related community liaisons including the dissemination of information, complaints management, and regular interaction with the various communities in the area.
<b>Site community liaison officer</b>	to support the EH&S Manager it will be necessary to have a full-time site community liaison officer. The site community liaison officer will be responsible for all contractor-related community liaisons including the dissemination of information, complaints management, and regular interaction with the various communities in the area.
<b>Health and safety advisors</b>	to support the EH&S Manager it will be necessary to have full time health and safety advisors (number to be determined). The health and safety advisors will ensure an ongoing site presence to proactively identify potential, health and safety risks and timeous intervention to prevent accidents.
<b>Engineering manager</b>	the engineering manager will be accountable for ensuring that all environmental and social management infrastructure that will be required during operations of the proposed smelter is included in the design. This includes: <ul style="list-style-type: none"> <li>(b) The identification and inclusion of general site wide infrastructure (e.g. stormwater management, spill control etc.) as well as requirements for specific facilities (e.g. dust control equipment);</li> <li>(c) The specification of design requirements and criteria (performance) for each engineering package.</li> </ul>

## **7.6 Overall Budget for the EMP**

Ngwe Yi Pale’ Cement Company Limited will contribute two percent (2 %) of the annual profit for implementing Environmental Management Plan (EMP) and Corporate social responsibility (CSR).

Ngwe Yi Pale’ Cement Company Limited estimated to allocate budget for the implement the Environmental Management Plan. Total estimated overall budget for Environmental Management Plan (i.e. including Estimate Cost for Environmental Monitoring in Section 7.6.2) and Management and Monitoring Sub-plans in Section 7.7) is 220 million kyats (**220,000,000 kyats**). The estimate budget of CSR plan will allocate particularly as present in **Section 7.8**. Ngwe Yi Pale Cement Company Limited also commits that additional budget will be provided if this estimated budget is not enough when the environmental management plan is implemented as practically.

Ngwe Yi Pale’ Cement Company Limited will allocate budget for each management sub-plans. Estimated budget of each sub-plan will include budget of monitoring as described details in **Section 7.6.2**.

## **7.7 Monitoring Plan**

Environmental monitoring involves measurement of relevant parameters to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality. Monitoring of set standards is a major problem in Myanmar because the authorities do not have the facilities to execute the monitoring function properly.

Environmental monitoring and audits will be undertaken during the construction/development phase and operation phase to check that the environmental management measures are being satisfactorily implemented and that they are delivering the appropriate level of environmental performance.

### **7.7.1 Monitoring Program**

The environmental monitoring program will be conducted by a qualified Environmental Monitoring Organization. The EMO will conduct for all monitoring activities and reporting the results and conclusions to the project proponent, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively.

The compliance monitoring program will be conducted by the Proponent (Ngwe Yi Pale’ Cement Co., Ltd). The compliance monitoring will involve making observations in the course of site visits, formal checking of records and other aspects. There will also be some surveys of residents, as most of the measures are aimed at preventing impacts on people and the human environment.

The phase II (4000 TPD) of CROWN Cement Plant will commercially produce in June 2019. So, the monitoring program for construction phase cannot be implemented because the CROWN Cement Plant is operation stage since 2019s. Details of monitoring program during operation phase of the project are presented in Table 7.5 and Table 7.6.

Table 7-5 Environmental Monitoring

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Ambient Air Quality	Measurement/ sampling	PM/ PM <sub>10</sub>	Kiln stack	Continuous
		NO <sub>x</sub> , SO <sub>x</sub>	Kiln stack	Quarterly
		PM/ PM <sub>10</sub>	Cement grinding and clinker cooler stacks	Quarterly
		Temperature, Oxygen level, combustion efficiency	Combustion sources	Biannually
		Ambient PM/ PM <sub>10</sub> , NO <sub>x</sub> , SO <sub>x</sub>	Selected receptor villages, colony, plant premises	Biannually



<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Indoor Air Quality	Measurement/sampling	SO <sub>2</sub> , NO, CO <sub>2</sub> , CO, O <sub>3</sub> , VOC	Offices & Plant Operator Room	Biannually
Noise and Vibration	Measurement	Leq [(dB(A)]	Crusher, Raw mills, Cement mills	Biannually
			4 sides around Plant site	Biannually and upon complaints
Water	Sampling	pH, Temperature increase, Total suspended solids, Oil content, COD	Surface Water sources, installed grease traps, oil/water separators, sedimentation tanks, effluent, inlet and outlet of STP	Quarterly
Soil	Sampling	Moisture content, pH, salinity, Nitrogen, Phosphate, Chloride, Potassium, Sodium	Agricultural plots near project site	Annual
		Heavy metal content (mercury, lead, chromium, copper, nickel, zinc and cadmium)		Every three years

Table 7-6 Compliance Monitoring

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Solid Waste	Audits, photographic documentation, and interviews	Generation, storage, recycling, transport and disposal	Plant premises	Quarterly
Biodiversity	Visual inspection and photographic documentation	General condition of the floral cover	Plant and landscaped areas	Annual
Resource use	Metering	Water and energy consumption	Plant	Daily
	Audit	Raw material consumption	Plant	Daily
Health and safety	Health and safety surveys	Proper use of PPE, presence of safety signs, first aid kit,	Plant, road linking the proposed project with the main road	Daily

Impact	Monitoring Method	Parameter	Location	Frequency
		firefighting devices, Injury/ illness records. Accident statistics recording	network	
Fire Hazard	Inspection & Testing	Checking oxygen content in dust-air mixture (Auto control)	Raw material and product handling areas	Continuously
Operations	Visual inspection and documentation	Production rate, gas flow rates, counter readings, pressure valves, temperatures, abnormal readings, overloads, stoppages	All facilities and major equipment at Plant	Daily

### 7.7.2 Estimate Budget for Monitoring

The estimated cost of monitoring and responsible party is shown in **Table 7.7**.

Table 7-7 Estimated Cost of Monitoring and Responsible Party

No.	Environmental Component	Responsibility Agency	Executing Agency	Total Cost per year (Kyats)
<b>Environmental Monitoring</b>				
1	Water quality monitoring	Ngwe Yi Pale' Cement Co., Ltd	Third Party	10,000,000
2	Air quality monitoring			
	<i>PM measurement</i>	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	12,000,000
	<i>NO<sub>x</sub>, SO<sub>x</sub></i>	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	2,000,000
	<i>Temperature and oxygen level</i>	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	4,000,000
	<i>Ambient air quality</i>	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	16,000,000
3	Noise and vibration monitoring	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	28,000,000
4	Soil quality monitoring	Ngwe Yi Pale' Cement Co., Ltd	Third Party (EMO)	10,000,000
<b>Compliance Monitoring</b>				
5	Solid Waste	Ngwe Yi Pale' Cement Co., Ltd &	-	4,000,000

No.	Environmental Component	Responsibility Agency	Executing Agency	Total Cost per year (Kyats)
		Contractor		
6	Biodiversity	Ngwe Yi Pale’ Cement Co., Ltd	-	2,000,000
7	Resource use	Ngwe Yi Pale’ Cement Co., Ltd	-	Include operation cost
8	Health and safety	Ngwe Yi Pale’ Cement Co., Ltd & Contractor	-	4,000,000
9	Fire Hazard	Ngwe Yi Pale’ Cement Co., Ltd & Contractor	-	4,000,000
10	Operations	Ngwe Yi Pale’ Cement Co., Ltd & Contractor	-	Include operation cost
<b>Total</b>				<b>96,000,000</b>

EMO = Environmental Monitoring Organization

### **7.7.3 Reporting**

Ngwe Yi Pale’ Cement Co., Ltd will submit monitoring reports to Ministry of Natural Resources and Environmental Conservation (MONREC) not less frequently than every six (6) months or periodically as prescribed by the Ministry. According to the EIA procedure, the monitoring report will include as follow;

- 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.

## **7.8 Management and Monitoring Sub-Plans**

### **7.8.1 Air Emission Management Plan**

#### *Objectives*

- To reduce the adverse impact to air quality caused by the sources and amounts of pollutants
- To prevent dust and fugitive dispersion on site or beyond the boundaries of the site
- To comply with relevant government rules

#### ***Legal Requirement***

Air Emission Management Plan will be undertaken in accordance with Occupational Health and Safety Law (2019), Public Health Law (1972), Environmental Conservation Law (2015), National Environmental Quality (Emission) Guideline and other relevant laws as details in **Chapter 2**.

#### ***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1** and photos of dust control equipment are shown in **Figure 3.27**.

#### ***Implement Schedule***

Air Emission Management Plan will be implemented during the construction phase and operation phase of the Project.

#### ***Management Actions***

The following management actions will be implemented during the construction phase;

- Spray water on exposed earth and graded roads for dust suppression during dry weather conditions.
- Clean vehicles periodically to minimize dust generation.
- Restricted speed of vehicles.
- Erect sign posts displaying the safe maximum speed limit.
- Water sprinkling in dry weather, cover cut and embankment sections of earthwork.
- Open stockpiles of loose, fine-grained materials should be avoided where possible.
- Maintenance of all roads clear of mud and dirt from the site.
- Loading and unloading should be carried out carefully with minimal drop heights to minimize dust generation.
- Ensure that all construction equipment and transport vehicles are well maintained.

The following management actions will be implemented during the operation phase;

#### ***Cement Plant***

- ESP / bag houses/ Dust suppression system will be provided at each point of flue gas emission sources and location of transfer points to control the air emission within 50 mg/Nm<sup>3</sup> in cement plant.
- Ensure maximum efficiency of combustion in kiln,
- Enclosures will be provided for unloading operations.
- Bag filters will be installed at all transfer points to reduce fugitive dust emissions.
- A well-designed burner system will be adopted to limit the temperature in the kiln to generate reasonably low NO<sub>x</sub>.
- Dust collected from air pollution control equipment will be totally recycled in the process.
- Fly ash will be pumped directly from the tankers to silos pneumatically in closed loop such that fugitive emissions do not occur.
- The packing machines will be equipped with dust extraction arrangement.
- The crushing site will be enclosed from all four sides and bag filter will be installed to arrest the fugitive dust.
- Raw material and products will be stored in covered storage yard.

#### Power Plant

- The stack of the power plant shall be of enough heights as per good international industry practice to avoid excessive ground level concentrations to minimize impacts.
- The exhaust gases from the project shall be cleaned using cyclones and an electro-static precipitator (ESP) system that will be covered in the design of the power plant. This shall remove most of the fine dust and ash from the exhaust stream, before being released into the atmosphere through a stack.
- Frequent monitoring to ensure the initial design emissions remain the same throughout and if immediate corrective actions cannot be taken.
- The stack of the power plant units shall be of enough heights to avoid excessive ground level concentrations to minimize impacts including acid deposition.
- Periodic maintenance shall be done as per machinery specifications

#### Other facilities

- All transportation vehicles will be suitably covered with tarpaulin & overloading of the vehicles will be avoided.
- Keep equipment and vehicles well- maintained to reduce smoke.
- Reduce the speed of vehicle to reduce dust generation.



- All the roads inside the plant premises will be concreted.
- Regular sweeping of all the roads & floors will be done.
- Avoid open burning of debris or solid waste.

**Monitoring plans**

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
<b>Operation Phase</b>				
Air Quality	Measurement/ sampling	PM/ PM <sub>10</sub>	Kiln stack, and boiler	Continuous
		NO <sub>x</sub> , SO <sub>x</sub>	Kiln stack, and boiler	Quarterly
		PM/ PM <sub>10</sub>	Cement grinding and clinker cooler stacks,	Quarterly
		Temperature, Oxygen level, combustion efficiency	Combustion sources	Biannually
		Ambient PM/ PM <sub>10</sub> , NO <sub>x</sub> and SO <sub>x</sub>	Selected receptor villages, colony, plant premises	Biannually
Indoor Air Quality	Measurement/ sampling	SO <sub>2</sub> , NO, CO <sub>2</sub> , CO, O <sub>3</sub> , VOC	Offices & Plant Operator Room	Biannually

**Projected Budgets and Responsibilities**

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 40,000,000 kyats per year for Air Emission Management Plan including maintenance cost of pollution control equipment.

**7.8.2 Noise and Vibration Management Plan**

**Objective**

- To reduce the noise emission and vibration
- To protect occupational and public health

**Legal Requirement**

Noise and Vibration Management Plan will be undertaken in accordance with Occupational Health and Safety Law (2019), Public Health Law (1972), Environmental Conservation Law (2015), National Environmental Quality (Emission) Guideline (2015) and other relevant laws as details in Chapter 2.

### ***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1** and map of Noise monitoring location is shown in **Figure 4.14**

### ***Implement Schedule***

Noise and Vibration Management Plan will be implemented during the construction phase and operation phase of the Project.

### ***Management Actions***

The following management actions will be implemented during the construction phase;

- Use and allow only well-maintained construction equipment which meet regulatory standards for source noise levels
- Position equipment which emit noise in one direction away from noise sensitive receivers; use silencers or mufflers on construction equipment;
- Maintain silencers and mufflers;
- Site mobile equipment as far as possible from noise sensitive receivers;
- Shut or throttle down to a minimum machines and transport equipment that are used intermittently during idle periods;
- Construction should be avoided during night times, except to use best practicable means to minimize noise during the construction period.
- Schedule high noise generating activities such as pilling and drilling for day time only.
- Complaints related to noise nuisances by neighbors, especially during night time (from 10 pm to 7 am) are avoided.

The following management actions will be implemented during the operation phase;

- Equipment generating excessive noise will be kept in properly insulated enclosures.
- Improved silencers within the equipment generating high noise.
- Isolation of continuously vibrating structures / machines by proper and secured mountings.
- Proper maintenance, oiling and greasing of machines at regular intervals to reduce generation of noise.
- Personal Protective Equipment (PPEs) like earplugs and earmuffs will be provided to the workers exposed to high noise level.

- Development of greenbelt of appropriate width inside the plant premises and at the plant boundary.
- Ambient noise level monitoring will be conducted at suitable location at periodic intervals during the operation phase in order to meet the relevant standards.

***Monitoring plans***

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
<b>Operation Phase</b>				
Noise and Vibration	Measurement	Leq [(dB(A)]	Crusher, Raw mills, Cement mills	Biannually
			4 sides around Plant site	Biannually and upon complaints

***Projected Budgets and Responsibilities***

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 20,000,000 kyats per year for Noise and Vibration Management Plan including cost of maintenance of machine and equipment.

**7.8.3 Wastewater Management Plan**

***Objective***

- To reduce the waste generation
- To protect occupational and public health, biodiversity

***Legal Requirement***

Wastewater Management Plan will be undertaken in accordance with Conservation of Water Resources and Rivers Law (2006), Public Health Law (1972), Environmental Conservation Law (2015), National Environmental Quality (Emission) Guideline (2015) and other relevant laws as details in **Chapter 2**.

***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1** Photos of Drainage system and Wastewater Pond is shown in **Figure 3.28 & 3.29**. Layout plan of current drainage system is shown in **Figure 3.30**.

***Management Actions***

The following management actions will be implemented during the construction phase;

- Minimize water consumption by reusing treated sewage/ wastewater for non-critical purposes such as dust suppression.
- Erosion of the construction site is controlled and minimized
- Drainage system must segregate storm water and runoff from wastewater streams
- Prevent wash water from carrying construction material into the drainage system
- Wash construction equipment and transport vehicles in designated areas only. Wash water must be collected in a primary sedimentation tank.
- In case of accidental spills or leaks on soil, ensure that contaminated sites are remediated promptly.

The following management actions will be implemented during the operation phase;

Sources of effluent	Management Actions
Effluent from Coal Handling	<p>Wastewater will be mostly generated from coal-pile area during rainy season. The yard will have guard drain so that the run-off can be collected at a point. This stream will contain mainly suspended coal particles. The effluent will be led to the coal particles settling tank to settle the coal particles. Settled coal particulates can be excavated during summer when the pond will be dry. There may be addition of chemicals, if required, to neutralize the stream. The clean supernatant from the settling tank will be discharged finally.</p> <p>Liquid effluents in the coal handling plant will be generated during dust suppression at the time of unloading of coal, in the primary crushed coal open stock pile and during reclamation from the store yard. A sizeable amount of the water sprinkled will be retained with the coal, certain amount will be lost due to evaporation and remaining water will be coming out as effluent containing mainly suspended solids. This stream will be led to the settling tank described above where most of the coal particles will settle.</p>
Effluent from Plant Services	<p>Wastewater from different plants including washings, leakages, etc. contains suspended solids and at times oil &amp; grease. This effluent will be passed through an oil separator unit/oil traps for removal of particulates and oil and then it will be sent to the wastewater pond.</p>
Effluent from any places	<p>Any contaminated runoff (i.e., fuel handling area and maintenance service places) will pass through oil separator/oil traps where oil will be captured before the runoff is drained into the drainage system.</p>

	Effluent will enter this drainage system and is discharged into wastewater pond.
Domestic waste water	All domestic waste water from washing and bathing will discharge to the wastewater pond through the drainage system.

***Monitoring Plans***

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Wastewater	Sampling	pH, Temperature increase, Total suspended solids, Oil content, COD	Surface sources, installed grease traps, oil/ water separators, sedimentation tanks, effluent, inlet and outlet of STP	Quarterly

***Projected Budgets and Responsibilities***

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 20,000,000 kyats per year for Wastewater Management Plan.

**7.8.4 Solid Waste Management Plan**

***Objective***

- To reduce the waste generation
- To protect occupational and public health, biodiversity

***Legal Requirement***

Solid Waste Management Plan will be undertaken in accordance with Conservation of Water Resources and Rivers Law (2006), Public Health Law (1972), Prevention and Control of Communicable Diseases Law (Amendment) (2011), Environmental Conservation Law (2015), National Environmental Quality (Emission) Guideline (2015) and other relevant laws as details in **Chapter 2**.

***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1** and Waste Disposal site is shown in **Figure 3.31**.

***Management Actions***

The following management actions will be implemented during the construction phase;

- Every effort shall be made to recycle waste.



- Segregate waste generated from construction activities into same group.
- Used oil and oily waste shall be collected in drums and stored in a dedicated impervious area on site for off-site disposal.
- At the time of demobilization, the contractor must remove accumulated waste to and approved off-site facility.
- Employ a local waste handler to remove non-hazardous construction waste from the site on a regular basis to an approved municipal landfill site.
- Prohibit burning of refuse on site.

The following management actions will be implemented during the operation phase;

*Non-hazardous Solid Waste*

- Solid waste will be segregated into biodegradable and non-biodegradable waste and used by separate bins.
- Enough rubbish bins shall be provided at the site of plant.
  - Cement dust collected in various pollution control equipment will be recycled in the process.
  - Some Recycle or reusable solid wastes will be sold to the recycling shop for further use, as appropriate or dispose to waste disposal site of plant.
- Food waste shall be handed over to local villagers for livestock feeding if there is a demand. If no demand, this waste shall be disposed to waste disposal site of plant.
- Sewage Sludge will be used in Plantation of Green Development as the fertilizer after mixing with soil.
- All reusable maintenance wastes will be sold to the recycling shop for further use, as appropriate and rest of waste with contaminated oil disposed to the plant disposal site or will be transferred to waste disposal site of Naung Hkio City Development Committee.
- No solid waste shall be burned at the plant site or anywhere else on the site, nor at the waste disposal site.
- Awareness will be given to the staff and workers about handling of solid waste at site.

*Hazardous Waste*

The plant site and accommodation campsite combined will generate a low volume of hazardous waste. The estimated amount of hazardous waste is expected to be 3 Ton per year month.

- The following wastes have been identified as the hazardous wastes:
  - ✓ Used lubricating oil

- ✓ Used hydraulic oil
  - ✓ Filters contaminated with oil
  - ✓ Drums and containers used for oil
  - ✓ Rags, paper, gloves, plastics and other materials contaminated with oil
  - ✓ bulb, fluorescence tube, LED bulb,
  - ✓ Used batteries
  - ✓ Medical Wastes
- Hazardous Solid wastes will be separated and store in proper labelled container (bins, skips, etc.).
  - Use containers that are compatible with the waste. For example, use HDPE (high-density polyethylene) plastic containers for corrosive wastes.
  - Never place incompatible wastes, such as wastes that react with each other (acids and bases) in the same container.
  - All used hydraulic and lubricant oil containers will be collected in separate containers. These containers will be kept as the follows;
    - ✓ Hazardous waste containers must be in good condition. If a container leaks, transfer waste to a new container.
    - ✓ Don't let rainwater accumulate on top of the container.
    - ✓ Keep containers closed after adding used oil.
  - Some used hydraulic and lubricant oil containers will be reused and the rest may be returned to Supplier.
  - Use lubricants oil will be sold for further reuse as appropriate.
  - Other hazardous waste (wastes with contaminated oil) will be disposed to the plant disposal site or will be transferred to waste disposal site of Naung Hkio City Development Committee.
  - Medical or clinical waste will be separated from other wastes because, they may contain infectious agents and potentially toxic substance and will be categorized as follow;
    - Yellow colour for infectious waste,
    - Red colour for sharpening and syringes, needles,
    - blue and green for domestic waste

- Other hazardous waste (wastes with contaminated oil) will be disposed to the plant disposal site or will be transferred to waste disposal site of Naung Hkio City Development Committee.

### **Coal Ash Utilization**

Coal Ash will be generated from the Coal Mill and Coal Power plant about 4 % of coal consumption (i.e. 80 ton per day of coal ash will be generated base on 2000 ton per day of coal consumption of Coal Power Plant and Cement Plant). The ash generation from the power plant is expected from Bed Ash and rest from fly-ash to be collected from Boiler EP, Economizer and Cyclone. The details of ash handling are as furnished below:

- Fly ash will be transported pneumatically with the help of dense phase pneumatic conveying system to the fly ash silo from EP, Economizer and Cyclone. The fly ash from the silo will be transported to cement plant by tanker for reusing in cement manufacturing process.
- Bed ash will be collected from overflow spouts into ash cooler hoppers. Ash from the hoppers, after sufficient cooling will be discharged through ash vessel of pneumatic conveying system to bed ash storage yard. Bed ash will be recycled for cement manufacturing. Coal Ash will be reused in cement manufacturing process by mixing raw materials and also used in brick manufacturing as shown in **Figure 7.3**. Due to this concept there are no environmental concerns with regard to ash disposal.



Figure 7-3 Brick Manufacturing

**Monitoring Plans**

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Solid Waste	Audits, photographic documentation, and interviews	Generation, storage, recycling, transport and disposal	Plant premises	Quarterly

**Projected Budgets and Responsibilities**

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 20,000,000 kyats per year for Solid Waste Management Plan.

**7.8.5 Ecology Management Plan**

**Objective**

- To conserve the biodiversity value and
- To reduce risks on biodiversity

**Legal Requirement**

Ecology Management Plan will be undertaken in accordance with Conservation of Biodiversity and Protected Areas Law (2018), Forest Law (2018),

Environmental Conservation Law (2015), and other relevant laws as details in **Chapter 2**.

***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1**.

***Implement Schedule***

Ecology Management Plan will be implemented during the construction and operation phase of the Project.

***Management Actions***

- Ensure that no vegetation outside the project area is damaged during the mobilization and demobilization of construction equipment.
- Unnecessary cleaning the trees is to avoid.
- Transplantation of existing matured trees will be undertaken and transplanted in the area earmarked for greenbelt development.
- Works areas in temporarily affected areas shall be reinstated with tree/shrub/ grass upon completion of the works.
- Hunting and catching the local wildlife are strictly prohibited.
- Environmental awareness training to be given to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area.

Management Actions of Ecology Management Plan are as follows;

- Implement Noise and Vibration Management Plan, Soil Quality Management Plan and Waste Management Plan.
- Induction training for workers will include;
  - (a) Ban on foraging, fishing and hunting;
  - (b) Protected plant and animals to be aware of;
- Restrict speed of vehicles to reduce risk of collision;
- Develop Green Belt Program

***Monitoring plans***

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
Biodiversity	Visual inspection and photographic documentation	General condition of the floral cover	Plant and landscaped areas	Annual

***Projected Budgets and Responsibilities***

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 20,000,000 kyats per year for Ecology Management Plan.

### **7.8.6 Resource Management Plan**

#### ***Objectives***

- To continuously monitor resource use (consumption of energy, water, raw material etc.) to limit over-exploitation.

#### ***Legal Requirement***

Resource Management Plan will be undertaken in accordance with Mine Law (2015), Environmental Conservation Law (2015), and other relevant laws as details in **Chapter 2**.

#### ***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1**.

#### ***Implement Schedule***

Resource Management Plan will be implemented during operation phase of the Project.

#### ***Management Actions***

The following management actions will be implemented during the operation phase;

- Continuous attempt to control wastages during transportation, storage and handling of raw materials,
- Regular monitoring of availability of stocks and consumption of raw materials, dispatch of products and loss of material.
- Installing closed-circuit cooling water systems with softening and separation for the mills and clinker cooling sections Measure consumption at each production sections.
- Measure consumption at each production section.
- Implement a power consumption audit.

#### ***Monitoring plans***

<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
<b>Construction and Operation Phase</b>				
Resource use	Metering	Water and energy consumption	Plant	Daily



<b>Impact</b>	<b>Monitoring Method</b>	<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
<b>Construction and Operation Phase</b>				
	Audit	Raw material consumption	Plant	Daily

***Projected Budgets and Responsibilities***

Ngwe Yi pale’ Cement Co., Ltd will allocate estimated 20,000,000 kyats per year for Resource Management Plan.

**7.8.7 Health & Safety Management Plan**

***Objective***

- To improve occupational health and safety and working conditions

***Legal Requirement***

Health and Safety Management Plan will be undertaken in accordance with Occupational Health and Safety Law (2019), Factory Act (amendment) (2016), Prevention and Control of Communicable Diseases Law (Amendment), Environmental Conservation Law (2015) and other relevant laws as details in Chapter 2.

***Maps and Photos***

Overview map of CROWN Cement Plant is shown in **Figure 3.1** and photos of dust control equipment are shown in **Figure 3.27**.

***Implement Schedule***

Health and Safety Management Plan will be implemented during the construction phase and operation phase of the Project.

***Management Actions***

**Occupational Health & Safety**

- All the construction employees are to be provided with appropriate safety training that covers key issues like hazards associated with the job, precautionary measures including necessary personal protective equipment and importance of safety on the work place.
- All the employees shall be aware of potential emergency conditions at the site, actions to be taken in case of emergency and facilities provided to combat emergency situations. The effectiveness of the emergency preparedness shall be tested by conducting periodic drills.
- Appropriate warning shall be displayed indicating hazard in the area and the personal protection to be used while working in the area.

- A safety and information bulletin board will be posted at sites where workers enter and leave the site or rest to encourage good communications.
- Provide adequate PPEs for workers who are exposed to heat, dust, smoke, loud noise etc.
- Provide orientation, EHS and other trainings to employees to prevent subsequent accidents and increase employee competency.
- Provide adequate proper sanitation facility e.g. bath rooms, toilets etc.
- Adoption and training all personnel (including contractor workers) in the use of PPE and chemical handling.
- Training of all personnel in health and safety risk prevention and protection.
- Provision of rest shelters for workers with amenities like drinking water, fans, toilets etc.
- Rotation of workers exposed to noise premises.
- Closed control room in crusher house with proper ventilation.
- First-aid facilities in the cement plant complex.
- Medical check-up will be done for all workers according to law and requirements.
- All workers engaged in material handling system shall be regularly examined for lung diseases.

#### Site Security

- Restrict access to site and control access gates during construction activities.
- Keeping the daily record of persons and vehicles entering/ leaving the site.
- Installing warning signs in Myanmar at the entrance of the site to warn people about the risks associated with the construction.
- Providing at least one 24-hour guard for the site.

#### Traffic Management

- Educate and train drivers, particularly heavy truck drivers for safety driving and defensive driving; ensure that the access road is not bumpy and safe for driving.
- Try to achieve zero accidents in excavation, hauling and transportation activities including traffic.
- Ensure that workers are not subject to excessive repetitive motions, over exertion and excessive manual handling; if possible, will use mechanical labor rather than manual labor as practical as possible to reduce fatigue, strain and injury on workers.

*Other Management*

- Develop and implement safe and effective procedures for transportation, storage and handling of hazardous materials according to the requirements of material safety data sheet.
- Bund all fuel tanks and oil/ lubricant storage areas to prevent spilled oil from reaching water systems or running into drainage systems.
- Keep welding gas cylinders in secure, cool, covered and ventilated areas.
- Keep radioactive material, used for radiographic testing of process vessels, in secured designated areas under custody of authorized personnel.
- Storage areas and conditions must comply with local regulations.
- Develop on effective emergency response plan in association with local authorities.
- Implement a health and hygiene management.

**7.8.8 Emergency Response Plan**

*Objective*

- To prepare and response emergency cases
- To save the property, life of workers and community

*Legal Requirement*

Emergency Response Plan will be undertaken in accordance with Natural Disaster Management Law (2013), Fire Bridge law (2015), Environmental Conservation Law (2015) and other relevant laws as details in **Chapter 2**.

*Maps and Photos*

Overview map of CROWN Cement Plant is shown in **Figure 3.1**.

*Implement Schedule*

Emergency Response Plan will be implemented during the construction and operation phase of the Project.

**Management Actions**

- Preparation of Emergency Response Plan. (Emergency Response Plan will cover emergency resources, emergency preparedness and training, emergency response procedures, administration of the plan, communication and procedures, and debriefing and post-traumatic stress procedures.)
- For practical purpose provide training for firefighting, training for First Aid and Rescue.

- Installation of the fire hydrants in and out the cement plant and offices in sufficiently.
- Conduction of emergency drill.
- Training of safety usage and preparation of the emergency response plans.
- Provision of protective equipment and clothes to workers as necessary.
- To provide material safety data sheet for any hazardous substance.
- Display phone numbers of Firefighting Department, Ambulance Services, Red Cross Society, Hospital and Police Station.

***Monitoring plan***

Description	Means to monitor	Frequency	Benefit/Suffer
Fire Hazard	<ul style="list-style-type: none"> <li>- Record of fire accidents relevant with cement plant directly or indirectly</li> <li>- Fire brigade training records for workers</li> <li>- Record of cooperation with local fire brigade.</li> </ul>	Monthly	Negative

***Projected Budgets and Responsibilities***

Ngwe Yi Pale’ Cement Co., Ltd will allocate estimated 10,000,000 kyats per year for Emergency Response Plan including Fire drill.

**7.9 Corporate Social Responsibility (CSR) Plan**

**7.9.1 CSR Program and Fund**

Corporate social responsibility (CSR) is now an important factor in the project operation. Ngwe Yi Pale’ Cement Co., Ltd is well known for its social responsibility in the country and will take up different social activities. Recognizing the vital role of social responsibility, Ngwe Yi Pale’ Cement Co., Ltd will contribute about 500 million kyats (500,000,000) per year for CSR plan, the program and fund for CSR plan of Ngwe Yi Pale’ Cement Co., Ltd are as follow **Table 7.8.**

Table 7-8 Contribution Fund for CSR Plan

No.	Activities	Proposed allocated % of CSR budget
1.	Contribution to get electrical power in nearest villages	25%

2.	Supporting health care facilities to nearest villages	15%
3.	Construction of roads	20%
4.	Donation for educational support	20%
5.	Supporting Construction and Maintenance of Religious Buildings	10%

**7.9.2 CSR Activities**

Up to present, Ngwe Yi Pale’ Cement Co., Ltd carried out the following CSR activities as per the CSR program. More details of CSR activities are presented in the website of company, www, <https://www.ngweyipalegroup.com>.

**1) Contribution of Electrical Power and Facilities**





2) Provide Healthcare Facilities



3) Construction of Religious Facilities







ကျောက်ကြမ်းကျေးရွာမှ ကရောင်သီလပ်မြေစက်ရုံကိတ် အထိ ကတ္တရာလမ်းလမ်းဖောက်လုပ်ပေးထားပုံ



လောက်ဖန်းကျေးရွာ ကွန်ကရစ်လမ်းဖောက်လုပ်ပေးထားပုံ



လောက်ဖန်းရွာမှ ဂိတ်(၁) စက်ရုံပတ် ကတ္တရာလမ်းခင်းခြင်း



လောက်ဖန်း-ခဲဆန်ကျေးရွာလမ်း သံကုက္ကန်ကရစ်တံတား

4) Construction of Education Facilities



ပြိန်းဆိုင်ရွာ မူလတန်းကျောင်းဆောင်သစ် တိုးချဲ့ ခေောင်



လောက်ဖန်းကျေးရွာ ဆရာမနေအိမ်နှင့်အိမ်သာ (၂)လုံး ဆောက်လုပ်လှူဒါန်းခြင်း



လယ်ကြီးတော ကျေးရွာစာသင်ကျောင်းသို့ စာရေးစားပွဲတိုင်ရုံဖန်တီး လှူဒါန်းခြင်း



လောက်ဖန်းကျေးရွာစာသင်ကျောင်းသို့ စာရေးစားပွဲတိုင်ရုံဖန်တီး လှူဒါန်းခြင်း



လောက်ဖန်းကျေးရွာစာသင်ကျောင်းရှိ(၄)ခန်းတွဲ အိမ်သာနှင့်ခရကန် လှူဒါန်းခြင်း



လယ်ကြီးတောကျေးရွာစာသင်ကျောင်းရှိ(၄)ခန်းတွဲ အိမ်သာနှင့်ခရကန် လှူဒါန်းခြင်း





5) Donate of Religious Facilities and Affairs

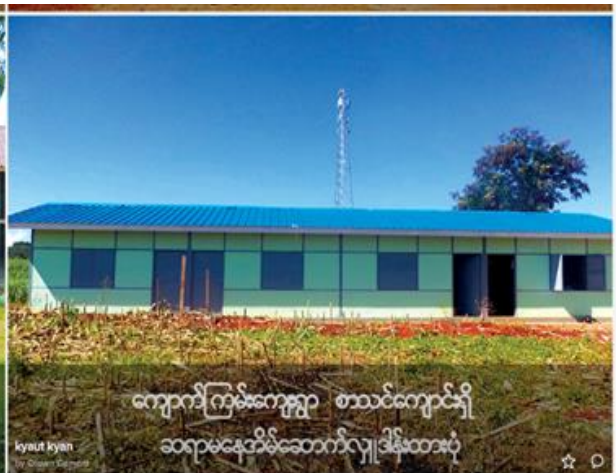


Figure 7-4 CSR Activities of CROWN Cement Plant

## **7.10 Social Welfare Program**

Crown Cement Factory plans to provide the following facilities for the employees.

- Residential houses for staff.
- Health care facilities and a clinic.
- Greenbelt development for better aesthetic environment.
- Separate toilets and bathrooms for males and females.
- Provide social security, factory and fire security.
- Transportation to and from the factory.
- Intended new appointed employees are pre-employment medical examined and appointed if succeed.
- The new appointed employees should be member of Social Security Welfare.
- All employees are medical checked up every 6 months.
- If there were some community/ occupational disease upon employees and they are medical cared according to law of Social Security Welfare Department.
- All reasonable supporting should be performed by factory.







Figure 7-5 Facilities Provided as Social Welfare Program

## 7.11 Greenbelt Development

Since beginning of the project, to beautify the plant surroundings and achieve green field plant site, Ngwe Yi Pale’ Cement Co., Ltd has undertaken the plantation work. The plantation work has been carried out as a part of “Clean & Green” program. Massive plantation has been taken up by Ngwe Yi Pale’ Cement Co., Ltd wherever land is available. The surroundings and image of plant site will be enhanced greatly, contributing to the erection of modern plant site.

The plantation also contributes towards environmental improvement, by:

- Acting as a “pollution sink” and preventing the particulate and other atmospheric pollutants from spreading to the nearby areas,
- Providing vegetative cover,
- Increasing the aesthetics of the surroundings, and
- Providing the resting, feeding and breeding site for fauna.

Greenbelt has been developed and well maintained in the internal space of the factory area. The factory has made elaborate arrangement in developing greenbelt inside the premises. Various flowering trees will be planted for getting the pleasant and beautiful landscaping within the factory.

Ngwe Yi Pale’ Cement Co., Ltd has planted 137257 trees in the area of about 500 acres around the cement plant as shown in **Table 7.9** and various type around the plant site are **Figure 7.6** and **Figure 7.7**. Most of the trees are indigenous. Multispecies plantation with a proper mix of timber yielding such as Kyun(teak), Macadamia, Cherry, Thanpaya, Danyin, Mezal, Arsian Thabye, Kha-yay, Padauk, Yay-htin-shu, Taiwun-bandar, Magyi, Ohm-pwar, Pyinkatoe, Tamalan, Pein-nae, Htaw-pat, Shwewa, Kyun, Nyaung-wine, Kyauk-sein, Yaythin-win, Mahawgani, Kyauk-hkak, Yay-patone, Tha-yet, and avocados, lemon, pineapple; medicinal and other useful varieties are planted.

Table 7-9 various tree type around the plant site

<b>No.</b>	<b>Name of Tree</b>	<b>No. of Tree</b>
1	Htin-shu	597
2	Kokko	2361
3	Yamanay	12996
4	Pyin-ma	20
5	Yu ka lip	51000
6	Pyinkatoe	4250
7	Kyun	86180
8	Tha-yet	571
9	Pein-nae	423
10	Sein Pane	838
11	Thit Mawe	3000
12	Nant Thar Ni	1000
13	Other	19921
<b>Total</b>		<b>137257</b>

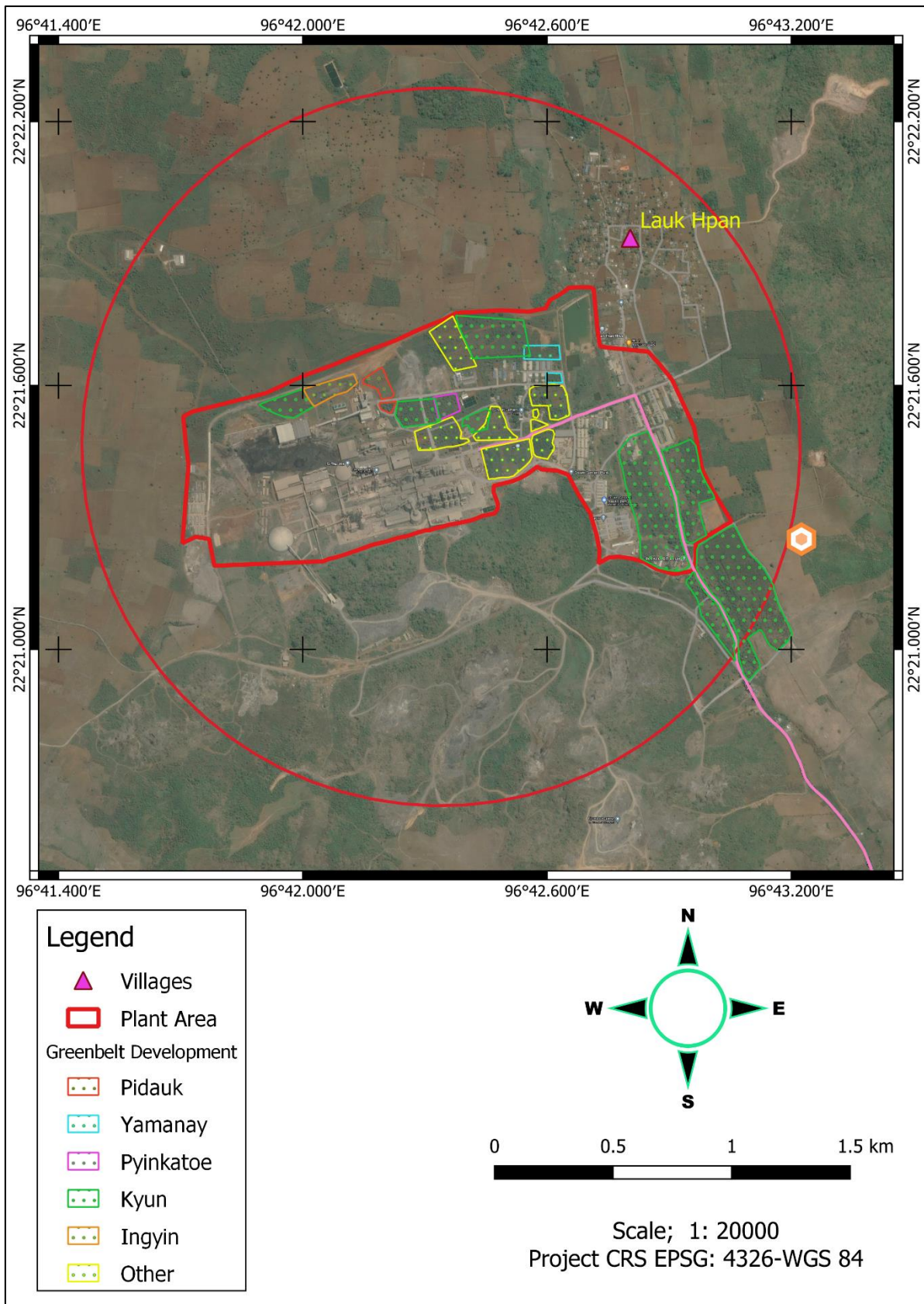


Figure 7-6 Greenbelt Development Area





Figure 7-7 Photos of Existing Green Development

## 7.12 Capacity Development and Training

Ngwe Yi Pale’ Cement Co., Ltd has been establishing the capacity development and training such as Management Training, Health and Safety Training, Interpersonal Skill Training, Language and Computer Training, and Role Play and Team Building Activities. The information and training photos of CROWN Cement Plant can see at <https://www.ngweyipalegroup.com>.





Figure 7-8 Photos of Management Training



Figure 7-9 Photos of Health and Safety Training





Figure 7-10 Photos of Interpersonal Skills Training



Figure 7-11 Photos of Language and Computer Training





Figure 7-12 Photos of Role Play and Team Building Activities

## **8.0 PUBLIC CONSULTATION AND DISCLOSURE**

### **8.1 Introduction**

Stakeholder’s consultation is a tool used for communication with a diverse group of people having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. This practice initiates a need assessment and identifies areas of concern for all the parties that maybe affected by the project activities.

Stakeholders by definition are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project.

### **8.2 Objectives of Stakeholder’s Consultation**

Consultation with stakeholders leads to an overall better understanding of the project on the part of the communities and gives the Proponent a clearer understanding of the stakeholders’ perspective. Effective public consultation can add substantial value to the EIA study process. The information gained through public consultation on the stakeholders’ concerns, interests, and their ability to influence decision-making helps identify key cause of environmental problems.

This can be used to evaluate direct and indirect environmental impacts and assess short term and long-term resource use implications. The input from local communities and institutional stakeholders can help evaluate alternatives and strengthen the management planning by incorporating local input and know-how.

An informed public will better understand the trade-offs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project Proponent and support for the project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders’ consultation are to:

- Promote better understanding of the proposed operation through explaining its objectives and its potential positive and negative impacts.
- Identify and address concerns of all interested and affected stakeholders.
- Provide a mechanism to resolve issues identified by communities, before project plans are finalized and development begins, thereby, avoiding public outcry and resentment.
- Instill trust between various stakeholders and the Proponent to promote cooperation.

### **8.3 Stakeholders Identification**

Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. Stakeholders are persons or groups who directly or indirectly affected by a project, as well as those who may have interests in a project and/ or the ability to influence its outcome, either positively or negatively.

After discussion with key informers from developer and local communities, the following communities, authorities and NGOs can be considered as key stakeholders who are directly or indirectly related to the proposed project.

- (a) Ngwe Yi Pale Mining Co., Ltd.;
- (b) Local residents in Lauk Hpan Village;
- (c) Local residents in Khe Hsan Village;
- (d) Local residents in Ngokalay Village;
- (e) Local residents in Own Ma Kar Village;
- (f) Local residents in Lei Gyi Daw Village;
- (g) Local residents in Kone Mone Village.
- (h) Head of Local Administration Office (Naung Hkio);
- (i) City Development Committee (Naung Hkio);
- (j) Department of Public Health (Naung Hkio);
- (k) Department of Forestry (Naung Hkio);
- (l) Inn Sein (Local NGOs);
- (m) Fire Station (Naung Hkio); etc.

### **8.4 Methodology for Consultation**

For the extension of existing cement Plant and expanding production capacity up to 5,000 Ton per day, effective public consultation and participation approaches in the form of focus group discussions, public meetings and public disclosure were conducted. Public meetings for active public participation are accomplished two times and detailed procedures for public participation process are described as follow:

### **8.5 Public Consultation Meeting**

#### **8.5.1 First Public Meeting**

##### **Objective**

First public meeting was held on 4<sup>th</sup> April 2015. There were about 150 people from local authorities, communities, and those who are directly or indirectly affected

by the proposed project were attended in this meeting. The aims of first public meeting are as follow:

- (i) To announce the process and procedure of Social Impact Assessment; and
- (ii) To discuss about the possible socio-economic impacts; and
- (iii) To discuss about the alternative ways to avoid the socio-economic impacts.

**Agenda**

Table 8-1 First Public Consultation Meeting Agenda

Date and Time	4.4.2015 02:00 pm – 05:00 pm
Venue	Meeting Hall, Crown Cement Plant
Agenda	The meeting was organized with eight agendas. Agenda 1: Announcing the opening ceremony of public meeting Agenda 2: Explaining about cement plant project for expanding production capacity up to 5,000 tons per day by a responsible person of Crown Cement Plant Agenda 3: Explaining about EIA procedures to be carried out for Crown Cement Plant by U Sein Thaug Oo and Specialists from GMES Co., Ltd. Agenda 4: Explaining about social impact assessment procedures associated with project by Dr. Kyaw Swar Tint Agenda 5: Question & Answer Session & giving suggestions Agenda 6: Responding to discussions Agenda 7: Saying thank to attendances by a responsible person of Crown Cement Plant Agenda 8: Announcing the closing of the ceremony

**Attendance**

Table 8-2 Total Attendance List for First Public Meeting

No.	Organization/Village	Attendance
1.	Local Authorities	11
2.	Local People who works in existing cement Plant	25

3.	Members of Third Party	7
4.	Kone Mo	18
5.	Naung Kwan	5
6.	Khe Hsan	21
7.	Pang Ti	8
8.	Lauk Hpan	14
9.	Nan Ke Aik	12
10.	Ngokalay	17
11.	Lei Gyi Taw	8
Total		146

**Summary of Comments**

After the presentation of EIA/ SIA procedures to be carried out for the extension of existing cement Plant, the floor opened for questions and answers. There was no complaint or grievance concerning expanding production capacity of Crown Cement Plant. Summary of comments received from local participants during the public consultation meeting are described in **Table 8.3**. Attendances list records and key discussion during the meeting and responses from the project side are attached in **Appendix XIII**.

Table 8-3 Summary of comments received from First Public Meeting

Public Needs	To plant more trees around the Plant
	To construct or renovate a monastery
	To upgrade and extent the roads in the villages
	To employ more local people at the Plant
	To do environmental conservation continuously and fulfill the requirements as necessary
	To develop social, economic and health status
Concerns	Impact to agriculture lands due to dispersion of dust
	Dust emission during transportation of raw material and cement bags





Figure 8-1 Recorded Photos during First Public Meeting

### 8.5.2 Second Public Meeting

#### Objective

Second public meeting was held on 23<sup>th</sup> August 2015 and about 176 people were attended in this meeting. The aims of second public meeting are as follow:

- (i) To make known the alternative ways to avoid socio-economic impacts;
- (ii) To announce-the anticipated socio-economic impacts of proposed projects; and
- (iii) To discuss about mitigation measures for these impacts.

#### Agenda

Table 8-4 Second Public Consultation Meeting Agenda

Date and Time	23.8.2015 02:00 pm – 05:00 pm
Venue	Meeting Hall, Crown Cement Plant
Agenda	The meeting was organized with eight agendas. Agenda 1: Announcing the opening ceremony of public meeting Agenda 2: Explaining about cement plant project for expanding production capacity up to 5,000 tons per day by a responsible person of Crown Cement Plant Agenda 3: Explaining about EIA procedures to be carried out for Crown Cement Plant by U Sein Thaug Oo and Specialists from GMES Co., Ltd. Agenda 4: Explaining about social impact assessment procedures associated with project by Dr. Kyaw Swar Tint Agenda 5: Question & Answer Session & giving suggestions Agenda 6: Responding to discussions Agenda 7: Saying thank to attended people by a responsible person of Crown Cement Plant Agenda 8: Announcing the closing of the ceremony

Table 8-5 Total Attendance List for Second Public Meeting

No.	Organization/Village	Attendance	Remark
1.	Local Authorities	13	
2.	Local People who works in existing cement Plant	22	
3.	Members of Third Party	6	
4.	Kone Mo	11	
5.	Naung Kwan	11	
6.	Khe Hsan	17	
7.	Pang Ti	16	
8.	Lauk Hpan	10	
9.	Nan Ke Aik	23	
10.	Ngokalay	29	

11.	Lal Gyi Taw	18	
Total		176	

**Summary of comments**

After the presentation of EIA/ SIA procedures to be carried out for the extension of existing cement Plant, the floor opened for questions and answers. Summary of comments received from local participants during the public consultation meeting are described in **Table 8.6**. Attendances list records and detail discussion during the meeting and responses from the project side are shown in **Appendix XIII**.

Table 8-6 Summary of comments received from Second Public Meeting

Public Needs	For electrification of village
	Upgrading village road
	Selling bags of cement to local residents without specifying the quantity
	Tube well for constant water supply during summer
	Private clinic for health care
	To develop social, economic and health status
Suggestions	To carry out greenbelt development
	To maintain safe environment and ecology
	To have the regional development
	To build a two-lane road from the Plant to Lashio
	To repair the damaged access road which is used for transportation
	To employ more local people at the Plant
Concerns	Impact to agriculture land due to dispersion of dust emission
	Noise/ Waste Disposal/
	Potential to road accidents
	Dust emission during transportation of raw material and cement bags





Figure 8-2 Recorded Photos during Second Public Meeting

## 8.6 Information Disclosure

Information disclosure is one of the requirements in EIA procedure. According to the EIA procedure, 2015, disclose information about the proposed Project to the public and civil society through posting on the Project or Project Proponent’s website(s) and local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project site which are visible to the public.

The company, Ngwe Ye Pale’s Cement Company Limited and the EIA consultants (GMES) disclosed the relevant information and results from public meeting to the Stakeholders at the consultation meetings (see Figure 8.4). In addition, the information of CROWN Cement Plant can read at <https://www.ngweyipalegroup.com> and the approved EIA report will be disclosed in this website.

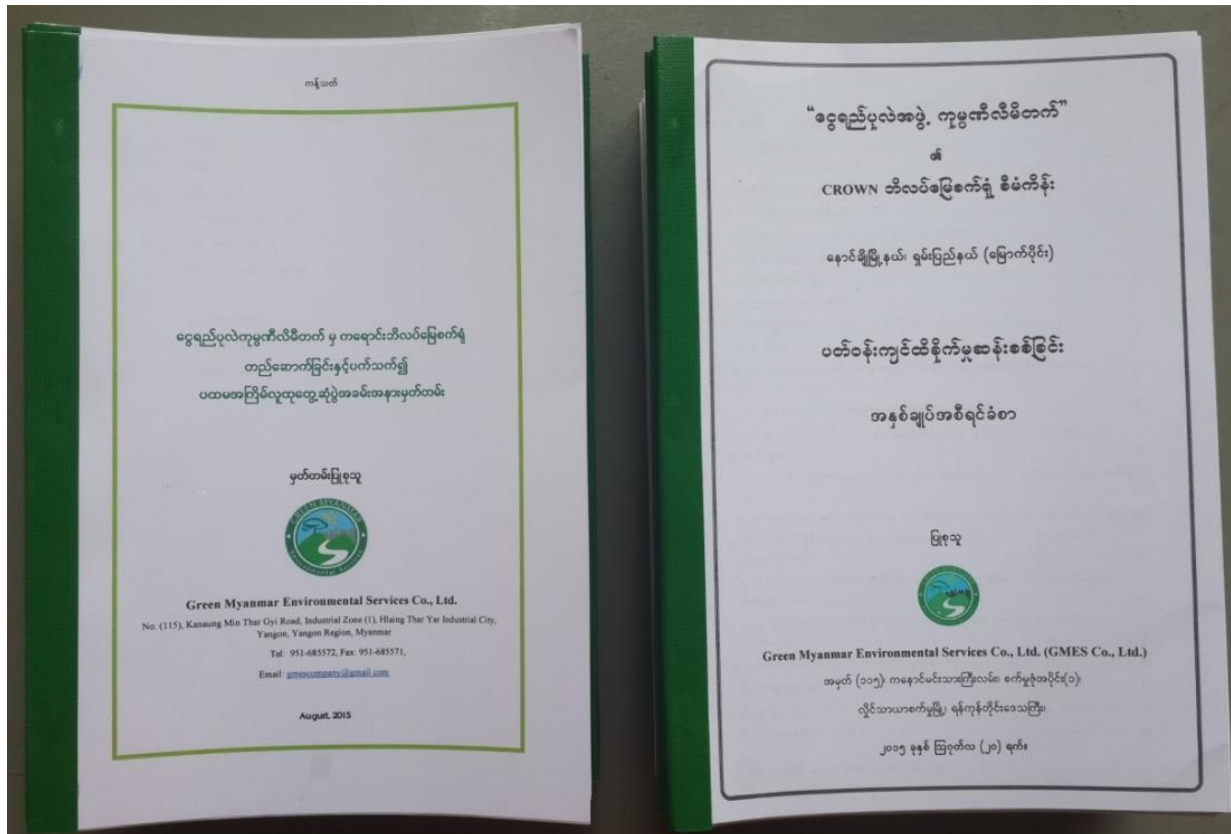


Figure 8-3 Photos of Meeting Minutes Documents

## 8.7 Grievance Redress Mechanism (GRM)

### Introduction

Grievance redress mechanism (GRMs) is a process by which a resolution to a grievance is sought and provided. The purpose of the Grievance Redress Mechanism is to approach to accepting, assessing, resolving and monitoring grievances from those affected by the social or environmental impacts of the Project.

### Grievance Reporting Channels

Crown Cement Plant will establish a Grievance Redress Mechanism (GRM) throughout the entire operation phase period and will proactively inform affected communities and the wider stakeholder group about the details of the Grievance Redress Mechanism. This will include information about where people can go and who they can talk to if they have a grievance. Complaints or grievances can be submitted in writing, telephonically or presented verbally using the following details:

- Name : U Sein Myo Aung
- Telephone : 02 71424
- Email : [crowncement@ngweyipalegroup.com](mailto:crowncement@ngweyipalegroup.com)

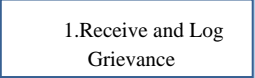

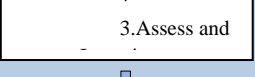



Complaints and grievance letters or information (e-mail, phone, fax, etc.,) are received by suggestion box at main gate and to administrated communication procedure. The



telephone numbers of administrated department were on notice board at main gate and sent to village administrators, town and district. After resolving, replying should be done by face to face or telephone or other communicable procedure such as fax, e-mail, etc.

Grievance Mechanism Process

The following steps outline the process that will be used to resolve a grievance.

Process	Description
	<ul style="list-style-type: none"> <li>- Face to face meeting with stakeholder</li> <li>- Phone, Fax, Letter or email</li> <li>- Recorded by Grievance Management Team staff</li> <li>- Completion and submission of grievance form</li> <li>- Record grievance in Grievance Form and log on Grievance Database</li> </ul>
	Receipt of grievance acknowledged through appropriate communication medium, but to be recorded in writing
	<ul style="list-style-type: none"> <li>- Assess grievance significance</li> <li>- Consult with relevant parties</li> <li>- May require site visits and discussions with other stakeholders</li> </ul>
	<ul style="list-style-type: none"> <li>- Identify further action required</li> <li>- Response provided to complainant including, if necessary and indication of additional time and resources required to resolve grievance</li> </ul>
	<ul style="list-style-type: none"> <li>- Confirm with complainant that grievance can be closed, or determine what follow-up is necessary.</li> <li>- If the grievance is to be closed, grievance sign off is required.</li> </ul>
	<ul style="list-style-type: none"> <li>- Record final sign off of grievance according to significance</li> <li>- If grievance cannot be closed, return to step 2 to reassess or recommend whether third-party arbitration is necessary</li> </ul>

Estimated Time Duration to Resolve

Time duration to resolve complaints and grievance is estimated as following.

No.	Time Duration (Week)	Condition
1	One	Can be resolved by power of Plant Manager
2	Two	Can be resolved by H.R department
3	Four	Can be resolved by Company
4	More than four	Can be resolved, including third party (such as, consultants, lawyer, NGO, Government Administrated Department, etc.,)

Keeping Records

Keeping a written record of all complaints is critical for effective grievance management. All records including the name of the individual or organization, the date and nature of the complaint, any follow-up actions taken, the final result, and how and when this decision was communicated to the complaint will be securely maintained.



## **9.0 CONCLUSION**

Cement manufacturing has a high impact on the ecological environment from “quarry to lorry”. Starting from excavation of limestone, raw material crushing and milling, clinker manufacturing, cement grinding and bulk & bag material transportation demands use of natural resources in the form of material and energy. The main impacts of the project are dust, noise, and runoff. If the recommended mitigation measures are implemented and pollution control facilities are properly operated, such impacts can be mitigated to acceptable levels.

Ngwe Yi Pa le' Cement Company Limited intends to increase the processing capacity of the existing cement manufacturing plant “Crown Cement Plant” in Northern Shan State. It committed to undertake an occupational health, safety and environmental management plan, a waste management plan, or a social management or comparable plan that aims to consult and support the communities affected by the project. Monitoring plans will also be conducted during the construction and the operation phases.

Ngwe Yi Pale' Cement Company Limited will establish a strong committee to undertake and manage occupational health, safety, social and environmental management responsibilities on site as well as off site.

Ngwe Yi Pale' Cement Company Limited will:

- Establish occupational health, safety and environmental management policies.
- Develop occupational health, safety and environmental management plans, including a water management, waste management and monitoring plan.
- The frequency of monitoring, reporting and remedial action procedures will be carried out as in the safety and environmental policies and management plans.
- Water management plans will be drafted including:

The water consumption of the plant, the whole compound, and the nearby located villages and settlements, their potential population related water consumption increase.

It should also include the wastewater treatment and the releases.

The EIA of the proposed project has identified major negative impacts that can be successfully mitigated. The critical environmental issues identified by the EIA were related to construction works management, landscaping, and operation impacts. Residual negative impacts are anticipated to be negligible, provided that the mitigative measures recommended are properly implemented and monitored.

This project is recommended for implementation because the positive impacts far outweigh the negative impacts. Myanmar will benefit from increase employment, increased earnings, increased tax revenue, increased foreign investment, and decreased imports while the use of modern technology and other measures are taken to mitigate all of the potentially negative impacts.

The project will also have economic and environmental value-added on a national and regional scale, since it will allow cement to be produced instead of imported, through a productive process that integrates a set of environmental protection measures, enabling the production of cement with less environmental impacts when compared to less modern cement industries.

The project proponents have committed to adhere to prudent implementation of the environmental management plan. They are obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. They have proposed adequate safety and health mitigation measures as part of the relevant statutory requirements. They should therefore be licensed to implement this project subject to adherence to the environmental management plan proposed in this report and the statutory requirements.

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Appendix I: Certification of Incorporation (Ngwe Yi Pale Cement Co., Ltd)



Appendix II: MIC permit

**မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှုကော်မရှင်**  
**ခွင့်ပြု မိန့်**

ခွင့်ပြုမိန့် အမှတ်၊ မနာသ - ..... ၈၁၈ ..... / ၂၀၁၁ ..... ၂၀၁၁ ခုနှစ်၊ နိုဝင်ဘာ လ ၈ ရက်၊

မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်သည် မြန်မာနိုင်ငံသားနှင့် ရင်းနှီးမြှုပ်နှံမှု ဥပဒေပုဒ်မ ၀၈ အရ ဤခွင့်ပြုမိန့်ကို ထုတ်ပေးလိုက်သည်။

(က) ရင်းနှီးမြှုပ်နှံသူ၏ အမည် ..... ဦးသိန်းမြင့်

(ခ) အဘ အမည် ..... ဦးယော်နိုင်တုံ

(ဂ) နိုင်ငံသား/ အမျိုးသားမှတ်ပုံတင်အမှတ် ..... ၁၃/ ၈၈၈ (နိုင်) ၀၀၀၀၁၇

(ဃ) နေရပ်လိပ်စာ ..... အမှတ် (၆၂)၊ ၁၅လမ်း၊ ၈၇X စလမ်းကြား၊  
အောင်မြေသာစံမြို့နယ်၊ မန္တလေးတိုင်းဒေသကြီး။

(င) ပို့စည်းထားသည့် သို့မဟုတ် ပို့စည်းမည့်အဖွဲ့အစည်း .....  
မြေလှုပ်သည့်အဖွဲ့အစည်း ..... (Ngwe Yi Pale Mining Co., Ltd)  
အသား ဘေးဒ်မ ညွှန်စစ် (၀၀-၄-၁၅၆) ရင်းနှီးမြှုပ်နှံမှုလုပ်မည့် လုပ်ငန်းအမျိုးအစား Phase-1 တွင်တစ်နေ့တန်(၁၀၀၀)ကျ ထုတ်လုပ်ပြီး  
၇၈၅ နှစ် မိမိ အ Phase-2 တွင်တစ်နေ့တန်(၂၀၀၀)ကျဖြင့် စုစုပေါင်းတစ်နေ့တန်(၃၀၀၀)ကျထုတ်လုပ်ခြင်းလုပ်ငန်း  
နှုတ် ၇၈ - ၇ ( ၁ ) /  
မ- ထွေ / ၂၀၁ (ဆ) ရင်းနှီးမြှုပ်နှံမှုလုပ်မည့် အရပ်ဒေသ (များ) ..... လောက်မန်းကွင်းပြင်၊ လုံးရုံးကျေးရွာအုပ်စု၊  
( ၃၀၀၄-၀ ) အရ နောင်ချိုမြို့နယ်၊ ကျောက်မဲခရိုင်၊ ရှမ်းပြည်နယ် (မြောက်ပိုင်း)။  
ပြင်ဆင်သည့်။

(ဇ) မတည်ငွေရင်းပမာဏ (ကျပ်) ..... ၂၄၈၅၅-၄၂ (သန်း) (အမေရိကန်ဒေါ်လာ(၂၀,၇၃၅)သန်းအပါအဝင်  
စုစုပေါင်း ကျပ်သန်းနှစ်သောင်းလေးထောင်၊ ရှစ်ရာငါးဆယ်ငါးနှင့်  
လေးသောင်း၊ နှစ်ထောင်ခန့်)

ဥက္ကဋ္ဌ ( ဟိုဒေသ )  
( အထွေထွေ ဦးစီးဌာန )

ဥက္ကဋ္ဌ  
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်



(မနုဿ-၂)  
ပူးတွဲ-၁

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်  
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်

၂၀၁၁ ခုနှစ်၊ နိုဝင်ဘာလ ၈ ရက်စွဲပါ ခွင့်ပြုမိန့်အမှတ် မနုဿ- ၈၁၈/ ၂၀၁၁ တွင် ပြင်ဆင်ချက်  
၂၀၁၅ ခုနှစ် ဇူလိုင်လ ၃ ရက်နေ့တွင် ကျင်းပခဲ့သော မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်  
၏ ၁၂/၂၀၁၅ အစည်းအဝေးဆုံးဖြတ်ချက်အရ ငွေရည်ပုလဲတိလပ်မြေကုမ္ပဏီလီမိတက်၏  
အဆိုပြု တင်ပြထားသော ရင်းနှီးမြှုပ်နှံမှုပြုလုပ်မည့် လုပ်ငန်းအမျိုးအစားတွင် မူလ " Phase-1  
တွင် တစ်နေ့တန်(၁၀၀၀) ကျ ထုတ်လုပ်ပြီး Phase-2 တွင်တစ်နေ့တန်(၂၀၀၀) ကျ မြင့် စုစုပေါင်း  
တစ်နေ့တန်(၃၀၀၀)ကျတိလပ်မြေထုတ်လုပ်ခြင်းလုပ်ငန်း"မှPhase-1တွင် တစ်နေ့တန်(၁၀၀၀)ကျ  
ထုတ်လုပ်ပြီး Phase-2 တွင်တစ်နေ့တန်(၄၀၀၀)ကျမြင့် စုစုပေါင်းတစ်နေ့တန်(၅၀၀၀)ကျ တိလပ်  
မြေ ထုတ်လုပ်ခြင်းလုပ်ငန်း" နှင့် မတည်ငွေရင်းပမာဏတွင် မူလ "ကျပ် ၂၄၈၅၅.၄၂ သန်း  
(အမေရိကန်ဒေါ်လာ ၂၀.၇၃၅သန်း အပါအဝင်စုစုပေါင်း ကျပ်သန်းနှစ်သောင်းလေးထောင်ရှစ်ရာ  
ငါးဆယ့်ငါးနှင့် လေးသိန်းနှစ်သောင်း တိတိ)" မှ "ကျပ် ၉၉၀၂၅.၅၅ သန်း (အမေရိကန်ဒေါ်လာ  
၈၉.၂၃၄ သန်း အပါအဝင် စုစုပေါင်း ကျပ်ကိုးသောင်း ကိုးထောင်နှစ်ဆယ့်ငါးသန်းနှင့် ငါးသိန်း  
ငါးသောင်း တိတိ)" သို့ တိုးမြှင့်ခွင့်ပြုလိုက်သည်။

- (စ) ရင်းနှီးမြှုပ်နှံမှုပြုလုပ်မည့်လုပ်ငန်းအမျိုးအစား Phase-1တွင် တစ်နေ့တန်(၁၀၀၀)  
ကျ ထုတ်လုပ်ပြီး Phase-2 တွင်တစ်နေ့တန်(၄၀၀၀)ကျမြင့် စုစုပေါင်း တစ်နေ့  
တန်(၅၀၀၀)ကျ တိလပ်မြေ ထုတ်လုပ်ခြင်းလုပ်ငန်း
- (ခ) မတည်ငွေရင်းပမာဏ (ကျပ်) ကျပ် ၉၉၀၂၅.၅၅ သန်း (အမေရိကန်ဒေါ်လာ  
၈၉.၂၃၄သန်းအပါအဝင် စုစုပေါင်း ကျပ်ကိုးသောင်းကိုးထောင်နှစ်ဆယ့်ငါးသန်းနှင့်  
ငါးသိန်းငါးသောင်း တိတိ)

  
(မြသူဇာ)

တွဲဖက်အတွင်းရေးမှူး

ရက်စွဲ၊ ၂၀၁၅ ခုနှစ် ဇူလိုင်လ ၁၅ ရက်  
နေရာ၊ ရန်ကုန်မြို့

Appendix III: Certificate of Incorporation of GMES



ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်  
Certificate of Incorporation

စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်  
GREEN MYANMAR ENVIRONMENTAL SERVICES COMPANY LIMITED  
Company Registration No. 110299931

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ  
စိမ်းလန်းမြန်မာ ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်  
အား ၂၀၁၂ ခုနှစ် အောက်တိုဘာလ ၃ ရက်နေ့တွင်  
အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ  
အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that  
GREEN MYANMAR ENVIRONMENTAL SERVICES COMPANY LIMITED  
was incorporated under the Myanmar Companies Act 1914 on 3 October  
2012 as a Private Company Limited by Shares.



ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ  
Registrar of Companies  
ရင်းနှီးမြုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန  
Directorate of Investment and Company Administration



Former Registration No. 2744/2012-2013



# Environmental Impact Assessment Report For "Crown Cement Factory 5,000 TPD"

Ngwe Yi Pale' Cement Co., Ltd

## Appendix IV: Transitional Consultant Registration (Company) and Personnel

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြည်ထောင်စုအခြားသို့လုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0006 Date 31.03.2018

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.  
(ဝတ်နံ့ကုန် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလုပ်ငန်းများ၊ အဆင့်မြှင့်တင်ရေးအဖွဲ့အစည်း၊ ၆၁၆/၂၀၁၅ အရ သတ်မှတ်ထားသည့် သဘာဝပတ်ဝန်းကျင်ထိခိုက်စွမ်းဆောင်ရည်စုံစမ်းစစ်ချက်ပြုစုရာတွင် ဤအထောက်အထားလက်မှတ်ကို အခွင့်အလမ်းအား ထုတ်ပေးလိုက်သည်။)

(a) Name of Organization (အဖွဲ့အစည်းအမည်) Green Myanmar Environmental Services Co., Ltd.  
(b) Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်) Engr. U Sein Thuang Oo  
(c) Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား) Myanmar  
(d) Identity Card / Passport Number of the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/နိုင်ငံတော်လက်မှတ် အမှတ်) 12/Ma Ya Ka (N) 082871  
(e) Address of organization (အက်သွယ်လိပ်စာ) 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.  
(f) Type of Consultancy (အခြားသို့လုပ်ကိုင်မှုအမျိုးအစား) Organization  
(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) 31 March 2018

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

EXTENSION  
သက်တမ်းတိုးခြင်း  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၃) ရက်မှစ၍ (၂၀-၈-၂၀၂၃) ရက်အထိ (၂)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

Areas of Expertise Permitted (စွဲပြုသည့် ကွမ်းကုန်မှုယ်ဝယ်များ)

1. Air Pollution Control
2. Facilitation of meeting
3. Meteorology, Modeling for Air Quality
4. Risk Assessment and Hazard Management
5. Socio-Economy
6. Water Pollution Control
7. Waste Management
8. Chemical Engineering Plant Design
9. Chemical Engineering Process Design
10. Chemical Engineering, Laboratory Analysis for water and waste water
11. Environmental Management
12. Industrial Management

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (31.6.2023)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၃) ရက်မှစ၍ (၂၀-၆-၂၀၂၃) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sa Aung Thu, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၂) ရက်မှစ၍ (၂၀-၁၂-၂၀၂၂) ရက်အထိ (၁)နှစ်သက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)  
ဤသက်တမ်းတိုးခြင်း (၁-၇-၂၀၂၁) ရက်မှစ၍ (၂၀-၁၂-၂၀၂၁) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.4.2019) to (31.12.2019)  
ဤသက်တမ်းတိုးခြင်း (၁-၄-၂၀၁၉) ရက်မှစ၍ (၂၀-၁၂-၂၀၁၉) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၀) ရက်မှစ၍ (၂၀-၁၂-၂၀၂၀) ရက်အထိ (၁)နှစ်သက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြည်ထောင်စုအခြားသို့လုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 0019 Date 31.03.2018

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.  
(ဝတ်နံ့ကုန် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလုပ်ငန်းများ၊ အဆင့်မြှင့်တင်ရေးအဖွဲ့အစည်း၊ ၆၁၆/၂၀၁၅ အရ သတ်မှတ်ထားသည့် သဘာဝပတ်ဝန်းကျင်ထိခိုက်စွမ်းဆောင်ရည်စုံစမ်းစစ်ချက်ပြုစုရာတွင် ဤအထောက်အထားလက်မှတ်ကို လုပ်ကိုင်အားထုတ်ပေးလိုက်သည်။)

(a) Name of Consultant (အခြားသို့လုပ်ကိုင်သူအမည်) Engr. U Kyaw Soe Win  
(b) Citizenship (နိုင်ငံသား) Myanmar  
(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံတော်လက်မှတ် အမှတ်) 12/ Ou Ka Ta (Naing) 038453  
(d) Address (အက်သွယ်လိပ်စာ) No. 155, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone(1), Hlaing Thar Yar Township, Yangon.  
(e) Organization (အဖွဲ့အစည်း) Green Myanmar Environmental Services Company Limited  
(f) Type of Consultancy (အခြားသို့လုပ်ကိုင်မှုအမျိုးအစား) Person  
(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) 31 March 2018

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

Areas of Expertise Permitted (စွဲပြုသည့် ကွမ်းကုန်မှုယ်ဝယ်များ)

1. Facilitation of meeting
2. Industrial Management

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.7.2023) to (31.8.2023)  
ဤသက်တမ်းတိုးခြင်း (၁-၇-၂၀၂၃) ရက်မှစ၍ (၂၀-၈-၂၀၂၃) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.1.2019) to (31.12.2019)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၁၉) ရက်မှစ၍ (၂၀-၁၂-၂၀၁၉) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (31.12.2021)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၁) ရက်မှစ၍ (၂၀-၁၂-၂၀၂၁) ရက်အထိ (၆)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)  
ဤသက်တမ်းတိုးခြင်း (၁-၁-၂၀၂၀) ရက်မှစ၍ (၂၀-၁၂-၂၀၂၀) ရက်အထိ (၁)နှစ်သက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sao Naing, Director)  
Environmental Conservation Department

EXTENSION (သက်တမ်းတိုးခြင်း)  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
ဤသက်တမ်းတိုးခြင်း (၁-၇-၂၀၂၃) ရက်မှစ၍ (၂၀-၈-၂၀၂၃) ရက်အထိ (၂)လသက်တမ်းတိုးပေးခြင်းဖြစ်သည်။

For Director General (Sa Aung Thu, Director)  
Environmental Conservation Department



# Environmental Impact Assessment Report For "Crown Cement Factory 5,000 TPD"

Ngwe Yi Pale' Cement Co., Ltd

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြည်ထောင်စုအကြံပေးလုပ်ကိုင်သူများပုံစံဖြင့် အထောက်အထားလက်မှတ်)


No. 0023 Date 11.03.2017

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

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလုပ်နည်း၊ အဆင့်မြှင့်တင်ရေးအမှတ် ၆၁၆/၂၀၁၅ အရ သတ်မှတ်ထားသော အထောက်အထားလက်မှတ်ဖြင့် အထောက်အထားလက်မှတ်ကို လုပ်ကိုင်အသုံးပြုခွင့်ပေးလိုက်သည်။)

(a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်) Engr. U Sein Thuang Oo  
(b) Citizenship (နိုင်ငံသား) Myanmar  
(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ်အမှတ်) 12/ Ma Ya Ka (N) 082871  
(d) Address (အလုပ်လုပ်ရန်လိပ်စာ) No. 17/D, Aung Theikdi Yetik Thar, Mayangone Township, Yangon.  
amsesonpany@gmail.com, seinthaungoo@gmail.com  
09 5122448  
(e) Organization (အဖွဲ့အစည်း) Green Myanmar Environmental Services Co.,Ltd.  
(f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) Person  
(g) Duration of validity (အလုပ်လုပ်ကိုင်ရန်သုံးလက်) 31 March 2018

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



Areas of Expertise Permitted  
(ရှင်ဖြုတ်သည့် ကွမ်းကုန်နယ်လယ်များ)

1. Air Pollution Control

2. Chemical Engineering Process Design, Industrial Management

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (31.6.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)  
For Director General (See Aung Thu, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
For Director General (See Aung Thu, Director)  
Environmental Conservation Department

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြည်ထောင်စုအကြံပေးလုပ်ကိုင်သူများပုံစံဖြင့် အထောက်အထားလက်မှတ်)


No. 0026 Date 11.03.2017

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

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလုပ်နည်း၊ အဆင့်မြှင့်တင်ရေးအမှတ် ၆၁၆/၂၀၁၅ အရ သတ်မှတ်ထားသော အထောက်အထားလက်မှတ်ဖြင့် အထောက်အထားလက်မှတ်ကို လုပ်ကိုင်အသုံးပြုခွင့်ပေးလိုက်သည်။)

(a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်) U Myo Myint  
(b) Citizenship (နိုင်ငံသား) Myanmar  
(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ်အမှတ်) 12/ Pa Ba Ta (N) 015315  
(d) Address (အလုပ်လုပ်ရန်လိပ်စာ) 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.  
amsesonpany@gmail.com, 09 2012723  
(e) Organization (အဖွဲ့အစည်း) Green Myanmar Environmental Services Co.,Ltd.  
(f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) Person  
(g) Duration of validity (အလုပ်လုပ်ကိုင်ရန်သုံးလက်) 31 March 2018

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



Areas of Expertise Permitted  
(ရှင်ဖြုတ်သည့် ကွမ်းကုန်နယ်လယ်များ)

1. Chemical Engineering, Laboratory Analysis for Water and Wastewater

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (30.6.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)  
For Director General (See Aung Thu, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
For Director General (See Aung Thu, Director)  
Environmental Conservation Department

# Environmental Impact Assessment Report For "Crown Cement Factory 5,000 TPD"

Ngwe Yi Pale' Cement Co., Ltd

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြောင်းလဲနေသော အခြေအနေအထားတွင် အထောက်အထားလက်မှတ်)

No. **40022** Date **11.11.2021**

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

(ဝတ်စုံကိုင်ဆောင်မှုဆိုင်ရာစီမံခန့်ခွဲရေးလုပ်ငန်းအတွက် အခြေအနေအထားအထောက်အထားလက်မှတ် အထောက်အထားလက်မှတ်အဖြစ် ထုတ်ပြန်ပေးအပ်ခြင်း)

(a) Name of Consultant (အခြေအနေအထားအထောက်အထားလက်မှတ်) Daw Khin Shwe Htay  
(b) Citizenship (နိုင်ငံသား) Myanmar  
(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံတော်လက်မှတ်အမှတ်) 12/ Tha Ga Ka (N) 008808  
(d) Address (အတည်အနေအထား) No. 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon  
shwehway.khin@gmail.com - 09 5032910  
Green Myanmar Environmental Services Co.,Ltd.  
(e) Organization (အဖွဲ့အစည်း)  
(f) Type of Consultancy (အခြေအနေအထားအထောက်အထားလက်မှတ်အမျိုးအစား) Person  
(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) 31 March 2018

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

Areas of Expertise Permitted  
(စွဲပြုသည့် ကွမ်းကုန်ပညာရပ်များ)

1. Water Pollution Control  
2. Waste Management

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (30.6.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
For Director General (See Naing, Director)  
Environmental Conservation Department

REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ပြောင်းလဲနေသော အခြေအနေအထားတွင် အထောက်အထားလက်မှတ်)

No. **40025** Date **11.11.2021**

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

(ဝတ်စုံကိုင်ဆောင်မှုဆိုင်ရာစီမံခန့်ခွဲရေးလုပ်ငန်းအတွက် အခြေအနေအထားအထောက်အထားလက်မှတ် အထောက်အထားလက်မှတ်အဖြစ် ထုတ်ပြန်ပေးအပ်ခြင်း)

(a) Name of Consultant (အခြေအနေအထားအထောက်အထားလက်မှတ်) U Khin Aung  
(b) Citizenship (နိုင်ငံသား) Myanmar  
(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံတော်လက်မှတ်အမှတ်) 12/ Ma Ya Ka (N) 047032  
(d) Address (အတည်အနေအထား) 115, Kanaung Min Thargyi Road, Hlaing Thar Yar Industrial City, Zone (1), Hlaing Thar Yar Township, Yangon.  
khinaung1@gmail.com - 09 43066741  
Green Myanmar Environmental Services Co.,Ltd.  
(e) Organization (အဖွဲ့အစည်း)  
(f) Type of Consultancy (အခြေအနေအထားအထောက်အထားလက်မှတ်အမျိုးအစား) Person  
(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်) 31 March 2018

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

Areas of Expertise Permitted  
(စွဲပြုသည့် ကွမ်းကုန်ပညာရပ်များ)

1. Socio-Economy

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2021) to (30.6.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)  
For Director General (See Naing, Director)  
Environmental Conservation Department



EXTENSION  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for six months from (1.1.2023) to (30.6.2023)  
For Director General (See Naing, Director)  
Environmental Conservation Department

EXTENSION  
The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
For Director General (See Naing, Director)  
Environmental Conservation Department

# Environmental Impact Assessment Report For "Crown Cement Factory 5,000 TPD"

Ngwe Yi Pale' Cement Co., Ltd


**THE REPUBLIC OF THE UNION OF MYANMAR**  
 Ministry of Natural Resources and Environmental Conservation  


**CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION**  
 (ပြည်ထောင်စုအကျိုးပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. **00275** Date **13 FEB 2023**


The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015. (ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိခိုက်စေမှုလျှော့ချရေးနည်းစနစ်ကြောင့် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

(a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)	Mr. Kyi Han Bo
(b) Citizenship (နိုင်ငံသား)	Myanmar
(c) Identity Card / Passport Number (မှတ်ပုံတင် / နိုင်ငံကွယ်လက်မှတ် အမှတ်)	12/DoGaMa (N) 022231
(d) Address (ဆက်သွယ်ရန်လိပ်စာ)	No.(8), Room (201), Yuzana Street, Sittaung Villa, Dagon Myothit Satekan Tsp, Yangon. Mobile phone: 0943197960 E mail: kyihanbo@gmail.com
(e) Organization (အဖွဲ့အစည်း)	Green Myanmar Environmental Services Co., Ltd
(f) Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Person
(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	30 <sup>th</sup> June, 2023.

**EXTENSION**  
ထပ်တင်ချိန်တိုးခြင်း

The VALIDITY of this certificate is extended for two months from (1.7.2023) to (31.8.2023)  
ဤအထောက်အထားလက်မှတ်၏ ဝင်ရောက်မှုအား (၁၇-၇-၂၀၂၃) မှစ၍ (၃၁-၈-၂၀၂၃) ရက်အထိ (၂ လ) ထပ်တင်ချိန်တိုးပေးခြင်း

For Director General  
(Sa Aung Thu, Director)  
Environmental Conservation Department

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

(ဤအထောက်အထားလက်မှတ်သည် တစ်ပြိုင်နက်တည်းထုတ်ပေးခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်း တစ်ပတ်လုံးလုံး သို့မဟုတ်

**Areas of Expertise Permitted (ရရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)**

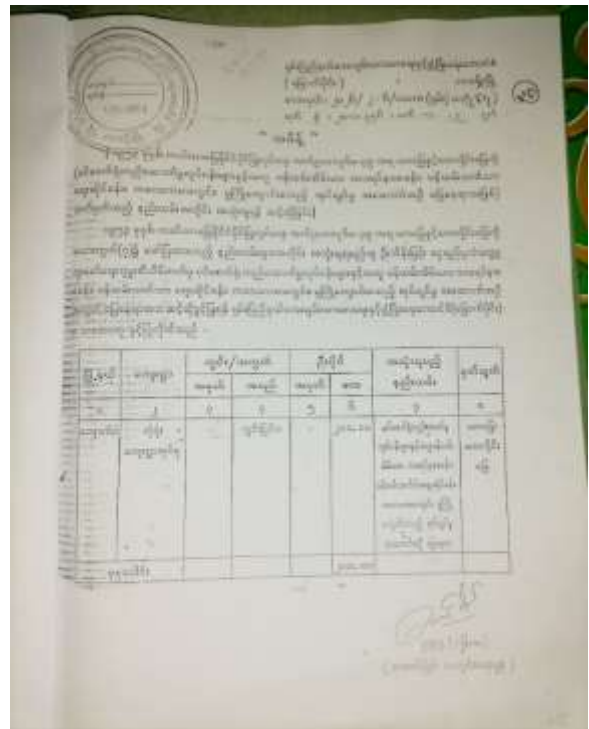
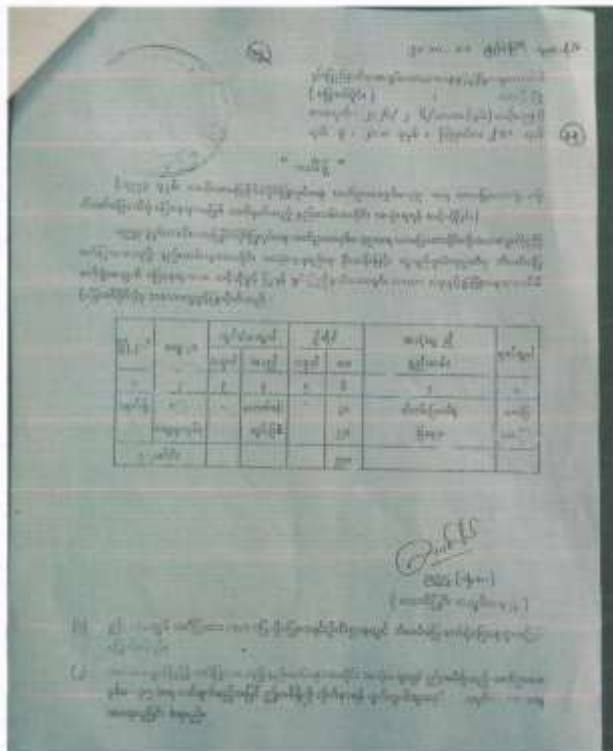
1. Noise and Vibration;	2. O (Air Quality and Odor).
3.	4.
5.	6.
7.	8.
9.	10.
11.	12.
13.	14.

**စည်းကမ်းချက်များ**

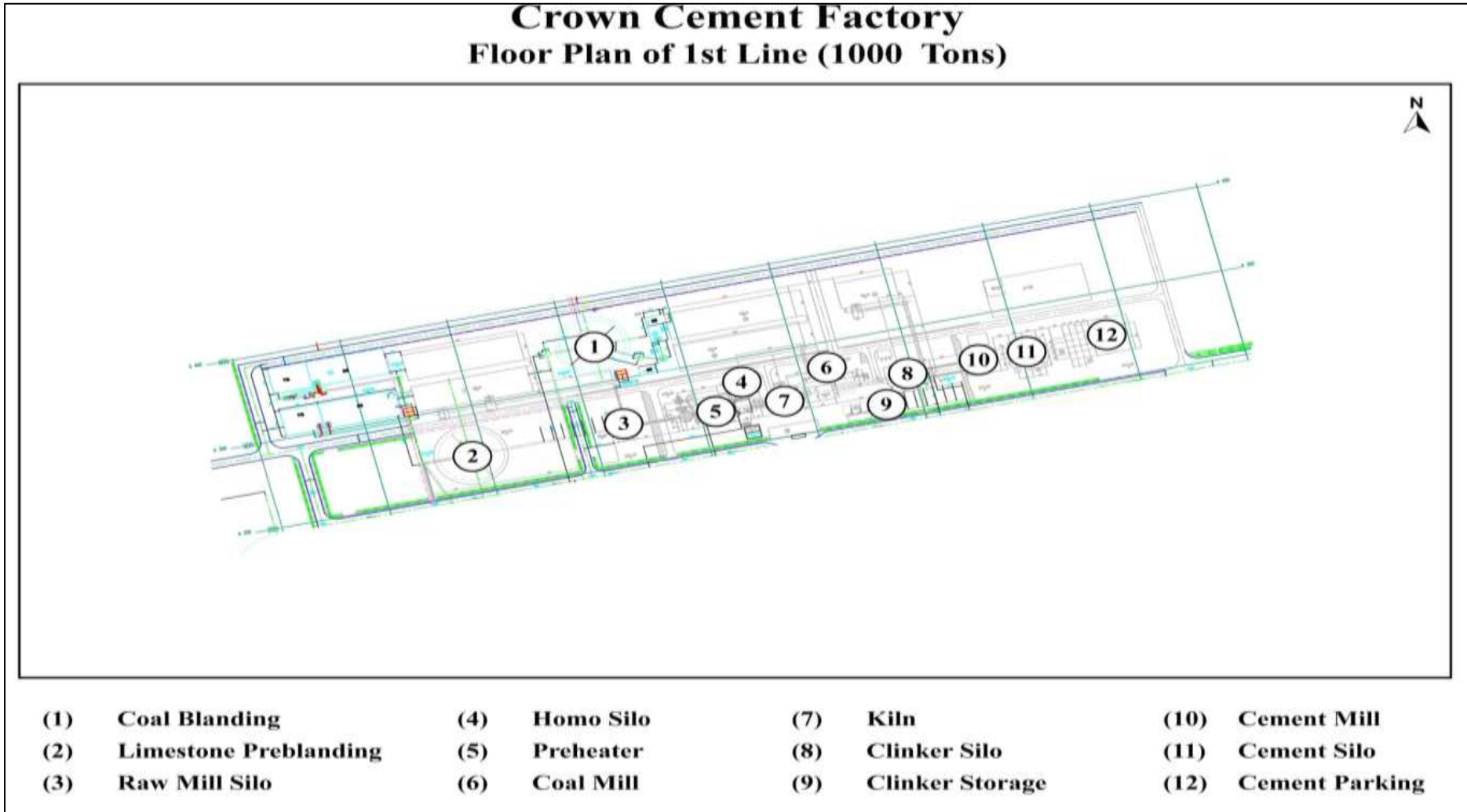
- ၁။ ပြည်ထောင်စုအကျိုးပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်ရရှိသူသည်-
  - (က) ဤအထောက်အထားလက်မှတ်ကို ဖျက်ခံခြင်း ဖြစ်ပေါ်ခြင်း ဝေဟနဆိုင်ရာစနစ်ဆိုင်ရာ ငှားရမ်းခြင်း အပိုင်ခံ အသုံးပြုခြင်းနှင့် တစ်ဆင့် ပြုပြင်ထိန်းသိမ်းမှုခြင်းမပြုရ။
  - (ခ) ဤအထောက်အထားလက်မှတ်ကို သက်တမ်းသည့် စည်းကမ်းအားအရ လုပ်ငန်းလုပ်ကိုင်ရန် အငြိမ်းစားယူရန် စောင့်ဆိုင်းရန်လိုအပ်သည့် တာဝန်လျစ်လျူရှုပြီး ယင်းသို့ ဖြစ်ပေါ်ခြင်း ဖြစ်ပေါ်ကာ အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း နေမည်။
  - (ဂ) ဤအထောက်အထားလက်မှတ်တွင် ခွင့်ပြုထားသည့် ကျွမ်းကျင်မှုနယ်ပယ်များအတွက်သာ တာဝန်ယူ လေ့လာဆန်းစစ်မှုများပြုနိုင်သည်။
  - (ဃ) မိမိအဖွဲ့အစည်းတွင် ဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိကာ ပြည်ထောင်စု အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသည့်အခါ အထောက်အထားလက်မှတ်အတွက် ဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာရှိကာ ပြည်ထောင်စု အကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိထားသည့်အခါ အထောက်အထားလက်မှတ်အတွက် ဝင်သည့် အကြံပေးပုဂ္ဂိုလ်များ ပြောင်းလဲမှု တစ်စုံတစ်ရာ ဖြစ်ပေါ်ပါက အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း နေမည်။
- ၂။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေးနည်းစနစ်ကြောင့် ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအစောင့်အောက်ဆောင်ရွက်ရမည်။
- ၃။ အထောက်အထားလက်မှတ်ရရှိသူသည် ပြန်မန်ဒီဒီ၏ တည်ဆဲပညာစံနှုန်းကို မောက်ဖျက်ကြောင်း သို့မဟုတ် ဆန်းစစ်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သိသာထင်ရှားသော မှားယွင်းမှုများ ပါရှိနေပြီး သတ်မှတ် စံနှုန်းနှင့် သို့မဟုတ် ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေး နည်းစနစ်များ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ငန်းလုပ်နည်းစနစ်နှင့် မညီညွတ်မှု ရှိနေပါက တည်ဆဲပညာစံနှုန်းနှင့် ဆိုင်ရာ ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေးနည်းစနစ်များကို ပြန်လည်ပြင်ဆင်ခြင်း ဖြစ်ကြောင်း ပတ်ဝန်းကျင်ထိခိုက်မှုလျှော့ချရေးနည်းစနစ်များကို သတ်မှတ်ဆုံးဖြတ်ခြင်းရရှိရမည့် အထောက်အထားလက်မှတ် ရုပ်ဆိုင်းခြင်း သို့မဟုတ် ပယ်ဖျက်ခြင်း နေမည်။
- ၄။ အထောက်အထားလက်မှတ်ရရှိသူသည် အဖွဲ့အစည်းသည် သက်ဆိုင်ရာစီမံခန့်ခွဲရေး ဝန်ထမ်းများ၏ အဖွဲ့အစည်းတွင် အထောက်အထားလက်မှတ် အကြံပေး ပုဂ္ဂိုလ်များ၏ အဖွဲ့အစည်းကိုသာ တင်ပြရမည်။
- ၅။ အထောက်အထားလက်မှတ်ရရှိသူသည် အဖွဲ့အစည်းသည် မိမိအဖွဲ့အစည်းက လက်လွှဲပေးသော ကျွမ်းကျင်မှု နယ်ပယ်များအတွက် လေ့လာဆန်းစစ်မှု ဆောင်ရွက်နိုင်ရန် ပြည်ထောင်စုအကျိုးပေးလုပ်ကိုင်သူ မှတ်ပုံတင်ခြင်း အထောက်အထားလက်မှတ် ရရှိခြင်းဖြင့် တစ်ခါတရံလုပ်ကိုင်သူ (Freelancer) ကို သက်ဆိုင်ရာစီမံခန့်ခွဲရေး အတွက်သာ ငှားရမ်းဆောင်ရွက်ရမည်။



**Appendix V: Land use permit**

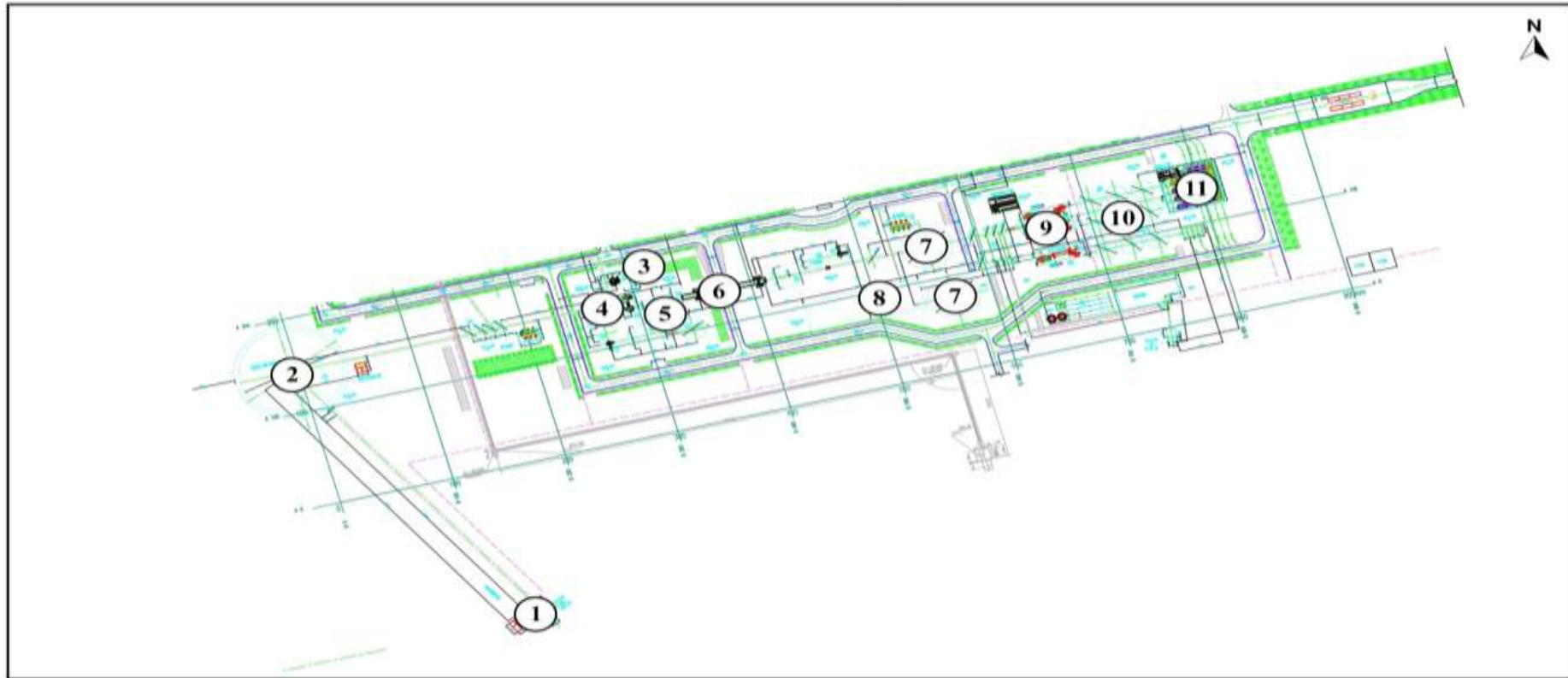


Appendix VI: Layout Plan of Cement Plants



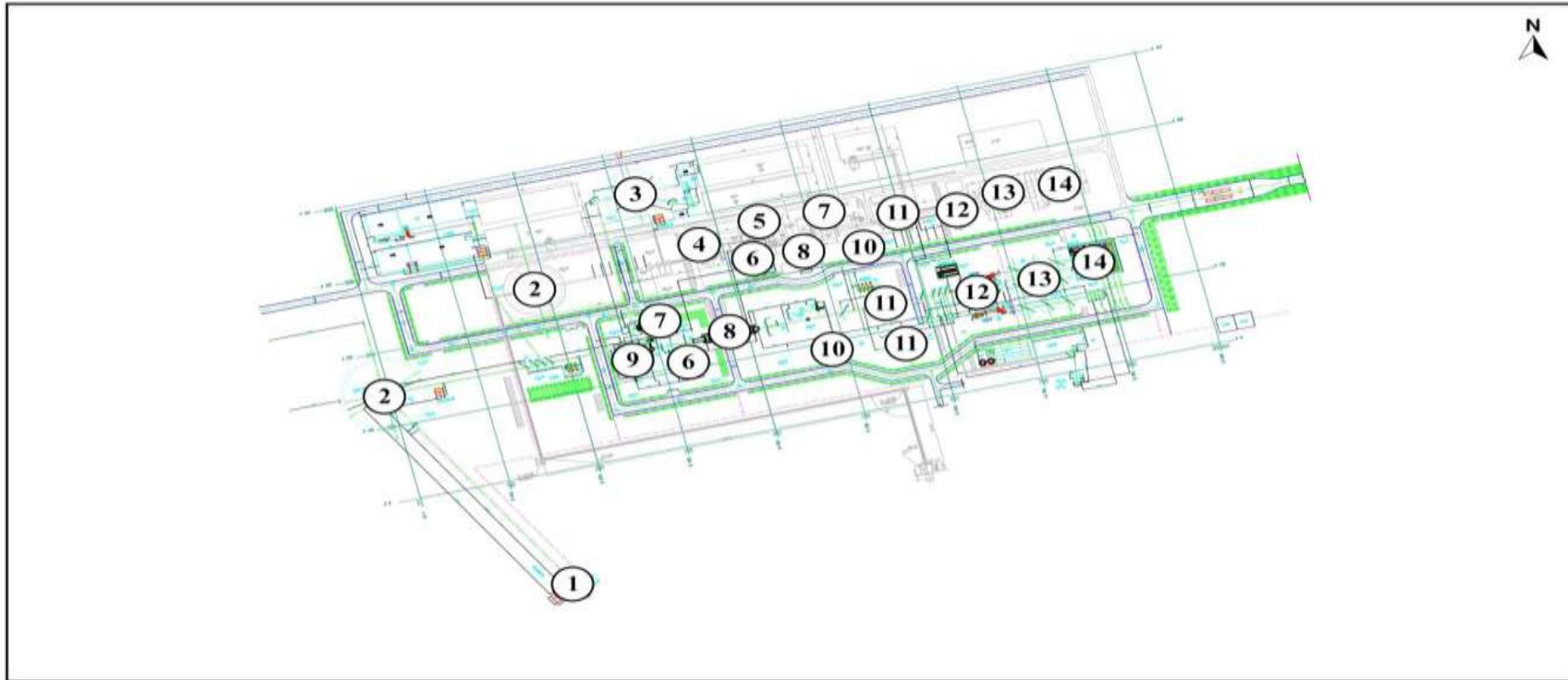


### Crown Cement Factory Floor Plan of 2nd Line (4000 Tons)



- |                           |               |                     |                     |
|---------------------------|---------------|---------------------|---------------------|
| (1) Main Crusher          | (4) Raw Mill  | (7) Clinker Silo    | (10) Cement Silo    |
| (2) Limestone Preblending | (5) Preheater | (8) Clinker Storage | (11) Cement Parking |
| (3) Coal Mill             | (6) Kiln      | (9) Cement Mill     |                     |

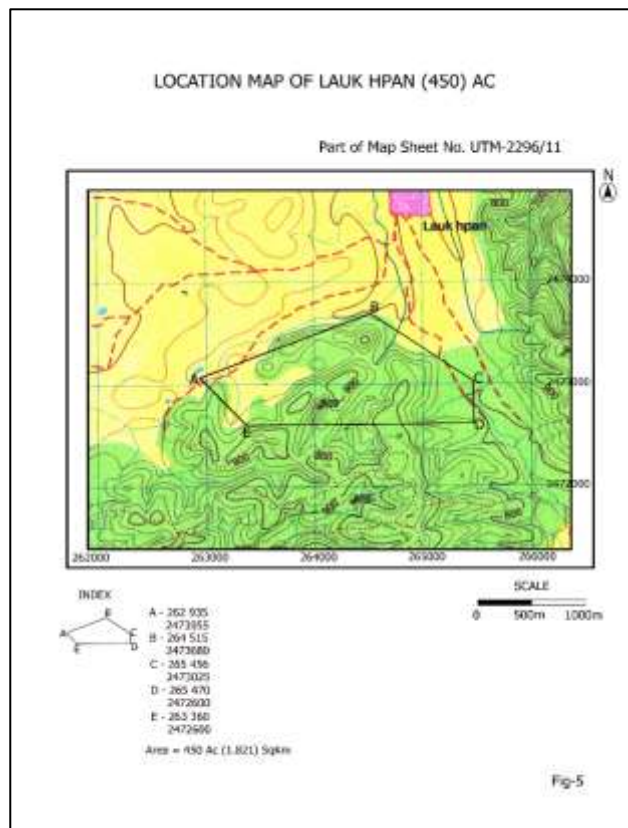
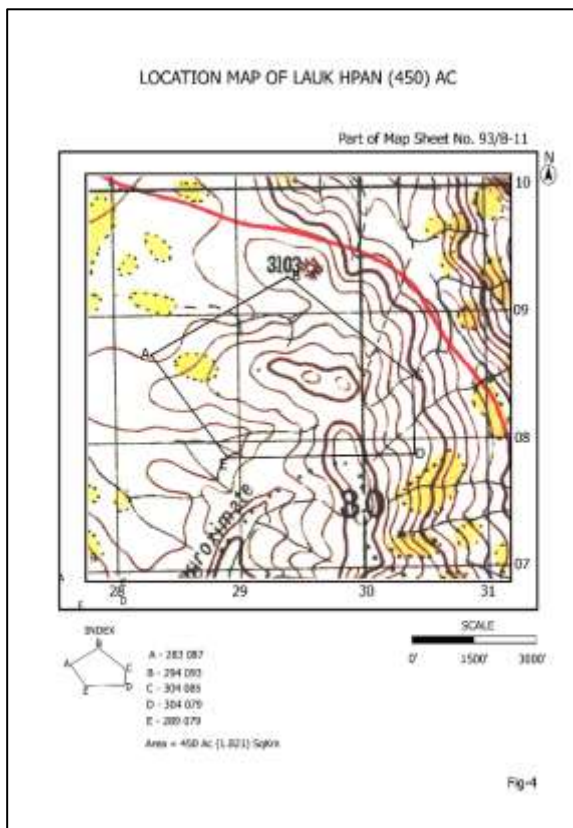
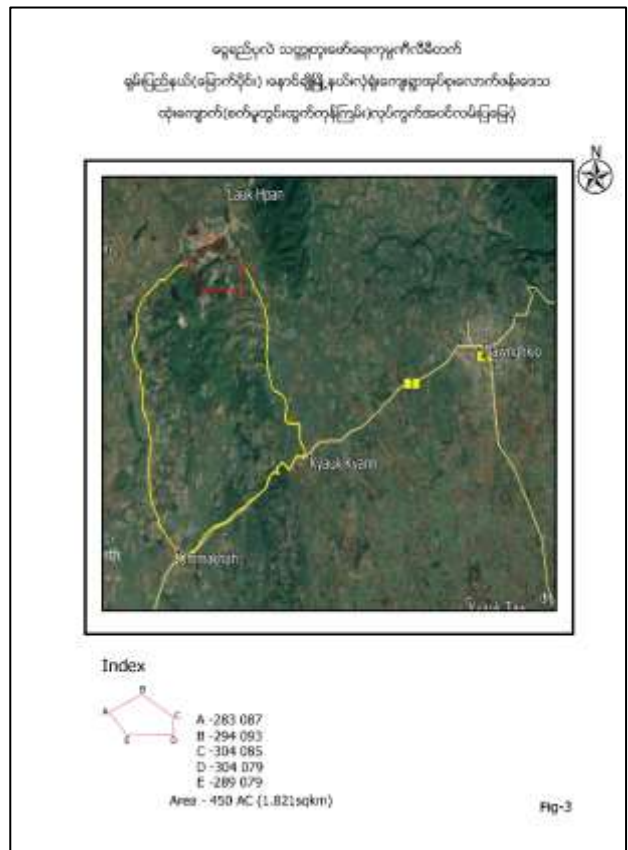
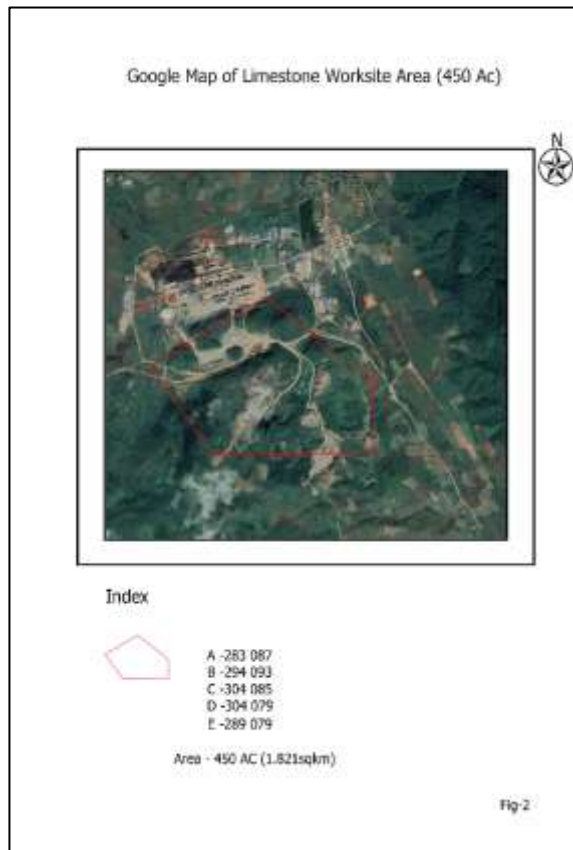
## Crown Cement Factory Floor Plan of (1000+4000) Tons



- |                           |               |                      |                     |
|---------------------------|---------------|----------------------|---------------------|
| (1) Main Crusher          | (5) Homo Silo | (9) Raw Mill         | (13) Cement Silo    |
| (2) Limestone Preblending | (6) Preheater | (10) Clinker Storage | (14) Cement Parking |
| (3) Coal Blanding         | (7) Coal Mill | (11) Clinker Silo    |                     |
| (4) Raw Mill Silo         | (8) Kiln      | (12) Cement Mill     |                     |



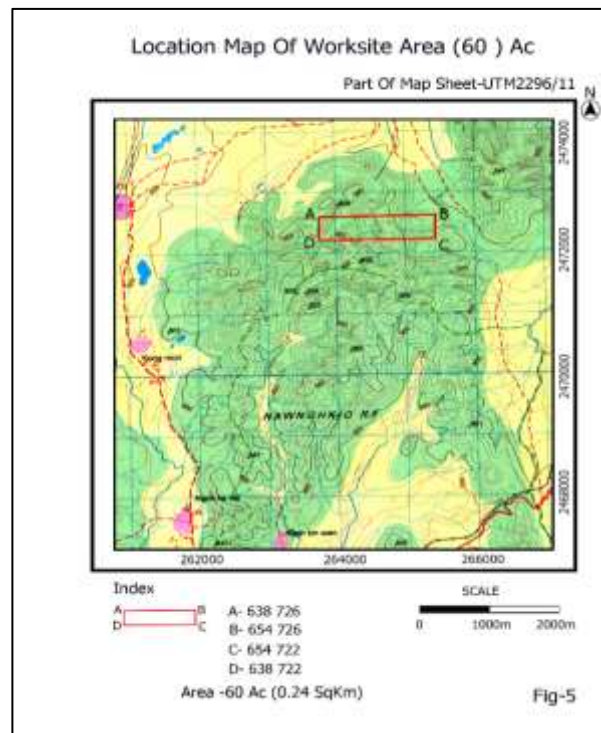
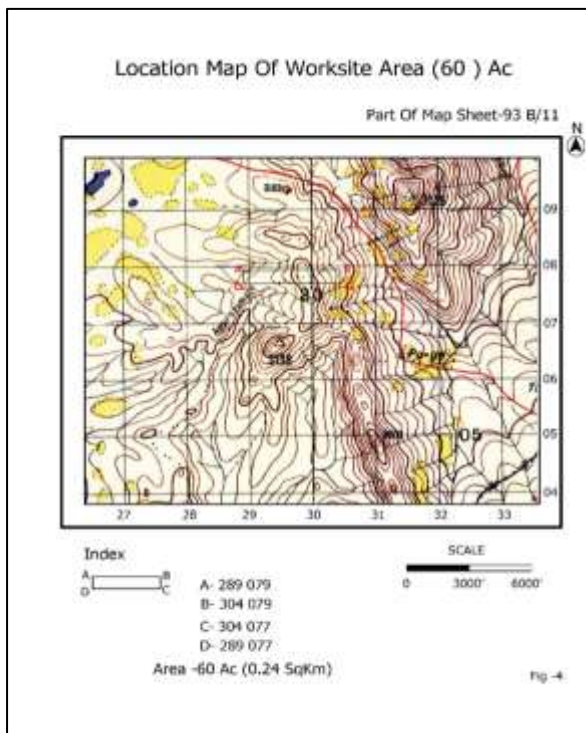
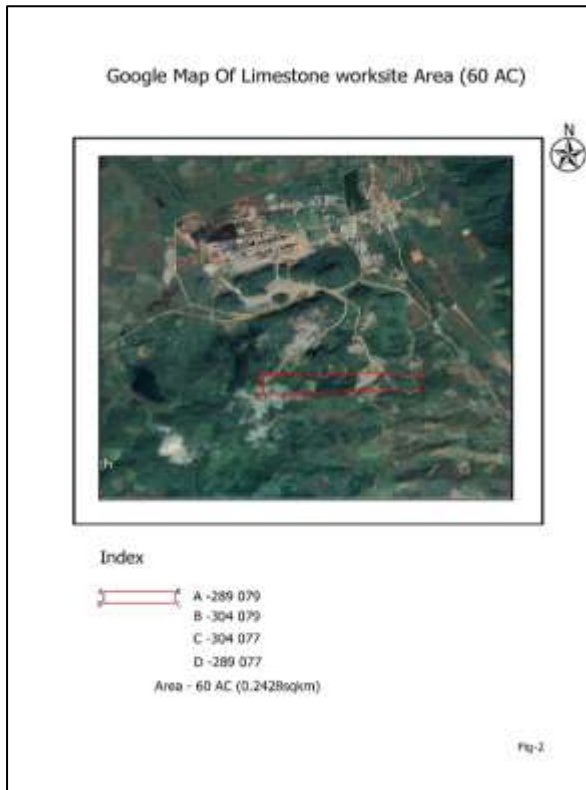






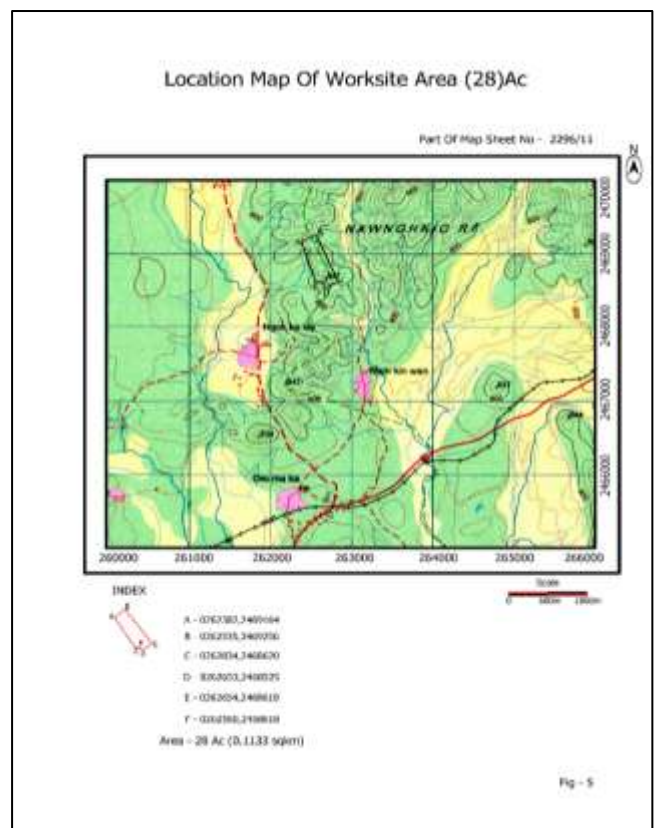
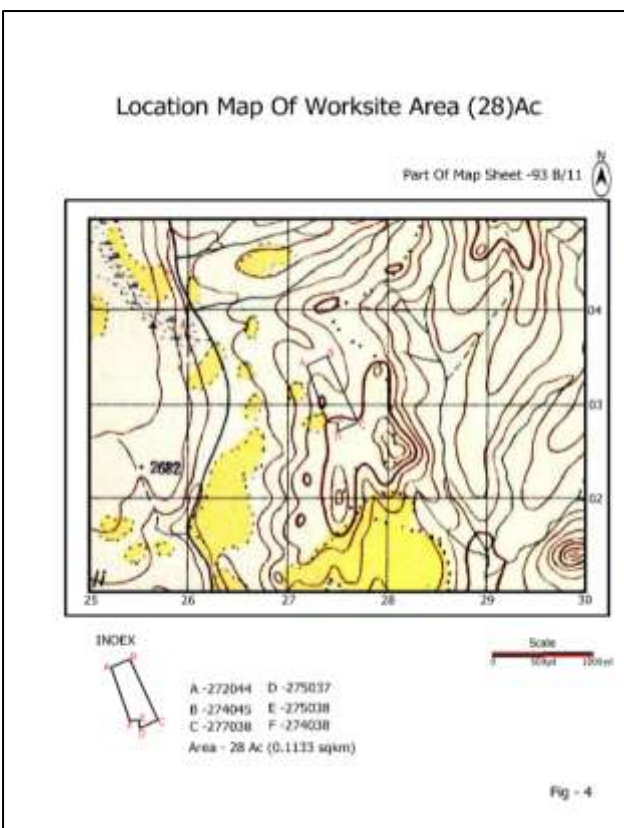


**Ngokkalay (28 Acres)**



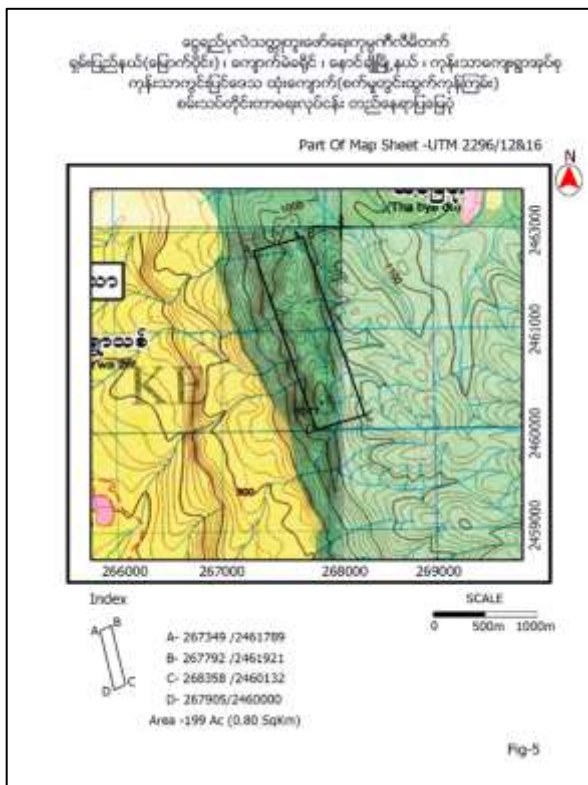
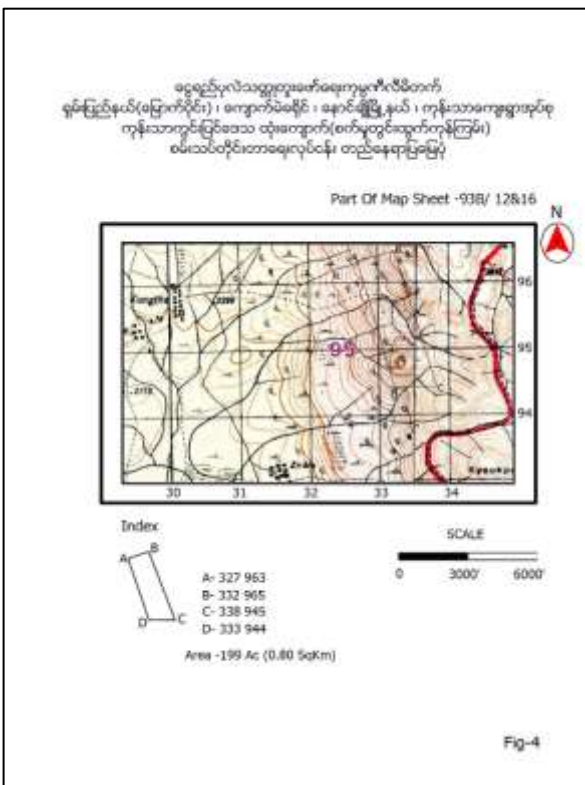
**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale’ Cement Co., Ltd*





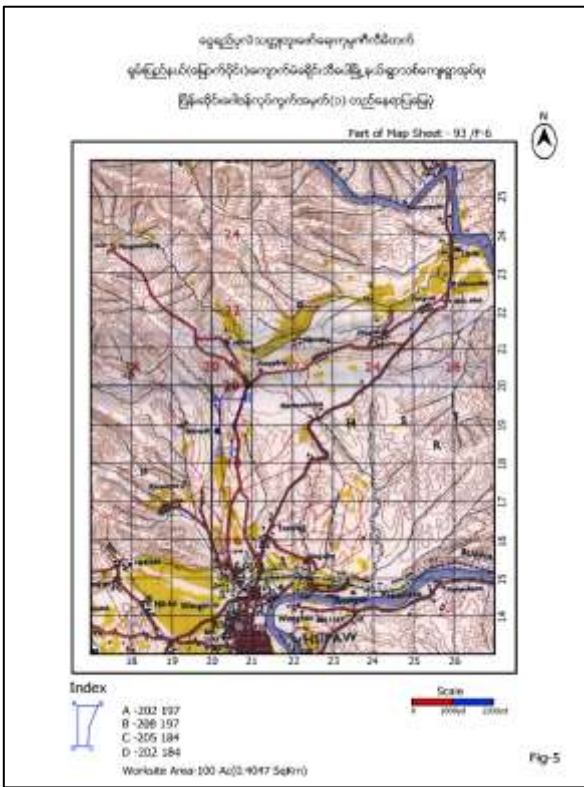




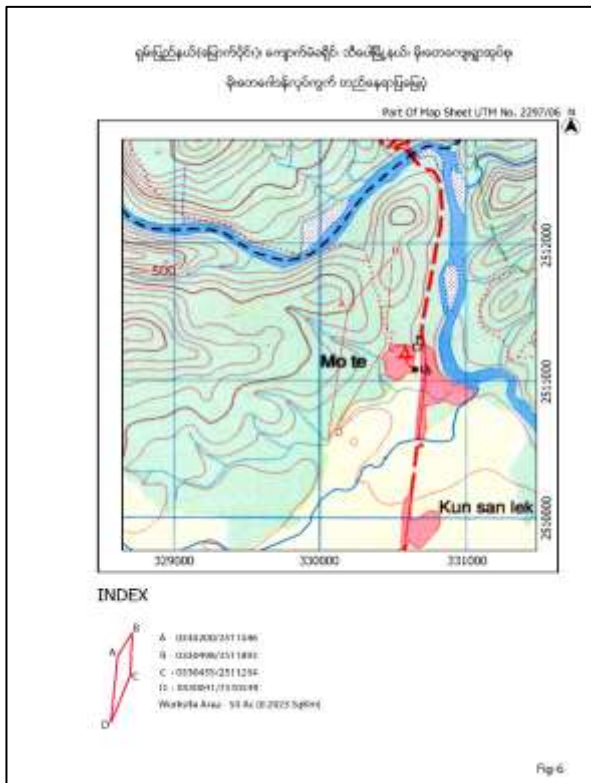
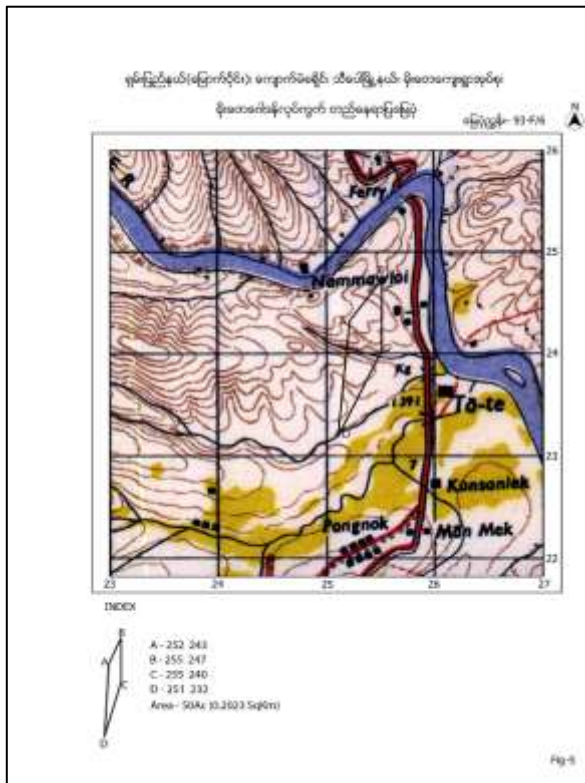
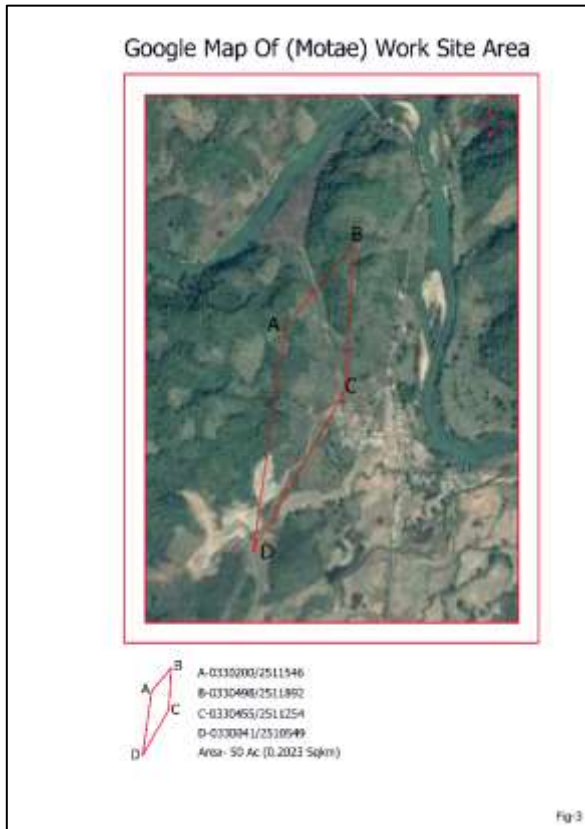




**Pang Hsai (100 Acrea)**

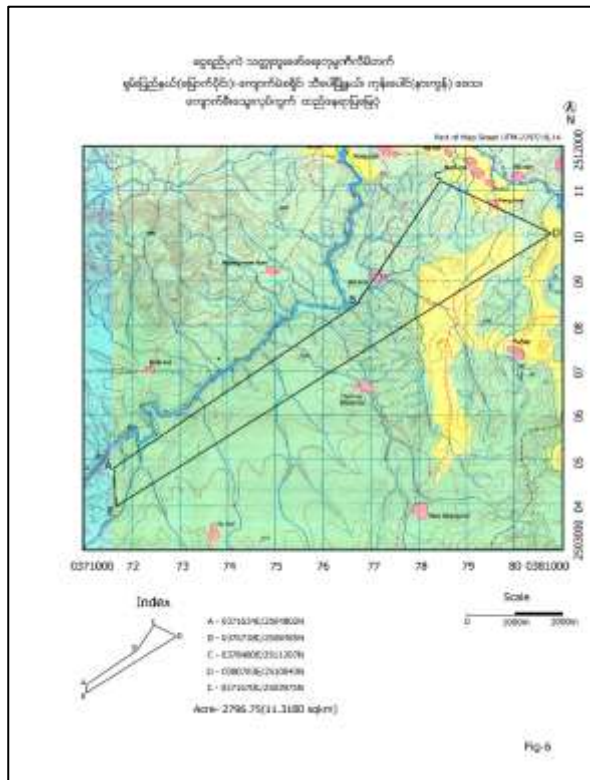
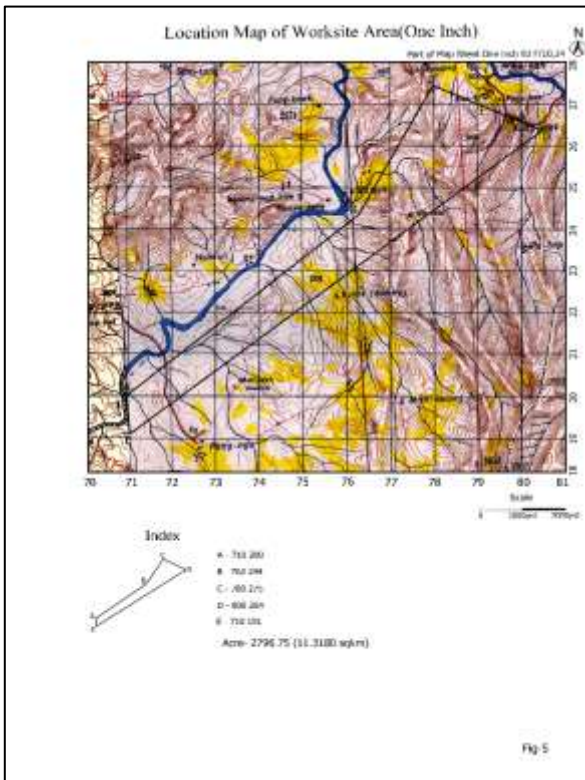
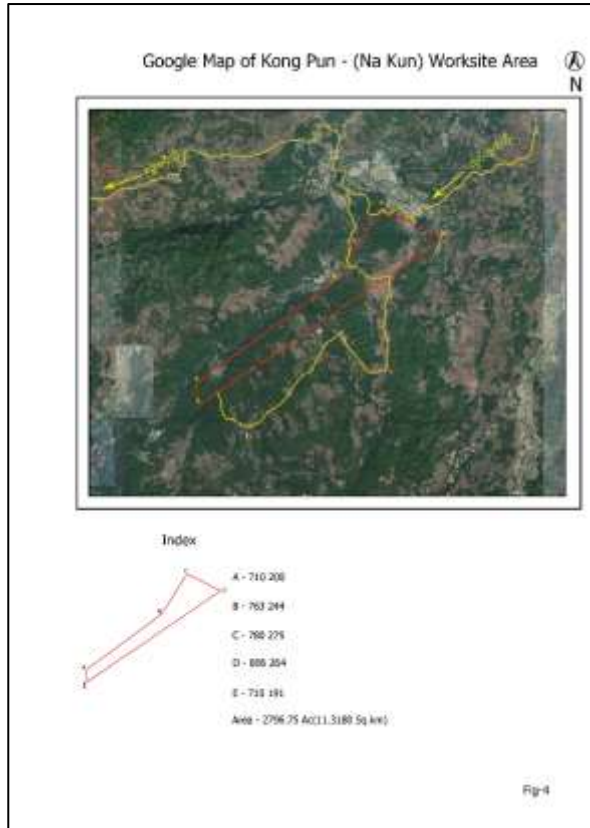
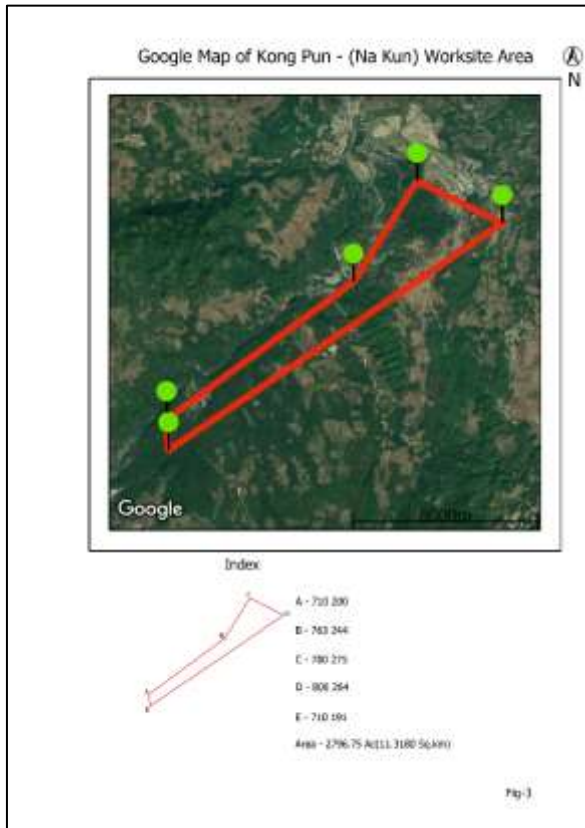


**Moe Tae (50 Acrea)**















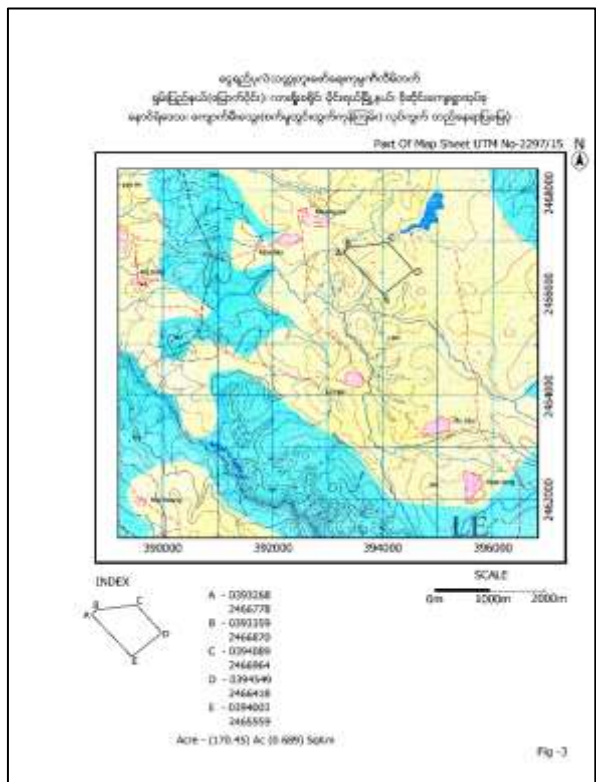
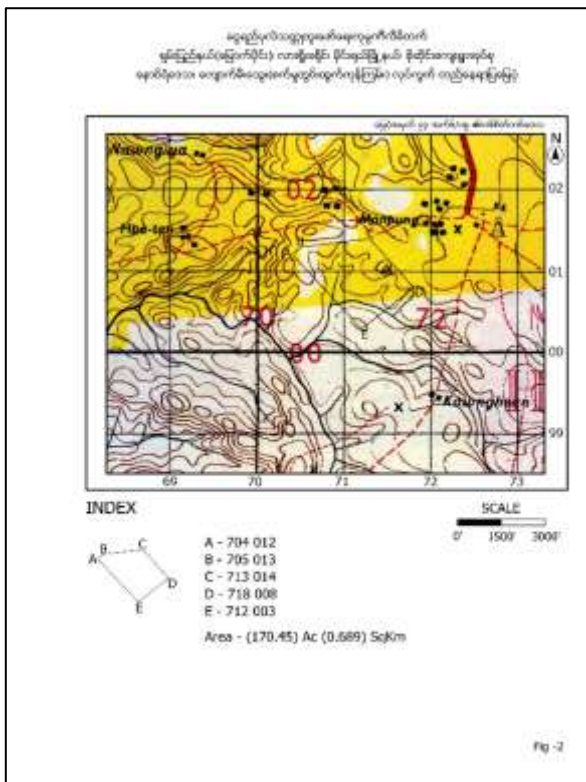
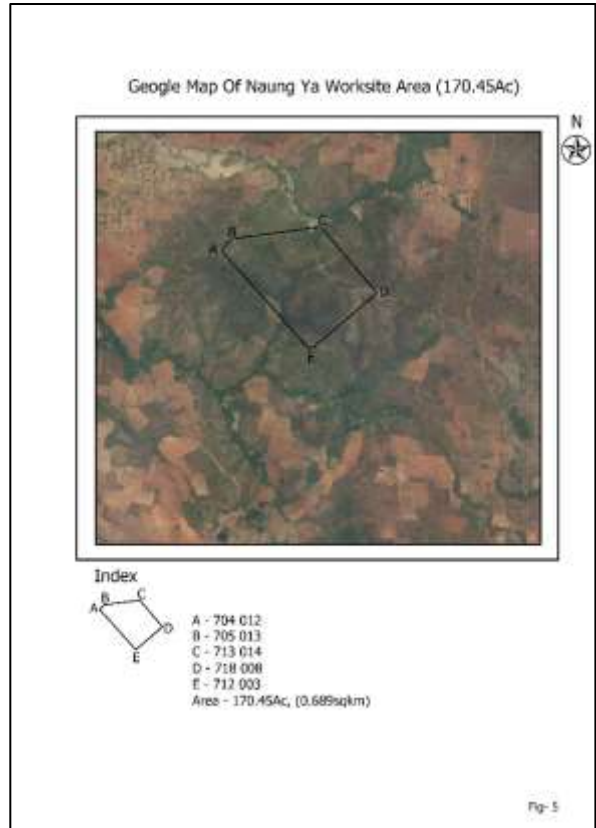
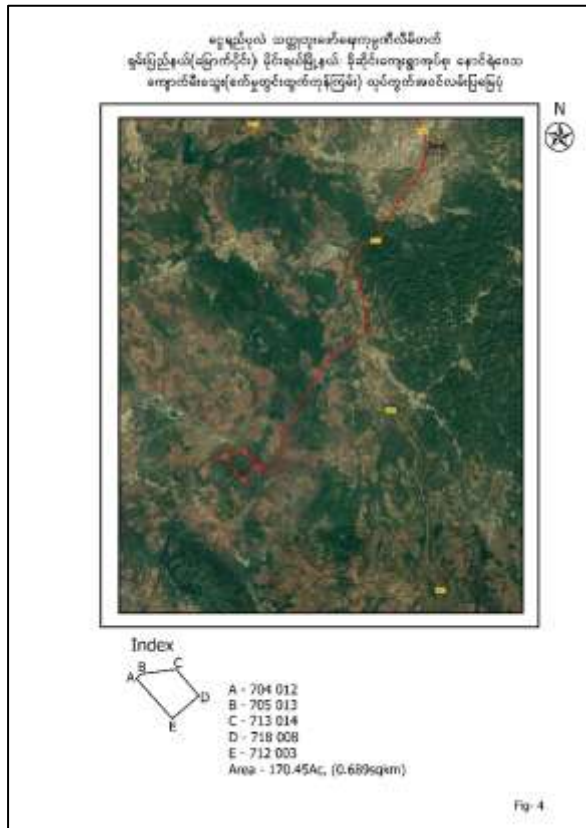
















**Appendix VIII: Photos of Bag Filters and Electrostatic Precipitator**

ရည်ရွယ်ချက်နှင့် ဆောင်ရွက်ရန် လိုအပ်သည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Electrostatic Precipitator - EP Bag Filter** မှာ အောက်ဖော်ပြပါအတိုင်း ဆောင်ရွက်ရန် လိုအပ်ပါသည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Sulphur နှင့် Nitrogen ပါဝင်မှုနှင့် ဆက်သွယ်သည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။**

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Complete Combustion**  
- 1 kg C = 2.86 kg O<sub>2</sub> = 3.666 kg CO<sub>2</sub> = 4100 KCal

**Incomplete Combustion**  
- 1 kg C = 1.57 kg O<sub>2</sub> = 2.23 kg CO = 2400 KCal

**Complete Combustion နှင့် Incomplete Combustion တို့တွင် အသုံးပြုသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။**

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

ရည်ရွယ်ချက်နှင့် ဆောင်ရွက်ရန် လိုအပ်သည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Electrostatic Precipitator - EP Bag Filter** မှာ အောက်ဖော်ပြပါအတိုင်း ဆောင်ရွက်ရန် လိုအပ်ပါသည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Sulphur နှင့် Nitrogen ပါဝင်မှုနှင့် ဆက်သွယ်သည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။**

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Complete Combustion နှင့် Incomplete Combustion တို့တွင် အသုံးပြုသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။**

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Nitrogen Oxide (NO) မြေညှိခြင်း**

Nitrogen Oxide (NO) မြေညှိခြင်းတွင် Low Combustion temperature oxides (NO<sub>x</sub>) မြေညှိခြင်း ဖြစ်ပေါ်သည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

ရည်ရွယ်ချက်နှင့် ဆောင်ရွက်ရန် လိုအပ်သည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Limestone (CaCO<sub>3</sub>) မှာ အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။**

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Calcination reaction: 800C ~ 750C temperature**  
CaCO<sub>3</sub> Heat CaO + CO<sub>2</sub>

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Decomposition reaction: 800C ~ 750C temperature**  
CaO + SiO<sub>2</sub> = CaSiO<sub>3</sub> Heat CaSiO<sub>3</sub>

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Nitrogen Oxide (NO) မြေညှိခြင်း**

Low Combustion temperature oxides (NO<sub>x</sub>) မြေညှိခြင်း

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားသည့် အချက်အလက်များကို အောက်ဖော်ပြပါအတိုင်း ဖော်ပြထားပါသည်။

**Crown Cement Factory (1000 T) မှာ အောက်ဖော်ပြပါအတိုင်း ဆောင်ရွက်ရန် လိုအပ်ပါသည်။**

No.	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Limestone Crushing System	Main Crusher	1	JPF 17*8*4-00	< 20 mg/nm <sup>3</sup>	Bag Filter
		Belt Conveyor	2	HMC 40 A	< 50 mg/nm <sup>3</sup>	Bag Filter
2	Limestone Preheating System	Blending Inlet	1	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
3	Sand & Iron Crushing System	Belt Conveyor	2	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
		Corrective Silo Top	4	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
4	Raw Material Proportioning Station	Corrective Silo Side	1	JPF 4/8/4	< 20 mg/nm <sup>3</sup>	Bag Filter
		Raw Material Grinding System	Mill Tail Dust Collector	1	WCI 150-3	< 50 mg/nm <sup>3</sup>
6	Homogenization System	Homogen Silo up	1	JPF 4/8/3	< 20 mg/nm <sup>3</sup>	Bag Filter
		Homogen Silo Bottom	1	JPF 4/8/5	< 20 mg/nm <sup>3</sup>	Bag Filter
7	Mill Hood System	Mill Head Dust Collector	1	WCI 150-3	< 20 mg/nm <sup>3</sup>	Electrostatic Precipitator
		Clinker Conveyor	1	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
8	Clinker Storing System	Clinker Silo up	1	JPF 4/8/5	< 20 mg/nm <sup>3</sup>	Bag Filter
		Unburn Silo up	1	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
9	Coal Crushing System	Crusher	2	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
10	Coal Grinding System	Coal Mill	1	JPF 10/8/2*2	< 20 mg/nm <sup>3</sup>	Bag Filter
		Fine Coal Hopper	1	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
11	Gypsum Crushing System	Crusher & Belt Conveyor	2	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
		Gypsum Silo up	3	HMC 112 A	< 20 mg/nm <sup>3</sup>	Bag Filter
12	Cement Proportioning Station	Gypsum Silo up	1	HW 22-5	< 20 mg/nm <sup>3</sup>	Bag Filter
		Silo Side	2	JPF 4/8/4	< 20 mg/nm <sup>3</sup>	Bag Filter
13	Cement Grinding System	Roller Press	2	HMC 95-7	< 20 mg/nm <sup>3</sup>	Bag Filter
		Cement Mill	2	JPF 12/8/7	< 20 mg/nm <sup>3</sup>	Bag Filter
14	Cement Storing System	Cement Silo Top	3	JPF 4/8/5	< 20 mg/nm <sup>3</sup>	Bag Filter
		Cement Silo Side	3	HMC 84 A	< 20 mg/nm <sup>3</sup>	Bag Filter
15	Cement Packing System	Main Packer	2	JPF 12/8/4	< 20 mg/nm <sup>3</sup>	Bag Filter
		Total	43			

**Environmental Impact Assessment Report  
For "Crown Cement Factory 5,000 TPD"**

*Ngwe Yi Pale' Cement Co., Ltd*

Crown Cement Factory (4000 T)  
အမှတ်တံဆိပ် အမှတ်အသား: ၀၀၀၀၀၀၀၀၀၀၀၀၀၀

No.	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Concrete Crushing System	Main Crusher	1	JCM 90-9	< 20 mg/No <sup>2</sup>	Bag Filter
2	Limestone Pulverizing System	Limestone Pulverizing Unit	1	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
3	Clay & Iron Ore Crushing System	Limestone Pulverizing Unit	1	LPM 5A-150	< 20 mg/No <sup>2</sup>	Bag Filter
4	Raw Material Processing System	Ball Conveyor	3	PPW 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
5	Raw Material Grinding System	Grinding Mill Top	4	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
6	Raw Material Grinding System	Grinding Mill Side	2	LPM 5A-150	< 20 mg/No <sup>2</sup>	Bag Filter
7	Raw Material Grinding System	Roll Mill Dust Collector	1	SPW 50*90-40	< 20 mg/No <sup>2</sup>	Electronics Precipitator
8	Raw Material Grinding System	Air Filter & Dmg Clean Conveyor	1	LPM 3A-150	< 20 mg/No <sup>2</sup>	Bag Filter
9	Interlocking System	Site-top	1	PPW 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
10	Interlocking System	Site Bottom	1	PPW 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
11	Site Head System	Roll Mill Dust Collector	1	WDM 2M 20183 90-40	< 20 mg/No <sup>2</sup>	Electronics Precipitator
12	Clinker Cooling System	Clinker Silo up (A)	1	PPCS 90-4	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo up (B)	1	PPCS 90-4	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo up	1	PPW 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo Side	2	PPW 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Conveyor	1	PPW 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
		Line 1&2 Dust Collector Support	1	PPCS 10-4	< 20 mg/No <sup>2</sup>	Bag Filter
		Line 1&2 Dust Collector Support	1	HTF 400	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo (A) Down	1	PPW 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo (A) Down	1	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
		Clinker Silo (B) Down	1	PPW 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
13	Coal Crushing System	Coal Crusher	1	PPW 20-6 (90)	< 20 mg/No <sup>2</sup>	Bag Filter
14	Coal Crushing System	Roll Conveyor	1	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
15	Coal Pulverizing System	Coal Pulverizing Unit	1	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
16	Coal Pulverizing System	Coal Pulverizing Unit	1	LPM 5A-150	< 20 mg/No <sup>2</sup>	Bag Filter
17	Coal Grinding System	Coal Mill	1	PP 120-710 (90)	< 20 mg/No <sup>2</sup>	Bag Filter
18	Coal Grinding System	Fine Coal Storage	1	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
19	Coal Grinding System	Fine Coal Storage	1	SMC 90	< 20 mg/No <sup>2</sup>	Bag Filter
20	Grasses Crushing System	Crusher	1	LPM 90-40	< 20 mg/No <sup>2</sup>	Bag Filter
21	Grasses Crushing System	Roll Conveyor	1	PP 20-6	< 20 mg/No <sup>2</sup>	Bag Filter
22	Grasses Preparing Raw/for Mill 1)	Grasses Silo up	4	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
23	Grasses Preparing Raw/for Mill 1)	Grasses Silo Side	2	PPCS 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
24	Grasses Preparing Raw/for Mill 1)	Grasses Silo up	2	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
25	Grasses Preparing Raw/for Mill 1)	Grasses Silo Side	1	PPCS 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
26	Grasses Grinding System (Grasses Mill 2, 4 & 5)	Grasses Mill Raw Dust Collector	1	HT 120-270	< 20 mg/No <sup>2</sup>	Bag Filter
27	Grasses Grinding System (Grasses Mill 2, 4 & 5)	Mill A-A Fine Dust Collector	1	HT 90-7	< 20 mg/No <sup>2</sup>	Bag Filter
28	Grasses Grinding System	Grasses Silo Top	4	PPW 22-6	< 20 mg/No <sup>2</sup>	Bag Filter
29	Grasses Grinding System	Grasses Silo Inside Side	2	SMC 90	< 20 mg/No <sup>2</sup>	Bag Filter
30	Grasses Grinding System	Mill Bottom	4	PP 120-40	< 20 mg/No <sup>2</sup>	Bag Filter
31	Grasses Packing System	Car Bottom	2	SMC 112 A	< 20 mg/No <sup>2</sup>	Bag Filter
32	Grasses Packing System	Top Bag Machine	1	SMC 90	< 20 mg/No <sup>2</sup>	Bag Filter
			Total	74		

Power Plant (15 MW)  
အမှတ်တံဆိပ် အမှတ်အသား: ၀၀၀၀၀၀၀၀၀၀၀၀၀၀

No.	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Coal Grinding system	Roller Crusher	1	SMC-12A	< 20 mg / No <sup>2</sup>	Bag Filter
2	Coal Grinding system	Hammer Crusher	1	SMC-12	< 20 mg / No <sup>2</sup>	Bag Filter
3	Coal Conveying System	Junction of Coal Conveyor No.1& No.2	1	FMC-90A	< 20 mg / No <sup>2</sup>	Bag Filter
4	Bottom Ash Conveying System	Bottom Ash Hopper	1	FMC-90A	< 20 mg / No <sup>2</sup>	Bag Filter
5	Fly Ash Conveying System	Fly Ash Silo	1	FMC-40	< 20 mg / No <sup>2</sup>	Silo Bag Filter
6	Fly Ash Conveying System	Boiler Flue Gas Line (Between Boiler & Chimney)	1	WDM-4	> 20 mg / No <sup>2</sup>	Electronics Precipitator (ESP)

Power Plant (60 MW)  
အမှတ်တံဆိပ် အမှတ်အသား: ၀၀၀၀၀၀၀၀၀၀၀၀၀၀

No.	Machine System	Machine Location	Qty	Model	Capacity	Remark
1	Coal Grinding system	Jaw Crusher	2	FMC-12A	< 20 mg / No <sup>2</sup>	Bag Filter
2	Coal Grinding system	Hammer Crusher	2	FMC-12	< 20 mg / No <sup>2</sup>	Bag Filter
3	Limestone Feeding System	Limestone Silo	1	DMC-36	< 20 mg / No <sup>2</sup>	Silo Bag Filter
4	Bottom Ash Conveying System	Bottom Ash Silo	1	DMC-40	< 20 mg / No <sup>2</sup>	Silo Bag Filter
5	Fly Ash Conveying System	Fly Ash Silo	1	DMC-22	< 20 mg / No <sup>2</sup>	Silo Bag Filter
6	Fly Ash Conveying System	Boiler Flue Gas Line (Between Boiler & Chimney)	1	WDM 100-225 W33M04	< 20 mg / No <sup>2</sup>	Electronics Precipitator (ESP)

တစ်ရက်တန် (၁၀၀၀)ကျ Crown ဘိလပ်မြေစက်ရုံ



**CROWN**  
ဘိလပ်မြေ



**Main Crusher Bag Filter**





**Belt Conveyor Bag Filter**


2



တစ်ရက်တန် (၁၀၀၀)ကျ Crown ဘိလပ်မြေစက်ရုံ




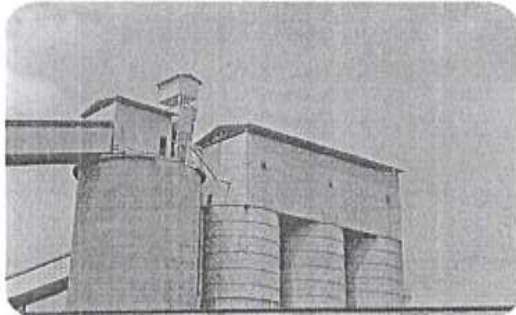
  
Sand & Iron Crushing Bag Filter

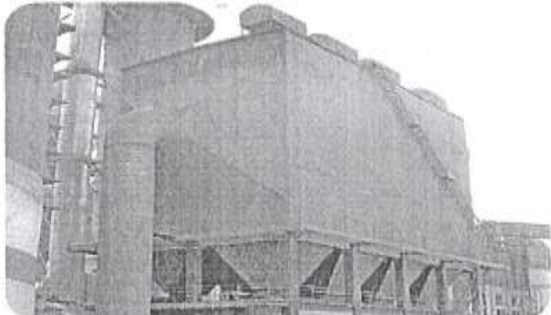
  
Line Stone Preblending Bag Filter

3

တစ်ရက်တန် (၁၀၀၀)ကျ Crown ဘိလပ်မြေစက်ရုံ



  
Raw Material Proportioning Bag Filter

  
Raw Material Grinding System  
Kiln Tail EP Dust Collector

4

တစ်ရက်တန် (၁၀၀၀)ကျ Crown ဘိလပ်မြေစက်ရုံ 




Homogenization System  
Homo Silo up Bag Filter

Kiln Hood System  
Kiln Head Dust Collector

5

တစ်ရက်တန် (၁၀၀၀)ကျ Crown ဘိလပ်မြေစက်ရုံ 



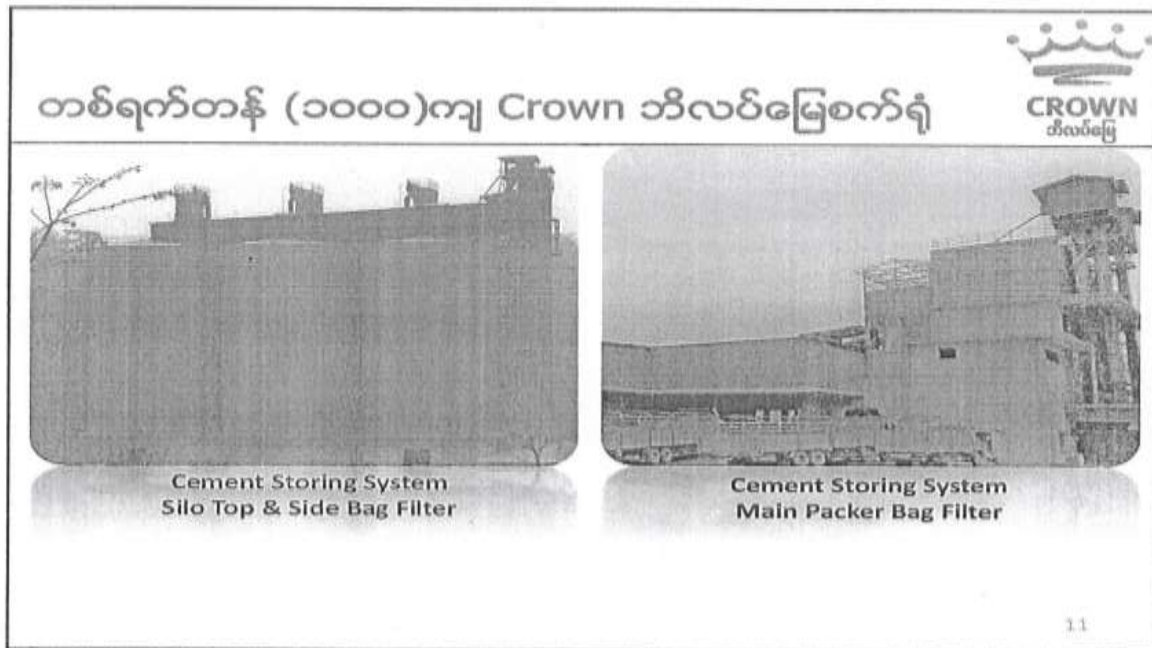
Clinker Silo up  
Bag Filter

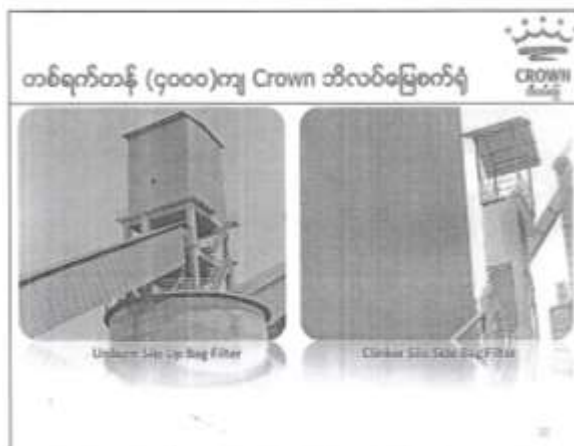
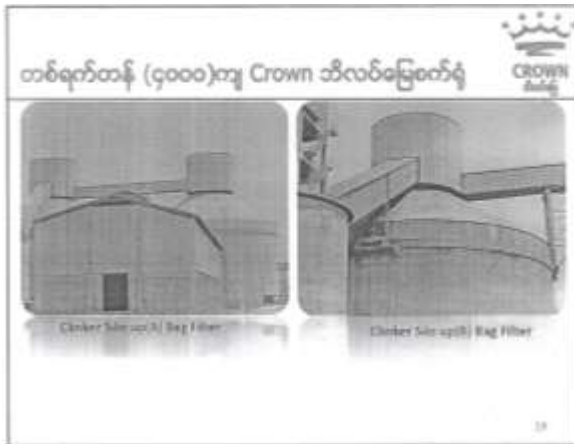
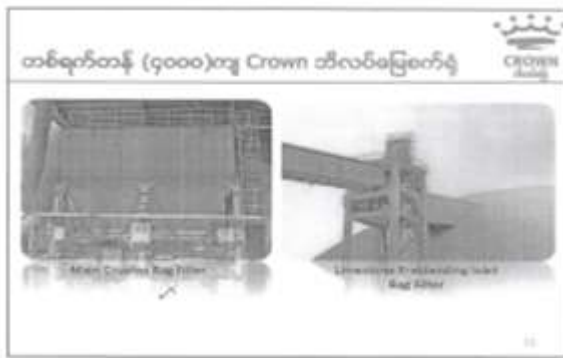
Unburn Silo up  
Bag Filter

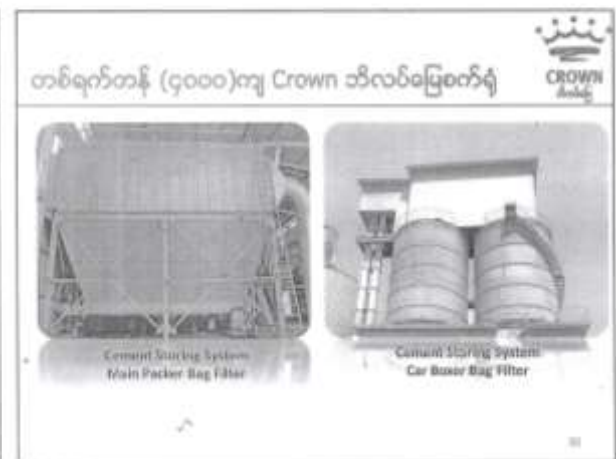
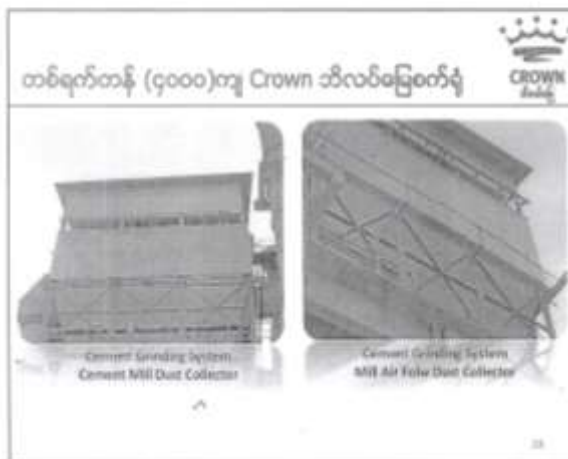
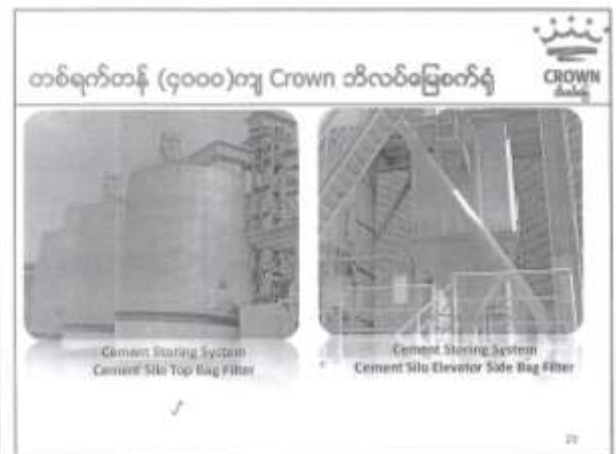
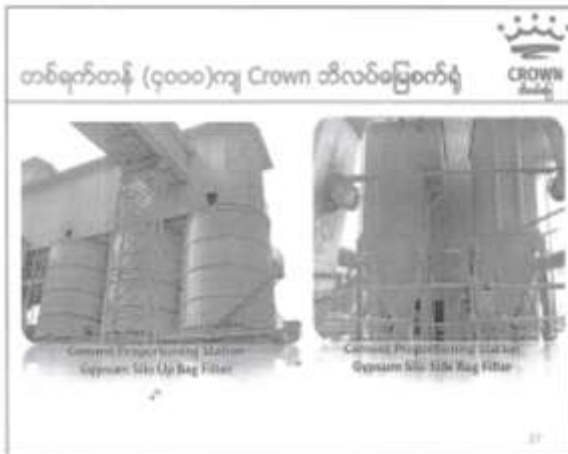
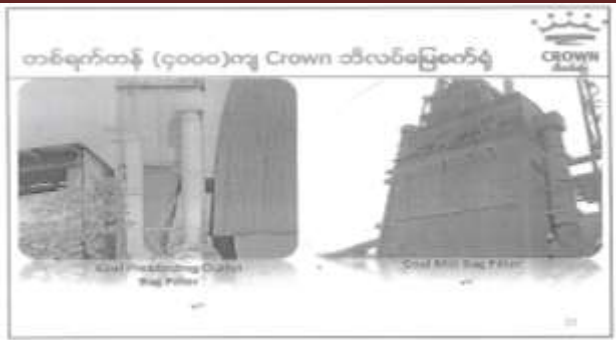
6



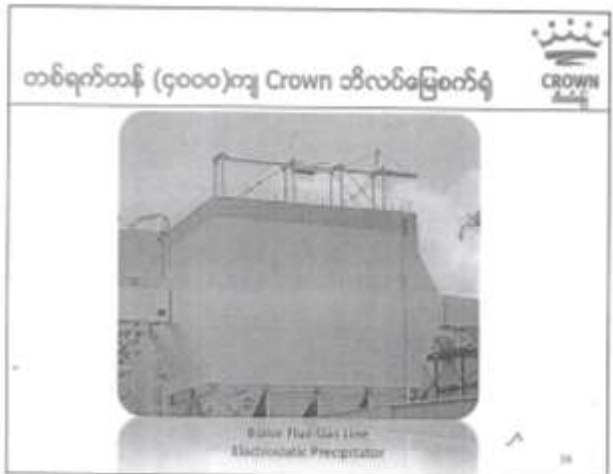
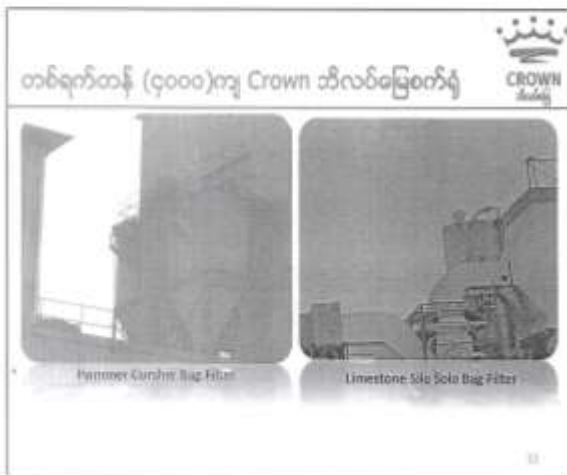
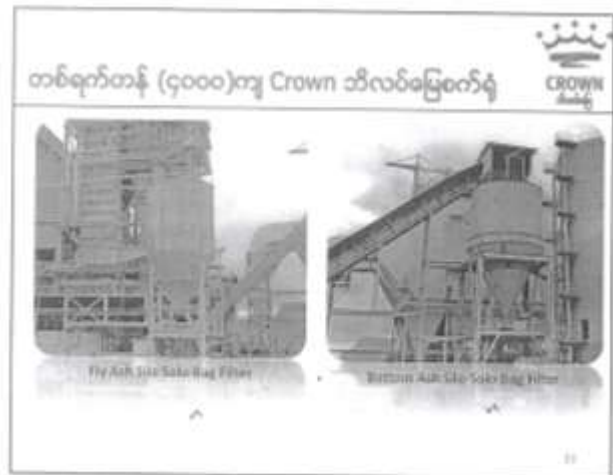
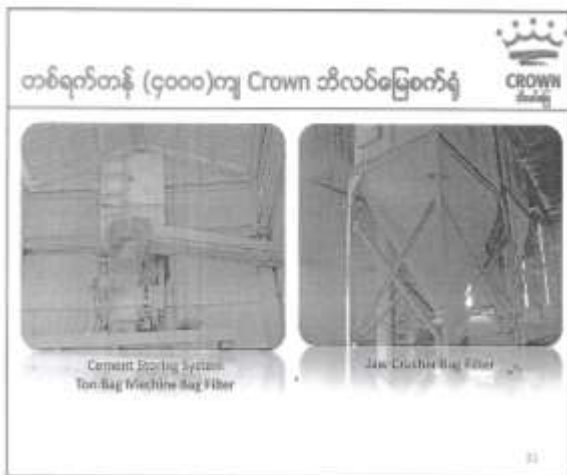














Appendix VIII: Results of Environmental Quality

Surface water Quality

**ALARM Ecological Laboratory**  
Water Testing Result Report

Report Number: SL-WR-23-02120 Date: October 26, 2023

Client Information		Sample Information	
Client Name: Crown Cement Factory	Sample ID: 20230	Organization: Ma Hta Pyae Hta Wang	Sample Name: Reservoir-1
Client ID: 00000	Sample Type / Source: -	Registration Date & Time: 10.10.2023	Sampling Date & Time: 23.10.2023
Address: 09-78222418	Sample Location: မြောက်မြောက်	Country: -	Latitude: -
Phone: -	Longitude: -	Testing Process: -	Remarks: -

**Testing Results**

The following water quality test results are based on the water sampled by the client under their own sampling process. The report shall not be responsible except for obvious written errors of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	< 0.5	NTU	< 5	Clear
3	TDS	280	mg/L	< 500	Normal
4	Hardness	180	mg/L	< 500	Normal
5	Dissolved	0.7	mg/L	< 1000	Normal
6	Calcium	< 0.01	mg/L	-	-
7	Magnesium	0.00	mg/L	< 0.2	Normal
8	Iron	0.00	mg/L	< 0.3	Normal
9	Copper	0.00	mg/L	< 0.7	Normal
10	Lead	0.00	mg/L	< 0.05	Normal
11	Mercury	0.0	mg/L	< 0.01	Normal
12	Ammonia	0.0	mg/L	< 0.5	Normal
13	Nitrate	0.0	mg/L	< 50	Normal

Tested by: [Signature] Checked by: [Signature] Approved by: [Signature]

No. 277, Corner of the 8th, 9th Street & 7 Street, (1) Block, South Dagon Sub-township, Yangon  
Tel: 09-87796976, Fax: 09-87796976

**ALARM Ecological Laboratory**  
Water Testing Result Report

Report Number: SL-WR-23-02121 Date: October 26, 2023

Client Information		Sample Information	
Client Name: Crown Cement Factory	Sample ID: 20230	Organization: Ma Hta Pyae Hta Wang	Sample Name: Reservoir-2
Client ID: 00000	Sample Type / Source: -	Registration Date & Time: 10.10.2023	Sampling Date & Time: 23.10.2023
Address: 09-78222418	Sample Location: မြောက်မြောက်	Country: -	Latitude: -
Phone: -	Longitude: -	Testing Process: -	Remarks: -

**Testing Results**

The following water quality test results are based on the water sampled by the client under their own sampling process. The report shall not be responsible except for obvious written errors of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	< 0.5	NTU	< 5	Clear
3	TDS	280	mg/L	< 500	Normal
4	Hardness	180	mg/L	< 500	Normal
5	Dissolved	0.8	mg/L	< 1000	Normal
6	Calcium	< 0.01	mg/L	-	-
7	Magnesium	0.00	mg/L	< 0.2	Normal
8	Iron	0.00	mg/L	< 0.3	Normal
9	Copper	0.00	mg/L	< 0.7	Normal
10	Lead	0.00	mg/L	< 0.05	Normal
11	Mercury	0.0	mg/L	< 0.01	Normal
12	Ammonia	0.0	mg/L	< 0.5	Normal
13	Nitrate	0.0	mg/L	< 50	Normal

Tested by: [Signature] Checked by: [Signature] Approved by: [Signature]

No. 277, Corner of the 8th, 9th Street & 7 Street, (1) Block, South Dagon Sub-township, Yangon  
Tel: 09-87796976, Fax: 09-87796976

**ALARM Ecological Laboratory**  
Water Testing Result Report

Report Number: SL-WR-23-02122 Date: October 26, 2023

Client Information		Sample Information	
Client Name: Crown Cement Factory	Sample ID: 10200	Organization: Ma Hta Pyae Hta Wang	Sample Name: Reservoir-3
Client ID: 00000	Sample Type / Source: -	Registration Date & Time: 10.10.2023	Sampling Date & Time: 23.10.2023
Address: 09-78222418	Sample Location: မြောက်မြောက်	Country: -	Latitude: -
Phone: -	Longitude: -	Testing Process: -	Remarks: -

**Testing Results**

The following water quality test results are based on the water sampled by the client under their own sampling process. The report shall not be responsible except for obvious written errors of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	< 0.5	NTU	< 5	Clear
3	TDS	280	mg/L	< 500	Normal
4	Hardness	180	mg/L	< 500	Normal
5	Dissolved	0.8	mg/L	< 1000	Normal
6	Calcium	< 0.01	mg/L	-	-
7	Magnesium	0.00	mg/L	< 0.2	Normal
8	Iron	0.00	mg/L	< 0.3	Normal
9	Copper	0.00	mg/L	< 0.7	Normal
10	Lead	0.00	mg/L	< 0.05	Normal
11	Mercury	0.0	mg/L	< 0.01	Normal
12	Ammonia	0.0	mg/L	< 0.5	Normal
13	Nitrate	0.0	mg/L	< 50	Normal

Tested by: [Signature] Checked by: [Signature] Approved by: [Signature]

No. 277, Corner of the 8th, 9th Street & 7 Street, (1) Block, South Dagon Sub-township, Yangon  
Tel: 09-87796976, Fax: 09-87796976

**ALARM Ecological Laboratory**  
Water Testing Result Report

Report Number: SL-WR-23-02123 Date: October 26, 2023

Client Information		Sample Information	
Client Name: Crown Cement Factory	Sample ID: 10200	Organization: Ma Hta Pyae Hta Wang	Sample Name: Reservoir-4
Client ID: 00000	Sample Type / Source: -	Registration Date & Time: 10.10.2023	Sampling Date & Time: 23.10.2023
Address: 09-78222418	Sample Location: မြောက်မြောက်	Country: -	Latitude: -
Phone: -	Longitude: -	Testing Process: -	Remarks: -

**Testing Results**

The following water quality test results are based on the water sampled by the client under their own sampling process. The report shall not be responsible except for obvious written errors of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	< 0.5	NTU	< 5	Clear
3	TDS	280	mg/L	< 500	Normal
4	Hardness	180	mg/L	< 500	Normal
5	Dissolved	0.8	mg/L	< 1000	Normal
6	Calcium	< 0.01	mg/L	-	-
7	Magnesium	0.00	mg/L	< 0.2	Normal
8	Iron	0.00	mg/L	< 0.3	Normal
9	Copper	0.00	mg/L	< 0.7	Normal
10	Lead	0.00	mg/L	< 0.05	Normal
11	Mercury	0.0	mg/L	< 0.01	Normal
12	Ammonia	0.0	mg/L	< 0.5	Normal
13	Nitrate	0.0	mg/L	< 50	Normal

Tested by: [Signature] Checked by: [Signature] Approved by: [Signature]

No. 277, Corner of the 8th, 9th Street & 7 Street, (1) Block, South Dagon Sub-township, Yangon  
Tel: 09-87796976, Fax: 09-87796976

# Environmental Impact Assessment Report For "Crown Cement Factory 5,000 TPD"

Ngwe Yi Pale' Cement Co., Ltd

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

Client Information		Sample Information	
Client Name	Crown Cement Factory	Sample ID	12287
Organization	Ma Hla Pyaw Hla Nading	Sample Name	Before Treated Water
Client ID	-	Sample Type / Source	-
Registration Date & Time	23.10.2023	Sampling Date & Time	23.10.2023
Contact	09-78221448	Sample Location	မုသိုဇာ
Email	-	Latitude	-
Testing Purpose	-	Longitude	-

**Testing Results**

This laboratory provides reports in accordance with the scope submitted by the client unless stated otherwise in writing. This report shall not be reproduced, copied or used without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	8.4	SI	6.5 - 8.5	Normal
2	Turbidity	0	NTU	-	-
3	TDS	8	mg/L	-	-

\*ND\* = Not Detected      \*LSD\* = Lower level of detection      \*SI\* = SI Reference Standard

Tested by	Checked by	Approved by
		
Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023

No. 222, Corner of the River, Thar Street & J Street, (3) Block, South Dakhla Township, Yangon.  
Tel: 09-49796078, Email: alarm.2023@gmail.com

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

Client Information		Sample Information	
Client Name	Crown Cement Factory	Sample ID	12288
Organization	Ma Hla Pyaw Hla Nading	Sample Name	Treated Water
Client ID	-	Sample Type / Source	-
Registration Date & Time	23.10.2023	Sampling Date & Time	23.10.2023
Contact	09-78221448	Sample Location	မုသိုဇာ
Email	-	Latitude	-
Testing Purpose	-	Longitude	-

**Testing Results**

This laboratory provides reports in accordance with the scope submitted by the client unless stated otherwise in writing. This report shall not be reproduced, copied or used without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	8.3	SI	6.5 - 8.5	6.5-8.5
2	Turbidity	2.8	NTU	-	-
3	TDS	7	mg/L	-	-

\*ND\* = Not Detected      \*LSD\* = Lower level of detection      \*SI\* = SI Reference Standard

Tested by	Checked by	Approved by
		
Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023

No. 222, Corner of the River, Thar Street & J Street, (3) Block, South Dakhla Township, Yangon.  
Tel: 09-49796078, Email: alarm.2023@gmail.com

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

Client Information		Sample Information	
Client Name	Crown Cement Factory	Sample ID	12289
Organization	Ma Hla Pyaw Hla Nading	Sample Name	Drinking Water
Client ID	-	Sample Type / Source	-
Registration Date & Time	23.10.2023	Sampling Date & Time	23.10.2023
Contact	09-78221448	Sample Location	မုသိုဇာ
Email	-	Latitude	-
Testing Purpose	-	Longitude	-

**Testing Results**

This laboratory provides reports in accordance with the scope submitted by the client unless stated otherwise in writing. This report shall not be reproduced, copied or used without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	8.4	SI	6.5 - 8.5	Normal
2	Turbidity	0	NTU	4.3	Clear
3	TDS	8	mg/L	<1000	Normal
4	Hardness	33	mg/L	200	Normal
5	Chloride	8.2	mg/L	250	Normal
6	Cyanide	<0.01	mg/L	-	-
7	Ammonium	0.04	mg/L	40.3	Normal
8	Arsonic	0.00	mg/L	10.00	Normal
9	Copper	0.28	mg/L	1.0	Normal
10	Iron	0.31	mg/L	0.7	Normal
11	Manganese	0.6	mg/L	0.1	Above the limit
12	Nitrate	10	mg/L	-	-
13	Sulfate	81	mg/L	200	Normal

\*ND\* = Not Detected      \*LSD\* = Lower level of detection      \*SI\* = SI Reference Standard

Tested by	Checked by	Approved by
		
Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023	Test Lead ALARM Ecological Laboratory 23.10.2023

No. 222, Corner of the River, Thar Street & J Street, (3) Block, South Dakhla Township, Yangon.  
Tel: 09-49796078, Email: alarm.2023@gmail.com

Soil Quality

**Green Myanmar Environmental Services Co., Ltd**  
No.115, Kalamy Mia Thar (D) Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar  
Tel: 09 9497 478 (24hrs/24hrs) E-mail: gmes@greenmyanmar.com.mm, info@greenmyanmar.com

Project Name: Crown Cement Factory Co., Ltd. Sample ID: SM-3  
Date of Collection: 11.11.2023  
Latitude: 22° 21' 56.29" N Date of Arrival at Lab: 16.10.2023  
Longitude: 96° 42' 45.00" E Date of Issue of Report: 17.11.2023

Sampling Location: နေပြည်တော်

**Laboratory Analysis Results of Soil**

Sl. No.	Parameter	Unit	Analytic Value	Minimum Measurement Range of Methods
1.	Aluminum	mg/kg soil	<0.01	0.01 mg/kg soil
2.	Arsenic	mg/kg soil	<0.02	0.02 mg/kg soil
3.	Barium	g/kg soil	0.07	0.02 mg/kg soil
4.	Copper	mg/kg soil	<2.5	2.5 mg/kg soil
5.	Cyanide	mg/kg soil	<0.05	0.05 mg/kg soil
6.	Extractable Acidity	meq/kg soil	3.2	0.25 meq/kg soil
7.	Manganese	mg/kg soil	<1	1 mg/kg soil
8.	P - Alkalinity	meq/l extract	8	0.2 meq/l extract
9.	pH	-	8.3	8.1
10.	Total Alkalinity	meq/l extract	3.8	0.2 meq/l extract
11.	Total Iron	mg/kg soil	<0.5	0.5 mg/kg soil

Analyzed By: <i>Pegone</i> Ma Hsu Pyae Hla Nzing Lab. Technician (Laboratory)	Checked By: <i>[Signature]</i> U Mye Hla Kyi Lab. Supervisor (Laboratory)	Approved By: <i>[Signature]</i> U Tun Lih Kywe In Charge (Laboratory)
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**Green Myanmar Environmental Services Co., Ltd**  
No.115, Kalamy Mia Thar (D) Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar  
Tel: 09 9497 478 (24hrs/24hrs) E-mail: gmes@greenmyanmar.com.mm, info@greenmyanmar.com

Project Name: Crown Cement Factory Co., Ltd. Sample ID: SM-2  
Date of Collection: 11.11.2023  
Latitude: 22° 21' 56.29" N Date of Arrival at Lab: 16.10.2023  
Longitude: 96° 42' 45.00" E Date of Issue of Report: 17.11.2023

Sampling Location: နေပြည်တော်

**Laboratory Analysis Results of Soil**

Sl. No.	Parameter	Unit	Analytic Value	Minimum Measurement Range of Methods
1.	Aluminum	mg/kg soil	<0.01	0.01 mg/kg soil
2.	Arsenic	mg/kg soil	<0.02	0.02 mg/kg soil
3.	Barium	g/kg soil	0.10	0.02 mg/kg soil
4.	Copper	mg/kg soil	<2.5	2.5 mg/kg soil
5.	Cyanide	mg/kg soil	<0.05	0.05 mg/kg soil
6.	Extractable Acidity	meq/kg soil	7.1	0.25 meq/kg soil
7.	Manganese	mg/kg soil	<1	1 mg/kg soil
8.	P - Alkalinity	meq/l extract	8	0.2 meq/l extract
9.	pH	-	8.24	8.1
10.	Total Alkalinity	meq/l extract	3.8	0.2 meq/l extract
11.	Total Iron	mg/kg soil	<0.5	0.5 mg/kg soil

Analyzed By: <i>Pegone</i> Ma Hsu Pyae Hla Nzing Lab. Technician (Laboratory)	Checked By: <i>[Signature]</i> U Mye Hla Kyi Lab. Supervisor (Laboratory)	Approved By: <i>[Signature]</i> U Tun Lih Kywe In Charge (Laboratory)
---	---	---

**Green Myanmar Environmental Services Co., Ltd**  
No.115, Kalamy Mia Thar (D) Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar  
Tel: 09 9497 478 (24hrs/24hrs) E-mail: gmes@greenmyanmar.com.mm, info@greenmyanmar.com

Project Name: Crown Cement Factory Co., Ltd. Sample ID: SM-3  
Date of Collection: 11.11.2023  
Latitude: 22° 28' 34.69" N Date of Arrival at Lab: 16.10.2023  
Longitude: 96° 42' 19.55" E Date of Issue of Report: 17.11.2023

Sampling Location: နေပြည်တော်

**Laboratory Analysis Results of Soil**

Sl. No.	Parameter	Unit	Analytic Value	Minimum Measurement Range of Methods
1.	Aluminum	mg/kg soil	<0.01	0.01 mg/kg soil
2.	Arsenic	mg/kg soil	<0.02	0.02 mg/kg soil
3.	Barium	g/kg soil	0.10	0.02 mg/kg soil
4.	Copper	mg/kg soil	<2.5	2.5 mg/kg soil
5.	Cyanide	mg/kg soil	<0.05	0.05 mg/kg soil
6.	Extractable Acidity	meq/kg soil	6.8	0.25 meq/kg soil
7.	Manganese	mg/kg soil	<1	1 mg/kg soil
8.	P - Alkalinity	meq/l extract	0	0.2 meq/l extract
9.	pH	-	8.8	8.1
10.	Total Alkalinity	meq/l extract	3.7	0.2 meq/l extract
11.	Total Iron	mg/kg soil	<0.5	0.5 mg/kg soil

Analyzed By: <i>Pegone</i> Ma Hsu Pyae Hla Nzing Lab. Technician (Laboratory)	Checked By: <i>[Signature]</i> U Mye Hla Kyi Lab. Supervisor (Laboratory)	Approved By: <i>[Signature]</i> U Tun Lih Kywe In Charge (Laboratory)
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**Green Myanmar Environmental Services Co., Ltd**  
No.115, Kalamy Mia Thar (D) Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar  
Tel: 09 9497 478 (24hrs/24hrs) E-mail: gmes@greenmyanmar.com.mm, info@greenmyanmar.com

Project Name: Crown Cement Factory Co., Ltd. Sample ID: SM-4  
Date of Collection: 11.11.2023  
Latitude: 22° 39' 53.24" N Date of Arrival at Lab: 16.10.2023  
Longitude: 96° 40' 42.71" E Date of Issue of Report: 17.11.2023

Sampling Location: နေပြည်တော်

**Laboratory Analysis Results of Soil**

Sl. No.	Parameter	Unit	Analytic Value	Minimum Measurement Range of Methods
1.	Aluminum	mg/kg soil	<0.01	0.01 mg/kg soil
2.	Arsenic	mg/kg soil	<0.02	0.02 mg/kg soil
3.	Barium	g/kg soil	0.04	0.02 mg/kg soil
4.	Copper	mg/kg soil	<2.5	2.5 mg/kg soil
5.	Cyanide	mg/kg soil	<0.05	0.05 mg/kg soil
6.	Extractable Acidity	meq/kg soil	7.1	0.25 meq/kg soil
7.	Manganese	mg/kg soil	<1	1 mg/kg soil
8.	P - Alkalinity	meq/l extract	8	0.2 meq/l extract
9.	pH	-	8.3	8.1
10.	Total Alkalinity	meq/l extract	2.8	0.2 meq/l extract
11.	Total Iron	mg/kg soil	<0.5	0.5 mg/kg soil

Analyzed By: <i>Pegone</i> Ma Hsu Pyae Hla Nzing Lab. Technician (Laboratory)	Checked By: <i>[Signature]</i> U Mye Hla Kyi Lab. Supervisor (Laboratory)	Approved By: <i>[Signature]</i> U Tun Lih Kywe In Charge (Laboratory)
---	---	---

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale’ Cement Co., Ltd*



**Green Myanmar  
Environmental Services Co., Ltd**

No.115, Kanaung Min Thar Gyi Road, Industrial Zone (1), Hlaing Thar Yar Industrial City,  
Yangon, Myanmar  
Tel: 09 897 978 296, 09-5081451 E-mail: [gmescompany@gmail.com](mailto:gmescompany@gmail.com), [info@gmes-mm.com](mailto:info@gmes-mm.com)

**Project Name:** Crown Cement Factory Co.,Ltd.

**Sample ID:** SS-5

**Date of Collection:** 12.10.2023

**Sampling Location:** ရှမ်းမြောက်

**Latitude:** 22° 21' 3.79"N

**Date of Arrival at Lab:** 16.10.2023

**Longitude:** 96° 40' 35.67"E

**Date of Issue of Results:** 15.11.2023

**Laboratory Analysis Results of Soil**

Sr. No.	Parameters	Unit	Analysis Value	Minimum Measurement Range of Methods
1.	Aluminum	mg/kg soil	<0.05	0.05 mg/kg soil
2.	Arsenic	mg/kg soil	<0.025	0.025 mg/kg soil
3.	Chloride	g/kg soil	0.2	0.025 mg/kg soil
4.	Copper	mg/kg soil	<2.5	2.5 mg/kg soil
5.	Cyanide	mg/kg soil	<0.05	0.05 mg/kg soil
6.	Extractable Acidity	cmol/kg soil	6.3	0.25 cmol/kg soil
7.	Manganese	mg/kg soil	<1	1 mg/kg soil
8.	P - Alkalinity	mmol/l extract	0	0.2 mmol/l extract
9.	pH	-	6.4	0.1
10.	Total Alkalinity	mmol/l extract	3.8	0.2 mmol/l extract
11.	Total Iron	mg/kg soil	<0.5	0.5 mg/kg soil

Analyzed By	Checked By	Approved By
Ma Hsu Pyae Hla Naing Lab Technician (Laboratory)	U Myo Min Ko Lab Supervisor (Laboratory)	U Tun Lin Kyaw In-Charge (Laboratory)



Groundwater Quality

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

<b>Client Information</b>		<b>Sample Information</b>	
Client Name: Crown Cement Factory	Sample ID: 3228	Client Name: Ma Hsu Pwe Hla Hing	Sample Name: 3228/1 Tube Well
Registration No: 25-09-0001	Sample Type / Source: -	Client ID: 30-02-2023	Sampling Date / Time: 12.00:00
Contact: 09-78022418	Sampling Date & Time: 30.10.2023	Contact: 09-78022418	Sample Location: 3228/1
Testing Purpose: -	Sample Location: 3228/1	Depth: -	Latitude: -
	Longitude: -		

**Testing Results**

This laboratory report is based only on the sample submitted to the lab unless otherwise stated on sampling forms. This report shall not be reproduced except in full without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	0.0	NTU	5.0	Clear
3	DO	1.88	mg/L	4.00	Normal
4	Hardness	31	mg/L	450	Normal
5	Calcium	1.8	mg/L	750	Normal
6	Magnesium	0.01	mg/L	40.0	Normal
7	Iron	0.01	mg/L	0.3	Normal
8	Copper	0.01	mg/L	0.05	Normal
9	Zinc	0.01	mg/L	0.05	Normal
10	Lead	0.01	mg/L	0.05	Normal
11	Manganese	0.01	mg/L	0.05	Normal
12	Nitrate	0.0	mg/L	50.0	Normal
13	Nitrite	0.0	mg/L	3.0	Normal
14	Sulfate	0.0	mg/L	200.0	Normal

ND = Not Detected      "SL" = Lower Limit of Detection      "L" = No Reference Standard

Tested by:	Checked by:	Approved by:
Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM

No. 27, Corner of Ma Hsu Pwe Hla Street & 7 Street, (1) Block, South Okkalapa Township, Yangon.  
Tel: 09-78022418, Email: alarm.ecolab@gmail.com

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

<b>Client Information</b>		<b>Sample Information</b>	
Client Name: Crown Cement Factory	Sample ID: 3229	Client Name: Ma Hsu Pwe Hla Hing	Sample Name: 3229/1 Tube Well
Registration No: 25-09-0001	Sample Type / Source: -	Client ID: 30-02-2023	Sampling Date / Time: 12.00:00
Contact: 09-78022418	Sampling Date & Time: 30.10.2023	Contact: 09-78022418	Sample Location: 3229/1
Testing Purpose: -	Sample Location: 3229/1	Depth: -	Latitude: -
	Longitude: -		

**Testing Results**

This laboratory report is based only on the sample submitted to the lab unless otherwise stated on sampling forms. This report shall not be reproduced except in full without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	0	NTU	5.0	Clear
3	DO	1.88	mg/L	4.00	Normal
4	Hardness	30	mg/L	450	Normal
5	Calcium	1.8	mg/L	750	Normal
6	Magnesium	0.01	mg/L	40.0	Normal
7	Iron	0.01	mg/L	0.3	Normal
8	Copper	0.01	mg/L	0.05	Normal
9	Zinc	0.01	mg/L	0.05	Normal
10	Lead	0.01	mg/L	0.05	Normal
11	Manganese	0.01	mg/L	0.05	Normal
12	Nitrate	0.0	mg/L	50.0	Normal
13	Nitrite	0.0	mg/L	3.0	Normal
14	Sulfate	0.0	mg/L	200.0	Normal

ND = Not Detected      "SL" = Lower Limit of Detection      "L" = No Reference Standard

Tested by:	Checked by:	Approved by:
Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM

No. 27, Corner of Ma Hsu Pwe Hla Street & 7 Street, (1) Block, South Okkalapa Township, Yangon.  
Tel: 09-78022418, Email: alarm.ecolab@gmail.com

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

<b>Client Information</b>		<b>Sample Information</b>	
Client Name: Crown Cement Factory	Sample ID: 3228	Client Name: Ma Hsu Pwe Hla Hing	Sample Name: 3228/2 Tube Well
Registration No: 25-09-0001	Sample Type / Source: -	Client ID: 30-02-2023	Sampling Date / Time: 12.00:00
Contact: 09-78022418	Sampling Date & Time: 30.10.2023	Contact: 09-78022418	Sample Location: 3228/2
Testing Purpose: -	Sample Location: 3228/2	Depth: -	Latitude: -
	Longitude: -		

**Testing Results**

This laboratory report is based only on the sample submitted to the lab unless otherwise stated on sampling forms. This report shall not be reproduced except in full without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	8	SL	6.5 - 8.5	Normal
2	Turbidity	0.0	NTU	5.0	Clear
3	DO	1.8	mg/L	4.00	Normal
4	Hardness	31	mg/L	450	Normal
5	Calcium	1.8	mg/L	750	Normal
6	Magnesium	0.01	mg/L	40.0	Normal
7	Iron	0.01	mg/L	0.3	Normal
8	Copper	0.01	mg/L	0.05	Normal
9	Zinc	0.01	mg/L	0.05	Normal
10	Lead	0.01	mg/L	0.05	Normal
11	Manganese	0.01	mg/L	0.05	Normal
12	Nitrate	0.0	mg/L	50.0	Normal
13	Nitrite	0.0	mg/L	3.0	Normal
14	Sulfate	0.0	mg/L	200.0	Normal

ND = Not Detected      "SL" = Lower Limit of Detection      "L" = No Reference Standard

Tested by:	Checked by:	Approved by:
Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM

No. 27, Corner of Ma Hsu Pwe Hla Street & 7 Street, (1) Block, South Okkalapa Township, Yangon.  
Tel: 09-78022418, Email: alarm.ecolab@gmail.com

**ALARM Ecological Laboratory**  
Water Testing Result Report

Date: October 26, 2023

<b>Client Information</b>		<b>Sample Information</b>	
Client Name: Crown Cement Factory	Sample ID: 3229	Client Name: Ma Hsu Pwe Hla Hing	Sample Name: 3229/2 Tube Well
Registration No: 25-09-0001	Sample Type / Source: -	Client ID: 30-02-2023	Sampling Date / Time: 12.00:00
Contact: 09-78022418	Sampling Date & Time: 30.10.2023	Contact: 09-78022418	Sample Location: 3229/2
Testing Purpose: -	Sample Location: 3229/2	Depth: -	Latitude: -
	Longitude: -		

**Testing Results**

This laboratory report is based only on the sample submitted to the lab unless otherwise stated on sampling forms. This report shall not be reproduced except in full without written approval of the laboratory.

No.	Quality Parameters	Results	Units	Drinking Standard	Remarks
1	pH	7.8	SL	6.5 - 8.5	Normal
2	Turbidity	0.0	NTU	5.0	Clear
3	DO	1.88	mg/L	4.00	Normal
4	Hardness	30	mg/L	450	Normal
5	Calcium	1.8	mg/L	750	Normal
6	Magnesium	0.01	mg/L	40.0	Normal
7	Iron	0.01	mg/L	0.3	Normal
8	Copper	0.01	mg/L	0.05	Normal
9	Zinc	0.01	mg/L	0.05	Normal
10	Lead	0.01	mg/L	0.05	Normal
11	Manganese	0.01	mg/L	0.05	Normal
12	Nitrate	0.0	mg/L	50.0	Normal
13	Nitrite	0.0	mg/L	3.0	Normal
14	Sulfate	0.0	mg/L	200.0	Normal


ND = Not Detected      "SL" = Lower Limit of Detection      "L" = No Reference Standard

Tested by:	Checked by:	Approved by:
Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM	Daw Lin Lin Myint Aung Lab. Technician I Ecological Laboratory ALARM

No. 27, Corner of Ma Hsu Pwe Hla Street & 7 Street, (1) Block, South Okkalapa Township, Yangon.  
Tel: 09-78022418, Email: alarm.ecolab@gmail.com



Appendix X: Celebration Certificate of Aeroqual

  
Aeroqual Limited  
460 Rosebank Road, Auckland 1026, New Zealand.  
Phone: +649-623 3013 Fax: +64-9-623 3012  
www.aeroqual.com

**Calibration Certificate**

**Calibration Date:** 8 June 2018

**Model:** PM2.5 PM10 0-1.000 mg/m3


**Serial No:** 5001-CDDB-001

**Measurements**

	PM2.5 mg/m3	PM10 mg/m3
Reference Zero	0.000	0.000
AQL Sensor Zero	0.000	0.000
Reference Span	0.150	0.207
AQL Sensor Span	0.152	0.208

**Calibration Standard**

Standard	Manufacturer	Model	Serial number
Optical Particle Counter	Met One Instruments	9722-1	U11996
Test aerosol	ATI	0.54 µm latex microspheres	n/a

**QC Approval:** 

**Date:** 8-Jun-18

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

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**Appendix XI: Celebration Certificate of Noise Meter**



Head Office - SH- 85(4), Malika Housing, Yadanar Road, 14/ Bawamyint Quarter, Dagon South Township, Yangon, Myanmar.  
Ph : 01-886 6717, 886 0135, 886 9732, 09 - 502 5972, Hot Line : 09 - 730 87708, 09 - 492 25984, 09- 261 88507, 09 - 882 429734, 09 - 882 9735, Fax : 01 - 886 6717  
Branch Office - No.(13/7), Mya Sandar Road, Between 26 x 27 & 62 x 63 Street, Mandalay. Ph: 09-291 88388, 09-280 678 505

To

Green Myanmar Environmental Service

Calibration Date : 18/2/2019

**Service Certificate**

We here by certified that Sound Level Meter, GM 1356, S/N- CX : 1294184 is servicing  
by Amigos Service and Technical Support Department( Amigos International Co.,Ltd ).

  
Ywet Nu Nge  
Senior Engineer(Incharge)  
Amigos International Co., Ltd

**Appendix XII: Flora around the Surrounding Area Of Project Site  
Flora**

**Plate (1)** Some species in Direct Impact Zone



**Plate (2)** Some species in Direct Impact Zone



**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*



**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Plate (3)** Some species in Direct Impact Zone





**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Plate (4)** Some species in Direct Impact Zone



**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Plate (5) Direct Impact Zone**





**Plate (6)** Some species in Direct Impact Zone



**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Plate (7)** Some species in Direct Impact Zone





**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Plate (8)** Direct Impact Zone of Cement Factory in Naung Hkio Township, Northern Shan State





**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

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**Plate (9)** Direct Impact Zone of Cement Factory in Naung Hkio Township, Northern Shan State



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**Appendix XIII: Report Form for Accident or Incident Cases**

**CROWN Cement Plant  
Naung Hkio Township, Shan State,  
Myanmar**

To  
IN CHARGE

----- Department  
NaungHkio Township  
Shan state

Date: -----

**Subject: Reporting the extraordinary events**

Concerning above, there were extraordinary events at **CROWN Cement Plant** and report it in order to be necessary instructions.

1. Fire Alert / Catch Fire

-----  
-----  
-----

2. Accident Occurrence

-----  
-----  
-----

3. Riot by Employee

-----  
-----  
-----

4. Natural Disaster Occurrence

-----  
-----  
-----

5. Riot by People

-----  
-----  
-----

6. Communicable diseases

-----  
-----  
-----

7. Food Poisoning

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

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8. Traffic Accident

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---

9. Others

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**General Manager**  
**(CEOWN Cement Plant)**

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**CROWN Cement Plant  
NaungHkio Township, Shan State,  
Myanmar**

**(ACCIDENT REPORT FORM)**

No. -----

Name of Person involved in accident -----

Address -----; Ph. No. -----

Date of occurrence -----; Time of occurrence -----

Where and to whom was the accident initially reported -----  
-----  
-----

Witness Ph. No. and Address -----  
-----  
-----

Summary of specific details of occurrence (include date and time) [Use additional pages and photos if necessary] -----  
-----  
-----

Details of injury/damage: (indicate type of injury – put 'x' in one box only):

- |  |  |
|--|--|
| <input type="checkbox"/> Bruising, contusion               | <input type="checkbox"/> Suffocation, asphyxiation             |
| <input type="checkbox"/> Concussion                        | <input type="checkbox"/> Gassing                               |
| <input type="checkbox"/> Internal injuries                 | <input type="checkbox"/> Drowning                              |
| <input type="checkbox"/> Open wound                        | <input type="checkbox"/> Poisoning                             |
| <input type="checkbox"/> Abrasion, graze                   | <input type="checkbox"/> Infection                             |
| <input type="checkbox"/> Amputation                        | <input type="checkbox"/> Burns, Scalds and frostbite           |
| <input type="checkbox"/> Open fracture (i.e. bone exposed) | <input type="checkbox"/> Effects of radiation                  |
| <input type="checkbox"/> Closed fracture                   | <input type="checkbox"/> Electrical injury                     |
| <input type="checkbox"/> Dislocation                       | <input type="checkbox"/> Property damage, Specify -----<br>--- |
| <input type="checkbox"/> Sprain, torn ligaments            | <input type="checkbox"/> Other, Specify -----<br>---           |

Indicate part of body most seriously injured (put 'x' in one box only):

- |  |   |
|--|---|
| <input type="checkbox"/> Head, except eyes | <input type="checkbox"/> Fingers, one or more         |
| <input type="checkbox"/> Eyes              | <input type="checkbox"/> Hip joint, thigh, knee cap   |
| <input type="checkbox"/> Neck              | <input type="checkbox"/> Knee joint, lower leg, ankle |

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

- |   |  |
|---|--|
| <input type="checkbox"/> Back, spine                | <input type="checkbox"/> Foot                        |
| <input type="checkbox"/> Chest                      | <input type="checkbox"/> Toes, one or more           |
| <input type="checkbox"/> Abdomen                    | <input type="checkbox"/> Extensive parts of the body |
| <input type="checkbox"/> Shoulder, upper arm, elbow | <input type="checkbox"/> Multiple injuries           |
| <input type="checkbox"/> Lower arm, wrist, hand     | <input type="checkbox"/> Other, Specify -----<br>--- |

Consequences of the Accident/Incident:

- |           |   |  |
|-----------|---|--|
| Fatal     | <input type="checkbox"/> Date of resumption of work | Anticipated absence if not                 |
| Non Fatal | <input type="checkbox"/> if back                    | <input type="checkbox"/> back              |
|           | Year    Month    Day                                | <input type="checkbox"/> 4-7 days          |
|           | -----    -----    -----                             | <input type="checkbox"/> 8-14 days         |
|           |   | <input type="checkbox"/> More than 14 days |

Treatment: -----  
-----  
-----

Doctor's report and recommendation: -----  
-----  
-----

Steps taken to prevent reoccurrence of this type of Accident/Incident: -----  
-----  
-----

Signature of person completing report: ----- Date: -----

Print Name and Job Title: -----

Signature of Head of Department: ----- Date: -----

Print Name: -----

**General Manager  
Crown Cement Plant**



**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale Cement Co., Ltd*

**Measuring the Performance with Indices, Interpreting and Acting by Indices**

At the said factory, accidents are recorded and calculated the **Accident Indices** and concluded that, factory directed to good or adverse condition by analyzing the indices. The calculating method of accident indices was as follow:

**CROWN Cement Plant  
NaungHkio Township, Shan State,  
Myanmar**

**(Calculation the Accident Indices)**

Frequency rate and Severity rate are measured as accident indices. In order to calculation, the attendance of employees, working hour, no. of employees were filled up as following:

**Facts from accident occurrence and attendance records**

Sr. No.	Fiscal Year	Accident Severe		Accident		Man-hour loss by official accident	Total man-hour loss	Average worked person a day	No. of accident in year
		Death	Alive	Official	Non-official				

From above table,

$$\text{Frequency rate} = \frac{\text{no of accident occur in one year} \times 10^6}{(\text{man-hour in one year})}$$

$$\text{Severity rate} = \frac{\text{loss man-hour in one year} \times 10^6}{(\text{man-hour in one year})}$$

Appendix XIII: Records of Stakeholder Meeting

**First Public Meeting**

**Attended Lists**

ကရင်ဒါလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၀၇.၇.၂၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်ရိုက်အဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးဘဝင်းဝင်း	စက်ရုံမှူး / Crown Cement	ကရင်ဒါလပ်မြေစက်ရုံ / စက်ရုံမှူး ၀၅-၄၇၅၅၅၆၄၆၆	
၂	ဦးဝင်းမောင်မောင်	ဒု-စက်ရုံမှူး / Crown Cement	ကရင်ဒါလပ်မြေစက်ရုံ / စက်ရုံမှူး	
၃	ဦးငွေရီရီ	ပညာရေး(ကျေးဇူး) Crown Cement	ကရင်ဒါလပ်မြေစက်ရုံ / စက်ရုံမှူး	
၄	ဦးဝင်းမောင်	ပညာရေး(ကျေးဇူး) Crown Cement	ကရင်ဒါလပ်မြေစက်ရုံ / စက်ရုံမှူး	
၅	ဦးကျော်မြ	ဖွဲ့စည်း ဖွဲ့စည်းပုံအခြေခံဇယားရေးရာဌာန	စက်ရုံမှူး ၀၅-၂၅၆၀၇၅၅၅	

၁.	အောင်ကျော်	အဖွဲ့ - ၂ / အဖွဲ့ဝင် ၅၂	Crown Cement	
၂.	အောင်ကျော်	အဖွဲ့ - ၂ / အဖွဲ့ဝင် ၅၂	Crown Cement	
၃.	ဦးကျော်မြ	အဖွဲ့ - ၂ / အဖွဲ့ဝင် ၅၂	Crown Cement	
၄.	Tim Mead & Henry	Bridiversity	၀၅၄၂၆၀၇၄၄၈	
၅.	AMIO BIET	Biotechnology	၀၅၅၀၀၀၀၆	
၆.	Dr. Khin Myo Myint	Plant Biotechnology	၀၅၂၅၄၀၂၀၇၇၆	

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၁	ခေါ်ထက်ထက်လွင်	ဦးစိ.မျှား ၊ မြို့နယ်စီမံကိန်းဌာန	မြို့နယ်စီမံကိန်းဌာန၊ ဧရာဝတီတိုင်း၊ ၀၉-၇၇၀၄၁၅၅-၇၅၅ ၀၉-၈၅၅၂၄၀	ဝ
၂	ဦးထိန်	၇၅၅၂၄၁၅၅	ကွမ်းခြံ	ထိန်
၃	ဦးထွန်းကျော်	၇၅၅၂၄၁၅၅	ဖျော်ကွမ်းခြံ	ကျော်
၄	ဦးကျော်စင်	ရပ်မိရပ်မ. ခဲဆန်ကျေးရွာ	ခဲဆန်	ကျော်စင်
၅	ဦးသုတေသန	ရပ်မိရပ်မ. ခဲဆန်ကျေးရွာ	ခဲဆန်	သုတေသန
၆	ဦးကျော်စင်ကျော်	၇၅၅၂-၀၈၈-၇၅၅၅၅	Crown Cement ၀၉-၅၁၀၅၇၇၈	ကျော်စင်
၇	ဦးကျော်စင်ကျော်	ရပ်မိရပ်မ/ Crown Cement	ကရင်ဘက်လက်မိုင်၊ ဧရာဝတီတိုင်း၊ ၀၉-၇၇၁၉၀၂၀၅	ကျော်စင်
၈	ဦးကျော်စင်	တောင်ကျေး ကုန်းပုံကျေးရွာ	ကုန်းပုံကျေးရွာ	ကျော်စင်
၉	ဦးကျော်စင်	တောင်ကျေး ပင်လယ်ကျေးရွာ	ပင်လယ်ကျေးရွာ	ကျော်စင်
၁၀	ဦးကျော်စင်	တောင်ကျေး ပင်လယ်ကျေးရွာ	ပင်လယ်ကျေးရွာ	ကျော်စင်

တရားဝင်လုပ်ငန်းစဉ်နှင့် ဆက်ဆံရေးဆိုင်ရာပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

ရက်စွဲ- ၀၇/၇/၀၀၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးဝိမာ	ရပ်မိရပ်မ. ခဲဆန်ကျေးရွာ	ခဲဆန်ကျေးရွာ ၀၉-၄၅၀၇၆၁၀၆	ဝိမာ
၂	ဦးကျော်စင်	ကုန်းပုံကျေးရွာ၊ တောင်ပန်းရွာ	တောင်ပန်းရွာ ၀၉-၄၇၁၃၀၈၂၀	ကျော်စင်
၃	ဦးကျော်စင်	ရပ်မိရပ်မ. ဒုတိယကုန်းပုံကျေးရွာ	ဒုတိယကုန်းပုံကျေးရွာ	ကျော်စင်
၄	ဦးကျော်စင်	ရပ်မိရပ်မ. ဒုတိယကုန်းပုံကျေးရွာ	ဒုတိယကုန်းပုံကျေးရွာ ၀၉-၃၆၀၇၅၅၅၅	ကျော်စင်
၅	ဦးကျော်စင်	ရပ်မိရပ်မ. ဒုတိယကုန်းပုံကျေးရွာ	ဒုတိယကုန်းပုံကျေးရွာ	ကျော်စင်
၆	ဦးကျော်စင်	ရပ်မိရပ်မ. ကုန်းပုံကျေးရွာ	ကုန်းပုံကျေးရွာ	ကျော်စင်
၇	ဦးကျော်စင်	ရပ်မိရပ်မ. တောင်ပန်းရွာ	တောင်ပန်းရွာ ၀၉-၂၅၆၂၄၀၀၇၅	ကျော်စင်
၈	ဦးကျော်စင်	ရပ်မိရပ်မ. Crown Cement	ကရင်ဘက်လက်မိုင်၊ ဧရာဝတီတိုင်း၊ ၀၉-၇၇၁၉၀၂၀၅	ကျော်စင်
၉	ဦးကျော်စင်	ခဲဆန်	ခဲဆန်ရွာ	ကျော်စင်
၁၀	ဦးကျော်စင်	ရပ်မိရပ်မ. ကုန်းပုံ	ကုန်းပုံကျေးရွာ	ကျော်စင်

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1	ဦးစိုက်ကွယ်	ရပ်မိရပ်မ. ငှက်ပေး (၂၂)	ငှက်ပေးကျေးရွာ - ၀၅-၄၀၃၇၆၃၈၃၂	
2	ဦးအောင်အိန်	ဆောင်ကမ်းပုဇွန် ငှက်ပေး (၂၂)	ငှက်ပေးကျေးရွာ - -	
3	ဦးစောဇော်	ရပ်မိရပ်မ. ကုံးပုံ	ကုံးပုံကျေးရွာ - ၀၅-၃၂၈၄၀၂၅၀	
4	ဦးအောင်ဦး	အုပ်ချုပ်ရေးမှူး၊ စောင့်ကြပ်ရေးဌာန	စောင့်ကြပ်ရေးဌာန	
5	ဦးစောအောင်	ရပ်မိရပ်မ. ကုံးပုံ	ကုံးပုံကျေးရွာ - ၀၅-၄၀၂၇၀၇၆၉၅	
6	ဦးအောင်အိန်	ရပ်မိရပ်မ. ကုံးပုံ	ကုံးပုံကျေးရွာ - ၀၅-၄၀၃၇၄၄၈၂၀	
7	ဦးကျော်စော	ရပ်မိရပ်မ. ကုံးပုံ	ကုံးပုံကျေးရွာ - -	
8	ဦးအောင်အောင်	ရပ်မိရပ်မ. ခဲဆိပ်	ခဲဆိပ်ကျေးရွာ - ၀၅-၃၅၅၄၆၂၅၂	
9	ဦးအောင်အောင်	ရပ်မိရပ်မ. ခဲဆိပ်	ခဲဆိပ်ကျေးရွာ - ၀၅-၃၂၈၃၇၇၆၈	

၂၁	ဦးအောင်အိန်	ရပ်မိရပ်မ	ခဲဆိပ်	
၂၂	ဦးကျော်စော	"	ရပ်မိရပ်မ	
၂၃	ဦးအောင်အိန်	"	ရပ်မိရပ်မ	
၂၄	ဦးအောင်အိန်	GMECS	GMECS - ၀၅၄၅၂၃၅၇၇၄	
၂၅	ဦးအောင်အိန်	ရပ်မိရပ်မ	ပင်မိ	

၂	ဦးအောင်အိန်	လယ်ထပ်ရေးမှူး၊ Crown Cement	ကရင်ဒီးလယ်မြေစက်ရုံ၊ စောင့်ကြပ်ရေးမှူး ၀၅-၄၇၀၃၅၄၇၂၅	
၃	ဦးအောင်အိန်	စီမံရေးမှူး / Crown Cement	ကရင်ဒီးလယ်မြေစက်ရုံ၊ စောင့်ကြပ်ရေးမှူး ၀၅-၄၀၃၇၆၃၈၃၆	
၄	ဦးအောင်အိန်	အုပ်ချုပ်ရေးမှူး / ကုံးပုံ	ကုံးပုံကျေးရွာ - -	
၅	ဦးအောင်အိန်	ရပ်မိရပ်မ. ကုံးပုံ	ကုံးပုံကျေးရွာ - (၀၅-၃၃၂၀၂၅၂) ၀၅-၃၃၂၀၂၅၂	
၆	ဦးအောင်အိန်	ရပ်မိရပ်မ. ငှက်ပေး	ငှက်ပေးကျေးရွာ - ၀၅-၃၆၀၄၀၇၇၇	
၇	ဦးအောင်အိန်	ရပ်မိရပ်မ. ငှက်ပေး	ငှက်ပေးကျေးရွာ - ၀၅-၃၅၅၃၅၇၂၅	
၈	ဦးအောင်အိန်	ရပ်မိရပ်မ. ငှက်ပေး	ငှက်ပေးကျေးရွာ - -	
၉	ဦးအောင်အိန်	ရပ်မိရပ်မ. ငှက်ပေး	ငှက်ပေး - -	
၁၀	ဦးအောင်အိန်	စီမံရေးမှူး / Crown Cement	ကရင်ဒီးလယ်မြေစက်ရုံ၊ စောင့်ကြပ်ရေးမှူး ၀၅-၄၇၂၇၀၂၅၂	



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၁	ဒီဂျစ်တယ်	ဒါရိုက်တာ / စာချုပ်ရေး	Crown Cement / ၀၉-၇၇၅၂၇၂၀၅၀	
၂	အိမ်ထောင်စု	က.၃ / စာချုပ်ရေး	Crown Cement / ၀၉-	
၃	အိမ်ထောင်စု	က.၄ / စာချုပ်ရေး	Crown Cement / ၀၉-	
၄	ဒီဂျစ်တယ်	ကွန်ပျူတာ / ရုပ်ပုံရေး	ကွန်ပျူတာ / ၀၉-၈၁၇၅၅၅၄၆	
၅	ဒီဂျစ်တယ်	ရုပ်ပုံရေး	ကွန်ပျူတာ / ၀၉-	
၆	ဒီဂျစ်တယ်	ကော်မတီ	ရေစိုက်ရေး (၂) / ၀၉-၇၇၇၁၅၅၅၅၅	
၇	ဒီဂျစ်တယ်	ကော်မတီ	ရေစိုက်ရေး (၂) / ၀၉-	
၈	ဒီဂျစ်တယ်	ကော်မတီ	ရေစိုက်ရေး (၂) / ၀၉-၅၅၅၅၅၅၅၅	
၉	ဒီဂျစ်တယ်	ကော်မတီ	ရေစိုက်ရေး (၂) / ၀၉-၇၇၀၅၅၅၅၅	
၁၀	ဒီဂျစ်တယ်	ကော်မတီ	ရေစိုက်ရေး (၂) / ၀၉-	

၁	ဒီဂျစ်တယ်	ဒါရိုက်တာ / စာချုပ်ရေး	Crown Cement	
၂	ဒီဂျစ်တယ်	ဒါရိုက်တာ / စာချုပ်ရေး	Crown Cement / ၀၉-၅၅၅၅၅၅၅၅	
၃	ဒီဂျစ်တယ်	ကွန်ပျူတာ / စာချုပ်ရေး	Crown Cement / ၀၉-၇၇၀၅၅၅၅၅	
၄	ဒီဂျစ်တယ်	ကွန်ပျူတာ	Crown Cement	
၅	ဒီဂျစ်တယ်	ရုပ်ပုံရေး / ရေစိုက်ရေး	၀၉-၄၀၅၅၅၅၅၅	
၆	ဒီဂျစ်တယ်	ကွန်ပျူတာ / စာချုပ်ရေး	Crown Cement	
၇	ဒီဂျစ်တယ်	ရေစိုက်ရေး		
၈	ဒီဂျစ်တယ်	ကွန်ပျူတာ / စာချုပ်ရေး	Crown Cement	
၉	ဒီဂျစ်တယ်	~	ရေစိုက်ရေး / ၀၉-၅၅၅၅၅၅၅၅	



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ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတော်ရောက်သူများစာရင်း

နေ့စွဲ- ၀၅/၂၂/၀၁၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
11	ဦးစောမောင်	တောင်ယာ	ခဲဆိပ်ကျေးရွာ / ၀၇-36142064	စောင့်
12	ဦးကျော်ဇိမ်း	တောင်ယာ	လယ်ကြီးတော / ၀၇-403742028	ကျော်ဇိမ်း
13	ဦးတင်စောင့်ထွန်း	တောင်ယာ	လယ်ကြီးတော / ၀၇-403732020	တင်စောင့်
14	ဦးကျော်သန်း	တောင်ယာ	လယ်ကြီးတော / ၀၇-	ကျော်သန်း
15	ဦးကျော်ဦး	တောင်ယာ	လယ်ကြီးတော / ၀၇-	ကျော်ဦး
16	ဦးစုမာညွန့်	တောင်ယာ	နွယ်ကယ်ချိုက် / ၀၇-256428883	စုမာညွန့်
17	ဦးကမိ	တောင်ယာ	ကွမ်းမုံ / ၀၇-257084737	ကမိ
18	ဒေါ်သန္တာဦး	ဒေါ်ဒေါ် ဖျူး / ကျေးလက်စေ့သဖွဲ့ကြီး	တောင်တောင် / ၀၇-793404392	သန္တာဦး
19	ဦးအင်ဂျ	တောင်ယာ	ခဲဆိပ် /	အင်ဂျ
20	ဦးကျော်ဝင်း	တောင်ယာ	ခဲဆိပ် / ၀၇-31714383	ကျော်ဝင်း

ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတော်ရောက်သူများစာရင်း

နေ့စွဲ- ၀၅/၂၂/၀၁၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
19	ဦးသိန်းထွန်း	တောင်ယာ	ခဲဆိပ် / ၀၇-31752548	သိန်းထွန်း
20	ဦးစံသိန်းကျော်	တောင်ယာ	လယ်ကြီးတော / ၀၇-256494115	စံသိန်း
21	ဦးစံဆန်းထွန်း	တောင်ယာ	ခဲဆိပ် / ၀၇-	စံဆန်း
22	ဦးကျော်	တောင်ယာ	နွယ်ကယ်ချိုက် /	ကျော်
23	ဦးစိုင်းအောင်ခမ်း	တောင်ယာ	နွယ်ကယ်ချိုက် (၂၇၅၄) နွယ်ကယ်ချိုက် / ၀၇-403742675	စိုင်းအောင်ခမ်း
24	ဦးကျော်	တောင်ယာ	နွယ်ကယ်ချိုက် /	ကျော်
25	ဦးနန္ဒိယ	တောင်ယာ	တောက်ဖျိကျေးရွာ	နန္ဒိယ
26	ဦးချစ်ထွန်း	က.၂ / ခဲမံ	Crown Cement / ၀၇-259292456	ချစ်ထွန်း

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pa le Co., Ltd*

ကရောင်းဘိလပ်မြေစံနှုန်း တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၀၄.၇.၂၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်စားမြဲအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးသိန္နီ	ဂျပန်ဂျပန်	၄၇၃၀၀၀	
၂	ဦးဇော်	ဂျပန်ဂျပန်	ခဲခဲ	
၃	ဦးစံအောင်	"	ခဲခဲ	
၄	ဦးစိန်	ဂျပန်ဂျပန်	ခဲခဲ	
၅	ဦးအောင်အောင်	"	ကော့ကော့	
၆	ဦးကျော်ကျော်	"	ကော့ကော့	
၇	ဦးအောင်ကျော်စွာ	အေ.အေ.စီ	၀၉၀၀၀၀	
၈	ဦးအောင်စိန်	"	"	
၉	ဦးအောင်စိန်စွာ	"	"	
၁၀	ဦးအောင်လင်းကျော်	"	"	



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နေ့စွဲ- ၀၄/၂၂/၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၀	ဦးမိဝေစော		ခဲက ၄ ၁၀၄-၄၇၀၇၇၄၆၂၉၀	ဆာ
၁၁	ဦးစိုးစိုးကျော်		ခဲက ၄ ၁၀၄-၄၇၃၀ ၈၄၃၇	ကျော်
၁၂	ဦးစိုးအောင်		ကျောက်စား	စိုးအောင်
၁၃	ဦးကျော်စွာ		ကျောက်စား ၁၀၄-၄၇၈၆၁၈၈၇၀	စွာ
၁၄	ဦးကျော်စွာ		ကျောက်စား	ကျော်စွာ
၁၅	ဦးကျော်စွာ		ကျော်စွာ ၁၀၄-၄၀၃၇၀၁၈၆၂	စွာ
၁၆	ဦးကျော်စွာ		ကျောက်စား	ကျော်စွာ
၁၇	ဦးကျော်စွာ		ကျောက်စား ၁၀၄-၃၆၀၇၄၂၃၆	ကျော်စွာ
၁၈	ဦးကျော်စွာ		ကျောက်စား	ကျော်စွာ
၁၉	ဦးကျော်စွာ		ပစ်တီး ၁၀၄-၃၆၀၇၈၄၂၆	ကျော်စွာ

ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ပထမအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ- ၀၄/၂၂/၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၂၀	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ပစ်တီး ၁၀၄-၃၁၄၂၇၄	ကျော်စွာ
၂၁	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ပစ်တီး ၁	ကျော်စွာ
၂၂	ဦးကျော်စွာ	ဦးကျော်စွာ အထောက်အကူ (၃၆၀၇၈၄၂၆)	ကျော်စွာ	ကျော်စွာ
၂၃	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ခဲက ၄	ကျော်စွာ
၂၄	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ခဲက ၄-၀၄-၃၆၆၆၁၀၀၇	ကျော်စွာ
၂၅	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ကျောက်စား- ၀၄-၇၇၅၅၅၅၅၅၅	ကျော်စွာ
၂၆	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ကျောက်စား	ကျော်စွာ
၂၇	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ကျောက်စား	ကျော်စွာ
၂၈	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	Crown Cement	ကျော်စွာ
၂၉	ဦးကျော်စွာ	ရပ်စဲ ၇၅၀	ပစ်တီး	ကျော်စွာ



**Key Discussions**

စဉ်	တင်ပြဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ
၁	<p><b>ဦးစိန်သောင်းဦး (Chairman, GMES Co. Ltd.)</b></p> <p>ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်များလုပ်ဆောင်ခြင်း ရည်ရွယ်ချက်၊ ဘိလပ်မြေစက်ရုံကြောင့် ဖြစ်ပေါ်နိုင်သော ထိခိုက်မှုများအကြောင်း၊ ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ဆောင်သွားမည့်လုပ်ငန်းစဉ်များအကြောင်း၊ ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ စံသတ်မှတ်ချက်များအကြောင်း၊ စီမံကိန်းဆိုင်ရာအချက်အလက်များအပေါ် ဆန်းစစ်ချက်များ၊ တွေ့ရှိချက်များ၊ လျော့နည်းသက်သာအောင် လုပ်ဆောင်ရမည့် နည်းလမ်းများ၊ စောင့်ကြည့် လေ့လာရေး အစီအစဉ်များအကြောင်းနှင့် အဖွဲ့အနေဖြင့် ဆက်လက်လုပ်ဆောင်သွားမည့် အစီအစဉ်များအကြောင်း ဆွေးနွေးတင်ပြသွားပါသည်။</p>
၂	<p><b>ဒေါ်မူမူအေး (အကြံပေး၊ GMES Co. Ltd.)</b></p> <p>စက်ရုံအား စိမ်းလန်းစွာတွေ့မြင်ရသဖြင့် ဝမ်းသာမိပါကြောင်း၊ မိမိအဖွဲ့အနေဖြင့် ဇီဝမျိုးစေ့မျိုးကွဲများဖြစ်တည်မှုနှင့် စီမံကိန်းကြောင့် ဇီဝမျိုးစေ့များအပေါ် ထိခိုက်နိုင်မှုများအား လေ့လာသွားမည်ဖြစ်ကြောင်း၊ လက်ရှိလေ့လာမိသလောက် ရှားပါးမျိုးစေ့များမရှိနိုင်ပါကြောင်း ဆွေးနွေးသွားပါသည်။</p>
၃	<p><b>ဒေါက်တာကျော်စွာတင့် (Team Leader, SIA Group)</b></p> <p>စက်ရုံလုပ်ငန်းများတွင် လူမှုစီးပွားထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်များ လိုအပ်ပုံ၊ လူမှုထိခိုက်မှုဆန်းစစ်ခြင်းကြောင့် ရရှိလာနိုင်မည့်အကျိုးကျေးဇူးများ၊ ပူးပေါင်းပါဝင်ဆောင်ရွက်ရမည့် အဖွဲ့အစည်းများ၊ လူမှုဆန်းစစ်ခြင်းအဖွဲ့အနေဖြင့် လုပ်ဆောင်သွားမည့် လုပ်ငန်းစဉ်များအကြောင်း၊ လုပ်ဆောင်မည့် ဧရိယာအကျယ်အဝန်း၊ ကွင်းဆင်းဆောင်ရွက်သွားမည့် လူနေရပ်ကွက်များ ၊ လူထုသဘောထားစစ်တမ်းကောက်ယူသွားမည့် အစီအစဉ်များ နှင့် အစီရင်ခံစာပြုစုရေးသားသွားမည့် အကြောင်းအရာများအကြောင်း ဆွေးနွေးတင်ပြသွား ပါသည်။</p>
၄	<p><b>ဦးကျော်မြ (ပြည်နယ်လွှတ်တော်ကိုယ်စားလှယ်၊ နောင်ချိုမြို့)</b></p> <p>ယခုလို လာရောက်တွေ့ဆုံဆွေးနွေးပေးသည့်အတွက် ဝမ်းမြောက်မိပါကြောင်း၊ အစပိုင်းက ထိခိုက်နိုင်မှုများအတွက် စိုးရိမ်မိသော်လည်း ယခုကဲ့သို့ နိုင်ငံတကာအဆင့်မှီ နည်းပညာ ဖြစ်ကြောင်းသိရှိရသဖြင့် စိုးရိမ်စိတ်လျော့ပါးသွားပါကြောင်း၊ အနီးအနား ကျေးရွာများတွင် အလုပ်အကိုင်အခွင့်အလမ်းများ၊ လမ်းပန်းဆက်သွယ်ရေး၊ ပညာရေး၊ ကျန်းမာရေးအဆင့်အတန်းများ စက်ရုံကြောင့် တိုးတက်လာသည်ကို တွေ့ရှိရပါကြောင်း၊ စက်ရုံစီမံကိန်းကြောင့် ဆိုးဆိုးရွားရွားထိခိုက်နိုင်သည်များ ရှိနိုင်မည်မဟုတ်ဟု ယုံကြည် ပါကြောင်း</p>



	ပြောကြားသွားပါသည်။
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**တွေ့ဆုံပွဲအတွင်းတက်ရောက်လာသူများမှဆွေးနွေးချက်များနှင့်သက်ဆိုင်သူများမှပြန်လည်ဖြေကြား  
ဝားချက်များ**

စဉ်	ဆွေးနွေးသူ / အဓိကဆွေးနွေးချက်များ	ပြန်လည်ဖြေကြားသူ/ ဖြေကြားချက်
၁	<p><b>ဦးထွန်းလင်းကျော် (အင်းစိမ်းမြေ၊ နောင်ချို)</b></p> <p>တိုင်းတာမည့် ဧရိယာ ၃ မိုင် ပတ်လည် အပြင် ၈ မိုင်ပတ်လည်အား တိုင်းတာပေးစေ လိုပါကြောင်း၊ နွေရာသီတွင် သစ်ပင်များ နည်းပါးသွားပြီး သက်ရောက်မှုဧရိယာ များ လာနိုင်သဖြင့် တိုင်းတာပေးစေလိုပါကြောင်း တင်ပြသွားပါသည်။</p>	<p><b>ဦးစိန်သောင်းဦး (Chairman, GMES Co., Ltd.)</b></p> <p>ဆွေးနွေးပေးသည့်အတွက် ကျေးဇူးတင် ရှိပါကြောင်း၊ တိုင်းတာရေးအတွက်လိုအပ်သည့် နေရာများ (ဥပမာ - လေတိုက်ရာလမ်းကြောင်း ကျရောက်ရာ လူနေရပ်ကွက်များ) ဦးစားပေး တိုင်းတာသွားမည်ဖြစ်ကြောင်း၊ သက်ရောက်မှု ရှိနိုင်သည့် နေရာများ ကျန်ရှိခြင်းမရှိစေရန် အလေးထားလုပ်ဆောင်သွားမည်ဖြစ်ပါကြောင်း ဆွေးနွေးသွားပါသည်။</p> <p><b>ဒေါက်တာကျော်စွာတင့် (အဖွဲ့ခေါင်းဆောင်၊ လူမှုဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ရေးအဖွဲ့)</b></p> <p>လူမှုဝန်းကျင်ဆန်းစစ်ခြင်း လုပ်ငန်းများနှင့် ကျန်းမာရေးဆန်းစစ်ခြင်းလုပ်ငန်းများ လုပ် ဆောင်ရာတွင် သတ်မှတ်ထားရှိသော ၃ မိုင် ပတ်လည်မှာ တိုက်ရိုက် သက်ရောက်မှုရှိနိုင် သောနေရာအားဆိုလိုခြင်းသာဖြစ်ပြီး ကွင်းဆင်း ဆောင်ရွက်ခြင်းအား အဆိုပါ ၃ မိုင်ပတ်လည် အတွင်း၌သာ ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း နှင့် အစီရင်ခံစာရေးသားခြင်းတွင်မူ နောင်ချို တစ်မြို့လုံးနှင့်သက်ဆိုင်သော အချက်အလက် များ စုဆောင်းရေးသားသွားမည်ဖြစ်ကြောင်း ဆွေးနွေးသွားပါသည်။</p>
၂	<p><b>ဦးအောင်ကျော်စိုး (အင်းစိမ်းမြေ၊ နောင်ချို)</b></p>	<p><b>ဦးဇော်နိုင်ဝင်း (လ/ထစက်ရုံမှူး၊ ကရောင်း ဘိလပ်မြေ)</b></p>

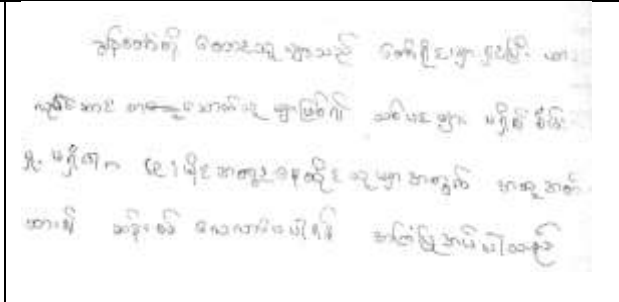
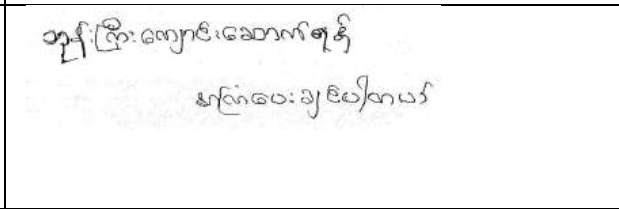
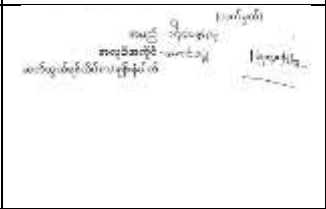
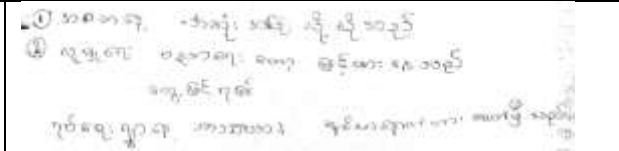
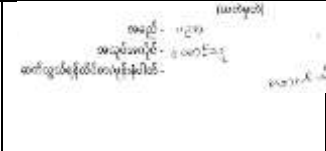
	<p>အလုပ်အကိုင် အခွင့်အလမ်းအတွက် ဒေသခံများအား ဦးစားပေးခန့်ထားပေးစေလိုကြောင်း၊ နွေရာသီတွင် သစ်ပင်များ ခြောက်သွေ့သွားသဖြင့် သစ်ပင်များများ စိုက်ပျိုးပေးစေလိုကြောင်းနှင့် ဒေသခံ လူငယ်များ စိုက်ပျိုးရေးလုပ်ဆောင်ရာတွင် လည်း တတ်နိုင်သရွေ့ အကူအညီပေးစေလိုပါကြောင်း ဆွေးနွေးသွားပါသည်။</p>	<p>ယခင်စက်ရုံက တန် (၁၀၀၀) ကျ ဘိလပ်မြေ စက်ရုံဖြစ်သဖြင့် အလုပ်သမား ခန့်ထားမှု နည်းပါးသေးသော်လည်း ယခု တန် (၄၀၀၀) ကျ စက်ရုံ တည်ဆောက်ပြီးပါက ဒေသခံအလုပ်သမားများ ပိုမို ခန့်ထားပေးနိုင်မည်ဖြစ်ကြောင်း၊ ထိုသို့ခန့်ထားရာတွင်လည်း ဒေသခံများအား ဦးစားပေး ခန့်ထားပေးမည် ဖြစ်ကြောင်း ဆွေးနွေးသွားပါသည်။</p> <p><b>ဦးစိန်သောင်းဦး (Chairman, GMES Co., Ltd.)</b></p> <p>ဒေသခံများ ခန့်ထားခြင်းအားဖြင့် အကျိုးကျေးဇူးများစွာရရှိနိုင်ပါကြောင်း၊ အလုပ်အကိုင် အခွင့်အလမ်းများအပြင် ဒေသအကျိုးစီးပွားအတွက် တာဝန်သိဒေသဖွံ့ဖြိုးရေးရုံပုံငွေ ထားရှိသွားစေမည်ဖြစ်ကြောင်း ဆွေးနွေးသွားပါသည်။</p> <p><b>ဦးခင်မောင်အေး (ဒု-စက်ရုံမှူး၊ ကရောင်းဘိလပ်မြေစက်ရုံ)</b></p> <p>သစ်ပင်စိုက်ပျိုးရေးအတွက် ဧက (၁၀၀၀) သစ်ပင်စိုက်ပျိုးပြီး ဖြစ်ပါကြောင်း ကုမ္ပဏီ စိုက်ခင်းအနေဖြင့် အပင်တစ်သိန်းကျော် စိုက်ပျိုးလျက်ရှိပါကြောင်း၊ ဆက်လက်ပြီးလည်း စိုက်ပျိုးသွားမည်ဖြစ်ပါကြောင်းနှင့် ဒေသခံ စိုက်ပျိုးရေးလုပ်ငန်းများတွင်လည်း ကူညီနိုင်ရေးအတွက် အထက်သို့ တင်ပြသွားမည်ဖြစ်ပါကြောင်း ဆွေးနွေးသွားပါသည်။</p>
<p>၃</p>	<p><b>ဦးဝင်းမောင် (ပညာရှင်၊ ကရောင်းဘိလပ်မြေစက်ရုံ)</b></p> <p>လုပ်ငန်းအတွေ့အကြုံများအရ ဘိလပ်မြေလုပ်ငန်းခွင်ကြောင့် မိမိတွင် ကျန်းမာရေး တစ်စုံတစ်ရာ ဆိုးဆိုးရွားရွားဖြစ်ခြင်း မရှိခဲ့ပါကြောင်း၊ တက်ရောက်ဆွေးနွေးပေးပါသော GMES Co., Ltd မှ တာဝန်ရှိပုဂ္ဂိုလ်များနှင့် လွှတ်တော်ကိုယ်စားလှယ်ကြီးအားလည်းကောင်း၊ ရွာသူရွာသားများအပေါင်းအားလည်းကောင်း အထူးကျေးဇူးတင်ရှိပါကြောင်း၊ ဒုတိယအကြိမ် အစည်းအဝေးအားလည်း တက်ရောက်ပေးကြပါရန် မေတ္တာရပ်ခံ ပြောကြားသွားပါသည်။</p>	

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*Ngwe Yi Pa le Co., Ltd*

**စာဖြင့်အကြံပြုဆွေးနွေးမှုများနှင့်ပြန်လည်ဖြေကြားချက်များ**

ပထမအကြိမ်လူထုတွေ့ဆုံပွဲတွင် စာဖြင့် အကြံပြုဆွေးနွေးချက်များနှင့် သက်ဆိုင်ရာပုဂ္ဂိုလ်အသီးသီးမှ ပြန်လည်ဖြေကြားချက်များမှာ အောက်ပါ အတိုင်း ဖြစ်ပါသည်။

စဉ်	အကြံပြုသည့် အကြောင်းအရာ	အကြံပြုသူအမည်	ပြန်လည်ဖြေကြားသူ/ ဖြေကြားချက်
၁			<p><b>ဦးသိန်းမြင့်၊ ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b>                      သစ်ပင်များအား စက်ရုံအစီအစဉ်ဖြင့် သော်လည်းကောင်း၊ ဒေသခံ လူမှုရေးအဖွဲ့အစည်းတစ်ခုဖြစ်သည့် အင်စိမ်းမြေအဖွဲ့ဖြင့် ပူးပေါင်း၍ သော်လည်းကောင်း စက်ရုံအနီး တစ်ဝိုက်တွင် အပင်တစ်သိန်းကျော် စိုက်ပျိုးထားရှိပြီးဖြစ်ပါသည်။ ထပ်မံ၍လည်း စိုက်ပျိုးသွားမည်ဖြစ်ပါသည်။</p>
၂			<p><b>ဦးသိန်းမြင့်၊ ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b>                      နှစ်စဉ်စက်ရုံအမြတ်ငွေမှ ရာခိုင်နှုန်းတစ်ခု သတ်မှတ်ပြီး လူမှုရေး၊ ကျန်းမာရေး၊ ဘာသာရေးဖွံ့ဖြိုးတိုးတက်ရေး လုပ်ငန်းများတွင် သုံးစွဲသွားမည်ဖြစ်ပါသည်။</p>
၃			<p><b>ဦးသိန်းမြင့်၊ ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b>                      ကျေးဇူးတင်ရှိပါသည်။</p>













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*Ngwe Yi Pa le Co., Ltd*

**Second Public Meeting**

**Attendance List**

ကရင်ဒီလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဂုဏ်ထူးဆောင် လူထုတွေ့ဆုံပွဲတော်များစာရင်း

ရက်စွဲ - ၂၀၂၀ ခု ဇူလိုင်လ ၂၅ ရက်

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဒေါ်သိန်းလှစိန်	ကျွမ်း - ၂ (RCW)	Crown Cement factory	
၂	ဒေါ်မာမာဦး	ကျွမ်း - ၂ (RCW)	Crown Cement factory	
၃	ဦးစိုးဇော်	ဂျပန်ဂျပန်	လမ်းကြောင်း	
၄	ဦးစောစော	ဒီ-ဒီ-ဂျီ (RCW)	Crown Cement factory	
၅	ဒေါ်အေးအေး	ကျွမ်း - ၄ (RCW)	Crown Cement factory	
၆	ဦးစောစော	လောကီ (C.C)	Crown Cement Factory	
၇	ဦးစိန်စိန်	ဒီ-ဒီ-ဂျီ (RCW)	နားခေါ်	
၈	Dr. သန်းသန်းစိန်	Biodiversity Group	144, ဗဟိုလမ်း၊ ကမာရွတ်၊ ရန်ကင်း ဖုန်း - ၉၅-၉၆၂၄၇၅၅၃၂ ဖုန်း - ၉၅-၉၆၂၄၇၅၅၃၂ ရောင်းကွပ်ဌာန	
၉	ဦးထွန်းကျော်	ဂျပန်ဂျပန်		

ကရင်ဒီလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဂုဏ်ထူးဆောင် လူထုတွေ့ဆုံပွဲတော်များစာရင်း

ရက်စွဲ - ၂၀၂၀ ခု ဇူလိုင်လ ၂၅ ရက်

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၀	ဦးစော	ဂျပန်ဂျပန်	ကျွမ်းမဲ့စာရင်း	
၁၁	ဦးစိန်စိန်	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၂	ဦးသာသာ	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၃	ဦးပန်းပန်း	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၄	ဦးစောစော	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၅	ဦးစောစော	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၆	ဦးထွန်းစွယ်	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၇	ဦးစောစော	ဂျပန်ဂျပန်	နယ်ကယ်အဖွဲ့	
၁၈	ဦးစိန်စိန်	ဂျပန်ဂျပန်	ကျွမ်းမဲ့	

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*Ngwe Yi Pa le Co., Ltd*

တရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဒုတိယအငြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၃၊ ၈၊ ၂၀၁၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၇.	ဦးခေါ်နု	ရုပ်မြင်ရုပ်	လောက်ဖရီးကျေးရွာ	
၁၈.	ဦးပိကဘာ	ရုပ်မြင်ရုပ်	လောက်ဖရီးကျေးရွာ	
၁၉.	ဦးအောင်စွန်းထွန်း	တပ်ဇော် (မြန်မာ့နိုင်ငံမီးသတ်တပ်ဖွဲ့)	နောင်ချိုမြို့	
၂၀.	ဦးအောင်သာ	ရုပ်မြင်ရုပ်	လောက်ဖရီးကျေးရွာ	
၂၁.	ဦးစံလှ	ရုပ်မြင်ရုပ်	ခဲဆန်ကျေးရွာ	
၂၂.	ဦးအောင်ဆန်း	ရုပ်မြင်ရုပ်	ဖင်တီးကျေးရွာ	
၂၃.	ဦးထွန်းထွန်း	ရုပ်မြင်ရုပ်	ဖင်တီးကျေးရွာ	
၂၄.	ဦးပန်တာ	ရုပ်မြင်ရုပ်	ခဲဆန်ကျေးရွာ	
၂၅.	ဦးသိန်းထွန်း	ရုပ်မြင်ရုပ်	ခဲဆန်ကျေးရွာ	

တရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဒုတိယအငြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၃၊ ၈၊ ၂၀၁၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၂၆.	ဦးထွန်းထွန်း	ရုပ်မြင်ရုပ်	လယ်ကြီးတောကျေးရွာ	
၂၇.	ဦးအောင်ထွန်း	ရုပ်မြင်ရုပ်	လောက်ဖရီးကျေးရွာ	
၂၈.	ဦးကျော်မြင့်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၂၉.	ဦးကျော်ကျော်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၃၀.	ဦးကျော်မြင့်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၃၁.	ဦးအောင်သူသော်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၃၂.	ဦးကျော်မြင့်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၃၃.	ဦးသူအောင်	ရုပ်မြင်ရုပ်	ခဲဆန်ကျေးရွာ	
၃၄.	ဦးကျော်မြင့်	ရုပ်မြင်ရုပ်	ငှက်ဆေးကျေးရွာ	
၃၅.	ဦးသူအောင်	ရုပ်မြင်ရုပ်	ခဲဆန်ကျေးရွာ	
၃၆.	အိ(မြောက်ကိုး)	ကျွမ်း - ၄ (ဘဏ္ဍရေး)	Crown Cement Factory	



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၁၇	ဦးညွှာ	ရုပ်ပုံကွဲ	လူကြွေးကျေးဇွာ	၂၃၁
၁၈	အိမ်ခြံမြေ	ရုပ်ပုံကွဲ	လူကြွေးကျေးဇွာ	၆
၁၉	ဒီဇိုင်း	ရုပ်ပုံကွဲ	ဖိတ်စာကျေးဇွာ	၆၅

ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲတော်ရောက်သူများစာရင်း

နေ့စွဲ- ၂၀၂၀.၀၅.၀၅

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးခိုင်မင်းကို	ဒု-မြို့နယ်စာတေ့တွေ့ရုပ်ချုပ်ရေးဌာန	၀၉-၄၉၂၇၅၀၄၁၉	
၂	ဦးဝင်းခိုင်	မြို့နယ်စာတေ့တွေ့ရုပ်ချုပ်ရေး	၀၉-၇၈၀၂၃၃၂၀၂	
၃	ဦးကျွမ်းမြေ့ဇော်	"	၀၉-၄၀၃၇၄၀၄၂၃	
၄	ဦးဖြိုးစည်ဟိန်	ဒု-ဦးစီး "	၀၉-၉၅၆၆၄၈၄၂၇	
၅	ဦးသန်းဝင်းစိုး	"	၀၉-၃၃၀၂၆၄၇၀	
၆	ဦးကျော်ဝင်း	ဒေသခံကွန်စရစ်	-	ကျော်ဝင်း
၇	ဦးကျော်စိုး	လယ်ယာကြီးတော	-	ကျော်စိုး
၈	ဦးဦးမြင့်စွေ	တောင်သူ ဒု.ကယ်စိုက်	၀၉-၃၆၀၇၈၈၁၄	ဦး
၉	ဦးစောဇော်	ဒု.ကယ်စိုက်		စောဇော်

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နေ့စွဲ - ၂၀၂၂ ခုနှစ်

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၀	ဦးကျော်သန်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉-၉၅၈၆၉၃၄၈၄	ကျော်သန်း
၁၁	ဦးသိန်းဝေ	- လယ်ကြီးတော	-	
၁၂	ဦးကျော်စန်းဝင်း	- လယ်ကြီးတော	၀၉-၉၇၀၈၅၅၆၄၉	
၁၃	ဒေါ်အိမ်စန်း	ဒေါ်အိမ်စန်း၊ ဦးကျော်စန်းဝင်းအဖွဲ့	-	
၁၄	ဦးကျော်စန်းဝင်း	စီမံ EIA/EMS, YTU	-	
၁၅	ဦးကျော်စန်းဝင်း	စီမံ EIA/EMS, YTU	-	
၁၆	ဒေါ်အိမ်စန်း	GMEC	၀၉-၄၅-၁၂၃၅၇၇၅	
၁၇	ဦးကျော်စန်းဝင်း	လယ်ကြီးတော	-	ကျော်စန်းဝင်း
၁၈	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	-	

ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ခုတ်ယူအကြိမ် လူထုတွေ့ဆုံပွဲတတ်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၀၂၂ ခုနှစ်

စဉ်	အမည်	ရာထူး/ကိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၉	ဦးကျော်စန်းဝင်း	လယ်ကြီးတော	-	ကျော်စန်းဝင်း
၂၀	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉၉၇၇၄၀၅၀၆၄	
၂၁	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	-	
၂၂	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉၂၅၆၆၄၈၃၇၅	
၂၃	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉ ၃၉၉၆၂၇၁၃	
၂၄	ဦးကျော်စန်းဝင်း	လယ်ကြီးတော	-	ကျော်စန်းဝင်း
၂၅	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉-၉၇၀၈၅၅၆၄၉	
၂၆	ဦးကျော်စန်းဝင်း	လယ်ကြီးတော	-	ကျော်စန်းဝင်း
၂၇	ဦးကျော်စန်းဝင်း	ရပ်မီရပ်မ လယ်ကြီးတော	၀၉-၃၆-၈၇၇၄၈	

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နေ့စွဲ - ၂၀၂၀၂၀၁၅

စဉ်	အမည်	ရာထူး/တိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
37	ဦးစိန်ကြွာ	ဧကန်ကွမ်	-	
38	ဒေါ်အေးအေးကြူ	မိုက်ပျို.ရှေး. ဦးစိုး. နာဂပျို	၀၇-၄၈၅၇၀၀၇၆၅	
39	ဒေါ်အေးအေး	ဧကန်ကွမ်	-	
40	ဒေါ်တင်တင်ဆွေ	လယ်ကြီးတော	၀၇-၀၅၆၇၄၅	
41	ဒေါ်အေးအေး	လယ်ကြီးတော	၀၇-၉၆၀၆၅၄၅၆၇	
42	ဦးမြတ်မြတ်	လယ်ကြီးတော	-	
43	ဦးအောင်သူဦး	လယ်ကြီးတော	-	
44	ဦးကောလ	ပင်တီ	၀၇-၅၉၉၇၅၇၆	

ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဗဟိုယအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၀၂၀၂၀၁၅

46	ဦးစံကော	ပင်တီ		- စာ
47	ဦးစိန်ကျော်	ပင်တီ		
48	ဦးစံဖြူ	ပင်တီ		
49	ဦးစံလွင်	ခဲခဲ		
50	ဦးစောတ	လောက်ဖန်		စောတ
51	ဦးစိန်လှ	လောက်ဖန်		
52	ဦးကျော်ဇွန်	လယ်ကြီးတော		
53	ဦးဦးစံကျော်	ကုန်းမိုး		ဦးစံကျော်
54	ဦးဦးစံ	ကုန်းမိုး		
56	ဦးစံကျော်	ခဲခဲ	-	စံကျော်



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နေ့စွဲ - ၂၃/၀၂/၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
55	ဦးနေမိစွာ	နယ်စားဦးစီး		
56	ဦးကံဝိ	ဒုတိယဦးစီး	-	
57	ဦးဇေယျာ	နယ်စားဦးစီး	-	
58	ဒေါ်နန်းမြစေ	နောင်ကွမ်	၀၅-၅၆၀၃၅၆၀၄	
59	ဦးမောင်မြင့်	ကုမ္ပဏီ	-	
60	ဦးစောတ	နောင်ကွမ်	-	
61	ဦးဝိမာလာ	ကုမ္ပဏီ	-	
62	ဦးဖြူ	နောင်ကွမ်	-	
63	ဦးနုမောင်	နောင်ကွမ်		

တရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၃/၀၂/၀၁၅

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
64	ဦးကျော်စွာ	နောင်ကွမ်		
65	ဦးသိန်းလွင်	မီးသတ်ဦးစီး / နောင်ကွမ်	၀၅ - ၄၀၅၇၄၅၀၈	
66	ဦးခင်မောင်စော	ဒု-စက်ရုံဗဟို Crown Cement	၀၅-၄၇၇၅၄၅၀၈	
67	ဦးဝိလာသ	ခဲဆွဲ		
68	ဦးဘဟန်	ပင်လီ		
69	ဦးအယ်လ	ပင်လီ	-	
70	ဦးသာသာ	ပင်လီ		
71	ဦးကျော်စွာ	ပင်လီ	-	
72	ဦးလှထွန်း	ပင်လီ		

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စဉ်	အမည်	ရာထူး/တိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၇၅	ဦးကျော်စော	ကုမ္ပဏီ	-	ဦးကျော်စော
၇၆	ဦးကျော်စော	ဘိစနစ်	-	ဦးကျော်စော
၇၇	ဦးကျော်စော	ဘိစနစ်	-	ဦးကျော်စော
၇၈	ဦးကျော်စော	ပစ်တို		ဦးကျော်စော
၇၉	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၀	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၁	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၂	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၃	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၄	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၅	ဦးကျော်စော	ရကလေး		ဦးကျော်စော
၈၆	ဦးကျော်စော	ရကလေး		ဦးကျော်စော

ကဏ္ဍအလိုက်လုပ်ငန်းစဉ်မှ ထုတ်ဖော်ချက်များနှင့်ပတ်သက်၍ ဖုလီယာအဖြစ် လူထုထုတ်ဖော်ဆောင်ရွက်ရမည့်အချက်များစာရင်း

ဇယား - ၈၊ ၂၀၂၀

စဉ်	အမည်	ရာထူး/တိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၈၇	ဦးကျော်စော	ပစ်တို	-	ဦးကျော်စော
၈၈	ဦးကျော်စော	ညောင်တန်းစတား Crown Cement	၀၇-၇၇၂၅၀၂၁၀၈	ဦးကျော်စော
၈၉	ဦးကျော်စော	လယ်စိုက်ရေး	၀၇-၈၈၅၈၇၆၇၂	ဦးကျော်စော
၉၀	ဦးကျော်စော	လယ်စိုက်ရေး	"	ဦးကျော်စော

ကဏ္ဍအလိုက်လုပ်ငန်းစဉ်မှ ထုတ်ဖော်ချက်များနှင့်ပတ်သက်၍ ဖုလီယာအဖြစ် လူထုထုတ်ဖော်ဆောင်ရွက်ရမည့်အချက်များစာရင်း

ဇယား - ၉၊ ၂၀၂၀

အမည်	ရာထူး/တိုယ်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
ဦးကျော်စော	၈-၄၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော
ဦးကျော်စော	၈-၄၊ ၇၂၆၅၅၅၅၅	"	ဦးကျော်စော
ဦးကျော်စော	၈-၄၊ ၇၂၆၅၅၅၅၅	"	ဦးကျော်စော
ဦးကျော်စော	၈-၄၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော
ဦးကျော်စော	၇၂၆၅၅၅၅၅	၇၂၆၅၅၅၅၅ / ၀၇-၄၀၅၇၇၂၀၀၈	ဦးကျော်စော
ဦးကျော်စော	၈-၂၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော
ဦးကျော်စော	၈-၂၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော
ဦးကျော်စော	၈-၂၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော
ဦးကျော်စော	၈-၂၊ ၇၂၆၅၅၅၅၅	Crown Cement	ဦးကျော်စော



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စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးဟန်ဝင်း	ရက်ကစား၊ ငှက်ကွယ်	-	
၂	ဦးကျော်စွာ	ငှက်ကွယ်	၀၉-၄၀၉၇၆၈၃၃၅	
၃	ဦးမင်းထွန်း	ငှက်ကွယ်	၀၉-၄၀၃၇၆၈၃၃၅	
၄	ဦးစွာဦးကျော်စွာ	ငှက်ကွယ်	၀၉-၄၇၃၃၅၁၇၉	
၅	ဦးဦးအောင်	ငှက်ကွယ်	-	
၆	<del>ဦးစွာဦးကျော်စွာ</del>	-	-	-
၆	ဦးစိုးစိုး	စတိုးဗို	-	ဦးစိုးစိုး
၇	ဦးစိုးမိုး	စတိုးဗို	-	ဦးစိုးမိုး
၈	ဒေါ်ခင်မိုးဥတ္တ	IT ဌာန / Crown Cement	၀၉-၉၇၁၉၀၂၁၁၄	

တရောင်းဆိုင်လုပ်ငန်းစဉ်နှင့်ဆက်သွယ်ရန်နှင့်ပတ်သက်၍ ဗဟိုအဖွဲ့ဝင် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၀၂၂ ခုနှစ်၊ ဇူလိုင်လ ၁၅ ရက်

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၀	ဦးစွာဦးကျော်စွာ	လွှဲစား - ၄ - အုပ်ချုပ်ရေးဦးစီးဌာန	CrownCement	
၁	ဦးစွာဦးကျော်စွာ	စာ-၃-အုပ်ချုပ်ရေးဦးစီးဌာန	CrownCement	
၂	ဦးစွာဦးကျော်စွာ	စာ-၄-အုပ်ချုပ်ရေးဦးစီးဌာန	CrownCement	
၃	ဒေါ်မိုးမိုးစန်း	ကဏ္ဍကိရိယာနှင့်အင်ဂျင်နီယာရေးရာ နည်းပညာ အဖွဲ့အစည်း	၀၉၅၀၂၈၁၈၇ muubiotech@gmail.com	
၄	ဦးစွာဦးကျော်စွာ	ရက်ကွယ်	ရက်ကွယ်	
၅	ဦးစွာဦးကျော်စွာ	ရက်ကွယ်	ရက်ကွယ်	
၆	ဦးစွာဦးကျော်စွာ	ရက်ကွယ်	ရက်ကွယ်	
၇	ဦးစွာဦးကျော်စွာ	ရက်ကွယ်	ရက်ကွယ်	
၈	ဦးစွာဦးကျော်စွာ	ရက်ကွယ်	ရက်ကွယ်	

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ကရောင်းဘိလပ်မြေစက်ရုံ တည်ဆောက်ခြင်းနှင့်ပတ်သက်၍ ဒုတိယအကြိမ် လူထုတွေ့ဆုံပွဲတက်ရောက်သူများစာရင်း

နေ့စွဲ - ၂၀၂၀ ခုနှစ်

စဉ်	အမည်	ရာထူး/တိုက်စားပြုအဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁.	ဦးစိုင်းစောကျ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	စိုင်းစောကျ
၂.	ဦးကျော်စွာ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	ကျော်စွာ
၃.	ဦးစောစိန်	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	စောစိန်
၄.	ဦးကျော်စွာ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	ကျော်စွာ
၅.	ဦးစိုင်းစောကျ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	စိုင်းစောကျ
၆.	ဦးကျော်စွာ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	ကျော်စွာ
၇.	ဦးစောစိန်	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	စောစိန်
၈.	ဦးကျော်စွာ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	ကျော်စွာ
၉.	ဦးကျော်စွာ	ရင်းနှီးမြှုပ်နှံရေး	၀၉-၉၅၅၅၅၅၅	ကျော်စွာ

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တရားဝင်ထုတ်ပြန်ရေးအဖွဲ့အစည်း၏ အဖွဲ့ဝင်များ၏ လက်မှတ်ရေးထိုးခြင်း

နေ့စွဲ - ၂၀၂၁ ခု ဇူလိုင်လ ၂၅ ရက်

စဉ်	အမည်	ရာထူး/တိုက်ရိုက်အဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၈.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀	
၉.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀	
၁၀.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀၀၀	
၁၁.	ဦးအောင်		၀၉၀၀၀၀၀၀	
၁၂.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	
၁၃.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	
၁၄.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀၀၀	
၁၅.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀၀၀	
၁၆.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀၀၀	

တရားဝင်ထုတ်ပြန်ရေးအဖွဲ့အစည်း၏ အဖွဲ့ဝင်များ၏ လက်မှတ်ရေးထိုးခြင်း

နေ့စွဲ - ၂၀၂၁ ခု ဇူလိုင်လ ၂၅ ရက်

စဉ်	အမည်	ရာထူး/တိုက်ရိုက်အဖွဲ့အစည်း	ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ်	လက်မှတ်
၁၇.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀၀၀	
၁၈.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	
၁၉.	ဦးအောင်	၅၀၀၀၀၀၀၀	Crown Cement	
၂၀.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	
၂၁.	ဦးအောင်		၀၉၀၀၀၀	
၂၂.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	
၂၃.	ဦးအောင်	၅၀၀၀၀၀၀၀	Crown Cement	
၂၄.	ဦးအောင်	၅၀၀၀၀၀၀၀	၀၉၀၀၀၀	



















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စဉ်	အကြံပြုသည့် အကြောင်းအရာ	အကြံပြုသူအမည်	ပြန်လည်ဖြေကြားသူ/ဖြေကြားချက်
၂၁	<p>စတား: ဆိုချက်အရ ၃ လို စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>လမ်း: ဆိုချက်အရ ၃ လို စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>စက်ရုံ: ဆိုချက်အရ ၃ လို စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p>	<p>(လက်မှတ်)</p> <p>အမည်: ...</p> <p>အလုပ်အကိုင်: ...</p> <p>ဆက်သွယ်ရန်ဖိတ်ခေါ်ရန်နံပါတ်: ...</p>	<p><b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b></p> <p>ရွာတွင်းလမ်းများအား သင့်တော်သော အချိန်တွင် အဆင့်မြှင့်တင် ပြုပြင်ပေးသွားပါမည်။</p>
၂၂	<p>၁။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>၂။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>၃။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p>	<p>(လက်မှတ်)</p> <p>အမည်: ...</p> <p>အလုပ်အကိုင်: ...</p> <p>ဆက်သွယ်ရန်ဖိတ်ခေါ်ရန်နံပါတ်: ...</p>	<p><b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b></p> <p>စက်ရုံသစ်တည်ဆောက်ပြီးပါက တိုးပွားလာသည့် ယာဉ် အခြေအနေအရ လိုအပ်ပါက လမ်းများအား တိုးချဲ့ ပြုပြင်သွားပါမည်။</p>
၂၃	<p>၁။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>၂။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p> <p>၃။ စက်ရုံတည်ဆောက်ရာတွင် ဤအကြံပြုချက်ကို အသုံးပြုရန် လိုအပ်ပါသည်။</p>	<p>(လက်မှတ်)</p> <p>အမည်: ...</p> <p>အလုပ်အကိုင်: ...</p> <p>ဆက်သွယ်ရန်ဖိတ်ခေါ်ရန်နံပါတ်: ...</p>	<p><b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b></p> <p>ရွာတွင်းလမ်းများအား သင့်တော်သော အချိန်တွင် အဆင့်မြှင့်တင် ပြုပြင်ပေးသွားပါမည်။ ရေအခက်အခဲ နှင့် မီးအခက်အခဲအား ရွာများအလိုက် ဦးစားပေးအစီအစဉ်အတိုင်း သတ်မှတ်ရုံပုံငွေအား အလှည့်ကျ သုံးစွဲပေးသွားမည် ဖြစ်ပါသည်။</p>



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စဉ်	အကြံပြုသည့် အကြောင်းအရာ	အကြံပြုသူအမည်	ပြန်လည်ဖြေကြားသူ/ဖြေကြားချက်
၂၄	<p>၁။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၂။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၃။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၄။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၅။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၆။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၇။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၈။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၉။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၁၀။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p>	 <p>အကြံပြုသူအမည် - ဦးသိန်းမြင့်</p>	<p><b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b></p> <p>ကျေးရွာများ ကျန်းမာရေးစောင့်ရှောက်မှု တိုးတက်စေရေး အတွက် ငွေအား၊ လူအား တတ်နိုင်သမျှ ညှိနှိုင်းဆောင်ရွက်ပေးသွားပါမည်။ ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့နည်းစေရေးအတွက် တတိယအဖွဲ့အစည်းမှ အကြံပြုသည့် အချက်များအတိုင်း လိုက်နာ ဆောင်ရွက်သွားပါမည်။ ရပ်ကွက်/ကျေးရွာအုပ်ချုပ်ရေးမှူး ထောက်ခံချက်ဖြင့် အမှန်တစ်ကယ်လိုအပ်သည့်ပမာဏ အတိုင်း သတ်မှတ် အကြိမ်အရေအတွက်ဖြင့်စက်ရုံတွင်လာရောက်ဝယ်ယူနိုင်ရေးဆောင်ရွက်သွားပါမည်။</p>
၂၅	<p>၁။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၂။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၃။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၄။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၅။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၆။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၇။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၈။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၉။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p> <p>၁၀။ မြေအောက်ရေအား ထိခိုက်စေခြင်း ရှိမည်ဟု ဆိုထားပါသည်။</p>	 <p>အကြံပြုသူအမည် - ဦးသိန်းမြင့်</p>	<p><b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b></p> <p>ယာဉ်များ၊ ယာဉ်စည်းကမ်း၊ လမ်းစည်းကမ်းများနှင့်အညီ သွားလာနိုင်ရေးအတွက် အသိပညာပေးဆောင်ရွက်သွားပါမည်။ ယာဉ်အန္တရာယ်/ လမ်းအန္တရာယ် ကင်းရှင်းရေး လမ်းညွှန်ချက်များနှင့်အညီ ဒေသ အာဏာပိုင်များနှင့် ပူးပေါင်းလုပ်ဆောင်သွားပါမည်။ တိုးချဲ့စက်ရုံသစ် တည်ဆောက်ရေးနှင့် လည်ပတ်ရေး လုပ်ငန်းစဉ်များတွင် ဒေသခံများ ခန့်အပ်ထားနိုင်ရေးအတွက် သက်ဆိုင်ရာ အလုပ်သမား ညွှန်ကြားမှုဦးစီးဌာနများသို့ အသိပေး အကြောင်းကြားခြင်း၊ ဗွီဒီယိုပုံစံတစ်မျိုးဖြင့် အသိပေး ခေါ်ယူခြင်း လုပ်ဆောင်သွားပါမည်။ ဘွဲ့ရလူငယ်များအား</p>









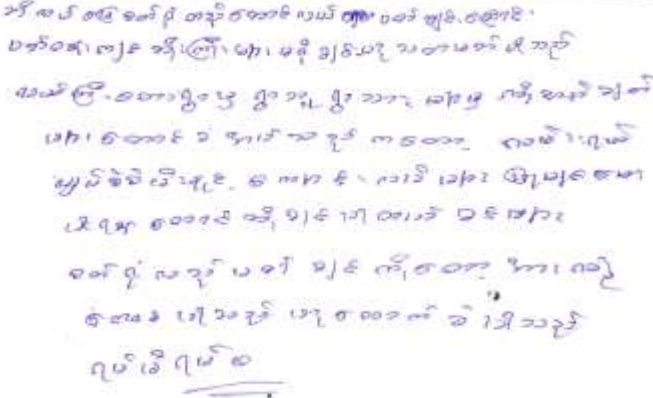
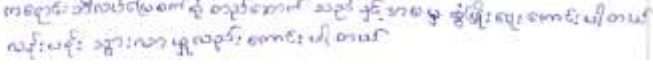
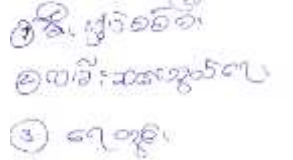






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စဉ်	အကြံပြုသည့် အကြောင်းအရာ	အကြံပြုသူအမည်	ပြန်လည်ဖြေကြားသူ/ဖြေကြားချက်
၃၂		 (လက်မှတ်)  အမည် - အလုပ်အကိုင် - ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ် -	<b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b> ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများအား လူမှုစီးပွား ဆန်းစစ် လေ့လာရေးအဖွဲ့အကြံပြုချက်များအတိုင်း ဒေသခံလူထု သဘောထားများနှင့်အညီ ရန်ပုံငွေသတ်မှတ်ပြီး ပုံမှန် လှူဒါန်း လုပ်ဆောင်သွားပါမည်။
၃၃		(လက်မှတ်)  အမည် - အလုပ်အကိုင် - ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ် -	<b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b> ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများအား လူမှုစီးပွား ဆန်းစစ် လေ့လာရေးအဖွဲ့အကြံပြုချက်များအတိုင်း ဒေသခံလူထု သဘောထားများနှင့်အညီ ရန်ပုံငွေသတ်မှတ်ပြီး ပုံမှန် လှူဒါန်း လုပ်ဆောင်သွားပါမည်။
၃၄		(လက်မှတ်)  အမည် - အလုပ်အကိုင် - ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ် -	<b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b> ကျေးဇူးအထူးတင်ရှိပါသည်။
၃၅		(လက်မှတ်)  အမည် - အလုပ်အကိုင် - ဆက်သွယ်ရန်လိပ်စာ/ဖုန်းနံပါတ် -	<b>ဦးသိန်းမြင့် ဒါရိုက်တာ၊ ငွေရည်ပုလဲ</b> ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများအား လူမှုစီးပွား ဆန်းစစ် လေ့လာရေးအဖွဲ့အကြံပြုချက်များအတိုင်း ဒေသခံလူထု သဘောထားများနှင့်အညီ ရန်ပုံငွေသတ်မှတ်ပြီး ပုံမှန် လှူဒါန်း လုပ်ဆောင်သွားပါမည်။

**APPENDIX (XV)  
SOCIAL IMPACT ASSESSMENT**

**SOCIAL IMPACT ASSESSMENT (SIA) REPORT FOR  
CROWN CEMENT FACTORY (NAUNG HKIO)**

**Reported by**



**Socially Responsible Partner (SRP)  
Social and Health Impact Assessment Group  
Assigned by GMES**

**June, 2016**

“လူမှုဝန်းကျင်ထိခိုက်မှုအနှစ်ချုပ်အစီရင်ခံစာ”

၁။ လုပ်ဆောင်ခဲ့ပြီးသည့်လူမှုစီးပွားထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းလုပ်ငန်းများ

လူမှုစီးပွားထိခိုက်မှု လေ့လာဆန်းစစ်ခြင်း အဖွဲ့အနေဖြင့် ဒေသခံလူထု ပူးပေါင်း ပါဝင်ပြီး သဘောထားဆန္ဒများ ရယူနိုင်ရေးအတွက် အောက်ဖော်ပြပါ လူမှုထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းများအား လုပ်ဆောင်ခဲ့ပါသည်။

- (က) ထိခိုက်မှုရှိနိုင်မည့် နယ်နိမိတ်အားသတ်မှတ်ခြင်း
- (ခ) သတ်မှတ်နယ်နိမိတ်များ အတွင်းသို့ကွင်းဆင်းဆောင်ရွက်ခြင်း၊
- (ဂ) လူထုတွေ့ဆုံပွဲပြုလုပ်ခြင်း (ပထမအကြိမ်)
- (ဃ) ထိခိုက်မှုရှိနိုင်သည်များအား လူမှုစီးပွားကျွမ်းကျင်ပညာရှင်များမှ စနစ်တကျ လေ့လာ ဖော်ထုတ်ခြင်း၊ ထိခိုက်နိုင်မှု အဆင့်သတ်မှတ်ခြင်း နှင့် ထိခိုက်မှု လျော့နည်းသက်သာအောင် လုပ်ဆောင်နိုင်သည့်နည်းလမ်းများ ရှာဖွေခြင်း၊
- (င) လူမှုစီးပွားတိုးတက်မှု စောင့်ကြည့်လေ့လာရေး အစီအစဉ်များသတ်မှတ်ခြင်း၊
- (စ) စောင့်ကြည့်လေ့လာရေးအဖွဲ့ ဖွဲ့စည်းပေးခြင်း အစရှိသည်တို့အား လုပ်ဆောင်ခဲ့ပြီးဖြစ်ပါသည်။

(က) ထိခိုက်မှုရှိနိုင်မည့် နယ်နိမိတ်အားသတ်မှတ်ခြင်း

ထိခိုက်မှုနယ်နိမိတ်အားသတ်မှတ်နိုင်ရေးအတွက် စီမံကိန်းတာဝန်ရှိသူများ၊ ကျေးရွာအုပ်ချုပ်ရေးမှူးများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း ဘိလပ်မြေစက်ရုံ တည်ဆောက်ရေး လုပ်ငန်းစဉ်ကြောင့် ထိခိုက်မှု ရှိနိုင်မည့်လူမှုစီးပွားနယ်ပယ်အား သတ်မှတ်ခဲ့ပါသည်။ နယ်နိမိတ်သတ်မှတ်ချက်အနေဖြင့် ဘိလပ်မြေ စက်ရုံအား ဗဟိုပြု၍ ၃ ကီလိုမီတာ ပတ်လည်အတွင်းရှိ ကျေးရွာများ ပါဝင်ကာ အဓိကအားဖြင့် အောက်ဖော်ပြပါ လူနေ ကျေးရွာများအားသတ်မှတ်ခဲ့ပါသည်။

၁။ လောက်ဖန်း

၂။ လယ်ကြီးတော

၃။ ခဲဆန်

၄။ ကုန်းမုံ

၅။ ငှက်လေး

၆။ နမ်ကယ်အိုက်

၇။ ပင်တီး

(ခ) သတ်မှတ်နယ်နိမိတ်များအတွင်းသို့ ကွင်းဆင်းဆောင်ရွက်ခြင်း

သတ်မှတ်ထားရှိသောနယ်နိမိတ်များ အတွင်းသို့ အောက်ဖော်ပြပါလူမှုစီးပွား ကျွမ်းကျင်သူများ ပါဝင်သည့်အဖွဲ့ ကွင်းဆင်းဆောင်ရွက်ခဲ့ပါသည်။ လူမှုစီးပွားအခြေအနေ များအား စစ်တမ်း ကောက်ယူခြင်း၊ ဘီလပ်မြေစက်ရုံတည် ဆောက်ခြင်းကြောင့် ပတ်ဝန်းကျင်လူထုအပေါ် ထိခိုက်မှုရှိနိုင်သည် များနှင့်စီမံကိန်းအပေါ် လူထုသဘောထား အမြင်များအား စစ်တမ်းကောက်ယူခဲ့ပါသည်။ ထိုသို့ ကောက်ယူရာတွင် သက်ဆိုင်ရာ ရပ်ကွက်များမှ အုပ်ချုပ်ရေးမှူးများနှင့် ညှိနှိုင်းဆောင်ရွက်ခဲ့ပြီး ရာအိမ်မှူးများ ပူးပေါင်းပါဝင်သော အဖွဲ့ဖြင့် ကွင်းဆင်းလုပ်ဆောင်ခဲ့ပါသည်။

(ဂ) ပထမအကြိမ်လူထုတွေ့ဆုံပွဲ

ပထမအကြိမ် လူထုတွေ့ဆုံပွဲအား (၄.၇.၂၀၁၅) ရက်နေ့တွင် ဘီလပ်မြေစက်ရုံဝင်း အတွင်းရှိ ရှင်းလင်းဆောင်ခန်းမတွင် ပထမအကြိမ်လူထုတွေ့ဆုံပွဲ ပြုလုပ်ခဲ့ပြီး တိုင်းဒေသကြီးလွှတ်တော် ကိုယ်စားလှယ်၊ မြို့နယ်အထောက်အကူပြုအဖွဲ့ဝင်များ၊ ဒေသဆိုင်ရာအာဏာပိုင်များ၊ ကျေးရွာအုပ်ချုပ်ရေးမှူးများ၊ ရပ်မိရပ်ဖများ စုစုပေါင်း အင်အား(၁၃၀)ခန့် တက်ရောက်ခဲ့ပါသည်။ စက်ရုံတည်ဆောက်ရေး တာဝန်ရှိ သူများမှ တည်ဆောက်ရေးလုပ်ငန်းစဉ်များအကြောင်း ရှင်းလင်းပြောကြားခြင်း၊ ပတ်ဝန်းကျင် ထိခိုက်မှုလေ့လာဆန်းစစ်ရေးအဖွဲ့မှ လေ့လာဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များနှင့် ကွင်းဆင်း ဆောင်ရွက်မှုမှ ရရှိသည့် လူထုသဘောထားများနှင့် ဒေသခံလူထု စိုးရိမ်မှု များအား ဆွေးနွေးစတင်ပြကြပါသည်။ တက်ရောက်လာသူများမှ သိရှိလိုသည်များ အား မေးမြန်းကြပြီး လုပ်ငန်းရှင်ဘက်မှ သိရှိလိုသမျှ ရှင်းလင်းဖြေကြားခဲ့ပါသည်။ အဓိက အားဖြင့် အောက်ဖော်ပြပါအချက်များအား ဆွေးနွေးခဲ့ကြပါသည်။



**ပထမအကြိမ်လူထုတွေ့ဆုံပွဲမှတွေ့ရှိချက်များ**

စဉ်	အကြံပြုဆွေးနွေးရေးသားသည့်အကြောင်းအရာ	မှတ်ချက်
၁။	- လျှပ်စစ်မီး၊ - လမ်းမကောင်းသည့်နေရာအချို့ရှိ။	နမ့်ကယ်အိုက်
၂။	- လမ်းမကောင်းသည့်နေရာအချို့ရှိ။	ငုတ်ကလေး၊ ကုန်းမို၊
၃။	- အိမ်အခြေခံအဆောက်အအုံများ အန္တရာယ်၊ ကင်းစွာမောင်းနှင်ပေးစေလို။	လယ်ကြီးတော
၄။	- ဆိုးကျိုးသက်ရောက်နိုင်မှုဧရိယာတိုးချဲ့စဉ်းစားပေးစေလို - ဒေသခံများဦးစားပေးခန့်အပ်စေလို၊ - သစ်ပင်များစိုက်ပျိုး/ထိန်းသိမ်းပေးစေလို။	အင်းစိမ်းမြေ
၅။	- ဒေသခံဘွဲ့ရဝန်ထမ်းများနှင့်အခြား ဝန်ထမ်း များခန့်ထားပေးစေလို	ကျေးလက်ဒေသဖွံ့ ဖြိုးရေးဦးစီးဌာန

**(ဃ) အစည်းအဝေးမှတ်တမ်းများဖြန့်ဝေခြင်း**

ပထမအကြိမ် လူထုတွေ့ဆုံပွဲမှ ဆွေးနွေးထားရှိချက်များနှင့် အကြံပြုထားရှိချက်များအား စီမံကိန်းနှင့် အဓိကသက်ဆိုင်သူများအား ဖြန့်ဝေထားရှိပြီး ဖြစ်ပါသည်။

**(င) လူမှုစီးပွား ထိခိုက်မှုရှိနိုင်သည်များအား လေ့လာဖော်ထုတ်ခြင်းနှင့် လျော့နည်းသက်သာစေမည့် နည်းလမ်းများရှာဖွေခြင်း၊**

ဆက်လက်ပြီး တည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် လူမှုစီးပွားထိခိုက်မှုများအားကျွမ်းကျင်သူများမှ စနစ်တကျရှာဖွေဖော်ထုတ်ခဲ့ပြီး အဆိုပါ အချက်များထဲမှ အဓိကကျသည့် ထိခိုက်နိုင်မှုများနှင့် လျော့နည်းသက်သာရန် လုပ်ဆောင်ရမည့်နည်းလမ်းများအား အောက်ပါဇယားအတိုင်း တင်ပြအပ်ပါသည်။

စဉ်	အကျိုးကျေးဇူး (သို့) ထိခိုက်နိုင်မှုများ	သက်ရောက်မှု အမျိုးအစား	အကျိုးကျေးဇူးပိုမိုရရှိစေရန် (သို့) လျော့နည်းသက်သာရန်ထိန်းသိမ်းလုပ်ဆောင်ရန်လိုအပ်မှုရှိ/မရှိ	အကျိုးကျေးဇူးပိုမိုရရှိစေရန် (သို့) လျော့နည်းသက်သာရန်ထိန်းသိမ်းလုပ်ဆောင်ရမည့်နည်းလမ်းများ
၁။	အလုပ်အကိုင်အခွင့်အလမ်း	အကျိုးကျေးဇူး	အကျိုးကျေးဇူးမြှင့်တင် ပေးရန်လိုအပ်	<ul style="list-style-type: none"> <li>- ဒေသခံများ ဦးစားပေးခန့်အပ်ရန်နှင့် အနိမ့်ဆုံးခန့်အပ်မည့် ဒေသခံ အလုပ်သမားသတ်မှတ် ထားရှိရန်၊</li> <li>- လိုအပ်ပါကဒေသခံများအား သင်တန်းပေးခန့်အပ်ရန်၊</li> <li>- ကျား/မခွဲခြားခန့်ထားခြင်းမပြုရန်၊</li> <li>- တစ်ဆင့်ခံလုပ်ငန်းများနှင့် လုပ်ငန်းအပ်နှံသဘောတူစာချုပ်များ တွင်အထက်ပါအချက်အား ထည့်သွင်း ချုပ်ဆိုပေးရန်၊</li> </ul>
၂။	ဒေသဝင်ငွေ တိုးတက်ခြင်း	အကျိုးကျေးဇူး	အကျိုးကျေးဇူးမြှင့်တင်ပေး ရန်လိုအပ်	<ul style="list-style-type: none"> <li>- တည်ဆောက်ခြင်းနှင့် လည်ပတ်ခြင်းလုပ်ငန်းစဉ်များအတွက်လိုအပ်မည့် ပစ္စည်းများ၊ အသုံးအဆောင်များ၊ ဝန်ဆောင်မှုများ အား ဒေသတွင်းမှသာ ဝယ်ယူအသုံးပြုရန်၊</li> <li>- ဒေသခံအသေးစားစီးပွားရေးလုပ်ငန်းများအား</li> </ul>

				<p>လိုအပ်ပါက ဝန်ဆောင်မှုများအတွက် ရန်ပုံငွေ/မတည်ငွေများ တည်ထောင် ပေးရန်၊</p> <p>- ဒေသခံဖွံ့ဖြိုးရေးလုပ်ငန်းများပါဝင်ကူညီဆောင်ရွက်ပေး ရန်၊</p> <p>-တစ်ဆင့်ခံ လုပ်ငန်းများ သဘောတူ စာချုပ်များတွင် အထက်ပါ အချက်အားထည့်သွင်းချုပ် ဆိုပေးရန်၊</p>
၃။	ဆက်စပ်စီးပွားရေးလုပ် ငန်းများ တိုးတက်ခြင်း	အကျိုးကျေးဇူး	အကျိုးကျေးဇူးမြှင့်တင်ပေး ရန်လိုအပ်	<p>-ဆက်စပ်လျက်ရှိသည့် ဒေသတွင်းစီးပွားရေးလုပ်ငန်းများ တိုးတက် ရန် လက်တွဲကူညီသွားရေး ပေါ်လစီချမှတ်ဆောင်ရွက်ရန်၊</p> <p>-တစ်ဆင့်ခံလုပ်ငန်းများတွင်လည်း အဆိုပါအချက်အား လိုက်နာလုပ်ဆောင်နိုင်ရေး သဘောတူ စာချုပ်များတွင် ထည့်သွင်းချုပ်ဆိုရန်၊</p>
၄။	နိုင်ငံဝင်ငွေ တိုးတက်ခြင်း	အကျိုးကျေးဇူး	အကျိုးကျေးဇူးမြှင့်တင် ပေးရန်လိုအပ်	<p>- ဒေသအာဏာပိုင်များ လမ်းညွှန်မှုများအတိုင်း အတိအကျ လိုက်နာပူးပေါင်း ဆောင်ရွက်ရန်၊</p>

				<ul style="list-style-type: none"> <li>- တာဝန်သိ/တာဝန်ယူမှုရှိသော အခွန်ပေးဆောင်ခြင်းစနစ် တည်ဆောက်ကျင့်သုံးရန်၊</li> </ul>
၅။	ဒေသတွင်းကျန်းမာရေးစောင့်ရှောက်မှု၊ ရေ၊ မီး၊ အမှိုက်သိမ်းစနစ်အသုံးပြုမှုအပေါ်သက်ရောက်မှုရှိခြင်း	ထိခိုက်မှု	ထိခိုက်မှုလျော့ချလုပ်ဆောင်ရန် ပေးလိုအပ်	<ul style="list-style-type: none"> <li>- ကိုယ်ပိုင်ကျန်းမာရေးဝန်ဆောင်မှုပေးရန်၊</li> <li>- ဒေသခံများ သုံးစွဲသည့် ရေနှင့် လျှပ်စစ်မီးအားတိုက်ရိုက်သုံးစွဲခြင်းနှင့် အမှိုက်စွန့်ပစ်မှုအသုံးပြုခြင်းမရှိသည့် နည်းလမ်းရှာဖွေသုံးစွဲရန်၊</li> <li>- ရေအသုံးပြုမှု၊ လျှပ်စစ်ဓါတ်အား အသုံးပြုမှု ချွေတာသုံးစွဲရန်၊</li> <li>- ကိုယ်ပိုင်ကျန်းမာရေးဝန်ဆောင်မှုများ အနီးအနားကျေးရွာများ အထိ ဝန်ဆောင်မှုပေးရန်၊</li> </ul>
၇။	ဒေသတွင်းလူနေအိမ်များပိုမိုလိုအပ်လာခြင်း	ထိခိုက်မှု	ထိခိုက်မှုလျော့ချလုပ်ဆောင်ရန် ပေးလိုအပ်	<ul style="list-style-type: none"> <li>- ဒေသခံများအားဦးစားပေးခန့်အပ်ရန်၊</li> <li>- ရပ်ဝေးဒေသမှအလုပ်သမားရှိပါကစက်ရုံဝင်းအတွင်း အဆောင်လုံလောက်စွာစီစဉ်ပေးရန်၊</li> </ul>

၈။	ခိုက်ရန်ဖြစ်မှုများ နှင့် ဒေသလုံခြုံရေး	ထိခိုက်မှု	ထိခိုက်မှုလျော့ချလုပ်ဆောင်ရန် ပေးလိုအပ်	<ul style="list-style-type: none"> <li>- ဒေသခံများဦးစားပေးခန့်အပ်ရန်၊</li> <li>- ဒေသယဉ်ကျေးမှုနှင့် လူနေမှုစေ့စပ်မှုများအတိုင်း လိုက်နာနိုင်ရန် အလုပ်သမားများအားအသိပညာပေးရန်၊</li> <li>- ဒေသအာဏာပိုင်များနှင့် ပူးပေါင်းဆောင်ရွက် ဖြေရှင်းရန်၊</li> <li>- တစ်ဆင့်ခံလုပ်ငန်းများ သဘောတူစာချုပ်များ တွင်အထက်ပါ အချက်အား ထည့်သွင်းချုပ်ဆိုရန်၊</li> </ul>
၉။	မီးဘေးအန္တရာယ်	ထိခိုက်မှု	ထိခိုက်မှုလျော့ချလုပ်ဆောင်ရန် ပေးလိုအပ်	<ul style="list-style-type: none"> <li>- မီးသတ်တပ်ဖွဲ့နှင့်ညှိနှိုင်းပြီး အဆင့်မြင့်မီးသတ်စနစ်များ တပ်ဆင်ရန်၊</li> <li>- ကိုယ်ပိုင်မီးသတ်တပ်ဖွဲ့ထားရှိရန်၊</li> <li>- အလုပ်သမားများအား ပုံမှန်မီးသတ်သင်တန်းပေးရန်၊</li> <li>- ဒေသခံမီးသတ်တပ်ဖွဲ့နှင့် စဉ်ဆက်မပြတ်ပူးပေါင်းဆောင်ရွက်ရန်၊</li> </ul>
၁၀။	လေထုညစ်ညမ်းမှုဖြစ်ပွ	ထိ ထိခိုက်မှု	ထိခိုက်မှုလျော့ချဆောင်ရွက်ရန်လိုအပ်	-လေထုညစ်ညမ်းမှုကို



	<p>ားလာနိုင်ခြင်းနှင့်ဆက်စပ်သည့်ကျန်းမာရေးဆိုင်ရာထိခိုက်နိုင်မှု</p>			<p>လျော့နည်းသက်သာစေသည့်စက်ကိရိယာများ အသုံးပြုခြင်း -လောင်စာစွမ်းအင်သုံးစွဲမှုကို အတတ်နိုင်ဆုံးလျော့နည်းစေခြင်း -ပတ်ဝန်းကျင်ထိခိုက်မှုနည်းပါးသည့် အခြားအစားထိုးလောင်စာများ သုံးစွဲရန်စီမံခြင်းနည်းလမ်းရှာဖွေခြင်း -ဖုံထိန်းချုပ်ကိရိယာများ အသုံးပြုခြင်း -ယာဉ်ကြောထူထပ်မှုကို ထိန်းချုပ်ဆောင်ရွက်ခြင်း -ဒေသလူထုနှင့်လုပ်သားများအားကျန်းမာရေး စောင့်ရှောက်မှုနှင့် ဆေးဝါးများ တိုးချဲ့ထောက်ပံ့ခြင်း</p>
<p>၁၁။</p>	<p>မိုင်းလုပ်ငန်းများနှင့်ဆက်စပ်သည့်မတော်ဆမှုများ တိုးပွားလာနိုင်ခြင်း</p>	<p>ထိခိုက်မှု</p>	<p>ထိခိုက်မှုလျော့ချဆောင်ရွက်ရန်လိုအပ်</p>	<p>-ဒေသခံလူထုသို့အသိပညာပေးအစီအစဉ်များဆောင်ရွက်ခြင်း -မတော်တဆမှုတားဆီးရေး ဆိုင်းဘုတ်များ အချက်ပြများတပ်ဆင်ခြင်း</p>

**(စ) လူမှုစီးပွားစောင့်ကြည့်လေ့လာရေးအစီအစဉ်များ**

စောင့်ကြည့်လေ့လာလုပ်ဆောင်သွားရမည့် အချက်များအနေဖြင့် အောက်ဖော်ပြပါ လုပ်ငန်းစဉ်များအား လုပ်ဆောင်ရန်အကြံပြုတင်ပြထားပါသည်။

စဉ်	စောင့်ကြည့်ရမည့် အကြောင်းအရာ	အကျိုး ကျေးဇူး (သို့) ထိခိုက်မှု	စောင့်ကြည့်ရမည့်နည်းလမ်း	စောင့်ကြည့် ရမည့် အကြိမ်
၁။	အလုပ်အကိုင်ရရှိမှု အခြေအနေ	အကျိုးကျေးဇူး	- ဒေသခံအလုပ်ခန့် အပ်ထားမှု ရာခိုင်နှုန်း၊	၃လတစ်ကြိမ်
၂။	ဒေသတွင်း လုပ်ငန်းများ ဖွံ့ဖြိုးမှု အခြေအနေ	အကျိုးကျေးဇူး	- ဒေသတွင်း စိုက်ပျိုးရေး လုပ်ငန်းများဖွံ့ဖြိုးမှု အခြေအနေ၊ - ဒေသတွင်းမှ ဝယ်ယူသည့် ပစ္စည်းများနှင့် အသုံးပြုခဲ့သည့် ဝန်ဆောင်မှုမှတ်တမ်းများ၊ - ဒေသအကျိုးပြုလုပ်ငန်းများ၊	၆လ တစ်ကြိမ်
၃။	နိုင်ငံစီးပွား အထောက်အပံ့ ပေးနိုင်မှု	အကျိုးကျေးဇူး	- အခွန်ပေးဆောင်မှု မှတ်တမ်းများ၊	နှစ်စဉ်
၄။	တာဝန်သိ လူမှုဖွံ့ဖြိုးရေး အစီအစဉ်များ	အကျိုးကျေးဇူး	- ဒေသတွင်း လူမှုဖွံ့ဖြိုးရေး လုပ်ဆောင်မှုမှတ်တမ်းများ၊ - ရန်ပုံငွေအသုံးပြုမှု မှတ်တမ်းများ၊ - ဒေသခံ လူထုလိုလားချက်များ ဖြည့်ဆည်းပေးနိုင်မှု အခြေအနေ နှင့်ဖွံ့ဖြိုးတိုးတက်လာမှုအခြေအနေ	၃လ တစ်ကြိမ်

**Environmental Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pale’ Cement Co., Ltd*

၅။	ယာဉ်တော်တဆ ဖြစ်မှု	ထိခိုက်မှု	-စက်ရုံသွားလမ်းပေါ်တွင်စက်ရုံသစ် ကြောင့် တိုးလာသည့် ယာဉ်အရေ အတွက်မှတ်တမ်းများ၊ -စက်ရုံသွားလမ်းပေါ် ယာဉ်တော်တဆ မှတ်တမ်းမပျံ့ဝေး။	လစဉ်
၆။	ဒေသခံလူထု လုံခြုံရေး	ထိခိုက်မှု	- စက်ရုံအလုပ်သမားနှင့်သက်ဆိုင်သ ည့် ရဲမှုခင်း ပြစ်မှု မှတ်တမ်းများ၊ -မတော်တဆဖြစ်ရပ် မှတ်တမ်းများ။	လစဉ်
၇။	ဒေသသယံဇာတများ သုံးစွဲမှု	ထိခိုက်မှု	- လစဉ်ကျောက်ထုတ်လုပ်မှု မှတ်တမ်း - လစဉ်ရေသုံးစွဲမှု မှတ်တမ်း - အမှိုက်စွန့်ပစ်သည့်ပမာဏ နှင့် စွန့်ပစ်သည့်နေရာ	လစဉ်
၈။	မီးဘေးအန္တရာယ်	ထိခိုက်မှု	- စက်ရုံနှင့်တိုက်ရိုက်(သို့)သွယ်ဝိုက် သက်ဆိုင်သည့် ဘေးမတော်တဆ ဖြစ်ရပ် မှတ်တမ်းများ၊ - အလုပ်သမားများအား မီးဘေးကာ ကွယ်ရေးသင်တန်းပေးမှု မှတ်တမ်းများ၊ -ဒေသခံမီးသတ်အဖွဲ့နှင့် ပူးပေါင်း ဆောင်ရွက်မှု မှတ်တမ်းများ။	လစဉ်

၉။	လေထုညစ်ညမ်းမှုဖြစ် ပွားလာနိုင်ခြင်းနှင့်ဆက်စပ်သည့် ကျန်းမာရေး ဆိုင်ရာ ထိခိုက်မှုများ	ထိခိုက်မှု	-ယာဉ်ကြောထူထပ်မှုကို ထိန်းချုပ်ဆောင်ရွက်ခြင်း မှတ်တမ်းများ -ဒေသလူထုနှင့်လုပ်သားများ အားကျန်းမာရေး စောင့်ရှောက်မှုနှင့် ဆေးဝါးများ တိုးချဲ့ထောက်ပံ့ခြင်း မှတ်တမ်းများ	လစဉ်
၁၀	မိုင်းလုပ်ငန်းများနှင့် ဆက်စပ်သည့် မတော်ဆမှုများ တိုးပွားလာ နိုင်ခြင်း	ထိခိုက်မှု	-ဒေသခံလူထုသို့အသိပညာပေး အစီအစဉ်များ ဆောင်ရွက်ခြင်းမှတ်တမ်းများ -မတော်တဆမှုတားဆီးရေး ဆိုင်းဘုတ်များ အချက်ပြများ တပ်ဆင်ခြင်းမှတ်တမ်းများ	၄လတစ်ကြိမ်
၁၂	မိုင်းလုပ်ငန်းများနှင့် ဆက် စပ်သည်နေရာများမှ စိုက်ပျိုးမြေများ ထိခိုက်နိုင်ခြင်း	ထိခိုက်မှု	ဖွံ့ဖြိုးမှုလျော့ချရေးအစီအမံ များ ဆောင်ရွက်ထားရှိခြင်း မှတ်တမ်းများ -စီမံကိန်းလုပ်ငန်းများကြောင့် ထိခိုက်မှုရှိလာပါက သင့်တော်မှုတသည့် နစ်နာကြေး ပေးမှုမှတ်တမ်းများ	၄လတစ်ကြိမ်

(ဆ) စောင့်ကြည့်လေ့လာရေးအဖွဲ့ ဖွဲ့စည်းပေးခြင်း

စောင့်ကြည့်လေ့လာရေးအဖွဲ့အားကုမ္ပဏီမှ တာဝန်ရှိသူများအပြင် ပတ်ဝန်းကျင်  
ထိန်းသိမ်းရေး ဦးစီးဌာနမှ တာဝန်ရှိသူများ၊ ဆက်စပ်လျက်ရှိသည့် ဌာနဆိုင်ရာ

အချို့မှတာဝန်ရှိသူများ၊ ရပ်ကွက်များ မှ တာဝန်ရှိ ပုဂ္ဂိုလ်များဖြင့် ဖွဲ့စည်းထားရှိရန်နှင့် လိုအပ်သလိုပူးပေါင်းဆောင်ရွက်သွားရန် လုပ်ငန်းရှင်အား အကြံပြုထားရှိပါသည်။

၂။ ဒေသခံလူထုအလုပ်အကိုင်အခွင့်အလမ်းရရှိနိုင်မှုအတွက်အစီအစဉ်များ

အလုပ်အကိုင်အခွင့်အလမ်းရရှိမှုအနေဖြင့် စက်ရုံတည်ဆောက်ခြင်း နှင့် လည်ပတ်ခြင်း လုပ်ငန်းစဉ်များတွင် သတ်မှတ်အရည်အချင်းကိုက်ညီမှုရှိပါက ဒေသခံများအား ဦးစားပေးခန့်ထား ပေးမည်ဖြစ်ကြောင်း ပထမအကြိမ်လူထုတွေ့ဆုံပွဲတွင် လုပ်ငန်းရှင်ဘက်မှ ကတိကဝတ်ပြု ပြောကြားခဲ့ပါသည်။

၃။ တာဝန်သိလူမှုဖွံ့ဖြိုးရေးအစီအစဉ်များ

လူမှုဖွံ့ဖြိုးရေး အစီအစဉ်များအနေဖြင့် နှစ်စဉ်အခွန်ဆောင်ပြီး အမြတ်ငွေများထဲမှ သတ်မှတ်ရာခိုင်နှုန်းတစ်ခုအဖြစ်နှစ်စဉ်နှစ်စဉ်သုံးစွဲသွားရန် လုပ်ငန်းရှင်အား အဆိုပြုပြောကြား ထားပါသည်။ သုံးစွဲမှုအနေဖြင့်လည်း လျှပ်စစ်မီး၊ လမ်းပန်းဆက်သွယ်မှု၊ ပညာရေးကဏ္ဍများတွင် အဓိကထား သုံးစွဲသွားရန် အဆိုပြု ထားပါသည်။ သုံးစွဲမှုများအားလည်းကုမ္ပဏီ ဝက်ဆိုဒ်မှတစ်ဆင့် အများပြည်သူသို့ ထုတ်ပြန်ကြေငြာပေးသွားရန် အဆိုပြုထားပါသည်။



## **1. EXECUTIVE SUMMARY**

### **1.1. Introduction**

Green Myanmar Environmental Services Co, Ltd. (GMES) proposes SRP Social Impact Assessment (SIA) Group to conduct Social Impact Assessment (SIA) and Social Management Plan (SMP) for Crown Cement Factory. Crown cement factory was invested by Ngwe Yi Pale Group of Companies and the factory is located in Lauk Hpan Village, Naung Hkio Township, Shan State.

### **1.2. Objectives of Proposed Project**

According to the data provided by the developer, the following are the main objectives of proposed cement factory.

- (a) To encourage the development of cement production in line with international standard,
- (b) To improve living standard of local people via creating of employment opportunities for them, and
- (c) To alleviate poverty and improve socio-economic status of local people and modernization of cities in line with the guidance of the President of the Republic of the Union of Myanmar.

### **1.3. Objectives of SIA**

The main goals of this social impact assessment study include:

- (a) To provide baseline socio-economic conditions of the project area;
- (b) To identify the potential socio-economic impacts, impacts on public services and fiscal positive and negative impacts that will result from construction, operation, and decommissioning phases of the proposed project;
- (c) To propose mitigation and enhancement measures to minimize or avoid negative social impacts and to maximize positive ones; and
- (d) To provide social management plan (SMP) and monitoring program to measure the improvement of the community around the area.

### **1.4. Scope of the Study**

Firstly, the objectives of SIA study, scope of SIA study, SIA study area and study limitations are described. Then, methodologies for SIA study, public participation process, data collection systems, and findings from primary and secondary data collections are discussed. And then, anticipated socio-economic impacts and mitigation/enhancement measures in construction, operation, and decommissioning phases are described. Finally, social management program, social monitoring program, and compensation & CSR program are described in the last section.

### 1.5. Methods of Data Collection

The typical methods of data collection of existing socio-economic conditions consist of the following:

- (a) ***Drawings and Maps***: Published maps and Google map are used to anticipate impacts on nearest villages, farm lands, daily movement pattern of local people, and potential to blockage of existing draining system.
- (b) ***Site Visits***: A number of visits to the study areas were made to verify the information and data already collected through other sources;
- (c) ***Interviews with Residents and Officials of Local Authorities***: Information and data which are not readily available from official records and databases are sourced from interviews with key informers. Such information and data should include community needs, public concerns, and existing culture and social conditions;
- (d) ***Consultations with Experienced Officials***: Interpretation by professionals and experienced people from developer and local communities are sourced in-depth information and data valuable for choice of alternatives.
- (e) ***Interaction with Government Departments***: Interaction with key government departments such as general administrative office, department of agricultural, department of health etc. are conducted to identify constraints and additional information specific to the individual departments and ministries;
- (f) ***Household Surveys***: Questionnaires and surveys are employed to obtain public needs and concerns from a representative sample household.

### 1.6. Data Sources

Primary and secondary data for socio-economic conditions of local communities were collected from the following data sources.

- (a) Review of Ngwee Yi Pale’s policies for local development;
- (b) Regional data from local administrative office;
- (c) Group discussions with key informers,
- (d) Community feedback from household surveys,
- (e) Feedback from government and non-government stakeholders, and
- (f) Public meetings.

### 1.7. Land Acquisition

The project area will use about 460 acres which is 250 acres of plant site and 210 acres of associated area for residential. Among them (220 acres) is uncreative lands that are owned by Government and about 30 acres were legally bought from local land owners who lived near the project (3 people in Lauk Hpan Village, 5 people in Khe Hsan Village). All of the documents that are related to land use and land acquisition are described in **Appendix V**.

### 1.8. Main Socio-economic Impacts and Mitigation Measures

The main socio-economic impacts will be impacts due to the population influx and potential to road accidents. The use of local people as much as possible and proper road safety management system are proposed to mitigate these main socio-economic impacts. Other mitigation measures for moderate to minor socio-economic impacts are also proposed appropriately.

### 1.9. Public Consultation and Participation

In this SIA study, effective public consultation and participation approaches in the form of focus group discussions, public meetings and public disclosure were conducted. Detailed procedures for public participation process will be described in the next sections.

### 1.10. Project Benefits

The following will be the direct and the indirectly benefits of the development of proposed cement factory.

#### **(a) Employment Generation**

The project will create direct and indirect employment for about 80 people for short term during construction phase and about 400 people for long term during operation phase. As the company’s policy is to appoint local people with relevant skill as much as possible, it may be great benefit for local people.

#### **(b) Revenue for the Government**

The Government revenue from the project will increase by the way of direct and indirect taxes, duties, etc.

#### **(c) Increased in Capital Investment**

The proposed project will introduce a significant capital investment in Naung Hkioregion, resulting in sizeable employment creation, increased in socio-economic and regional development.

### 1.11. Developer Policy for Local Development and CSR Program

The company’s policy for local development is to appoint local people with relevant skill as much as possible and policy for CSR program is to contribute at least 2 percent of the annual net profit after tax as CSR program.

### 1.12. Summary for Recommendation and Conclusion

According to the SIA study, all of the socio-economic impacts described in this report can be mitigated to acceptable level with proper mitigation measures. Residual socio-economic impacts after mitigation measures can also be diminished by proposed compensation and CSR programmes. Most of the anticipated social impact can be solved by creating job opportunity for local people. Job opportunities for local people and

revenue for the government will be improve the local and national economy. So it can be concluded that the project could be allowed to operate according to the SIA study under proposed mitigation measures, committed EMP, emergency measures, CSR program and standing rules and laws.

## **2. RELEVANT MYANMAR LAWS AND LEGISLATIONS TO SAFEGARD HUMAN ENVIRONMENT**

Myanmar has promulgated several laws and regulations concerning protection of the human environment. The relevant laws that safeguard the human environment in Myanmar are shown in **Relevant Laws and Regulations for Human Environment in Myanmar**

### **Relevant Laws and Regulations for Human Environment in Myanmar**

<b>Laws and Regulations</b>	<b>Year</b>	<b>Purpose</b>
<b>Town Act and Village Act</b>	1907, 1908	To protect the people and animals of Myanmar from infection diseases.
<b>Public Property Protection Act</b>	1947	To protect forest degradation, illegal logging or poaching, possession or transport of illegal timber or forest product.
<b>Essential Supplies and Services Act</b>	1947	To maintain supplies and services essential to the life of the community providing or regulating water supply and environmental sanitation in rural areas.
<b>Public Health Law</b>	1972	To promote and safeguard public health and to take necessary measures in respect of environmental health.
<b>Forest Law</b>	1992	To implement forest policy and environmental conservation policy, to promote public cooperation in implementing these policies, to develop the economy of the State, to prevent destruction of forest and biodiversity, to carry out conservation of natural forests and establishment of forest plantations and to contribute towards the fuel requirement of the country.
<b>Animal Health and Development Law</b>	1993	To prevent of dangers to animal feeds, prevention of infectious diseases, and prevention of cruelty to animals.
<b>National</b>	1994	To ensue sound environmental policies in the

<b>Environmental Policy</b>		utilization of water, land, forest, mineral resources and other natural resources in order to conserve the environment and prevent its degradation.
<b>Protection and Preservation of Cultural Heritage Regions Laws</b>	1998	To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years; to protect and preserve the cultural heritage regions and the cultural heritage.
<b>Environmental Conservation Law</b>	2012	To implement National Environmental Policy; to set up principles and guidelines for sustainable development; to conserve the clean environment, natural and cultural heritage for present and future generation.
<b>Agricultural Land Law</b>	2012	To protect the rights of the people who are working on the farm.
<b>EIA Procedures</b>	2015	To guide the quality of EIA report according to the regulations.
<b>National Emission Guidelines</b>	2015	To compare and control the quantities of emissions with national guidelines.

### **3. Alternative Analysis for SIA STUDY**

Alternative analysis are made to avoid some of the socio-economic impacts as follow:

#### **3.1. Alternative Location**

The project cannot make to consider alternative location to avoid socio-economic impacts because the project is the extension of existing cement factory and will be built on existing cement factory compound.

#### **3.2. “No Action” Alternative (“No-project Option”)**

If the project were not to proceed (No-project Option), none of the positive or negative impacts identified in this SIA study will materialize. Although some potential social impacts will be avoided by no-go option of the proposed project, the public benefits associated with the project such as industrial development in the region, increased revenue to the government, hundreds of employment opportunities for local people, infrastructure development including roads and electricity in the region, increased business opportunities for local people, skill development, and improved services and community development potential among other benefits would not be realized.

According to the SIA study, all of the anticipated socio-economic impacts can be mitigated by proposed mitigation measures described in this SIA report. So, “no-project”



option of proposed project should not be accepted if the developer will do all of the mitigation, enhancement, compensation and CSR program for all of the anticipated socio-economic impacts and residual impacts after mitigation measures in the present condition. Thus, the “No-project Alternative” would also aggravate the current demand of domestic cement production in the country.

#### **4. SOCIO-ECONOMIC SETTING AROUND THE PROJECT**

According to the study of secondary data, site investigation and interviews with local people during social survey, some important socio-economic setting are as follow:

##### **4.1. Archeological Sites**

- (a) No archaeological sites were identified during field investigations and in relation to site clearing of proposed project there will no impact upon the archaeological record;
- (b) Additional land uses such as tracks and vehicle access will have no impact on any cultural materials; and
- (c) The area has not been used for travel and tour.

##### **4.2. Land Use**

The land use of the proposed project will include about 30 acres of agricultural lands and the rest 220 acres are uncreative lands owned by Government.

##### **4.3. Nearest Residents**

There are 10 villages around the proposed project as shown in Figure 4.1.

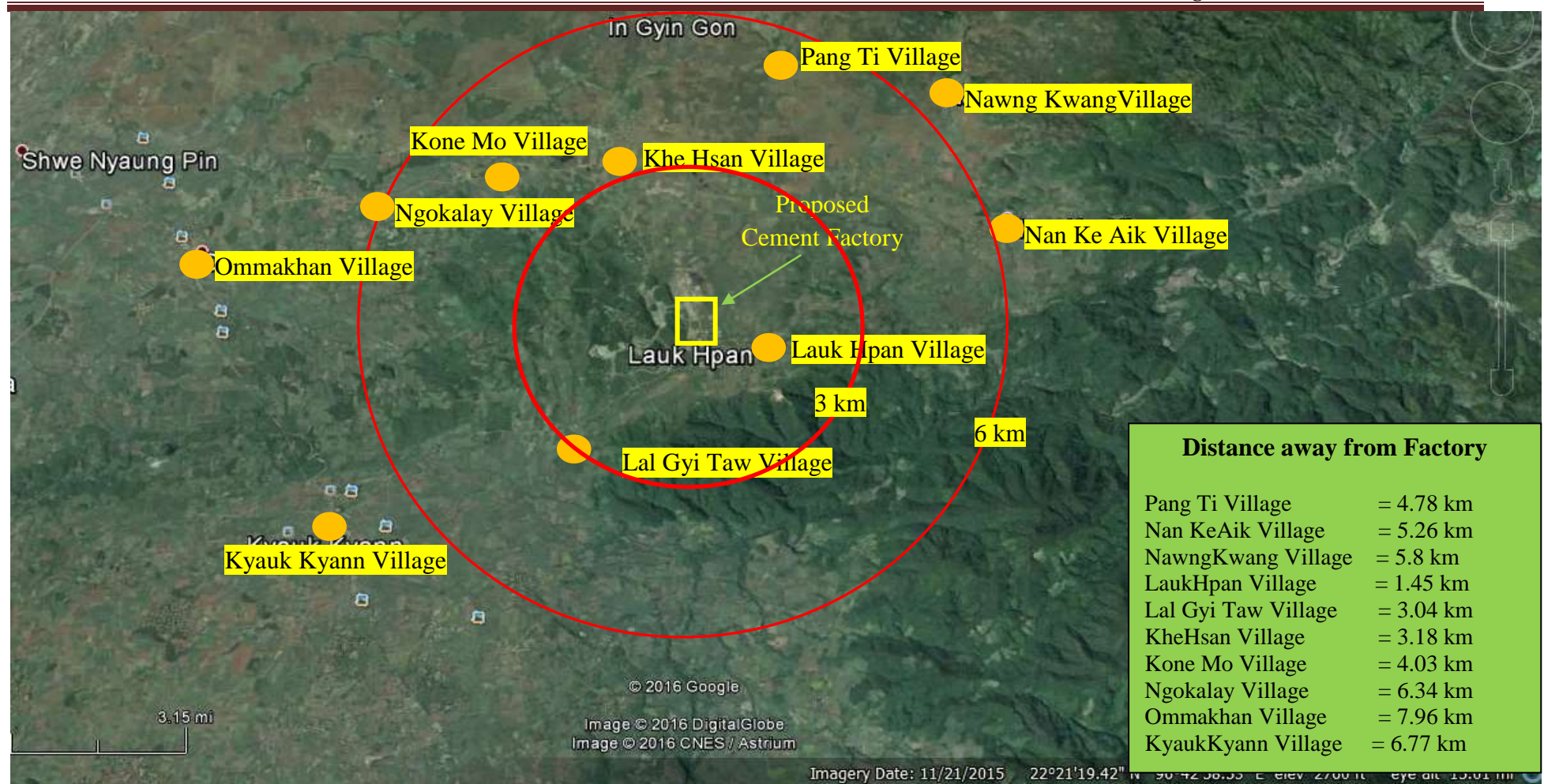
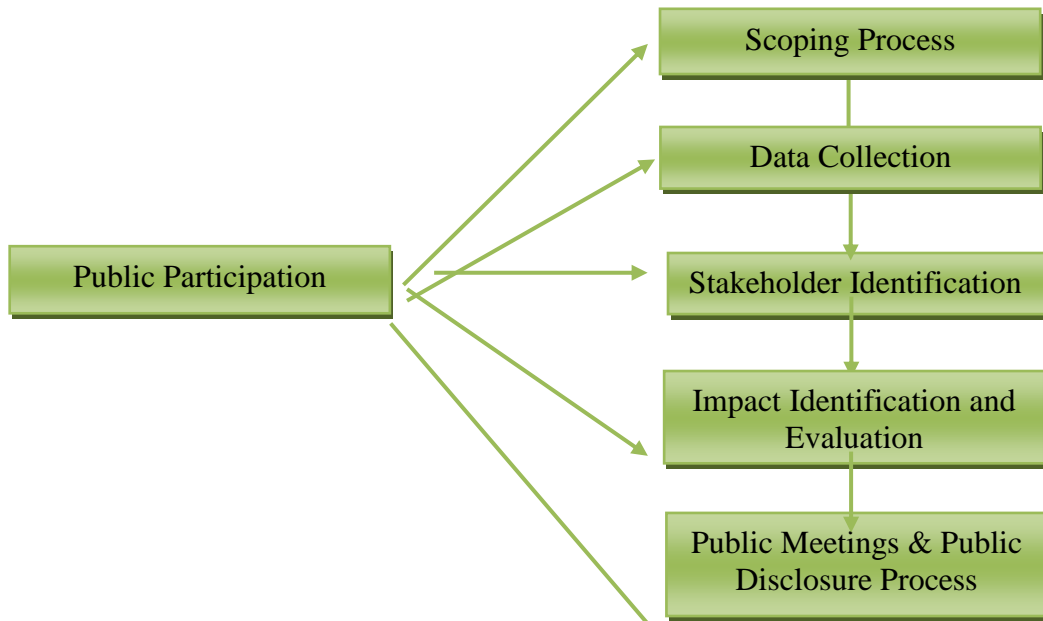


Figure 4.1. Nearest Local Residents around the Proposed Cement Factory

## 5. METHODOLOGY USED IN SIA STUDY

Socioeconomic impact assessment for proposed factory was conducted by the following procedures.



**Figure 5.1. Methodology Used in the SIA Study**

### 5.1. Phase I: Scoping Process for SIA Study

Scoping for SIA study was done to determine SIA study area and potential socio-economic impacts.

#### 5.1.1. Determination of SIA Study Area

Study area was considered after the group discussions with environmental specialists from Green Myanmar Environmental Services Co., Ltd., representatives from Ngwe Yi Pale Co., Ltd., the head of General Administrative Department (Naung Hkio) Township and the heads of villages administrative offices in nearest villages. Based on the discussion results Lauk Hpan Village, Lal Gyi Taw Village, and Khe Hsan Village, can impact due to increase in traffic and road accident, noise at night, particulate matter emission, pressure on social services, etc. All of these villages are located within 3 km radius of the proposed project. So, the SIA team decided the study area should be within 3 km radius around the proposed project. Google Map and census are used for determination of SIA study area as shown in **Figure 4.1**.





Figure 5.2. Determination of SIA Study Area with Heads of Village Administrative Offices



Figure 5.3. Determination of SIA Study Area with Head of Administrative Office (Naung Hkio)

## 5.2. Determination of Project Affected Persons (PAPs) and Possible Socio-economic Impacts in the Study Area

Key PAPs are considered by group discussions with administrative members of villages' heads in nearest villages and key informers after consideration of SIA study area. Possible socio-economic impacts are also anticipated during the discussion. Recorded photos are shown in **Figure 5.4**. According to the discussions, the key PAPs were considered as follow:

- (i) Local residents in Lone Yone Village Tract (Lauk Hpan Village, Lal Gyi Daw Village);
- (ii) Local residents in Own Ma Kar Village;
- (iii) Local residents in Lal Gyi Daw Village;
- (iv) Local People in Ping Ti Village Tract (Khe Hsan Village, Nan Ke Aik Village);
- (v) Local residents in Own Ma Kar Village Tract (Kone Mo Village, Ngokalay Village).





**Figure 5.5. Determination of PAPs by Heads of Village Administrative Offices**

The following table shows household (dwelling) numbers in each village.

Village Tract	Village Name	Dwelling
<b>Pang Ti</b>	Kae Hsan Village	90
<b>Pang Ti</b>	Nan Ki Aik Village	130
<b>Lon Yone</b>	Lauk Hpan Village	104
<b>Lon Yone</b>	Lal Gyi Taw Village	44
<b>Ohm Ma Khar</b>	Kone Mone	56
<b>Ohm Ma Khar</b>	Ngokalay	87

**(a) Sample Size Determination**

The number of households selected to take part in the survey was determined using the Slovin’s Formula (Lauraya & Sala, 1995). The method estimates sample size n from, population size N and sampling error E using the following formula:

$$n = \frac{N}{1+NE^2}$$

Where,

*n = sample size*

*N = total number of households in the study area*

*E = desired margin error*

In order to have a clear understanding about the sampling error “E” value, the correlation between sample size and “E” value were presented in the following table. Gay(1978) as cited by Sevilla et al (1978) offers some minimum acceptable sizes descriptive research, 5% for a smaller population as small as 500 and below and 4% of the population for a larger population as large as 1,500.



**Table: Correlation between Sample Size and Sampling Error**

Population	Margin of Error					
	1%	2%	3%	4%	5%	10%
500	NA	NA	NA	NA	222	83
1,500	NA	NA	638	441	316	94
2,500	NA	1,250	769	500	345	96
3,000	NA	1,364	811	517	353	97
4,000	NA	1,538	870	541	364	98
5,000	NA	1,667	909	556	370	98
6,000	NA	1,765	938	566	375	98
7,000	NA	1,842	959	574	378	99
8,000	NA	1,908	976	580	381	99
9,000	NA	1,908	989	584	383	99
10,000	5,000	2,000	1,020	588	388	99
50,000	8,333	2,333	1,087	617	387	100

Source: Acceptable Sizes & Error- Updated from Glenn D. Israel, 2003

The sampling error will be considered depending upon the percentage of confident level set. This study aimed to set the confident level at 95% and the sampling error at 5% accordingly for small population size of below and around 500.

According to the above calculation, approximately a total of 418 households took part in the study as follow:

**Stratified Systematic Sample for Study Strata**

Village Tract	Village Name	Population	Household (Dwelling)	Sample Size
<b>Pang Ti</b>	Kae Hsan Village	368	90	78
<b>Pang Ti</b>	Nan Ki Aik Village	537	130	98
<b>Lon Yone</b>	Lauk Hpan Village	432	104	82
<b>Lon Yone</b>	Lal Gyi Taw Village	186	44	39
<b>Ohm Ma Khar</b>	Kone Mone	231	56	49
<b>Ohm Ma Khar</b>	Ngokalay	353	87	72
<b>Total</b>		2107	511	418

### 5.3. Data Collections

To assess potential social impacts and baseline socio-economic conditions, SIA team employed both quantitative and qualitative approaches as follow:

- (a) The primary data collection (quantitative approach) of socio-economic around the 3 km radius of the proposed cement factory, and
- (b) The secondary data collection (qualitative approach) for the whole Naung Hkio Township.

#### 5.3.1. Primary Data Collection

Under the quantitative approach, household sample survey was conducted to evaluate primary socio-economic conditions of the project area and to understand the mood, perceptions and extent of preparedness of the people towards the proposed project. The collection of primary data consisted of focus group discussions and household surveys in the target area. The accuracy of primary socio-economic data was based on the accuracy and quantity of household survey.

##### 5.3.1.1. Household Survey

The survey was undertaken in those villages located at nearest proximity to the project vicinity where the project has potential impacts on socioeconomic activities of local community. The survey was carried out to tap the baseline socio-economic conditions of project area and to assess project perceptions and attitudes of the local people over a period of five days.







Figure 5.6 Primary Data Collection by Household Survey

The following methodologies have been used for carrying out during household survey:

- (a) Local communities, individuals, and owners and employees of commercial establishments who are directly or indirectly affected were given priority while conducting public consultation.
- (b) Walk-through informal group consultations were held in the proposed project area.
- (c) The local communities were informed through public consultation, with briefing on project interventions, including its benefits.

**(a) Formation of Household Survey Team**

The team was formed with researchers from social, medical, and engineering sciences having research experiences in the field of social impact assessment and social management planning. The team conducted desk review of literature and relevant documents, and official records by interacting with local government authorities and by searching available resources. The team also collected primary data by conducting household socioeconomic survey. The team also engaged in extensive public consultation activities to know more about the past and present socioeconomic conditions and key social issues faced by the local people.

The team organized 10 people (4 socio-economic consultants, 1 health consultant, 2 local people and 3 social surveyors). Four socio-economic consultants are three from the Yangon Technological University (YTU) and one from Taungyi University. Health consultant is Medical Doctor. Two local people are members of quarter administrative offices and 3 surveyors are from qualified survey team. Roles and responsibilities of key consultants are as follow:

**Survey Team for Proposed Cement Factory**

No.	Consultants	Role	Responsibility
1.	Dr. Kyaw Swar Tint	Social Specialist	Impacts Evaluation and Social Management Plan
2.	Dr. Than Aung Htwe	Social Consultant	Impacts Identification and Mitigation Measures
3.	Dr. Thein Tun	Social Consultant	Primary Data Analysis
4.	Dr. Myo Min Htun	Social Consultant	Secondary Data Analysis
5.	Dr. Khon Aung	Health Consultant	Social and Health Impact Identification

**(b) Development of Survey Questionnaire**

Design for household survey questionnaire was based on Living Standard Measurement Survey (LSMS) examples and those items used in existing socioeconomic survey questionnaires frequently used in developing countries throughout Asia and Africa. Socioeconomic aspects to be included in this questionnaire were based on site visits and issues identified by interviews with local people and village heads. Items were formulated by the consultant and reviewed by social assessment team members as to clarity of item wordings and relevance to the socioeconomic domains measured. The survey

questionnaire was designed to collect information as to the following household characteristics:

- (i) household composition (age, gender, educational status, religion, ethnicity, language used and marital status);
- (ii) occupations;
- (iii) ownership of agricultural fields and livestock;
- (iv) energy sources and facilities;
- (v) agricultural and other economic activities;
- (vi) daily movement patterns;
- (vii) income and expenditure patterns;
- (viii) access to and use of community services/facilities and natural resources;
- (ix) health and nutrition; and
- (x) views/concerns/suggestions on the proposed development.

### **(c) Recruitment and Training**

The enumerators were received a training program prior to commencing with the fieldwork. The training program included a briefing on the objectives of the survey, socioeconomic aspects to be measured, interview techniques as well as a detailed explanation of each question and its relevance to the survey objectives, how to pose the question and how to code the answer. Discussions were also held among participants about the socioeconomic conditions and initial questionnaire items were revised based on the discussion results. A set of guidelines were given to each enumerator for administration of survey questionnaire. The training program for social survey data collection was carried out two days. In the field data collection activities, the enumerators were supervised by experienced supervisors with household survey. In household survey data collection period, field supervisors checked and ensured the control of data quality.

### **(d) Observation and Photographic Records**

During field surveys, information obtained through household survey and interviews was corroborated through direct observation by the study team aiming at assessing social and cultural infrastructure existed in the project area, physical assets of people, and living conditions. Observations were backed up by photographic records.

### **(e) Data Analysis**

Quantitative data were coded and processed using SPSS statistical package. Qualitative data were coded using standard methods.

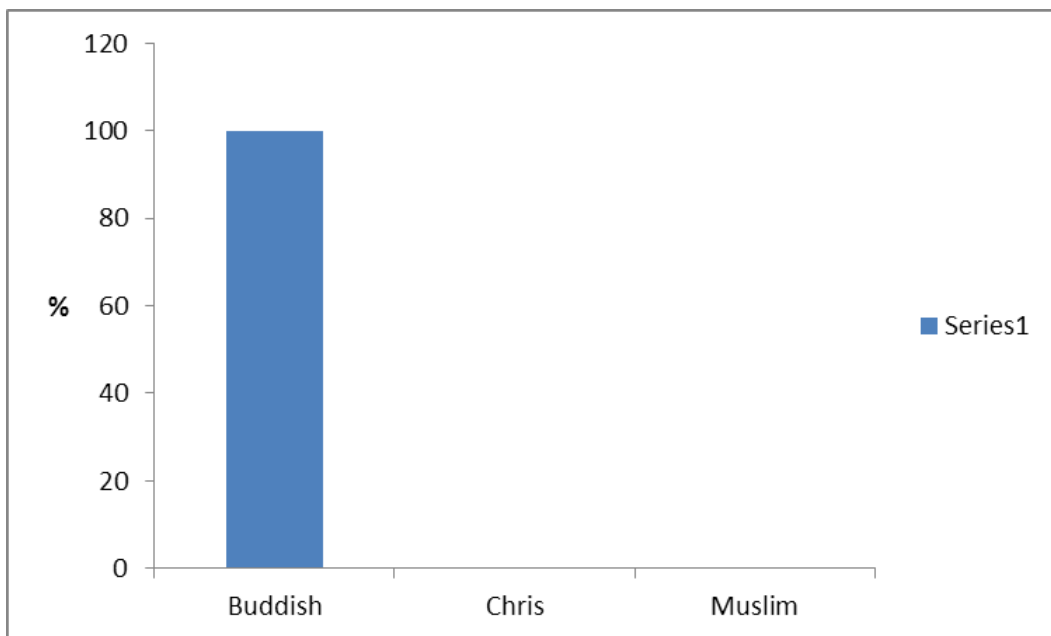
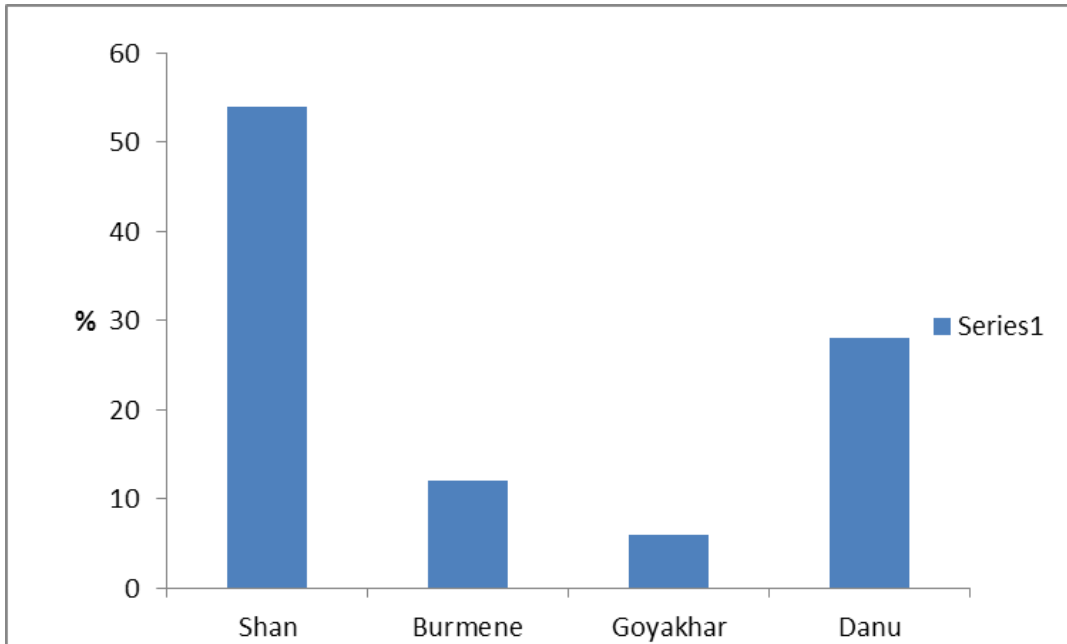
#### **5.3.1.2. Socio-Economic Profile Resulting from Primary Data Collection**

According to the data analysis, the following are the main socio-economic data resulting from primary data collection (household survey).

#### **(a) Major Ethnic Groups and Religious**



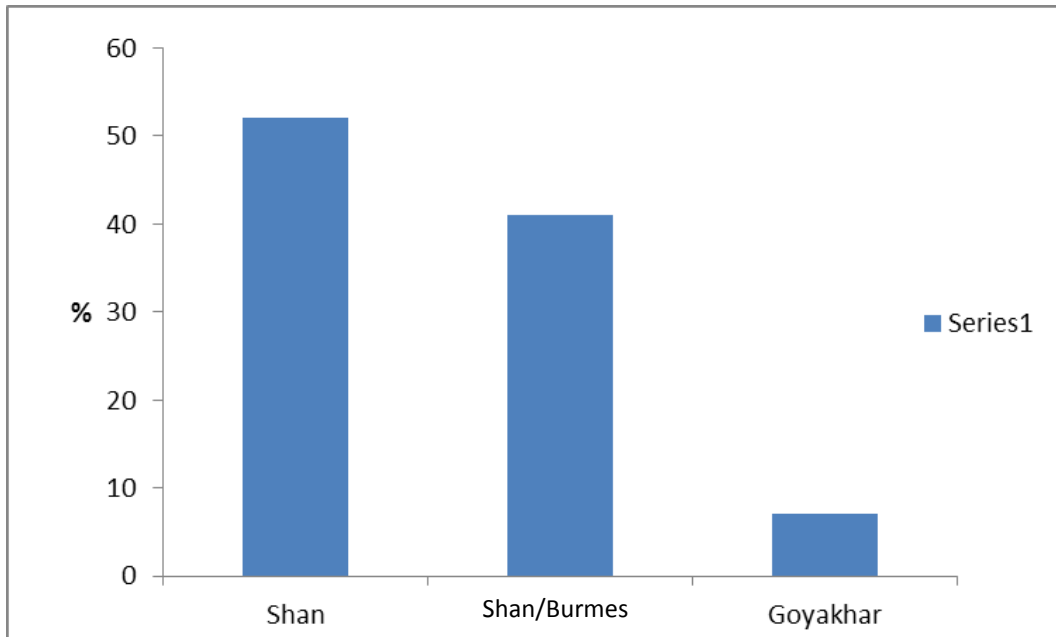
The project area comprises of four major ethnic groups, that is, Shan, Myanmar, Danu, and Goyakhar. Within the project affected villages, the dominant ethnic group is Shan (54%), followed by Danu (30%), Myanmar (10%), and Goyakhar (5%). The only one dominant religion of the people in the project area is Buddhism nearly 100%.



According to the survey result, most of the people are Shan and Danu. Moreover, all of the local people are Buddhism, so the developer should have to aware not to impact on custom of Shan and Danu due to the workers (both local and foreign workers).

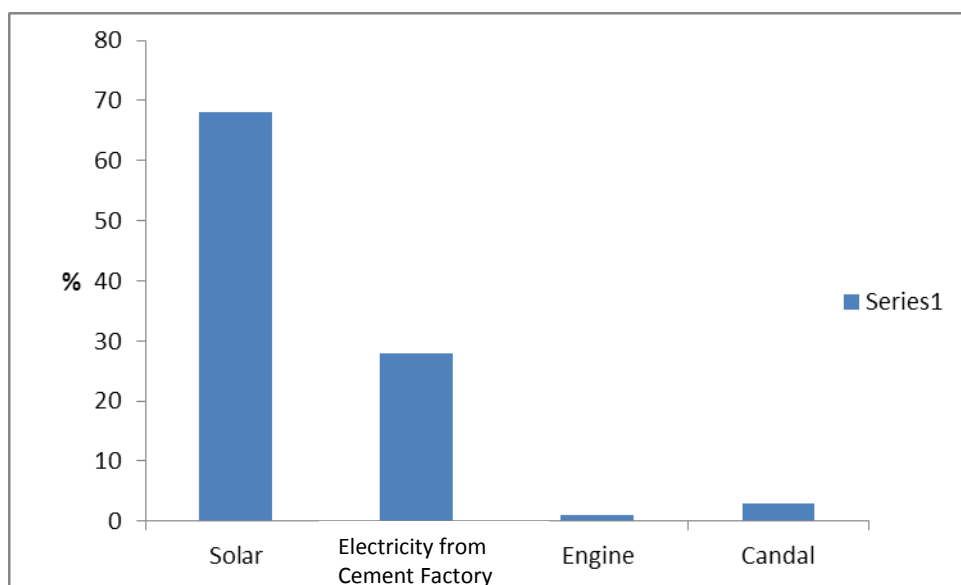
**(b) Language**

Household survey results identified three major languages commonly used in the project area, that is, Only Shan (52%), Both Shan and Myanmar (42%), and Goyakhar (6%).



**(c) Energy Sources for Lighting**

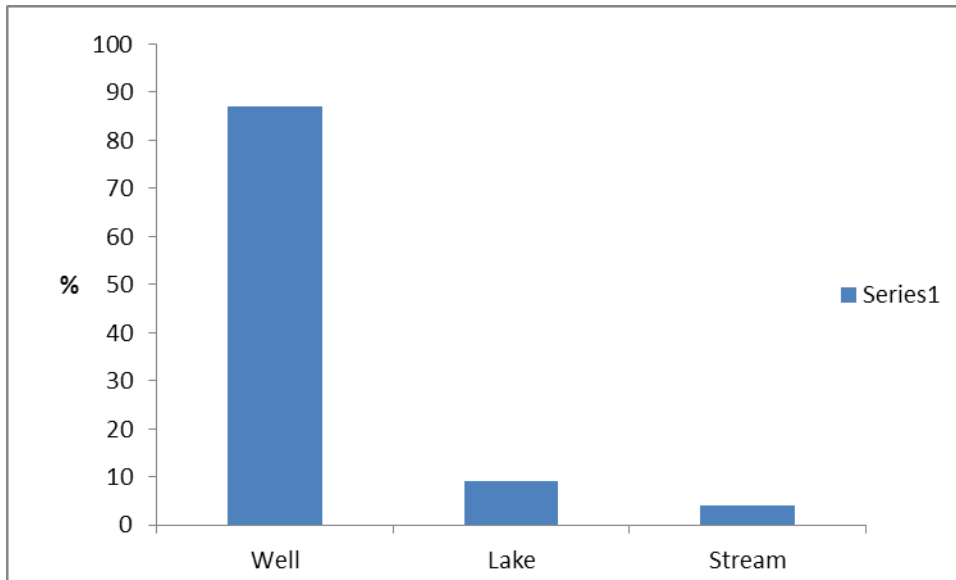
Primary data from household survey revealed that the two main sources of energy for lighting in the project area are solar (68%) and electricity provided by Crown Cement Factory (29%). Few households used generator and candle for lighting.



According to the primary data collection, most of the local people used solar energy for electrification. However, they believed that solar energy is not obtainable regularly during rainy seasons and damage due to the intense heat during summer. So, they want to get electricity from cement factory as part of the CSR program.

**(d) Domestic Use of Water**

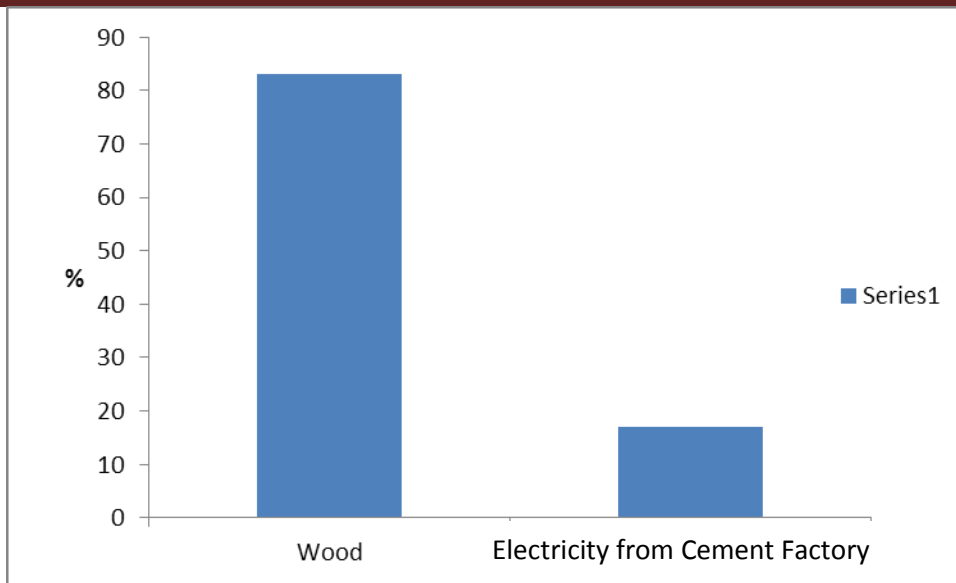
Access to clean and safe water is crucial to the health population and thus have a direct impact on the quality of life of local community. The survey results on domestic water sources used by communities in the project area are provided in the following figure. Majority of households in the project area obtained their domestic water from shallow well. Lake (10%) and Stream (5%) were found to be another source of domestic use of water in the area.



According to the primary data collection, there have potential to dry up of domestic water in some nearest villages during summer and so Ngwe Yi Pale should have a plan for to get safe drinking water supply to nearest village during summer as part of CSR program.

**(e) Energy Sources for Cooking**

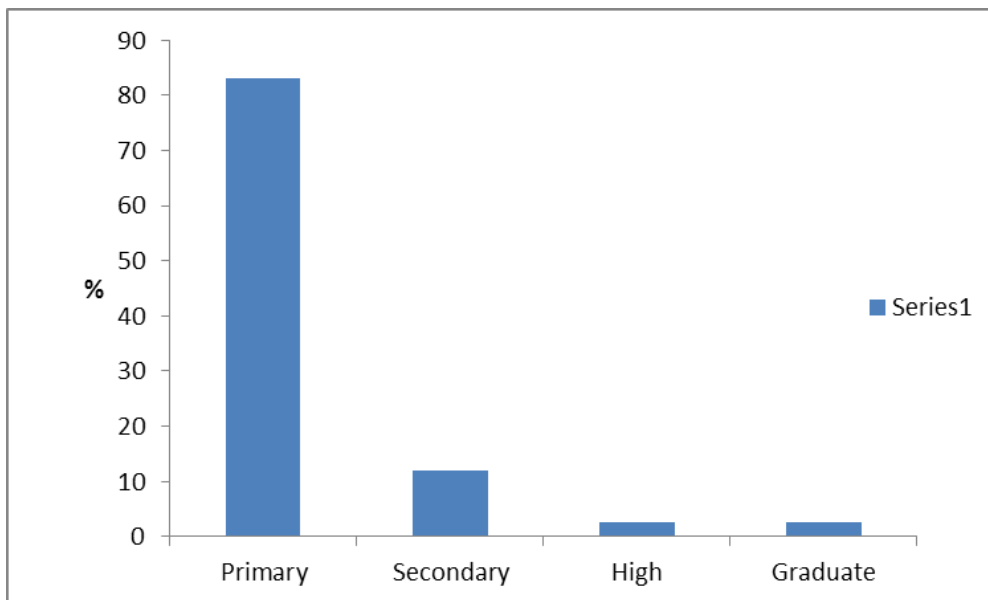
Primary data from field survey show that firewood was the main source of cooking in the entire project area standing at (82%), followed by use of electricity from the cement factory (18%).



According to the survey, most of the people are not too familiar to use the electricity for cooking. So, Ngwe Yi Pale should have a plan for training program to use the electricity for cooking safety for local people and workers in nearest villages. It will also help to reduce deforestation.

**(f) Educational Attainment**

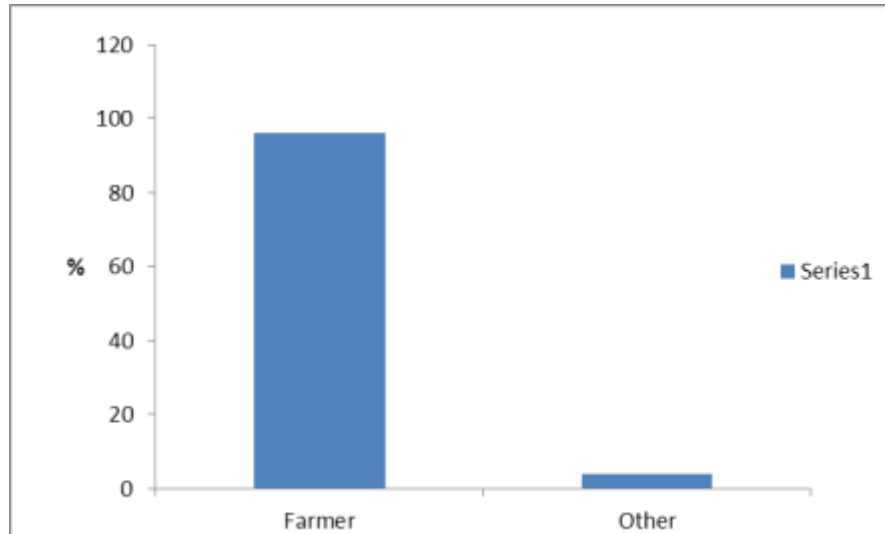
The educational attainment of respondents enumerated in the household socioeconomic survey in the project area is reported in the following figure.



Overall, educational attainment of local residents in the project area was found to be relatively low. More than 80% of the total sample had some form of primary education, and 10 % proceeded to middle school education. Of the sample, only (4%) completed high school while (3%) graduated a bachelor degree.

**(g) Livelihood and Occupation**

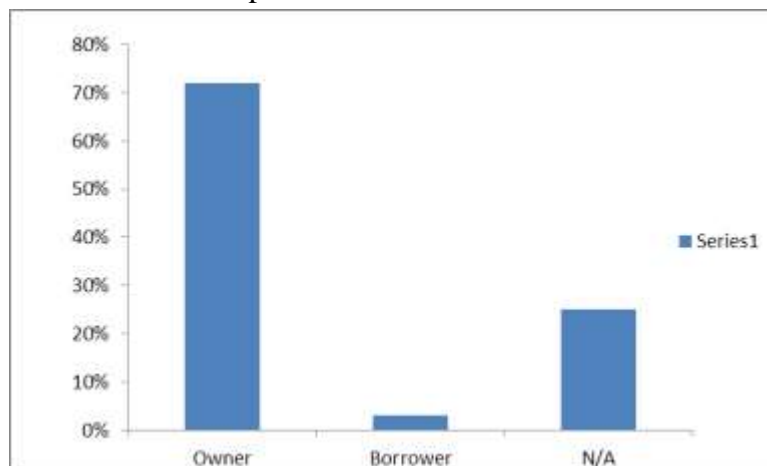
In the project area (97%) of the household population enumerated in the household survey reported that their main occupation was farming. The largest proportion of households in the area is rural based, and farming is the major source of household income. Other occupational categories (trade and services) represent a small portion of the sample households in the survey (3%).



The land used for the proposed project will have no impact on livelihood and occupation pattern of local people because most of the land used for proposed factory is not suitable of agricultural land due to soil type and location (near the mountain).

**(h) Ownership of Farmland**

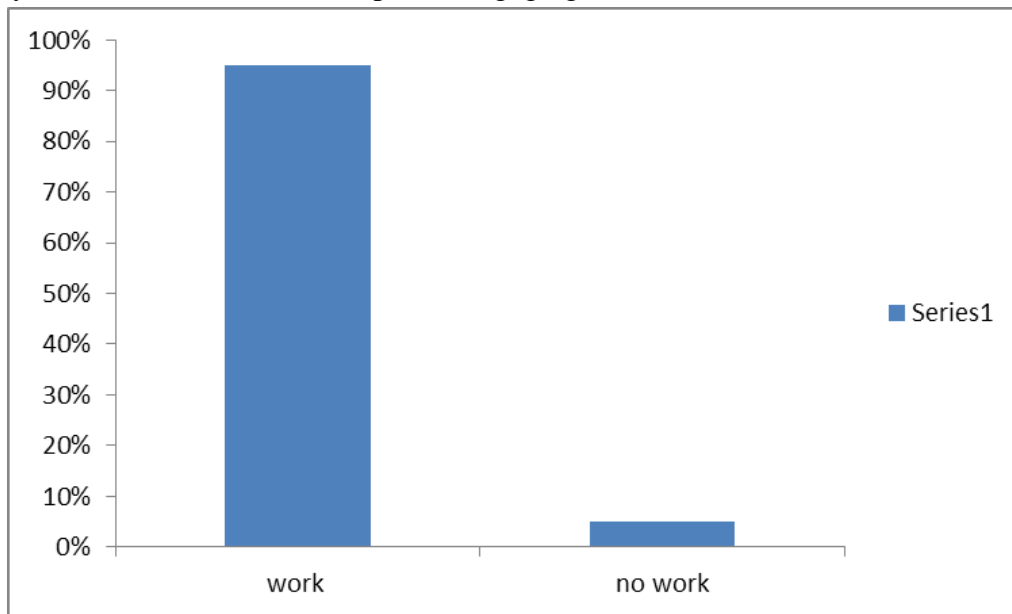
Status of the ownership of homestead was also recorded in the household survey. The vast majority (72%) of the households enumerated in this socio-economic study owned their farmland. Of the total households, (4%) were found to be hired and the rest of respondents did not report their status of ownership.



**(i) Employment**



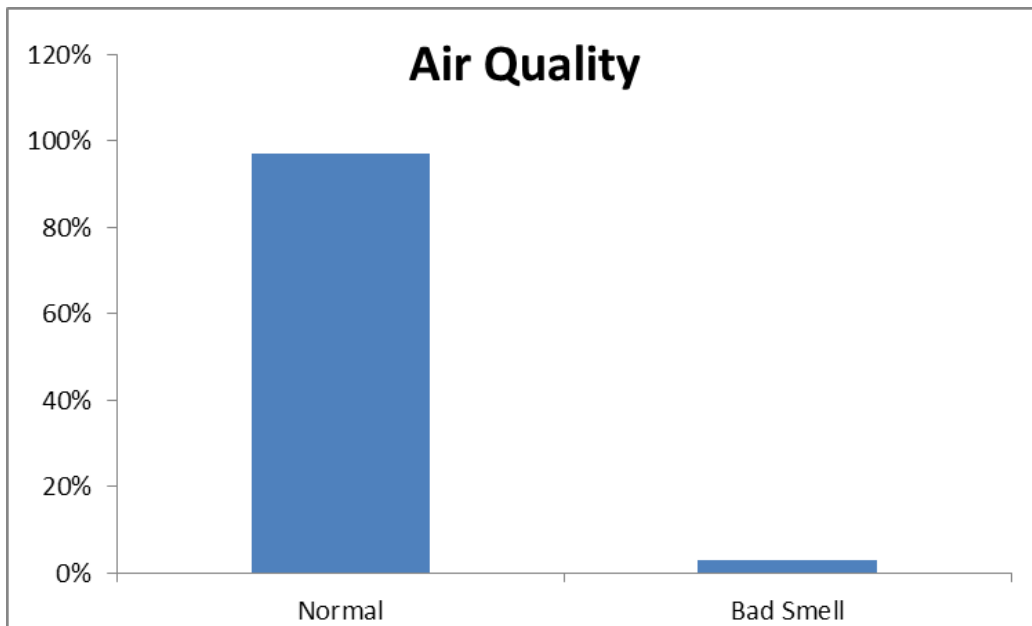
Employment status of respondents was also recorded in the household survey. The following figure indicates the results. More than 90% of respondents were found to have employment while less than 5% reported engaging in no work.



So, Ngwe Yi Pale should have a plan to ensure job opportunities for local people.

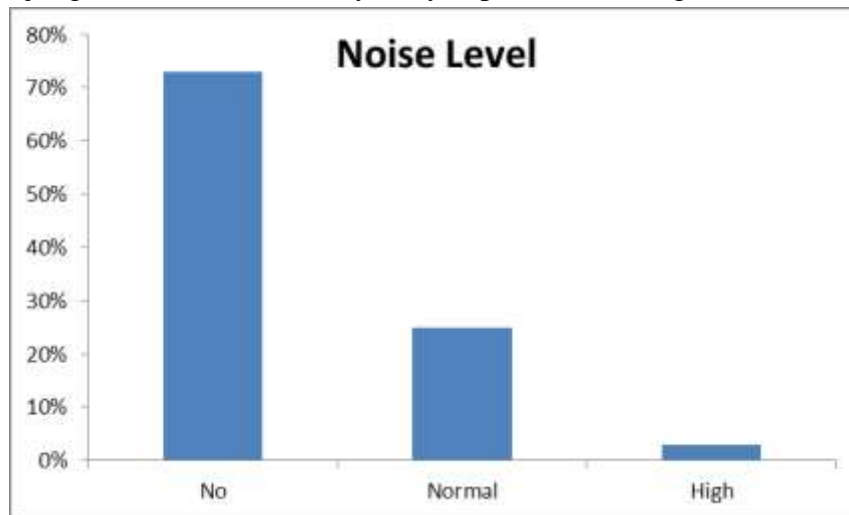
**(j) Ambient Air Quality**

In the survey, respondents were asked to indicate outdoor air quality in the environment. More than 90% of respondents reported the air quality they experienced as normal. Less than 10% (people in Lauk Hpan Village) revealed that they perceived bad odor from the burning of lime from existing cement factory.



**(k) Existing Noise Condition**

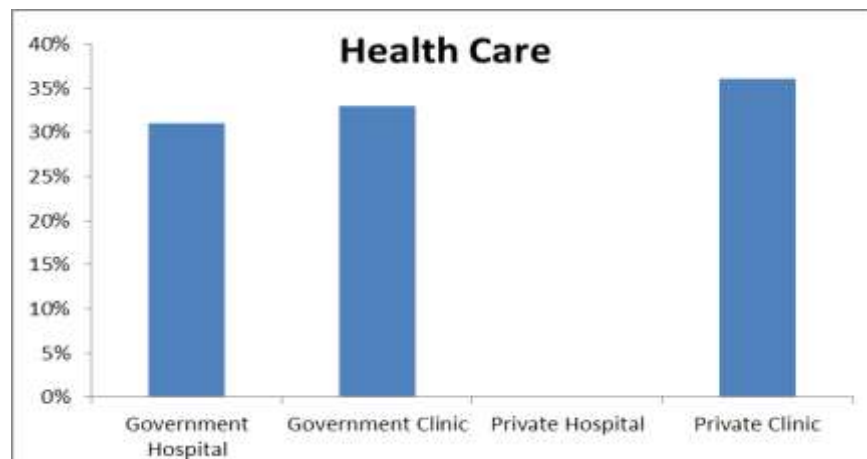
Respondents in the survey were asked to indicate the degree of noise level they experience daily from surrounding. As depicted in the following figure, more than two-third of respondents indicated no noise while nearly 25% reported normal noise level, and few percent (3%) judged the noise level they daily experienced as high.



Most of the people who answer high noise level are people in nearest villages (noise from factory) and people near the main road to the factory (noise from transportation).

### **(I) Healthcare Services**

There were three types of healthcare centers people in the project area usually go for their illness and disease. As shown in the following figure, private clinics in Naung Hkio Township were the most common centers people attended (36%), followed by public rural healthcare centers (33%), and government hospitals (31%).



According to the household questionnaires, some local people answered that it is a little difficult to go to public hospital in Naung Hkio and Station Hospital (Ban Bwe). So, medical representative of private health clinic inside existing cement factory concluded that the private clinic inside the cement factory is the most dependable for local people in nearest villages. Moreover according to the SIA study, private health clinic inside the factory is not enough for additional people of extension cement factory. So, Ngwe Yi Pale should upgrade existing health care facilities of standing cement factory.

**(m) Most Public Needs and Concerns by Primary Data Collection**

During social survey, immediate community needs and concerns were assessed. The most important positive outcomes from the project expected by the local people include getting of electricity in nearest villages and enhancement of all round improvements in religious, education and access road as follow:

No.	Village Name	Most Public Need and Concerns	
		Public Concerns	Public Needs
1.	Lauk Hpan Village	- High noise level at night (45% of respondents)	- Upgrading internal roads within the village - Renovation of monastery - Ferry for students in Kyute-Sa-Khan Quarry - Upgrading school for additional students in next year
2.	Lal Gyi Taw Village	-	- Getting of Electricity - Tube well for constant water supply during summer - Private clinic for health care
3.	Khae San Village	- Odour during line burning (16% of respondents) - Noise (38% of respondents)	- Getting of Electricity - Upgrading village road
4.	Kone Moe Village	- Impact to agriculture land due to blasting for lime stone (15% of respondents)	- Tube well for constant water supply during summer (25% of respondents) - Private clinic for health care - Public school for education
5.	Ngut Ga La Village	-Dust emission during transportation of cement bag (68% of respondents) - Odour during lime stone burning (38% of respondents) - Potential to road accidents (75% of respondents)	- Getting of Electricity - Tube well for constant water supply during summer - Private clinic for health care
6.	Nan Ke Aik Village	-	- Getting of Electricity - Upgrading village road

All of these data are local people hopes on the proposed project according to their wishes and concerns that were got from household survey in their surroundings on surveying within the limited borders (within 3 km radius).

**5.3.2. Secondary Data Collection (Qualitative Approach)**

For qualitative approach, data on demographic distribution of Naung Hkio Township are sourced from local government offices. The project data are provided by the developer.

**5.3.2.1. Regional Socio-economic Profile by Secondary Data Collection**

The regional socio-economic profiles resulting from secondary data collection are as follow:

**(a) Township Profile**

Naung Hkio Township is situated in northern Shan State in the East of Myanmar with an area of 1265.61 sq. miles. The township lies between 22°45´ and 23°15´ north latitude and 96°00´ and 97°00´ east longitude. Its length in the South-North is 35 miles and East-West direction is 27.4 miles. Naung Hkio Township borders Kyaukme Township in the east and North, Yat Sauk in the South, and Pyin Oo Lwin in the West. Altitude ranges from 700 feet above the sea level in the lowest to 4300 in the highest with an average of 2750 feet. Nearly half of the center of land is plane surrounded by maintains. More than half of the surface area is covered by rain forests. Overall township profile of Naung Hkio Township is mentioned in the following table.

**Table 5.1. Overall Profile of Naung Hkio Township**

<b>Location</b>	
Coordinates	Latitude 22°45´ to 23°15´ N , Longitude 96°00´ to 97°00´ E
Adjacent Territory N/E/S/W	Kyaukme/ Yat Sauk/ Pyin Oo Lwin
Areas	1265.61 sq. miles
Above sea level	2,750 feet
<b>Administrative division</b>	
Overall Township	1 town, 6quarters and 253 villages
<b>Household Information</b>	
Dwelling	26,576
Household	25,653
Population	125, 269

**(b) Climate**

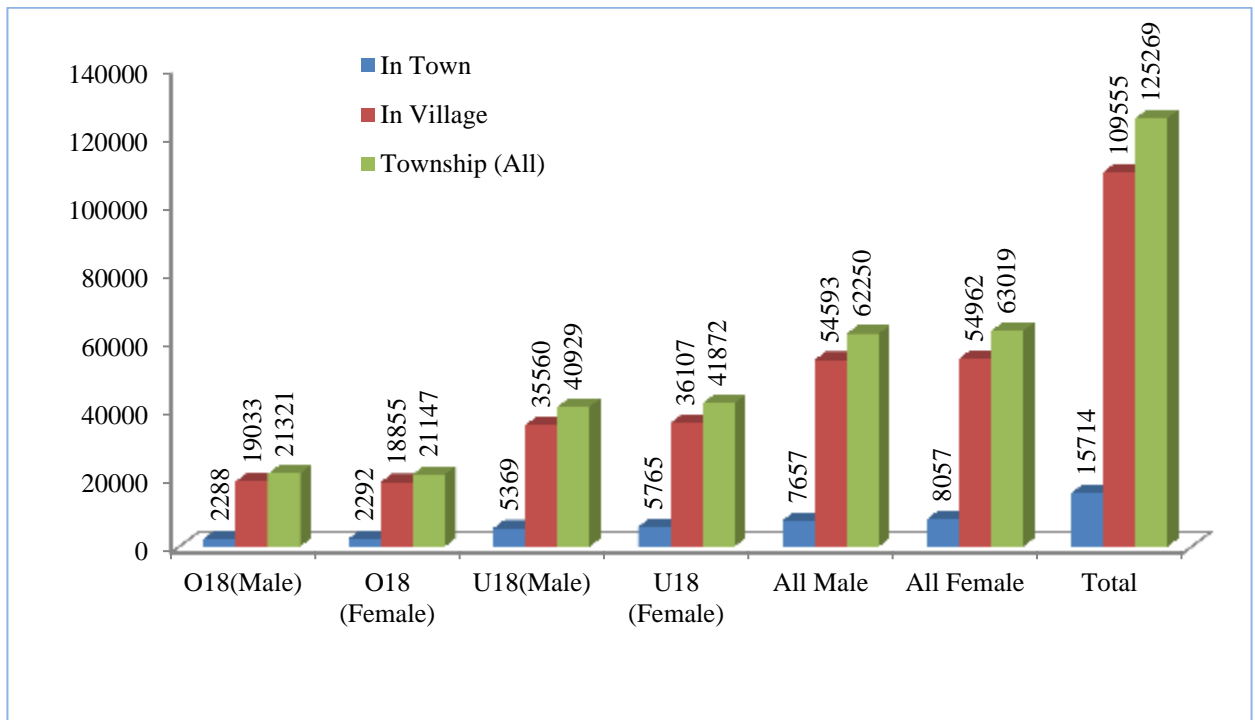
Naung Hkio gets monsoon climate with minimum temperature of 7.8°C and maximum of 32.3°C. Average number of raining days range from 73 to 105 days per year (from 2010 to 2013) and annual rain fall varies from 38.33 to 59.21 inches. Many small rivers and streams are running across the township throughout the year.

**(c) Demographic Details**

Household information and population details of the overall township (up to the middle of 2015) are described in Table 5.2. As indicated in the table, majority of township population live in rural area. Female population slightly outnumbered males. Over 66% of township population was persons younger than 18 years of age. According to the 2014-Union Census, total dependency ratio of Naung Hkio Township was 49.3. Population density is estimated as 226 persons per sq. mile in the township.

**Table 5.2. Household and Population of Overall Township**

Residence	Older than 18			Younger than 18			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
<b>Urban</b>	2288	2292	4580	5369	5765	11134	7657	8057	15714
<b>Rural</b>	19033	18855	37888	35560	36107	71667	54583	54962	109555
<b>Total</b>	21321	21147	42465	40929	41872	82801	62250	63019	125269



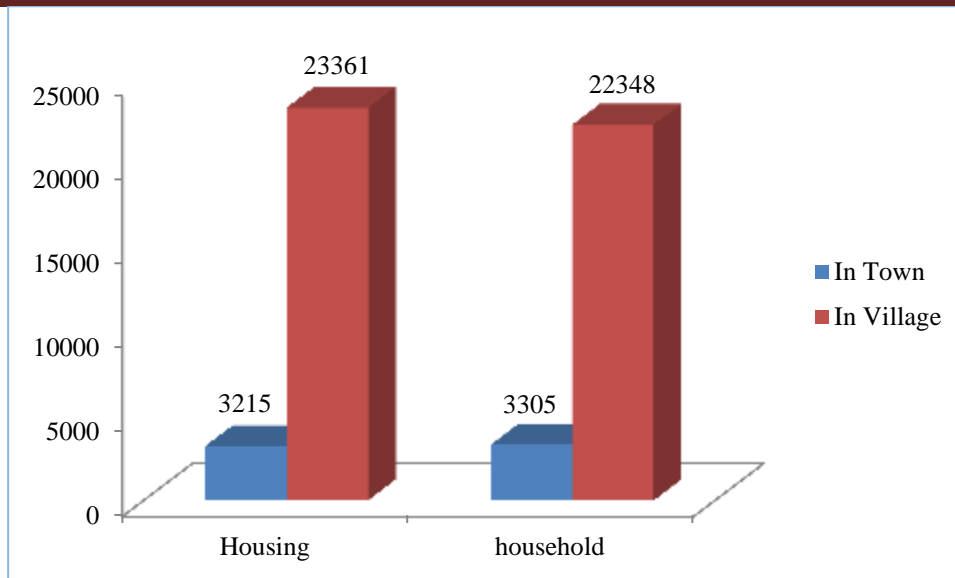
**(d) Administrative Division**

Administrative division of Naung Hkio Township is comprised of 6 quarters, and 35 village tracts.

**(e) Government Organizations**

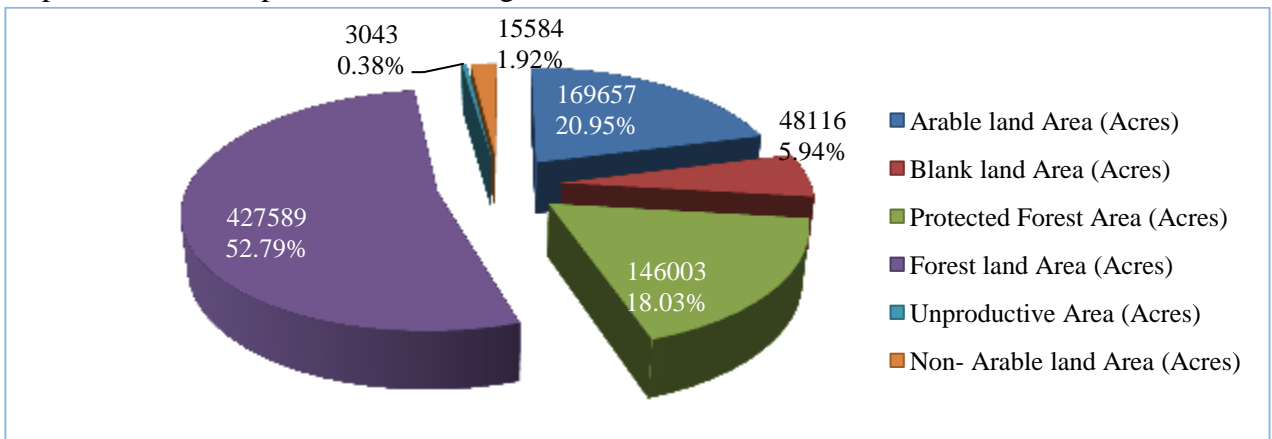
There are 46 government departments or organizations and 2,660 public service employees in the overall township.





**(f) Land Used Pattern**

Naung Hkio Township has 169,657 acres of cultivated land area, of which 15,110 acres are paddy cultivated land and 131,238 acres are farmland and 21,910 acres orchards. Key crops of the township are maize and sugarcane.



**(g) Ethnicity, Language and Religion**

According to official statistics (see Table 1.5), three major ethnic groups in Naung Hkio are Danu (36.7%), Shan (31.4%), and Bamar (21.8%). Other ethnic minority groups include Kachin (1.5%), Kayah (0.01%), Palaung (0.2%), Kayin (0.2%), Rakhine (0.1%), Chin (0.2%), Mon (.04%), Li Su (0.2%), Larhu (0.04%), Ko Kant (0.01%), others (7.4%), and foreign nationalities (0.14%). Bamar and Shan are the common languages used in Naung Hkio. Table 5 reveals that the majority of local people are Buddhists (92.4%), followed by Hindus (3.2%), Christians (2.2%), Moslems (1.2%), and Thus, only one religious group is dominating there. There are many religious places in the region including six historic and well-known pagodas and six well-known monasteries for Buddhists. There are also 10 churches, 33 Hindu temples, and 4 mosques.

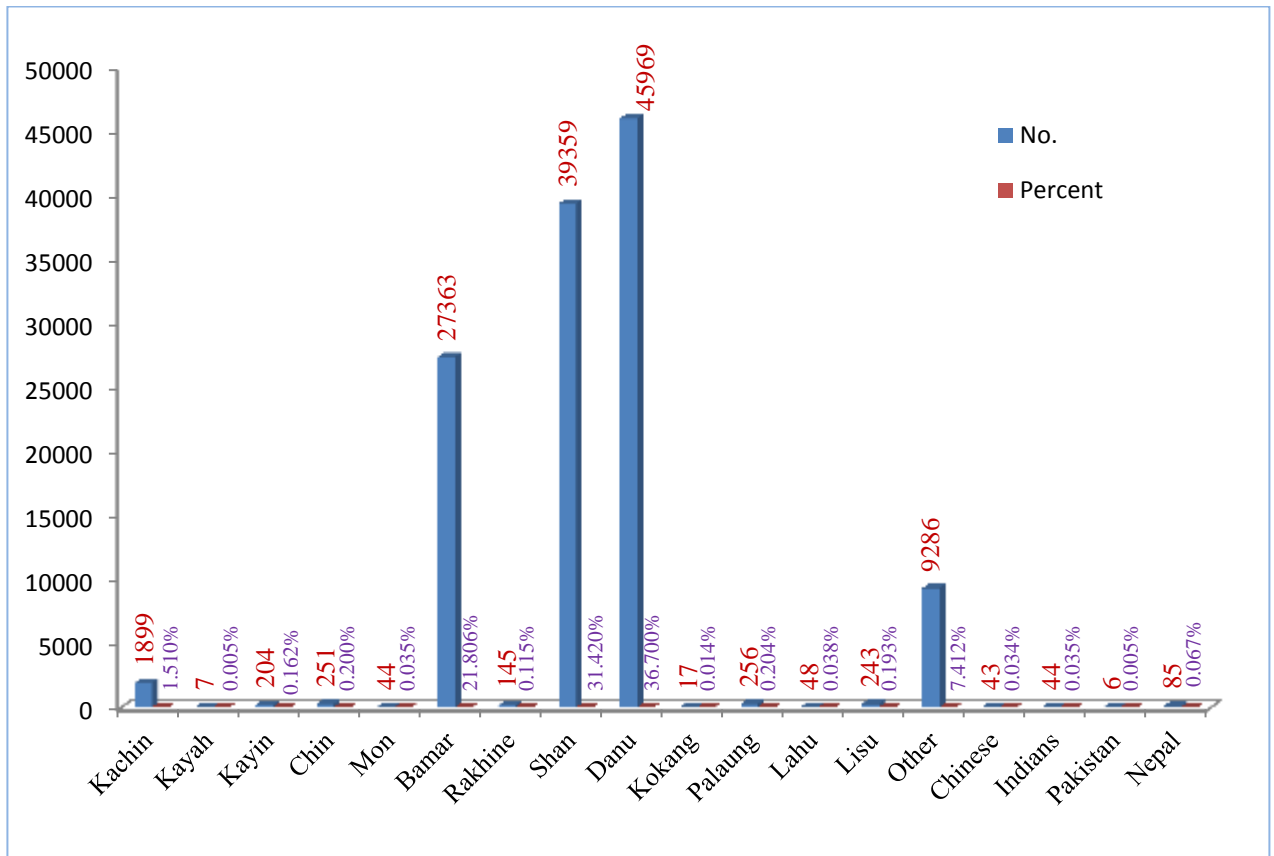
**Table 5.3. Ethnic Groups in Naung Hkio**

Ethnicity	Population	Percentage

**Social Impact Assessment Report  
For “Crown Cement Plant 5,000 TPD”**

*Ngwe Yi Pa Le Cement Co., Ltd*

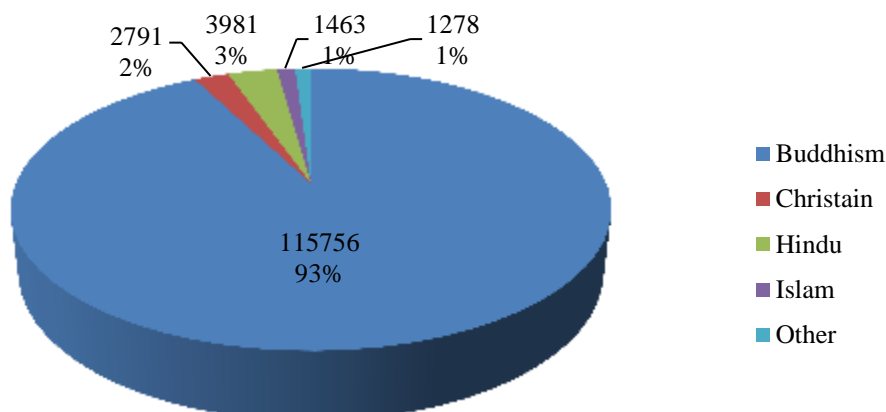
<b>Kachin</b>	1899	1.51
<b>Kayah</b>	7	0.01
<b>Kayin</b>	204	0.16
<b>Chin</b>	251	0.2
<b>Bamar</b>	27363	21.81
<b>Mon</b>	44	0.04
<b>Rakhine</b>	145	0.12
<b>Shan</b>	39359	31.42
<b>Danu</b>	45969	36.70
<b>Ko Kant</b>	17	0.01
<b>Palung</b>	256	0.20
<b>Li Su</b>	243	0.19
<b>Larhu</b>	48	0.04
<b>Others</b>	9286	7.41
<b>Foreign nationalities</b>	178	0.14
<b>Total</b>	125269	100



**Table 5.4. Religious Groups in Naung Hkio**

<b>Buddhism</b>	<b>Christian</b>	<b>Hindu</b>	<b>Islam</b>	<b>Other</b>	<b>Total</b>
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<b>115756</b>	2791	3981	1463	1278	125269
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**(h) Education**

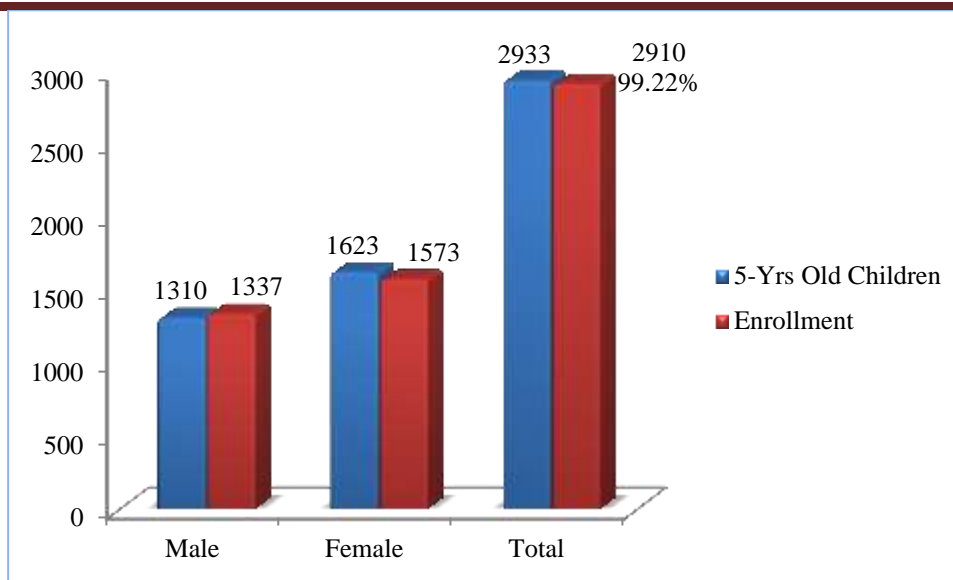
In primary education, school enrollment rate of 5-year-olds is 99.22% in the overall township. Percentage of students passing the matriculation is 29.28%. The teacher-student ratios are 1:32 in Post-Primary schools, 1:32 in BEMS, and 1:38 in BEHS. Data on education and literacy report that literacy rate of persons 15 years and older in Naung Hkio Township was 99.89%.

**Table 5.5. Educational Infrastructure**

School	No. of Schools	No. of Teachers	No. of Students	Teacher/Student Ratio
<b>BEHS</b>	11	233	8845	1:38
<b>BEMS</b>	14	135	4316	1:32
<b>BEPPS</b>	149	729	23301	1:32
<b>Monastic school</b>	2	15	495	1:35

**Table 5.6. School Enrollment**

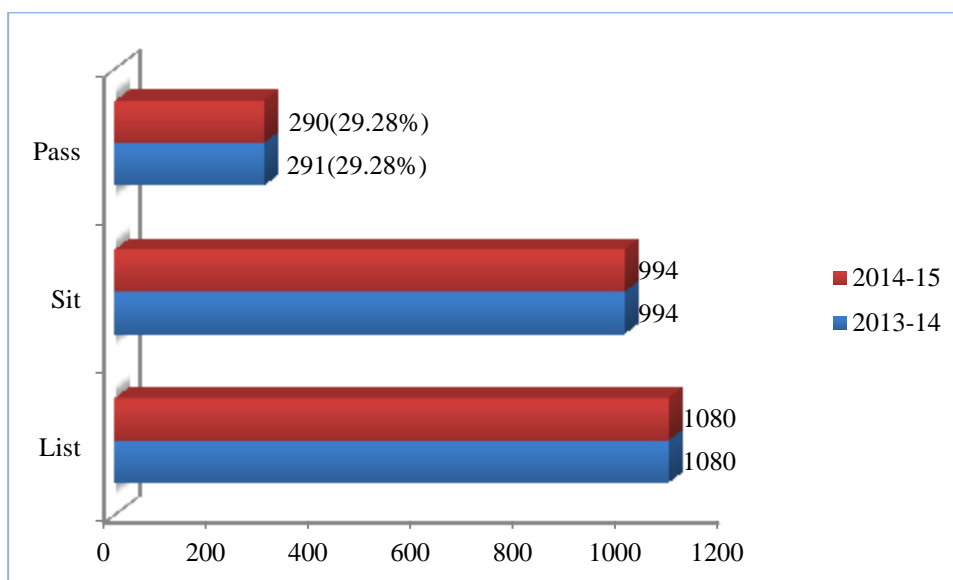
No. of 5 Yrs.-old children			Enrollment			Enrollment Rate
Male	Female	Total	Male	Female	Total	
<b>1310</b>	1623	2933	1337	1573	2910	99.22



**School Enrollment**

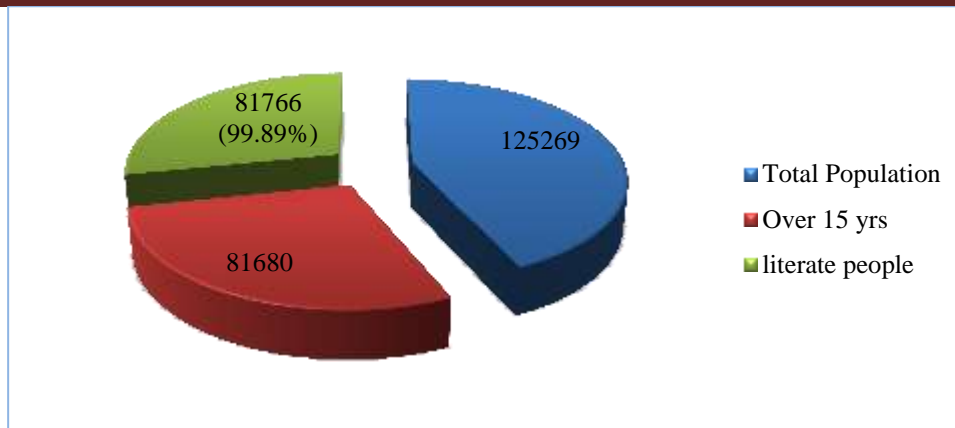
**Table 5.7 Matriculation Pass Rate**

2013-14		
Sit	Pass	Pass Rate
994	291	29.28



**Table 5.8. Literacy Rate**

Township Population	Population 15 Years and Older	Literate Population	Literacy Rate
125269	81766	81680	99.89



**(i) Healthcare Services**

In public health sector, the ratios of medical service personnel and local population indicate the existing conditions of the insufficient healthcare facilities particularly for rural people. According to secondary data available, the most common diseases include Diarrhea, Malaria, stomach ailment, Tuberculosis, and Hepatitis. It was also found out that there were substantial amount of incidence of Diarrhea, Malaria, Tuberculosis and stomach ailment in the township. HIV/AIDS prevalence is significantly increased in 2014-15 than in 2013-14. As also noted in Table 5.10, there are one 25-bed hospital and two 16-bed hospitals in the township. There are also 6 rural healthcare centers and 24 rural health sub-centers.

**Table 5.9. Healthcare Facilities**

No. of Doctors	Ratio of doctor and population	No. of Nurses	Ratio of nurse and population	No. of Healthcare Assistant	Ratio of assistant and population
7	1:17895	24	1:5219	5	1:2505

**Table 5.10. Healthcare Infrastructure**

25-Beded Hospital	16-beded Hospital	RHC	RHS
1	2	6	24

**Table 5.11. Common Diseases**

Sr. No.	Disease	Incidence
1.	Malaria	337
2.	Diarrhea	1896
3.	TB	60
4.	Stomach Ailment	576
5.	Hepatitis	30

**Table 5.12. HIV/AIDS**

2013-14	2014-15



Infected	Dead	Infected	Dead
13	-	23	-

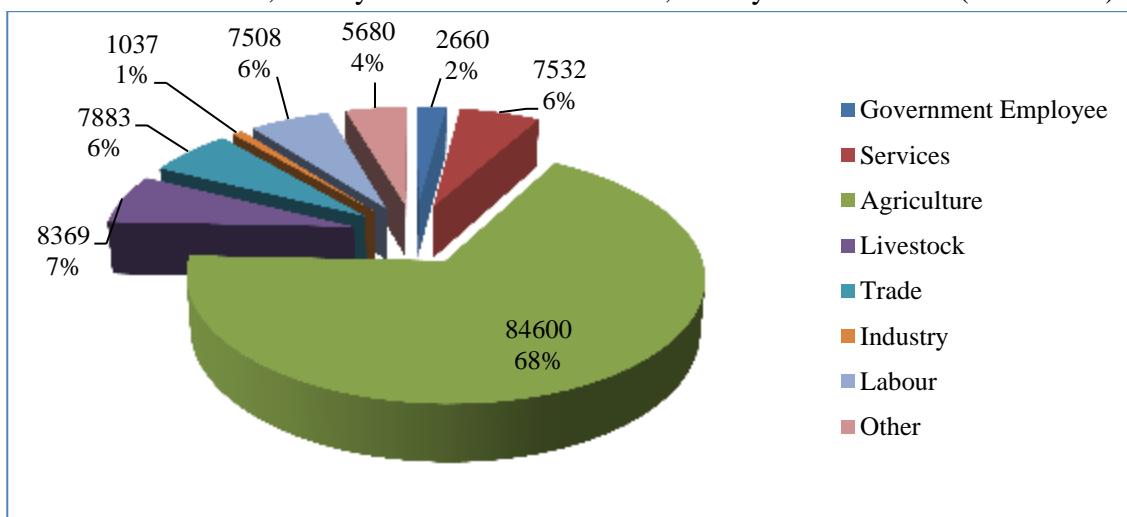
**Table 5.13. Health Indices**

Maternal population	Infant population	Per 1000			
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
31392	3085	22.8	1.6	13.3	5.3

**(j) Occupational Patterns**

Agriculture is the major economy of the township and Maize, sugarcane and rice are main crops grown in the township. Agricultural-based industry, timber extraction, charcoal production, burnt lime production, apiculture, and animal husbandry are other economies of the township. The volume of maize production in 2014-15 is estimated as 46, 34, 341 baskets (Table 5.15). Paddy is also a major crop cultivated in the region. The township paddy production is estimated as 24, 40, 821 baskets in 2014-15. Beans and pulses, rubber, coffee, and tea are also key agricultural products in the township. Livestock husbandry is also found to be a component of local economic activities. Ngwe Yi Pale Group established two sugar mills and one cement factory in Naung Hkio area, offering 1582 people employment. Small-scale garment industries, goldsmith and blacksmith were also found in the township. There are mineral productions and lead is the major mineral product in Naung Hkio Township.

The other main economic activities in the area are services, trade, industry, and public services. According to official statistics, unemployment rate in Naung Hkio Township is estimated as 4.04% (Table 5.16). Domestic net production and value of services of the township in 2013-14 FY is estimated to be 98, 473.2 million kyats and per capita income is estimated to be 858,318 Kyats in 2012-13 and 932,473 Kyats in 2013-14 (Table 5.19).



**Table 5.14. Major Agricultural Products in Naung Hkio Township**

No.	Crop	Plan 2014-15 (Acre)	2014-15 Achieved			Production (Basket)	Remark
			Sown Acre	Harvest Acre	Rate		
1.	Maize	59580	61382	61382	75.50	4634341	
2.	Paddy	26160	25160	25160	97.01	2440821	
3.	Sugarcane	18088	23996	23996	34.12	696926	Ton
4.	Groundnut	11020	10670	10670	56.70	604989	

Table 5.15. Livestock Farming in Naung Hkio Township

Year	Buffalo	Bull & cow	Pig	Chicken	Duck	Goat/ sheep
2013-14	16096	32653	8057	139149	297	501
2014-15	21677	48554	13088	134912	561	1945

Table 5.16. Employment

Workforce	Employed	Unemployed	Unemployment rate
82,801	79,456	3,345	4.04%

Table 5.17. Factories

Factory	No. of factory	Ownership	Work force
Sin Shwe Li-1 Sugar Mill	1	Private	1062
Crown Cement Factory	1	Private	300
Sin Shwe Li-2 Sugar Mill	1	Private	220
Garment industries	5	Private	15
Goldsmith	2	Private	10
Blacksmith	1	Private	5

Table 5.18. Per Capita Income

Year	Income
2012-13	858,318 Ks.
2013-14	932,473 Ks.

#### (k) Economic Infrastructure

One hundred and twenty-nine cooperative organizations have already been established in Naung Hkio. However, limited banking facilities are found in the region. There are one private bank in the township and two Myanmar Economic Bank in the township (Table 5.20). There are also eight principal markets in the overall township. Table 5.21 lists markets in Naung Hkio.

Table 5.19. Banks

Township	Government	Private	Total
Naung Hkio	2	1	3

**Table 5.20. Markets**

No.	Name	No. of shops	Ownership
1	Myoma Market	52	Government
2	Kan Gyi Market	25	Government
3	Taung Kham Market	32	Government
4	Sam Sal Market	30	Government
5	Thone Sal Market	30	Government
6	Ho Kho Market	28	Government
7	Ban Bwe Market	25	Government
8	Tharatkone Market	17	Government

**(l) Electricity**

According to official statistics (Table 5.22), there are two power sub-stations and 76 transformers for distributing electricity in Naung Hkio Township. There is also a mini-hydropower plant generating 192, 000 kW per year. According to official data, the amount of electricity distributed in the township is 4800 kW and consumed electricity is just 2400 kW.

**Table 5.21. Electricity**

No. of substations	Mini-Hydropower	No. of Transformers	Distributed Electricity	Consumed Electricity
2	1	76	4800 kW	2400 kW

**(m) Transportation and Communication**

Road transport is the common form of public transportation mode in the area by means of buses, automobiles, and motor cycles. There are three public transportation services composed of 31 buses for transporting to regional areas and Mandalay and Lashio. There are 30-mile railway line and one railway station in the township transporting Mandalay and Lashio. There is also a bridge with length over 180'. Naung Hkio has a total population of 125, 269 and 55.78% of them have access to use auto and mobile phones. There are four post offices and one telegraph stations in the township.

**Table 5.22. Communication**

Post Office	Telegraph Station	TV Transmission Station	Auto Telephone	Mobile Phone	Internet Users
4	1	2	721	16, 350	12, 500

**(n) Safety and Security**

There are 5 police stations in Naung Hkio Township which host 131 crime fighting personnel. The ratio of police to population is 1:956. Cases in major crimes, other crimes, and preventive crimes could be seen in Table 5.24.

**Table 5.23. Incidence of Crime**

2013-14	2014-15
---------	---------

<b>10 major crime</b>	7 other crime	10 preventive crime	10 major crime	7 other crime	10 preventive crime
<b>3</b>	139	124	5	185	134

**(o) Fire Fighting Capacity**

There are 11 permanent fire-fighting personnel and 190 people in the auxiliary fire fighting force in the township. Table 5.25 shows fire service personnel and fire machine in Naung Hkio.

**Table 5.24. Fire Service and Fire Machine**

<b>Permanent force</b>	<b>Auxiliary force</b>	<b>Total</b>	<b>Fire machine</b>	<b>Water carrier</b>	<b>Supporting vehicle</b>	<b>Light fire machine</b>
<b>11</b>	190	201	3	1	-	4

**(p) NGOs**

Several NGOs are working in Naung Hkio Township. Table 5.26 and 5.27 provide local NGOs and their force. Ngwe Yi Pale Mining Company Limited established a foundation for providing assistance and aid for development of education sector in the township.

**Table 5.25. NGOs**

Myanmar Women Affair Federation	Maternal and Child Care	Veteran	Red Cross	Auxiliary Fire Service
16, 317	20, 450	410	581	220

**Table 5.26. NGOs and CBOs**

<b>Name</b>	<b>Location</b>	<b>Service/Activities</b>
<b>Saytanarmon social organization</b>	South Quarter	Social
<b>Ngwe Yi Pale Education Foundation</b>	Lauk Hpam village	Educational Assistance
<b>Karunashin Social Aid</b>	Sam Sal village	Social
<b>Inn Sein Myay Social Aid</b>	Lone Yone village	Social

**5.4. Stakeholders Identification**

After discussion with key informers from developer and local communities, the following communities, authorities and NGOs can be considered as key stakeholders who are directly or indirectly related to the proposed project.

- (a) Ngwe Yi Pale Mining Co., Ltd;
- (b) Local residents in Lauk Hpan Village;
- (c) Local residents in Khe Hsan Village;

- (d) Local residents in Ngokalay Village;
- (e) Local residents in Own Ma Kar Village;
- (f) Local residents in Lal Gyi Daw Village;
- (g) Local residents in Kone Mone Village.
- (h) Head of Local Administration Office (Naung Hkio);
- (i) City Development Committee (Naung Hkio);
- (j) Department of Public Health (Naung Hkio);
- (k) Department of Forestry (Naung Hkio);
- (l) Inn Sein (Local NGOs);
- (m) Fire Station (Naung Hkio); etc.

### 5.5. Public Consultations and Participation

Bottom up planning is necessary for the achievement of sustainable development of proposed project. Public participation empowers local people so that they regard the development projects as their own. Community involvement also reduces the impact of uncertainties and stress caused by the proposed project. Therefore, the local community should actively participate in the development of planning of proposed project. In this study, effective public consultation and participation approaches in the form of focus group discussions, discussion with key informers and household survey were conducted.

#### 5.5.1. Focus Group Discussions

Focus group discussions were carried out with heads of village administration office and elders from almost all of the nearest villages. Through these discussions, information was collected for consideration of PAPs (Project Affected Persons) and possible socio-economic impacts.

#### 5.5.2. Household Survey

Household surveys in nearest villages are conducted to collect socio-economic conditions, public needs and public concerns regarding with proposed project to ensure effective public participation process.

### 5.6. Public Meetings

Public meetings for active public participation are accomplished two times as follow:

#### 5.6.1. First Public Meeting

First public meeting was made in (4.4.2015). There were about 150 people from local authorities, communities, NGOs and INGOs, and those who are directly or indirectly affected by the proposed project are attended in this meeting. The aims of first public meeting are as follow:

- (i) To announce the process and procedure of Social Impact Assessment; and
- (ii) To discuss about the possible socio-economic impacts; and
- (iii) To discuss about the alternative ways to avoid the socio-economic impacts.

Attendance list records and key discussion during the meeting are shown in Appendix XI.





Figure 5.7. Recorded Photo during First Public Meeting

#### 5.6.2. Second Public Meeting

Second public meeting was held on (23.8.2015) and about (176) people attended in this meeting. The aims of the second public meeting are as follows:

- (i) To make known the alternative ways to avoid socio-economic impacts;
- (ii) To announce the anticipated socio-economic impacts of proposed projects; and
- (iii) To discuss about mitigation measures for these impacts.

Attendance list records and key discussion during the meeting are shown in **Appendix XI**.

### 5.6.3. Attendant List for Public Meetings

The following are the total attendance list for first and second public meetings.

#### **Total Attendance List for First Public Meeting**

<b>No.</b>	<b>Organization/Village</b>	<b>Attendance</b>	<b>Remark</b>
1.	Local Authorities	11	
2.	Local People who works in existing cement factory	25	
3.	Members of Third Party	7	
4.	Kone Mo	18	
5.	Naung Kwan	5	
6.	Khe Hsan	21	
7.	Pang Ti	8	
8.	Lauk Hpan	14	
9.	Nan Ke Aik	12	
10.	Ngokalay	17	
11.	Lal Gyi Taw	8	
	<b>Total</b>	146	

#### **Total Attendance List for Second Public Meeting**

<b>No.</b>	<b>Organization/Village</b>	<b>Attendance</b>	<b>Remark</b>
1.	Local Authorities	13	
2.	Local People who works in existing cement factory	22	
3.	Members of Third Party	6	
4.	Kone Mo	11	
5.	Naung Kwan	11	
6.	Khe Hsan	17	
7.	Pang Ti	16	
8.	Lauk Hpan	10	
9.	Nan Ke Aik	23	
10.	Ngokalay	29	
11.	Lal Gyi Taw	18	
	<b>Total</b>	176	





Figure 5.8. Recorded Photo during Second Public Meeting

### 5.7. Public Disclosure Process

Summary of ESIA report and photo of meeting minutes from first public disclosure (See Figure 5.9) as Myanmar Language are distributed to all key stakeholders as one part of public disclosure process.



Figure 5.9. Meeting Minutes and Summary of ESIA Report for Public Disclosure

## 6. ANTICIPATED SOCIO-ECONOMIC IMPACTS AND MITIGATION MEASURES

The proposed project will give rise to several impacts to socio-economic, both positive and negative. In this section will describe potential impacts that may result from the project construction, operation, and decommission were assessed by considering the various aspects of social receptors and mitigation measures were proposed to ensure negative impacts on the social environment are reduced and positive impacts are enhanced.

Anticipated environmental impacts for the proposed project will be conducted into the entire life of the proposed project. To cover the entire life of the project, it is necessary to conduct impact assessment for three major phases as follow:

- (a) Phase I: Construction Phase (during the construction period),
- (b) Phase II: Operation Phase (during the operation period), and
- (c) Phase III: Decommissioning Phase (after the operation period).

To identify and analyze the project impacts, the following methods were adopted:

- Determination of concerns and expectations of the affected and interested stakeholders and community feedback from household surveys;
- Feedback from government and nongovernment stakeholders;
- Review of Company’s policies and proposal to MIC; and

- Literature reviews.

### **Impact Assessment Methodology**

Impacts will be assessed using information gathered during the baseline assessment in combination with previously collected data and the detailed project plan. The significance of the identified impacts will be determined using the approach outlined in Table 6.1. This incorporates two aspects for assessing the potential significance i.e. occurrence and severity, which are further sub-divided as indicated. The impact ranking will be described for both pre and post implementation of mitigation/management measures conditions.

SIA is a formal process used to predict how the proposed project will affect existing socio-economic conditions of nearest local communities. It is desirable to ensure that the development options under consideration are sustainable. It also aims to make recommendations for the mitigation of the potential negative impacts and enhancement of the positive ones. SIA will also contain Social Management and Monitoring Plan (SMMP). SMMP is a site-specific plan developed to ensure that the project is implemented in a socially sustainable manner where all contractors and subcontractors, including consultants, understand the potential socio-economic impacts arising from the proposed project and take appropriate actions to properly manage that risk.

The significance of the aspects/impacts of the process was rated by using a Matrix Method modified by Green Tech ESIA Team. The significances of the impacts were determined through a synthesis of the criteria below:

#### *1. Scale*

<b>No.</b>	<b>Description</b>	<b>Rating</b>	<b>Score</b>
1.	Impact will be affected (Distance = 100 m or Area = 1000 m <sup>2</sup> )	Site	1
2.	Impact will be affected (Distance = 1000 m or Area = 10 km <sup>2</sup> )	Limited	2
3.	Impact will be affected (Distance = 1000 m to 10 km or Area = 10 km <sup>2</sup> to 100 km <sup>2</sup> )	Local	3
4.	Impact will be affected (Distance = 10 km to 100 km or Area = 100 km <sup>2</sup> to 1000 km <sup>2</sup> )	District	4
5.	Impact will be affected ( to the distance exceeding 100 km or Area = 1000 km <sup>2</sup> )	Regional	5

Note: For linear objects areal gradations are used. If the area cannot be evaluated, the linear distance is used.

#### *2. Duration*

<b>No.</b>	<b>Description</b>	<b>Rating</b>	<b>Score</b>
1.	One day to one month	Very short term	1
2.	One month to two years	Short term	2
3.	Two years to ten years	Medium term	3
4.	Ten years to the whole life of operation	Long term	4
5.	Permanent and irreversible impact on nature	Permanent	5

#### *3. Severity for the Environment*

<b>No.</b>	<b>Description</b>	<b>Rating</b>	<b>Score</b>
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1.	Isolated parts will be damaged and easy to mitigate/restore	Very low	1
2.	Isolated parts will be damaged and hard to mitigate/restore	Low	2
3.	Large parts will be damaged and easy to mitigate/restore	Low to Medium	3
4.	Large parts will be damaged and hard to mitigate/restore	Medium	4
5.	Large parts will be permanently destroyed	High	5

**4. Frequency**

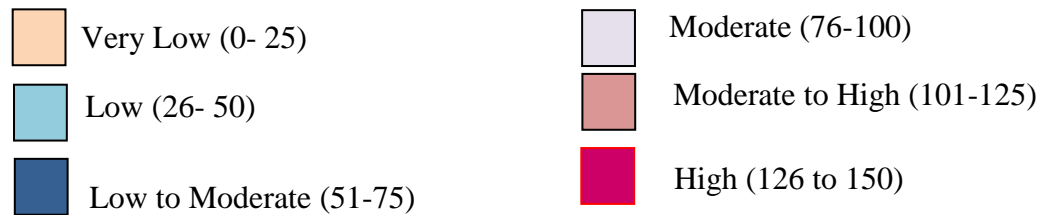
No.	Description	Rating	Score
1.	Less than twice a year	Rare	1
2.	3 to 4 times per year	Intermittent	2
3.	Once a month	Regular	3
4.	1-3 times per week	Very Often	4
5.	More than 3 times per week	Continuous	5

**5. Probability**

No.	Description	Rating	Score
1.	Impact is very unlikely to occur under normal conditions but may occur in exceptional circumstances	Very Seldom	1
2.	Impact is unlikely to but may occur at some time under normal operating conditions	Seldom	2
3.	Impact is likely to occur at some time under normal conditions	Probable	3
4.	Impact is very likely to occur at some time under normal conditions	Highly probable	4
5.	Impact will occur under normal operating conditions	Certain	5

Table 6.1- Impact Rating Table

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



***Mitigation Requirement for Impact Significance***

<b>No.</b>	<b>Impact Significance</b>	<b>Mitigation Requirement</b>
1	Very Low (Negligible)	No mitigation required
2	Low	Required a small number of additional mitigations
3	Low to Moderate	Require more or less additional mitigations
4	Moderate	Require a number of additional mitigations
5	Moderate to High	Require a number of additional mitigation or modification of the project design
6	High	Require additional mitigations plus modification of the project design or alternative action may be required

***Prediction Confidence***

Although not explicitly included in the criteria tables, there is uncertainty associated with the information and methods used in an ESIA because of its predictive nature. The certainty with which an impact analysis can be completed depends on a number of factors including:

- Understanding of natural/ecological and socio-economic processes at work now and in the future; and
- Understanding of present and future properties of the affected resource.

The level of prediction confidence for an impact analysis will be discussed when there are questions about the factors reviewed above. Where the level of prediction confidence makes a prediction of the impact problematic, a subjective assessment is made based on the available information, the applicability of information on surrogates and on professional opinion.

The level of prediction confidence is sufficiently low in some cases that an estimate of Environmental consequence cannot be made with a sufficient degree of confidence. Undetermined ratings are accompanied by recommendations for research or monitoring to provide more data in the future.

***Development of Mitigation Measures***

A common approach to describing mitigation measures for critical impacts is to specify a range of targets a predetermined acceptable range and an associated monitoring and evaluation plan. To ensure successful implementation, mitigation measures should be unambiguous statements of actions and requirements that are practical to execute. The following summarize the different approaches that may be used in prescribing and designing mitigation measures:

- Avoidance: e.g. mitigation by not carrying out the proposed action on the specific site, but rather on a more suitable site;
- Minimization: mitigation by scaling down the magnitude of a development, reorienting the layout of the project or employing technology to limit the undesirable Environmental impact;

- Rectification: mitigation through the restoration of Environments affected by the action;
- Reduction: mitigation by taking maintenance steps during the course of the action; and Compensation: mitigation through the creation, enhancement or acquisition of similar Environments to those affected by the action.

### 6.1. Anticipated Socio-economic Impacts and Mitigation Measures during Construction Phase (Phase I)

The proposed project is predicted to have both beneficial and potentially adverse socio-economic impacts on the environment, workers and the community. The following major socio-economic impacts that are expected to occur as a result of project construction activities.

- (a) Five positive impacts (access roads and electrical power to nearest villages, job creation, local skill development, growth of local business and enterprise and growth of local economy); and
- (b) Three negative impacts (impacts related with population influx and increase in crimes and security).

#### 6.1.1. Positive Socio-economic Impacts during Construction Phase

The anticipated positive social impacts during pre-construction phase are as follow:

##### 6.1.1.1. Access Roads and Electrical Power to Nearest Villages

During construction period, upgrade the existing access roads to nearest villages or new access roads to proposed factory will be developed and these access roads will help to improve daily movement pattern of local people in nearest villages. Moreover, there will have high probability to get electrical power to nearest villages according to the development of proposed project.

#### **(a) Impact Significance of Access Roads and Electrical Power to Nearest Villages before Enhancement Measures**

According to the primary data collection, improvement of access roads and electrical power will be the basic and essential needs for socio-economic development of local people in nearest villages and so this kind of positive impact will be considered as medium before enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Access roads and electrical power	Benefits to local development	Development of access road to factory and CSR program	Positive (+)	Limited (+2)	Long term (+4)	High (+5)	Continuous (+5)	Highly probable (+4)	Moderate (+99)

#### **(b) Enhancement Measures for Access Roads and Electrical Power to Nearest Villages**

As the development of access roads and achievement of electrical power will be fundamental requirements to the development of every village and so the developer should

pay great attention to these matters. During the development of access roads, road safety, potential to road accidents, and potential to blockage of existing drainage system should be considered. All of the new access roads or upgrading of old access roads should be allowed to use local people without any fee. Road safety signs and slowdowns in accordance with the road safety rules should be provided. All of the vehicles which are coming to proposed factory should be instructed to follow road safety rules and reduce speed near the villages. Electrical power from proposed factory should be distributed to nearest villages as part of CSR program if feasible.

**(c) Impact Significance of Access Roads and Electrical Power after Mitigation Measures**

The impact will be considered after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Access roads and electrical power	Benefits to local development	Development of access road to factory and CSR program	Positive (+)	Local (+3)	Long term (+4)	High (+5)	Continuous (+5)	Certain (+5)	Moderate to High (+120)

**6.1.1.2. Job Creation**

The construction phase of the project will have temporary positive impact on local household income and livelihood. The proposed cement plant will provide approximately 150 temporary employment opportunities during construction phase. Thus, the proposed development will create a significant amount of temporary employment opportunities for local residents. Indirect employment opportunities will also be equally important sources for the generation of income for the local community. So, the construction phase of the project will have temporary positive impacts on local household income and livelihood.

**(a) Impact Significance of Job Creation without Enhancement Measure**

The construction phase of the proposed project will last about 2 years and create substantial amount of job opportunities. The construction phase of the project is estimated to employ approximately 150 people. Although many construction workers will form part of the permanent workforce of contractors, the scale of construction activities means that additional workers will be required. As a result, it would benefit the community to a point. Job opportunities would benefit to the local community to a point because unemployment rate in Naung Hkio Township is about 4 % according to the secondary data collection in 2014-2015 and there have high jobless percentage (about 6%) in nearest village according to the primary data collection.

Although the unemployed percentage is a little high, the impact significance of job creation during construction phase cannot be rated as moderate or high due to the tiny number of construction workers. Moreover, Naung Hkio Township is near to boarder city (Muse Township) and most of the young people are going to the China for seeking jobs. So, the impact significance of job creation during construction phase can be considered as low without enhancement measures as follow:



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Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Job creation	Potential to Increase in household income	Jobs in construction site	Positive (+)	Local (+3)	Short term (+2)	Low to Moderate (+3)	Regular (+3)	Probable (+3)	Low (+48)

**(b) Enhancement Measures for Job Creation**

Unskilled and semi-skilled job opportunities should be offered to the local communities as much as possible. As the population of females is slightly higher than that of males in the township (1.1:1), employment opportunities for construction works should also be created to ensure that the local female population also has equal chance for these opportunities (Gender Equality). The ratio of less than 18 year and above 18 year is 1.95:1. This can be explained higher number of working age per household in the area. So, job opportunities will be great benefit to local people older than 18 years. Unskilled and semi-skilled job opportunities should be offered to the local communities as much as possible. Ngwe Yi Pale should encourage construction contractors and sub-contractors to use local labor force as part of tender requirement and should arrange the local people who seek alternative livelihood other than farming activities to obtain employment opportunities. The establishment of local labor desk prior to and during construction might also be effective strategy to identify local labor pool. If necessary, training program for heavy construction machineries (like trucks, bulldozer, back hoe, crane etc.) should be prepared to ensure job opportunities for local people.

**(c) Impact Significance of Job Creation after Enhancement Measure**

The impact will become from low to moderate after enhancement actions due to the boost in frequency and probability as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Job creation	Potential to Increase in household income	Jobs in construction site	Positive (+)	Local (+3)	Short term (+2)	Low to Moderate (+3)	Continuous (+5)	Highly probable (+4)	Moderate (+72)

According to the above rating for job opportunities during construction phase, the positive impact for job opportunities will be boosted to moderate after enhancement measures. Moreover, job opportunities are one of the most public needs according to the primary data collection and so it is necessary to encourage job opportunity for local people during construction phase.

*6.1.1.3. Local Skill Development*

Local people hired by the proposed plant would remain in communities with skills acquired during project construction including construction, woodwork, concrete work, steel/metal work and masonry. Former construction workers can use these lifelong skills

for self-employment and for income generation. This is a positive and long-term socio-economic benefit.

**(a) Impact Significance of Local Skill Development without Enhancement Measure**

Local people hired by the proposed plant would remain in communities with skills acquired during project construction including construction, woodwork, concrete work, steel/metal work and masonry. There is no vocational education for construction related works in Naung Hkio Township, it would benefit for local people to some extent. Communication skills for local people will also improve in office works during construction period. This is a positive and long-term socio-economic benefit. So, the impact significance of local skill development during construction phase can be considered as low to moderate without enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local skill development	Increase in human resource development	Construction Techniques	Positive (+)	Local (+3)	Long term (+4)	Moderate (+4)	Intermittent (+2)	Probable (+3)	Low to Moderate (+55)

**(b) Enhancement measures for Local Skill Development**

This positive impact can be boosted by ensuring the used of local construction contractors, job opportunities and training program for local people at nearest villages as much as possible. Although large potential labor pool exists in the study area, majority of them may not be adequately skilled to qualify for positions requiring skilled labor. Thus, training programs (e.g. driving tractors and maintaining of vehicles, welding, wiring, masonry building etc.) should be implemented prior to and during the construction phase to ensure benefits for local communities. Local construction sub-contractors should be chose as first priority during tender process. Moreover, Ngwe Yi Pale should encourage construction contractors and sub-contractors to stimulate local skill development as part of tender requirement.

**(c) Impact Significance of Local Skill Development after Enhancement Measure**

The impact significance of local skill development during construction phase can be considered as moderate after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local skill development	Increase in human resource development	Construction Techniques	Positive (+)	Local (+3)	Long term (+4)	Moderate (+4)	Regular (+3)	Highly Probable (+4)	Moderate (+77)

**6.1.1.4. Growth of Local Business and Enterprises**

The construction phase and accompanying employment opportunities for construction activities represent a positive socio-economic impact that would benefit local business through increased spending power. There will be potential to growth local business and

enterprise if the developer will buy construction materials from local market and helping hand construction related services from local.

**(a) Impact Significance of Growth of Local Business and Enterprises without Enhancement Measures**

According to the secondary data, the services in Naung HkioTownship are only 6 percent and there will have limited construction service providers for construction works. According to the primary data collection, there are no construction contractors and business for construction materials in nearest villages. So, this kind of impact during construction period will be considered as very low for local people in nearest villages and low for local business in Naung HkioTownship without enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Growth of local business	Growth of business in Naung Hkiodowntown area	Supply of construction services and materials	Positive (+)	Local (+3)	Short term (+2)	Low to Medium (+3)	Regular (+3)	Probable (+3)	Low (+48)
	Growth of business in nearest villages	Supply of construction services and materials	Positive (+)	Limited (+2)	Short term (+2)	Medium (+4)	Rare (+1)	Very Seldom (+1)	Very Low (+16)

**(b) Enhancement Measures for Growth of Local Business and Enterprises**

Any construction materials and services that can be available in Naung HkioTownship should be preferred as first priority. Although there was no construction services provider in nearest villages according to the primary data collection, Nwge Yi Pale should have policy to partner as construction contractor and sub-contractors as much as possible in Naung HkioTownship. Ngwe Yi Pale should have to stimulate the emergence of small business, local enterprises, and trading in the project area and should assist local people establish their small business, trading, and accommodation services in the area. Ngwe Yi Pale should encourage construction contractors and sub-contractors to stimulate the emergence of local small business as part of tender requirement.

**(c) Impact Significance of Growth of Local Business and Enterprises after Enhancement Measures**

As Naung HkioTownship is just developing and boost in local business for construction services, construction materials, and food supplies will be great benefit for local business during construction period. Impact significance can be considered as low to moderate after enhancement measures due to the increase in frequency and probability as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
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Growth of local business	Growth of business in Naung Hkiodowntown area	Supply of construction services and materials	Positive (+)	Local (+3)	Short term (+2)	Low to Medium (+3)	Very often (+4)	Highly probable (+4)	Low to Moderate (+64)
	Growth of business in nearest villages	Supply of construction services and materials	Positive (+)	Limited (+2)	Short term (+2)	Medium (+4)	Intermittent (+2)	Probable (+3)	Low (+40)

**6.1.1.5. Potential to Growth of Local Economy**

There will be benefit for local economy if the required food and consumer goods for construction workers are bought from nearest villages.

**(a) Impact Significance of Growth of Local Economy without Enhancement Measures**

According to the primary data collection, there will not enough food and consumer goods for migrants construction workers in nearest villages. However, there will have sufficient quantity in Myoma and other markets in Naung Hkio Township according to the secondary data collection. So, this kind of positive impact will be more beneficial for local people in Naung Hkio downtown area rather than local people in nearest villages. So, the impact significant will be considered as two categories without enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Growth of local economy	Growth of economy in Naung Hkiodowntown area	Food and consumer goods for construction workers	Positive (+)	Local (+3)	Short term (+2)	Low (+2)	Regular (+3)	Probable (+3)	Low (+42)
	Growth of economy in nearest villages	Food and consumer goods for construction workers	Positive (+)	Limited (+2)	Short term (+2)	Medium (+3)	Intermittent (+2)	Seldom (+2)	Low (+28)

**(b) Enhancement Measures for Growth of Local Economy**

As Naung Hkio Township is just developing and boost in local economy will be advantage for local people during construction period. Ngwe Yi Pale should have policy to support local businesses, especially in nearest villages. Ngwe Yi Pale should establish a policy to collaborate local businesses and enterprises for procurement of goods and services in relation to project activities to encourage local economy. Any food and consumer goods that can be bought in nearest villages should be preferred as first priority. Local business for food and consumer goods in nearest villages should boost by buying required things regularly. Ngwe Yi Pale should encourage construction contractors and sub-contractors to stimulate the emergence of local small business as part of tender requirement.

**(c) Impact Significance of Local Economy after Enhancement Measures**

Impact significance can be raised by enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Growth of local economy	Growth of economy in Naung Hkio downtown area	Food and consumer goods for construction workers	Positive (+)	Local (+3)	Short term (+2)	Low (+2)	Regular (+3)	Highly Probable (+4)	Low (+49)
	Growth of economy in nearest villages	Food and consumer goods for construction workers	Positive (+)	Limited (+2)	Short term (+2)	Medium (+3)	Very often (+4)	Highly probable (+4)	Low to Moderate (+56)

### 6.1.2. Negative Socio-economic Impacts during Construction Phase

The anticipated negative socio-economic impacts during construction phase are as follow:

#### 6.1.2.1. Impacts Associated with Population Influx

A possible population influx due to the presence of construction workforce will increase temporary pressure on existing infrastructure and services including health, food, shelter, water, transport and recreational facilities. Infrastructure and facilities to be impacted due to the increase in population will be hospitals and healthcare services, schools, and sanitation facilities among others.

#### (a) Significant of Impacts Associated with Population Influx without Mitigation Measures

As proposed project is extension project and will be situated in the existing cement factory compound, the requirements for housing, recreational facilities and water for the additional construction workers will be shared by existing facilities. However, there will be impact existing health care facilities due to the influx of new construction workers because presented health care facilities is just enough for staffs of existing cement factory. Food for additional construction workers will also impact on an adequate amount of local food. Impact rating for all impacts associated with population influx will be as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, and water	Public anxiety	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Very low (-1)	Continuous (-5)	Very seldom (-1)	Very low (-24)
Increase pressure on health care facility	Anxiety of existing workers	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Regular (-3)	Highly Probable (-4)	Low (-42)
Increase pressure on adequate	Public and existing workers'	Influx of construction workers	Negative (-)	Limited (-2)	Short term (-2)	Low (-2)	Continuous (-5)	Highly Probable (-4)	Low to Moderate (-54)



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amount of local food	anxiety								
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**(b) Mitigation Measures for Impacts Associated with Population Influx**

There will no other mitigation measures for pressure for housing, recreational facilities and water for additional workers because the impact rating is very low. During the construction phase, impact brought about by changes in population should be mitigated through the use of local labor force and provision of social facilities. Existing health care facilities within the project compound should be upgraded to additional workers during construction phase and should plan to buy food for construction workers that will not impact on local food consumption for nearest villages.

**(c) Significant of Impacts Associated with Population Influx after Mitigation Measures**

All of the impacts associated with population influx will be very low or low after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on health care facility	Anxiety of existing workers	Influx of construction workers	Negative (-)	Site (-1)	Short term (-2)	Low to Moderate (-3)	Intermittent (-2)	Seldom (-2)	Very Low (-24)
Increase pressure on adequate amount of local food	Public and existing workers' anxiety	Influx of construction workers	Negative (-)	Limited (-2)	Short term (-2)	Low (-2)	Regular (-3)	Seldom (-2)	Low (-30)

**6.1.2.2. Increase in Crime and Security**

An inflow of skilled construction workers from local and foreign (Republic of China) and their dependents of migrant workers from other areas may also be accompanied by possible concomitant increase in social pathologies and crime including drug and alcohol abuse, assault, theft and violence. There may be increased demand on emergency and police services due to population influx in this phase.

**(a) Impact Significance of Increase in Crime and Security before Mitigation Measures**

The impact will be considered as low without mitigation measures due to limited capacity and the distance of nearest police station for additional construction workers.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase crime and security	Public security	Migrant construction workers	Negative (-)	Limited (-2)	Short term (-2)	Moderate (-4)	Intermittent (-2)	Probable (-3)	Low (-40)

**(b) Mitigation Measures for Increase in Crime and Security**

Very Impact brought about by changes in population should be mitigated through the use of local labor force. Unskilled job opportunities should be offered to the local communities as much as possible. The developer should encourage the construction contractors or sub-contractors (China) to ensure that the local community communicates their expectations of construction workers’ behavior, and formalize between the community and them. The developer also needs to continue to work with the local and regional police personnel and local administrative members in the resolution of potential increase in crime and violence. Management of construction camp should be adequately formalized and have communication channels with local police force in order to take measures for any inappropriate behavior that may occur. Construction workers should be clearly identifiable and identification cards should be used in workers’ check in and check out. Construction site should be fenced and access should be controlled. . Security force should be organized and trained to put a stop to crime and violence.

**(c) Impact Significance of Crime and Security after Mitigation Measures**

After systematically control of foreign and migrant workers and continuous cooperation with village administrative offices and police force, the impact will be very low as follow.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase crime and security	Public security	Migrant workers	Negative (-)	Limited (-2)	Short term (-2)	Moderate (-4)	Rare (-1)	Very Seldom (-1)	Very Low (-16)

**6.2. Anticipated Socio-Economic Impacts and Mitigation Measures during Operation Phase**

This section deals with socio-economic impacts that are expected to occur after construction has been completed and project operation commences. The following are the major socio-economic impacts that will result from project operation.

**6.2.1. Positive Socio-economic Impacts during Operation Phase**

The following are the anticipated positive impacts during operation phase:

**6.2.1.1. Local Community Development Potential and Increased Living Standard**

Ngwe Ye Pale was taking part in community development activities such as providing electricity to Lauk Hpam village and constructing new roads in the surrounding area of the plant. Crown Cement factory established a clinic and hired medical personnel within the factory compound and provided healthcare services for employees and local residents from surrounding villages. This center became important healthcare service providers most residents from the nearby villages relied on. Ngwe Yi Pale is engaging in all-round community development activities for local people. Crown Cement Factory has already provided 110.7 Million Kyats for local community development. As part of the corporate social responsibility activities, the factory has provided scholarships to students who cannot afford to attend university in tenure course. The company also provided food and

learning aids for children in Tha Phan Kine monastic School located at the project vicinity in monthly manner. The company also built new educational infrastructures and provides personnel, stationaries, and transport in the villages in the project area. The proposed cement plant will contribute to development of social infrastructure and facilities for its host communities, including healthcare services, support for local schools, social infrastructures, and support for public utilities in the project area. Ngwe Yi Pale is intending to use ten million Kyats for its corporate social responsibility activities for proposed 5000-ton cement factory every year when the project operation begins. The commencement of proposed cement plant will increase potential for local community development and increased living standard for local people.

The developer already had CSR policy and budget allocation for community development purposes. Corporate social responsibility (CSR) is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society. The developer is intending to use at least 2% of its net benefit of the project for every year in CSR activities. The developer also has well-established policies and plans for skill-building, providing healthcare services, assisting education, and social-welfare activities. The project may provide opportunities for continued improvements in basic infrastructure and community development, provision of health care services and education and in providing skill development.

**(a) Impact Significance of Local Community Development Potential without Enhancement Measures**

According to the social survey, improvement in roads and bridges, getting of electricity, improvement in health care services, supporting in education will be the essential things and basic needs of local community development in nearest villages. So, the significant of impact will be considered as low to moderate to the nearest villages as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local community development potential	Development in nearest villages	Operation of proposed factory	Positive (+)	Limited (+2)	Long term (+4)	High (-5)	Intermittent (+2)	Highly probable (+4)	Low to Moderate (+66)

**(b) Enhancement Measures for Local Community Development Potential**

This positive impact of the project can be enhanced by adjusting allocation of CSR budget and giving priority for CSR activities relevant to community immediate needs each year. According to the social survey, it would be better to support the electrical power, health care facilities, supporting tube well for water supply and educational supports are most of the public needs and it will also help to community development.

**(c) Impact Significance of Local Community Development Potential after Enhancement Measures**

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The significant of impact will be considered as moderate after enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Local community development potential	Development in nearest villages	Operation of proposed factory	Positive (+)	Limited (+2)	Long term (+4)	High (-5)	Regular (+3)	Certain (+5)	Moderate (+88)

**6.2.1.2. Employment Opportunities**

It is also anticipated that the operational phase of the new cement plant will offer permanent employment opportunities for the local communities. The project is estimated to employ hundreds of people in the project operation. The project will require two technicians, 68 supervisors, 207 skilled workers and 357 workers. With sufficient training, a large portion of these personnel can be sourced from local communities. Ngwe Yi Pale has established company policy of providing employment priority for local applicants for the proposed development. Estimated salaries and wages for employees of the proposed cement factory are as follows:

Salary for technician post	-	400,000 Ks.
Salary for supervisor post	-	220, 000 Ks.
Salary for skilled worker post	-	220, 000 Ks.
Salary for worker post	-	100, 000 Ks.
Rate for daily wage	-	3, 500 Ks.

Increased employment will improve household income levels and livelihood of local people. The proposed plant will provide an alternative livelihood to people in the project area who are seeking better employment other than helping their family farming activities.

**(a) Impact Significance of Employment Opportunities before Enhancement Measures**

As there is jobless percentage in Naung Hkio Township, long term job opportunities will be great benefit to local people and nearest villages. Impact significance will be moderate before enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Employment opportunities	Increase in household income	Office and General Works	Positive (+)	Local (+3)	Long term (+4)	Moderate (+4)	Continuous (+5)	Probable (+3)	Moderate (+88)

**(b) Enhancement Measures for Employment Opportunities**

Most of the locals in the project area rely on farming as their main livelihood means. Household members do agricultural works together and most households have no members who contribute to household income by other jobs. Local people who have potential for plant operation should be afforded training opportunities and apprenticeship in project operational activities to ensure to support local community in obtaining employment opportunities. Ngwe Yi Pale should carry out advertising and disseminating

information about employment opportunities that will be offered for local community in project operation in advance since the time of project construction period. By doing so, local people will acquire necessary skills and make preparation for the alternative livelihood that will contribute their substantial household income. According to the data collection, the literate rate of Naung Hkio Township is 99.89%. So, a large portion of these personnel can be sourced from Naung Hkio Region with sufficient training.

**(c) Impact Significance of Employment Opportunities after Enhancement Measures**

As job opportunities is important factor for local economic development for Naung Hkio Township and the impact will be moderate to high due to increase in probability as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Employment opportunities	Increase in household income	Jobs in hotel	Positive (+)	Local (+3)	Long term (+4)	Moderate (+4)	Continuous (+5)	Certain (+5)	Moderate to High (+110)

**6.2.1.3. Benefits to National Economy**

The project operation will contribute to government revenues in terms of taxes paid to the government and multiplier effect arising from its linkages to other sectors. The project will contribute to the regional and national economy by creation of opportunities for local businesses in the supply of goods and services and promotion of the national cement market and thus decreasing the national demand for importation.

**(a) Impact Significance of Benefits to National Economy before Enhancement Measures**

Impact significance of benefits to national economy before enhancement measures will be as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in government revenue	Benefit to national economy	Taxes	Positive (+)	Regional (+5)	Long term (+4)	Moderate (+4)	Rare (+1)	Highly Probable (+4)	Low to Moderate (+65)

**(b) Enhancement Measures for Benefits for National Economy**

Efficient and transparent tax collection mechanisms should be introduced and strengthened. By creating responsible taxes paying system to local or national government will be great benefit to national economy. In order to ensure that the benefits are sustained, the developer should work in hand in hand with local taxes office and external audits regularly.

**(c) Impact Significance of Benefits to National Economy after Enhancement Measures**

This positive impact will be moderate after enhancement measures as follow:



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Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Income in government revenue	Benefit to national economy	Taxes	Positive (+)	Regional (+5)	Long term (+4)	Moderate (+4)	Rare (+1)	Certain (+5)	Moderate (+78)

**6.2.1.4. Potential to Growth of Local Economy**

There will be benefit for local economy if the required food and consumer goods for workers are bought from nearest villages.

**(a) Impact Significance of Growth of Local Economy without Enhancement Measures**

According to the primary data collection, there will not enough food and consumer goods for additional workers in nearest villages. However, there will have sufficient quantity in Myoma and other markets in Naung Hkio Township according to the secondary data collection. So, this kind of positive impact will be more beneficial for local people in Naung Hkio downtown area rather than local people in nearest villages. So, the impact significant will be considered as two categories without enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Growth of local economy	Growth of economy in Naung Hkio downtown area	Food and consumer goods for workers	Positive (+)	Local (+3)	Long term (+4)	Low to Medium (+3)	Regular (+3)	Probable (+3)	Low to Moderate (+60)
	Growth of economy in nearest villages	Food and consumer goods for workers	Positive (+)	Limited (+2)	Long term (+4)	High (+5)	Intermittent (+2)	Seldom (+2)	Low (+44)

**(b) Enhancement Measures for Growth of Local Economy**

As Naung Hkio Township is just developing and boost in local economy will be advantage for local people. Ngwe Yi Pale should establish a policy to collaborate local businesses and enterprises for procurement of goods and services in relation to project activities to encourage local economy in both of the nearest villages and Naung Hkio downtown area. Any food and consumer goods that can be bought in nearest villages should be preferred as first priority rather in Naung Hkio Township. Local business for food and consumer goods in nearest villages should boost by buying required things regularly.

**(c) Impact Significance of Local Economy after Enhancement Measures**

Impact significance can be raised by enhancement measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Growth of local economy	Growth of economy in Naung Hkio	Food and consumer goods for workers	Positive (+)	Local (+3)	Long term (+4)	Low to Medium (+3)	Regular (+3)	Highly Probable (+4)	Low to Moderate (+70)

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	downtown area								
	Growth of economy in nearest villages	Food and consumer goods for workers	Positive (+)	Limited (+2)	Long term (+4)	High (+5)	Intermittent (+2)	Probable (+3)	Low to Moderate (+55)

**6.2.2. Negative Socio-economic Impacts during Operation Phase**

The following are the anticipated negative impacts during operation phase:

**6.2.2.1. Increase in Traffic and Road Accidents**

There are residential villages along the access road from the cement factory to Naung Hkio downtown area. Potential risk for traffic accidents may occur on this road due to a large number of trucks with heavy load of cement they carry from the factory and with full driving speed using the road. The factory road is the nearest access road which is made up of tar, connecting the factory to downtown area so that most of the local people use the road to go to the town. The new factory will increase traffic volume and truck movements on the factory road and daily movements of local people. As a result there will be inevitable disruption of access routes, road accidents and daily movement patterns by the carrying of cement bags and the travelling of additional workers due to the new cement factory.

**(a) Impact Significance of Increased in Traffic and Road Accidents before Mitigation Measures**

Road accident is one of the most public concerns during public meeting and this kind of impact will be considered as moderate because there already had potential to traffic and road accident to the main road from proposed factory to Naung Hkio Township due to the carrying of cement bags from existing cement factory.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Disruption of access routes	Public anxiety and security	Carrying of cement bags to customers	Negative (-)	Limited (-2)	Long term (-4)	Moderate (-4)	Continuous (-5)	Highly Probable (-4)	Moderate (-90)

**(b) Mitigation Measures for Increased in Traffic and Road Accidents**

In order to minimize increased in traffic and road accidents, roads must have adequate width for increased vehicles. Ngwe Yi Pale should have good traffic management plan not only inside the project compound but also along the main road to Naung Hkio. Slow down should be equipped every cross points at villages. Any bushes along the road should be clear regularly for road safety. Moreover, company should also collaborate with local traffic police personnel to reduce this impact and should make use of road safety sign around the road. Ngwe Yi Pale should implement community awareness campaign in collaboration with local authorities to sensitize the community members to traffic and other construction-related safety risks. Road safety sign should be equipped along the main

road to factory. All of the customers coming to cement factory should be requested to obey road safety rules. Slow down should be arrange along the points to enter villages’ roads.

**(c) Impact Significance of Increased in Traffic and Road Accidents after Mitigation Measures**

The impact will be low to moderate due to the lower in frequency and probability after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Disruption of access routes	Public anxiety and security	Carrying of cement bags to customers	Negative (-)	Limited (-2)	Long term (-4)	Moderate (-4)	Regular (-3)	Seldom (-2)	Low (-50)

*6.2.2.2. Fire Outbreak Risk*

Fire outbreak may result in loss of human life and air pollution beyond the boundary of the site. According to the secondary data collection, fire outbreak risk in Naung Hkio Township can be considered as Category C (unlikely, ARI 100) according to the disaster risk assessment.

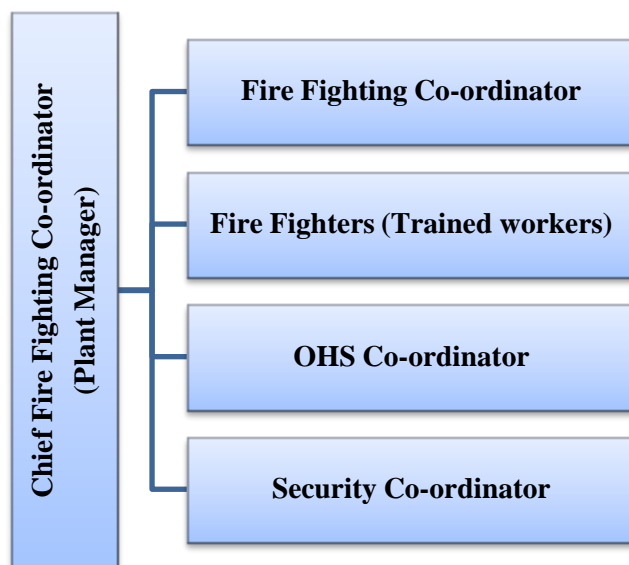
**(a) Impact Significance of Fire Outbreak Risk without Mitigation Measures**

The impact will be rated as low without mitigation measure as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fire outbreak risk	Public security	Increase in population	Negative (-)	District (-4)	Long term (-4)	High (-5)	Rare (-1)	Seldom (-2)	Low (-39)

**(b) Mitigation Measures for Fire Outbreak Risk**

As the proposed factory is a little far from Naung Hkio-Muse Highway Road and local fire fighting force cannot reach within a short time, the project should be installed with modern fire hydrant system effectively fighting fires of various proportions and of all classes of fire risks. Ngwe Ye Pale should have its own fire machine and fire-fighting force for providing fire service not only for the factory but also for the nearest villages. Moreover, fire service personnel should be assigned and well trained on how to prevent fire, how to use fire-fighting equipment, and emergency response actions. The developer should also adhere to the fire-fighting regulations of the Ministry of Home Affairs and should collaborate with regional fire brigade in the prevention of fire outbreak and training local fire fighting force. Fire fighting force for the proposed project should be composed as shown in the following figure.



### Proposed Fire Fighting Team

The following are the role and responsibilities of each members of fire fighting team.

Team Members	Role	Responsibilities
Plant Manager	Chief co-ordinator	<ul style="list-style-type: none"> <li>Make Emergency shut-down of activities. Put everything in Safe condition.</li> <li>Commence initial emergency case, till fire fighting department (Mandalay) comes to take up.</li> </ul>
Fire fighting leader	Fire fighting co-ordinator	<ul style="list-style-type: none"> <li>Be Overall in-charge for Fire and Safety.</li> <li>Coordinate with Local fire fighting station.</li> </ul>
Trained workers and securities	Fire fighters	<ul style="list-style-type: none"> <li>Put off fire by using available equipment.</li> </ul>
Safety officer	OHS co-ordinator	<ul style="list-style-type: none"> <li>Establish Emergency Center, Treat affected persons, Transfer/Remove Patients.</li> <li>Workers Tally</li> <li>Map showing hazardous storages, Fire horns, Safety equipment, Gates and side gates, Assembly points, List of persons.</li> </ul>
Security leader	Security co-ordinator	<ul style="list-style-type: none"> <li>Remove Crowd</li> <li>Arrange Gate security</li> <li>Contact Police if necessary</li> <li>Handle news media</li> <li>Mobilise vehicles</li> </ul>

### (c) Impact Significance of Fire Outbreak Risk after Mitigation Measures

Impact rating for fire outbreak risk can be considered as still low after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Fire outbreak risk	Public security	Increase in population	Negative (-)	District (-4)	Long term (-4)	High (-5)	Rare (-1)	Very Seldom (-1)	Low (-26)

*6.2.2.3. Increase in Crime and Conflict with Local People*

An inflow of migrant workers to the proposed project during operation phase will increase in social pathologies and crime including drug and alcohol abuse, assault, theft and violence. There will also have potential to conflict with workers and local people during the operation phase. This will intend to increase demand on emergency and police services due to population influx.

**(a) Impact Significance of Increased in Crime and Conflict with Local People before Mitigation Measures**

The impact will be considered as medium without mitigation measures because the proposed project a little far from Naung HkioPolice Station, the ratio of police to population is 1:956 and 134 preventative crimes in Naung Hkioregion.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase crime and security	Public security	Increased in population	Negative (-)	Limited (-2)	Long term (-4)	Medium (-4)	Intermittent (-2)	Probable (-3)	Low (-50)

**(b) Mitigation Measures for Increased in Crime and Conflict with Local People**

Most of the people in nearest villages are Shan and the developer should try to become community with local people. Conflict with local people can also be mitigated through the use of local labor force. Unskilled job opportunities like security and housekeeping should be offered to the local communities as much as possible. The use of local people will greatly reduce the probability of increased in crime and conflict with local people. The developer should encourage the workers to know about the custom and behaviors of local people (especially in Custom of Shan) especially for foreign workers (Chinese). The developer also needs to continue to work with the local and regional police personnel and local administrative members in the resolution of potential increase in crime and violence. Project area should be fenced and access road should be controlled to avoid the conflict on resources use with local people.

**(c) Impact Significance of Crime and Security after Mitigation Measures**

After systematically control of migrant and foreign workers and continuous cooperation with local administrative office and police force, the impact will be as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase	Public	Increased	Negative	Limited	Long	Medium	Rare	Seldom	Low



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crime and security	security	in population	(-)	(-2)	term (-4)	(-4)	(-1)	(-2)	(-30)
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A possible population influx due to the migrant workers during operation phase will increase temporary pressure on existing infrastructure and services including health, food, shelter, water, and recreational facilities.

**(a) Significant of Impacts Associated with Population Influx without Mitigation Measures**

All of the impact ratings related to population influx during operation period are as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on recreational facilities, health care, water and food	Public anxiety	Migrant workers	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Very often (-4)	Probable (-3)	Low to Moderate (-56)

**(b) Mitigation Measures for Impacts Associated with Population Influx**

According to social survey, people in nearest villages are not ready for further food and facilities for additional people. So, the developer should have to ensure the use of local people as much as possible. Moreover, it is also necessary set up policy to encourage local businesses for food and consumer goods during operation phase. Own health care facilities should be upgraded to additional workers during operation period.

**(c) Significant of Impacts Associated with Population Influx after Mitigation Measures**

Impacts due to population influx will be very low after mitigation measures as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Increase pressure on housing, recreational facilities, health care, water and food	Public anxiety	Migrant workers	Negative (-)	Limited (-2)	Long term (-4)	Low (-2)	Intermittent (-2)	Seldom (-2)	Low (-32)

**6.3. Anticipated Impacts and Mitigation Measures for Decommissioning Phase**

Generally, it tends to reverse the benefits that are got from the operation of the proposed project on closing the project. As an example, it would have to face the cases like giving up job opportunity and losing the State currency.

**6.3.1. Positive Socio-economic Impacts during Decommissioning Phase**

Generally, it tends to reverse the benefits that are got from the operation of the proposed project on closing the project. So, all of the negative impacts during operation phase will turn into positive and no enhancement measures are required for all of these positive impacts.

**6.3.2. Negative Socio-economic Impacts during Decommissioning Phase**

The anticipated negative socio-economic impacts during decommissioning phase will be as follow:

**6.3.2.1. Loss of Jobs for Local People and Revenues for the Government**

In the event of the project closure, there will be potential negative impacts resulting in loss of jobs and indirect employment depending on the production of cement and of associated business enterprises as well as loss of revenues for the government.

**(a) Impact Significant of Loss of Jobs and Revenues**

As Naung Hkiois just developing township, loss of job opportunities for local people and revenues for regional government will have adverse impact on local GDP. So, impact significant will be considered as (1) moderate for loss of jobs for local people due to the jobless in Naung HkioTownship and (2) low to moderate for loss of revenues to Government due to essential of incomes from industrial sector in GDP.

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Loss of jobs	Decline in local economy	Decommissioning of project	Negative (-)	Local (-3)	Permanent (-5)	Moderate (-4)	Regular (-3)	Highly probable (-4)	Moderate (-84)
Loss of revenues	Decline in regional economy	Decommissioning of project	Negative (-)	Regional (-5)	Permanent (-5)	Low (-2)	Rare (-1)	Certain (-5)	Low to Moderate (-72)

**(b) Mitigation Measures for Loss of Jobs for Local People and Revenues for the Government**

As job opportunities and revenues from industrial sectors are very important for developing cities, the developer should have a plan not to close the entire factory totally and intend to use another business purposes to retain the loss of job for local people and to keep the revenues for the Government.

Ngwe Yi Pale should provide their employees in applicable jobs at other factories in or near the Naung HkioTownship under the Ngwe Yi Pale Group, if feasible. If it is not feasible to appoint in other factories, extensive and comprehensive warning to employees to allow them to source alternative livelihood should be taken early and should pay compensation according to the national labour rules and regulations. The buildings of proposed factory should be used as another business purposes in order to retain revenues for the Government.

**(c) Impact Significant of Loss of Jobs for Local People and Revenues for the Government after Mitigation Measures**

After mitigation measures for loss of jobs and revenues for the government, the impacts can be rated as follow:

Components	Anticipated Impact	Sources	Impact Type	Scale	Duration	Severity	Frequency	Probability	Impact Rating
Loss of jobs	Decline in local economy	Decommissioning of project	Negative (-)	Local (-3)	Permanent (-5)	Moderate (-4)	Intermittent (-2)	Probable (-3)	Low to Moderate (-60)
Loss of revenues	Decline in regional economy	Decommissioning of project	Negative (-)	Regional (-5)	Permanent (-5)	Low (-2)	Rare (-1)	Probable (-3)	Low (-48)

**7. SOCIAL MANAGEMENT PLAN (SMP) FOR PROPOSED PROJECT**

The Social Management Plan (SMP) identifies the relevant responsible institutions, authorities and stakeholders to manage the negative social impacts and enhance potential benefits and to monitor these impacts to adjust mitigation strategies. SMP also develop to ensure that the project is implemented in a socially responsible manner where all contractors and subcontractors, including consultants, understand the potential environmental risks arising from the proposed project. SMP for proposed cement factory will include the following essential parts.

- (a) Summary of anticipated socio-economic impacts and mitigation/enhancement measures;
- (b) Residual socio-economic impacts after mitigation/enhancement measures;
- (c) Compensation framework and CSR program; and
- (d) Social Monitoring Plan;
- (e) Record Keeping;
- (f) Auditing; and
- (g) Corrective Action Plan.

**7.1. Summary of Anticipated Socio-economic Impacts**

All of the anticipated socio-economic impacts were described in the previous section and this section will only describe the summary of anticipated impacts. Table 7.1 shows summary of anticipated socio-economic impacts before and after mitigation measures.

**Table 7.1. Summary of Anticipated Socio-economic Impacts before and after Mitigation Measures**

No.	Anticipated Impacts	Impact Ratings before Enhancement/ Mitigation Measures	Impact Ratings after Mitigation Measures	Enhancement or Mitigation Requirements	Proposed Enhancement/ Mitigation Measures
<b>Construction Phase (Positive Impacts)</b>					
1.	Development of access roads	Moderate (+99)	Moderate to High (+120)	Yes	Section 6.1.1.1
2.	Job creation	Low (+48)	Moderate (+72)	Yes	Section 6.1.1.2
3.	Local skill development	Low to Moderate (+55)	Moderate (+77)	Yes	Section 6.1.1.3
4.	Growth of local business and enterprises	Low (+48) for Naung Hkio Downtown Area	Low to Moderate (+64) for Naung Hkio Downtown Area	Yes	Section 6.1.1.4
		Very Low (+16) for Nearest Villages	Low (+40) for Nearest Villages	Yes	Section 6.1.1.4
5.	Growth of local economy	Low (+42) for Naung Hkio Downtown Area	Low (+49) for Naung Hkio Downtown Area	Yes	Section 6.1.1.5
		Low (+28) for Nearest Villages	Low to Moderate (+56) for Nearest Villages	Yes	Section 6.1.1.5
<b>Construction Phase (Negative Impacts)</b>					
1.	Pressure on housing	Very low (-24)	-	No	Section 6.1.2.1
	Pressure on health care facility	Low (-42)	Very Low (-24)	Yes	Section 6.1.2.1
	Pressure on food	Low to Moderate (-54)	Low (-30)	Yes	Section 6.1.2.1
2.	Increase in	Low (-40)	Very Low	Yes	Section 6.1.2.2

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	crime and security		(-16)		
<b>Operation Phase (Positive Impacts)</b>					
1.	Local community development potential and increased living standard	Low to Moderate (+66)	Moderate (+88)	Yes	Section 6.2.1.1
2.	Employment opportunities	Moderate (+88)	Moderate to High (+110)	Yes	Section 6.2.1.2
3.	Benefits to National economy	Low to Moderate (+65)	Moderate (+78)	Yes	Section 6.2.1.3
4.	Growth of local economy	Low to Moderate (+60) for Naung Hkio Downtown Area	Low to Moderate (+70) for Naung Hkio Downtown Area	Yes	Section 6.2.1.4
		Low (+44) for Nearest Villages	Low to Moderate (+55) for Nearest Villages	Yes	
<b>Operation Phase (Negative Impacts)</b>					
1.	Increase in traffic and road accidents	Moderate (-90)	Low (-50)	Yes	Section 6.2.2.1
2.	Fire outbreak risk	Low (-39)	Low (-26)	Yes	Section 6.2.2.2
3.	Crime and conflict with local people	Low (-50)	Low (-32)	Yes	Section 6.2.2.3
4.	Impact associated with population influx	Low to Moderate (-56)	Low (-32)	Yes	Section 6.2.2.4
<b>Decommissioning Phase (Negative Impacts)</b>					
1.	Loss of jobs for local	Moderate (-84)	Low to Moderate (-60)	Yes	Section 6.3.2



	people				
2.	Loss of revenues for government	Low to Moderate (-72)	Low (-48)	Yes	Section 6.3.2

## 7.2. Residual Socio-economic Impacts after Mitigation Measures

According to the SIA Study, all of the environmental impacts related to the development of proposed project can be mitigated to acceptable levels with proper mitigation measures. Unfortunately, most of the major and moderate negative impacts cannot be diminished to natural conditions and these impacts will remain as residual impacts. According to the Table 7.1, there will no anticipated residual impacts in construction phase and operation phase. The anticipated residual socio-economic impacts after mitigation measures will be only on decommissioning phase as shown in Table 7.2.

**Table 7.2. Anticipated Residual Socio-economic Impacts after Mitigation Measures**

No.	Residual Impacts	Compensation and CSR Programmes for Residual Impacts	
		Compensation Framework	CSR Program
<b>Decommissioning Phase</b>			
1.	Loss of job for local people in decommissioning phase	Support at least three times of recent salary to every workers	Training program for other applicable jobs
2.	Loss of revenues for Government in decommissioning phase	Use the factory to other business purpose	Donate to local government

### 7.2.1. Compensation Framework for Anticipated Residual Impacts

According to the analysis of residual impacts, the remaining impacts will be loss of jobs for local communities in decommissioning phase.

#### 7.2.1.1. Compensation for Loss of Job for Local People

Loss of job can be relief by support at least three times of recent salary to every worker. Moreover, it is necessary to point out workers in another factoris (Crown Cement Factory) under the same company if feasible. Traning program will also be provided to ensure to get jobs in the other factory.

### 7.3. Corporate Social Responsibility (CSR) Program

As only a monetary contribution at unplanned places will have a potential to some social problem within the nearest villages and Ngwe Yi Pale Group of Companies should have inclusive CSR program as follow:

#### 7.3.1. CSR Policy of Ngwe Yi Pale

Ngwe Yi Pale already had CSR Policy as follow:

No.	Description	Company’s Policy
1.	Local Community Development Policy	Appoint local people with relevant skills as much as possible
2.	Corporate Social Responsibility (CSR) Policy	Contribute some fixed portion of profit after tax as CSR fund regularly

#### 7.3.2. CSR Officer (or) CSR Coordinator

Ngwe Ye Pale should assign permanent CSR officer (or) CSR Coordinator to closely relate with local people and to manage the contributions of CSR fund effectively. CSR officer should consider the contribution of CSR fund after the discussion with all of the representatives from nearest villages.

#### 7.3.3. CSR Fund

Ngwe Ye Pale should set up at least 2 percent of annual net profit as CSR fund. Annual environmental conservation and monitoring costs should not include in this CSR fund.

#### 7.3.4. Proposed CSR Activities

According to the household survey to some residents in nearest villages, the most public need as CSR activities is to get electricity for nearest villages. The following are the proposed CSR activities for Ngwe Yi Pale Group of Companies to retain good relationship with local communities and to ensure socially responsible project.

- (a) Contributions to Health Care Facilities;
- (b) Supporting Electrification to Nearest Villages;
- (c) Donation to Improve Education;
- (d) Supporting Construction and Maintenance of Religious Buildings;
- (e) Participating Government Schemes for Social Welfare; and
- (f) Cooperation with NGOs and INGOs.

**7.3.4.1. Proposed Allocation of CSR Fund**

It is important that CSR activities should be accomplished not only by financial assistance but also by technical assistance and manpower in some donations. Proposed allocated percent of CSR budget are as follow:

<b>No.</b>	<b>Activities</b>	<b>Proposed allocated per cent of CSR budget</b>	<b>Public Needs according to Primary Data Collection</b>
1.	Contribution to get electrical power in nearest villages	25%	Yes
2.	Supporting health care facilities to nearest villages	15%	Yes
3.	Construction of roads	20%	Yes
4.	Donation for educational support	20%	Yes
5.	Supporting Construction and Maintenance of Religious Buildings	10%	Yes
6.	Contribution to Local Government’s CSR Program	5%	-
7.	Contribution to local NGOs’s and CBOs’s CSR Program	5%	-
<b>Total</b>		<b>100% (at least 2% of annual net profit after tax)</b>	

**7.3.4.1.1. Supporting Electrification to Nearest Villages**

Crown Cement Factory is providing electricity to nearby village, Lauk Hpam, and is making continued effort to support this energy source to other surrounding villages of the factory. According to field survey findings, one of the major community needs of the villages located in the project area was electricity. Access to electricity can bring the villages in the project area socio-economic development rapidly. Therefore, Ngwe Yi Pale should entail supporting the electrification of these villages into Company’s CSR activities in collaboration with local authorities and government concerned including MOEP.

**7.3.4.1.2. Supporting Health Care Facilities**

According to social survey, there is very little public health care facilities in nearest residents. Most of the people in nearest villages are relied on private health clinic in the compound of cement factory. So, health care facilities of proposed project should be assessed to nearest local people with no or little charge as part of CSR program and should be extended to

additional people for new cement factory. Local people in the project area rely on agriculture as their major livelihood means. Spraying pesticide is one of the farming activities and the field survey found that farmers in the area were practicing activity of spraying pesticide on cultivated crops without safety devices, such as mask. Therefore, CSR activities to educate local farmers should be launched in each village or collected villages regarding using pesticides systematically and safely to avoid potential respiratory and health related problems.

#### 7.3.4.1.3. Donation for Education Support

According to social survey, most of the older people are passed just primary school because of difficult to going to school. But young generations today are higher educational standards due to the improvements of schools and teaching staffs. It will be great benefit for local people in nearest villages and so Ngwe Yi Pale should contribute CSR fund in this section regularly.

#### 7.3.4.1.4. Supporting Construction and Maintenance of Religious Buildings

Since the majority of local people in the project area are Shan citizens who are devout Buddhists, Ngwe Yi Pale should engage in such social responsibility activities as supporting Buddhist religious ceremonies traditionally held in the area in timely manner, donating financial or material properties to build Buddhist ordination hall at nearby monasteries as the whole community merit whenever necessary. Ngwe Yi Pale should also support holding seasonal ceremonies for listening to religious sermons in the local area.

#### 7.3.4.1.5. Participating Government Schemes for Social Welfare

Ngwe Yi Pale Group of Co., Ltd. should actively participate in implementation of government schemes for welfare of the society of the Naung Hkio region.

#### 7.3.4.1.6. Cooperation with NGOs and INGOs

Ngwe Yi Pale Co., Ltd. should cooperate with Inn Sein Myay, one of the local NGOs in Naung Hkio Region, in the activities to improve environmental conservation especially in tree plantation in Naung Hkio Region.

#### 7.3.5. Declaration of CSR Program

All of the CSR activities and contribution programs should be declared to public by means of local media, company annual report or company’s website on a regular basis. Audit on CSR fund should be conducted together with environmental and social monitoring audit through independent external audit team for transparency.

#### 7.4. Social Management Team

To enable smooth implementation of social impact management plan, a social management team should be formed to oversee the overall management of the plan. The SMP team should be composed as follow:

- (i) Corporate Social Responsibility (CSR) officer (and/or) Head of HR Department or Community Liaison Officer (CLO) of Ngwe Yi Pale Co., Ltd.,
- (ii) Health and Safety Officer, as well as other relevant employees of Ngwe Yi Pale Co., Ltd.,
- (iii) Representatives from Administrative Office (Naung Hkio),
- (iv) Representatives from local residents in project affected area, and
- (v) Representatives from local CBOs and NGOs.

The SMP team should be held meeting regularly to view progress made and the problems encountered that need to be addressed. The SMP team will also serve as Ngwe Yi Pale’s grievance committee that will address grievances from the community.

#### 7.5. Key Stakeholders for SMP

The SMP has various components with the respective stakeholders involved towards the implementation of the corrective actions. Various persons and organizations have to be involved in the project. The following should be involved in the implementation of the SMP:

- Ngwe Yi Pale Co. Ltd.,
- Regional government authorities,
- Regional health office,
- Local NGOs/CBOs,
- Local entrepreneurs,
- Police force,
- Department of labor,
- Department of national planning, and
- Local residents from the project area, etc.

#### 7.6. Social Monitoring Plan

There will be continuous monitoring and follow-up on the plant activities to ensure that the social management plan is implemented and that its objectives are achieved. The key objectives of the monitoring program will be able to:

- (i) Demonstrate compliance with currently-practiced social performance standards;
- (ii) Track the identified impacts and the delivery of their mitigation strategies;
- (iii) Identify new impacts arising from changing conditions and develop responses; and
- (iv) Enable regular stakeholder contact and feedback.



#### 7.6.1. Components of Social Monitoring Plan

The SMP monitoring plan consists of:

- (i) A list of identified impacts and issues;
- (ii) A monitoring strategy- how management of the impact will be monitored;
- (iii) Responsibility for monitoring- documenting of the party responsible for the implementation of each monitoring strategy, for example, monitoring team or third party agent; and
- (iv) Performance indicators- informative, relevant, measure, useful, widely recognized, simple to report and easily understood.

#### 7.6.2. Scope of Social Monitoring Plan

Social monitoring is proposed for the following areas:

- (i) Improvement and sustainable of job opportunities for local people;
- (ii) Improvement of State economy;
- (iii) Improvement of local economy; and
- (iv) Changes in overall community development.

#### 7.6.3. Monitoring Schedule for Social Monitoring Plan

The monitoring schedule for social monitoring plan is shown in Table 7.3.

Table 7.3. Monitoring Parameters and Performance Indicators for Socio-economic Development

No.	Potential Impact	Performance Indicators	Method	Frequency of Measurement	Responsibility	Supporting or Cooperation Organizations	Estimated Monitoring Cost (US \$)
<b>Monitoring Parameters during Construction Phase (Positive Impacts)</b>							
1.	Job Creation during Construction Phase	<ul style="list-style-type: none"> <li>Local labor employed as % of total construction workforce</li> <li>% of local women employed as % of total construction workforce</li> </ul>	<ul style="list-style-type: none"> <li>Review of company’s labour appointment records</li> </ul>	Monthly during construction phase	<ul style="list-style-type: none"> <li>Construction contractors</li> </ul>	<ul style="list-style-type: none"> <li>Nwge Yi Pale</li> <li>Department of Labour Force</li> <li>Heads of Village Administrative Office in nearest villages</li> <li>Local people</li> </ul>	-
2.	Potential to increase local business and economy	<ul style="list-style-type: none"> <li>Estimates of local products sold to the project</li> <li>Number of local business emerged in the project area</li> <li>Entrepreneurial activities associated with the construction of proposed project</li> </ul>	<ul style="list-style-type: none"> <li>Company’s records for imported food and goods from local and routine inspection in nearest villages for</li> </ul>	Monthly during construction phase	<ul style="list-style-type: none"> <li>Construction contractors</li> </ul>	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> <li>Heads of Village Administrative Office in nearest villages</li> <li>Local people</li> </ul>	-

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			local development				
3.	Economic benefit to local communities	<ol style="list-style-type: none"> <li>1. Formulation of specific strategies for linking the project development with local economy</li> <li>2. Ensure good governance pertaining to mechanisms of benefit sharing.</li> <li>3. Provision of extension services to contracted and individual out growers</li> </ol>	<ul style="list-style-type: none"> <li>•Review of company’s policy to support local socio-economic development during construction phase</li> </ul>	Monthly during construction phase	<ul style="list-style-type: none"> <li>▪Construction contractors</li> </ul>	<ul style="list-style-type: none"> <li>▪Ngwe Yi Pale                             <ul style="list-style-type: none"> <li>▪Heads of Village Administrative Office in nearest villages</li> </ul> </li> <li>▪Local people</li> </ul>	-
<b>Monitoring Parameters during Construction Phase (Negative Impacts)</b>							
1.	Increase pressure on social services and utilities	<ul style="list-style-type: none"> <li>• Records of healthcare assistance provided for construction labor force</li> <li>• Sources of food supply for construction workers</li> <li>• Source of water usage during</li> </ul>	<ul style="list-style-type: none"> <li>•Review of company’s records</li> </ul>	Monthly during construction phase	<ul style="list-style-type: none"> <li>▪Construction contractors</li> </ul>	<ul style="list-style-type: none"> <li>▪Ngwe Yi Pale                             <ul style="list-style-type: none"> <li>▪Administrative Offices in nearest villages</li> </ul> </li> <li>▪Local people</li> </ul>	-

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		construction phase					
2.	Crime and Security	<ul style="list-style-type: none"> <li>Increased cases of alcohol and drug abuse, theft, and crime in general</li> </ul>	<ul style="list-style-type: none"> <li>Review of police reported cases</li> </ul>	Monthly during construction phase	<ul style="list-style-type: none"> <li>Construction Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> <li>Local Police Force</li> </ul>	-
<b>Monitoring Parameters during Operation Phase (Positive Impacts)</b>							
1.	Benefits to National Economy	<ul style="list-style-type: none"> <li>Efficient and transparent tax collection mechanisms in place</li> <li>Tax recorded books</li> </ul>	<ul style="list-style-type: none"> <li>Review of company’s records and external audit reports</li> </ul>	Annually throughout the project	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> </ul>	<ul style="list-style-type: none"> <li>Administrative Office (Naung Hkio)</li> <li>Department of internal revenue</li> </ul>	-
2.	Benefit to Local Economy	<ul style="list-style-type: none"> <li>Estimates of local products sold to the project</li> <li>Entrepreneurial activities associated with the project</li> </ul>	<ul style="list-style-type: none"> <li>Review of company’s records for sources of foods and consumer goods</li> </ul>	Annually	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> </ul>	<ul style="list-style-type: none"> <li>Department of internal revenue</li> </ul>	-
3.	Job Opportunities	<ul style="list-style-type: none"> <li>% of local employees as % of total operation workforce</li> <li>% of local women employed as % of total construction workforce</li> </ul>	<ul style="list-style-type: none"> <li>Review of local employee appointment records</li> </ul>	Annually throughout the project	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> </ul>	<ul style="list-style-type: none"> <li>Department of labour force</li> <li>Administrative Offices in nearest villages</li> </ul>	-
4.	Community Development	<ul style="list-style-type: none"> <li>CSR programs in place</li> </ul>	<ul style="list-style-type: none"> <li>Reviews of effectiveness</li> </ul>	Annually	<ul style="list-style-type: none"> <li>Ngwe Yi Pale</li> </ul>	<ul style="list-style-type: none"> <li>Administrative Offices in nearest</li> </ul>	-

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	Potential	<ul style="list-style-type: none"> <li>• Changes in overall development</li> </ul>	<ul style="list-style-type: none"> <li>• ss of CSR programs</li> <li>• Consultations</li> </ul>			<ul style="list-style-type: none"> <li>• villages</li> <li>▪ External Audit team</li> </ul>	
5.	Changes in life style in nearest villages	<ul style="list-style-type: none"> <li>• Income per household in nearest villages</li> <li>• Improvement of local GDP</li> </ul>	<ul style="list-style-type: none"> <li>• Reviews of effectiveness CSR Program and interviews with local authorities and entrepreneurs</li> <li>• Proxy indicators for changes in life style such as quality of houses improved diets, more time for leisure, and schooling for children, asset ownership</li> </ul>	Annually throughout the project	▪ Ngwe Yi Pale	<ul style="list-style-type: none"> <li>▪ Progress Appraisal &amp; Progress Reporting Department (Naung Hkio)</li> <li>▪ Department of Social Welfare (Naung Hkio)</li> </ul>	\$500 per annum
6.	Increased in Road Accidents	<ul style="list-style-type: none"> <li>• Number of traffic accidents and incidents</li> <li>• Traffic management plan in place</li> </ul>	<ul style="list-style-type: none"> <li>• Accidents and incidents reporting</li> </ul>	Monthly	▪ Ngwe Yi Pale Group of Companies	▪ Local police force	-
7.	Fire Outbreak Risk	<ul style="list-style-type: none"> <li>• Training programs of Fire service personnel of the company implemented</li> </ul>	<ul style="list-style-type: none"> <li>• Reviews of training programs</li> <li>• Review of company’s records</li> </ul>	Quarterly	▪ Ngwe Yi Pale	▪ Local fire fighting force	\$ 1000 per annum



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		<ul style="list-style-type: none"><li>• Records of collaborated activities with regional fire brigade</li></ul>					
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Remark: 1. Construction contractors mean partners for site clearing, ground leveling, and cement plant & other facilities construction.

### 7.7. Records Keeping

Records should be maintained for regulatory, monitoring and operational issues. Typical record keeping requirements for the proposed project are summarized in Table 7.4.

**Table 7.4. Record Keeping Requirements**

No.	Parameter	Record Books	Responsibilities
<b>During Construction Phase</b>			
1.	Job opportunities for local people	- Percentage of local labour used in construction phase	Construction contractors
2.	Increase in crime and security	- Records of Police reported cases directly or indirectly related to the project	Construction contractors
<b>During Operation Phase</b>			
1.	Job opportunities for local people	- % of local labour force used in operation phase	Ngwe Yi Pale
2.	Donation of CSR fund	- CSR fund distribution record book	Ngwe Yi Pale
3.	Taxes for Government	- Tax payment record book	Ngwe Yi Pale
4.	Odour and Noise	- Complaints from local people in nearest residents	Ngwe Yi Pale
5.	Road accidents	- Complaints from local people in nearest villages	Ngwe Yi Pale
6.	Support to local business	- Record book for raw material supply (sugarcane)	Ngwe Yi Pale
<b>During Decommissioning Phase</b>			
1.	Compensation for retirement of labour force	- Compensation record book	Ngwe Yi Pale
2.	Reassign of labours in the same company	- Labours record book	Ngwe Yi Pale

### 7.8. Reporting of Monitoring Results

Monitoring will be carried out strictly as required by the related national regulations and the monitoring results of required parameters should be reported to local authorities monthly and copies to City Development Committee (Naung Hkio) and representatives of local communities. Moreover, it is necessary to disseminate monitoring results to the community via Company’s newsletter and website regularly.

### 7.9. Auditing on Socio-economic Monitoring Results and Distribution of CSR Funds

An annual reporting mechanism will be through a social audit as part of the environmental audit as follow:

No.	Type of Audit	Proposed Audit Team	Frequency	Remark
1.	Internal Audit Team	Financial department of proposed factory	Annually before external audit team	Can be done together with environmental monitoring audit
2.	External Audit Team	Registered third party audit team	Annually	Can be done together with environmental monitoring audit

## 8. KEY FINDINGS FROM THE SIA STUDY

The followings are the key findings from primary data collection, secondary data collection, identification and evaluation of social impacts from SIA Team and public meetings. By observing the mentioned facts, it is intended to shape the proposed project according to the communities’ desire.

No.	Description	Assessment Methods			
		Primary data collection	Secondary data collection	Public Meetings (Notes from discussions and suggestion letters)	Professional Judgment by SIA Team
<b>Public Concerns</b>					
1.	Deforestation	-	-	Yes	Yes
2.	Road Accident	Yes	-	Yes	Yes
3.	Smell from Lime Burning	Yes	-	-	Yes
4.	Noise	Yes	-	-	Yes
<b>Public Needs</b>					
1.	Electrification to nearest villages	Yes	Yes	Yes	Yes
2.	Support to education	Yes	Yes	Yes	Yes
3.	Donate to religious	Yes	-	Yes	Yes
4.	Contribute to road construction	Yes	-	Yes	Yes
5.	Support preparation	Yes	-	Yes	-

	of agriculture lands for sugarcane				
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According to the above tables, it can be seen that the most public concern is increased in road accident and the most public need is getting of electrification and support to education to nearest villages.

## **9. CONCLUSION**

According to the social impact assessment and key findings from the study, the development of proposed project will have both positive and negative socio-economic impacts for local communities. All of the socio-economic impacts resulting from construction and operation of proposed cement factory can be mitigated by proper mitigation measures to satisfactory levels and the development of proposed project has the potential to act as a catalyst for economic growth in the area. Employment opportunities will be improved in the nearby quarters. The developer also intends to contribute towards social welfare like electrification, religious, education, and facilities for the surrounding areas.

So, it can be concluded that the proposed hotel project has suitable benefits to local people together with no significant adverse social impacts and should be allowed to operate if the developer approves to make all of the mitigation and enhancement measures in this report and contribute CSR fund regularly for local community development.

## **10. RECOMMENDATIONS**

Most of the anticipated social impact can be solved by creating job opportunity for local people. Owing to the proposed project, having responsible CSR fund and creating job opportunities for local people will match with the community and it will be a socially responsible project. According to the primary data collection and public meetings, most of the local people did not want to put a stop to the proposed project and they just want to minimize adverse impacts due to project development. To better run the cement factory project in the long term, it is needed to decrease the social impacts while shaping the proposed project to succeed. On the other hand, it is also needed to boost the possible benefits that can have in construction and operation of the project. Fundamentally, the below observations should be emphasized to carry out.

- (a) Avoid off-site nuisance or interference with amenity, such as increased in road accidents due to the travelling of cement loaded car.
- (b) Provide job opportunities for local people as much as feasible and provide job training programs for local people before the announcements of job opportunities;
- (c) Donate CSR fun to local communities regularly and it is also the most public concern during household survey and public meetings.





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**APPENDIX-XVI**  
**HEALTH IMPACT ASSESSMENT**



**Health Impact Assessment Report for  
Crown Cement Factory (Naung Hkio)**

**Reported by:**



**Socially Responsible Partner**

**Social and Health Impact Assessment Group**

**Assigned by GMES**

**June, 2016**



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For “Crown Cement Factory 5,000 TPD”**

*Ngwe Yi Pa le’ Cement Co., Ltd*

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**ABBREVIATIONS**

AIDS	Acquired Immune Deficiency Syndrome
HIA	Health Impact Assessment
HIR	Health Impact Rating
HIV	Human Immunodeficiency Virus
HNA	Health Needs Assessment
HRA	Occupational Health Risk Assessment
HSE	Health, Safety and Environment
HMP	Health Management Plan
NGO	Non Governmental Organization
SIA	Social Impact Assessment
TB	Tuberculosis
WHO	World Health Organization



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## 1. EXECUTIVE SUMMARY

### 1.1. Introduction

Health Impact Assessment (HIA) will provide the developer to identify the positive and negative health effects of the proposed project on physical activity and social cohesion and to a lesser extent on access to healthy food as well as to make recommendations to maximize these effects and to minimize any potential negative health effects. This HIA was conducted by Socially Responsible Partner (SRP) Social and Health Impact Assessment Group, and the potential health impact of the proposed project on local communities and the wider society were assessed.

### 1.2. Objectives of HIA

HIA provides a systematic analysis of the potential community health impacts as well as developing options for maximizing the positive health impacts, minimizing the negative impacts and enhancing health equity/reducing health inequalities.

### 1.3. Scope of the HIA Study

This study also involves developing a baseline assessment and community profile with a particular focus on existing health and wellbeing problems and assets. Initially, a detailed understanding of the project, its aims and objectives is developed. This is followed by a desk-based community health and wellbeing profile using existing local health information from Public Health Department (Naung Hkio). Based on secondary data collection, HIA for local people in nearest villages follows by a more detailed community health impact based on the ground fieldwork, social surveys, focus groups and discussions with key informants such as community health and development workers and local health/public health officials.

### 1.4. Key Steps Used in HIA Study

HIA for proposed cement factory was conducted by scoping; identification and assessment of potential health impacts; mitigation and management measures as shown in Table 1.1.

**Table 1.1. Key Steps Used in Conducting HIA for Crown Cement Factory**

No.	Key Steps in HIA	Purposes	Outcomes
1.	Scoping	To determine the scope of the HIA to be undertaken.	<b>Outlines of how the HIA will be conducted including the time, resources and activities required.</b>

2.	Identification and assessment of potential health impacts	To identify and assess the potential health outcomes.	<b>Document that describes the potential health outcomes of the proposed cement factory project.</b>
3.	Mitigation	To minimize and remedy for potential health impacts.	<b>Set of mitigation measures to prevent, reduce and minimize for potential impacts of proposed cement factory project.</b>
4.	<b>Management and Monitoring</b>	<b>To manage the effectiveness of the HIA and monitor health outcomes.</b>	<b>Document that manage and monitor the HIA process and other outcomes.</b>

### **1.5. Major Negative Health Impacts**

Major health related impacts that can effect on local community health and wellbeing will be increased risk of sexually transmitted infections during construction and operation phases.

### **1.6. Major Positive Health Impacts**

Major positive impacts will be increased in health care services for local people and improved in mental health of local people due to the improvements of job opportunities and household income.

### **1.7. Limitations to the HIA Study**

Due to the difficulties to collect primary health data within the study area, statistics may not be representative by 100%.

### **1.8. Methods of Data Collection**

The typical methods of data collection of existing health conditions consist of the following:

- (a) **Interaction with Government Departments:** Interaction with key government departments such as general administrative office, department of health etc. are conducted to identify constraints and additional information specific to the individual departments and ministries;

- (b) **Household Surveys:** Questionnaires and surveys about health are employed to obtain public needs and concerns from a representative sample household.

### **1.9. Data Sources**

Primary and secondary data for obtainable health conditions of local communities were collected from the following data sources.

- (a) Regional health data from department of health;
- (b) Group discussions with key informers,
- (c) Community feedback from household surveys,
- (d) Feedback from government and non-government stakeholders, and
- (e) Public meetings.

### **1.10. Conclusion and Recommendation**

According to the findings from HIA study, all of the potential health impacts related to the development of the proposed project can be mitigated to acceptable level with proper mitigation measures described in this report. So, the proposed cement factory project should be allowed to operate if the developer approves to do all of the proposed mitigation measures described in this HIA report.

## **2. LAWS AND LEGISLATIONS RELATED TO HIA**

The relevant laws and legislations that safeguard about the health and wellbeing of public in Myanmar are shown in Table 2.1. **Relevant Laws and Regulations for Human Environment in Myanmar**

**Table 2.1. Relevant Laws and Regulations for Human Environment in Myanmar**

<b>Laws and Regulations</b>	<b>Year</b>	<b>Purpose</b>
<b>Town Act and Village Act</b>	1907, 1908	To protect the people and animals of Myanmar from infection diseases.
<b>Essential Supplies and Services Act</b>	1947	To maintain supplies and services essential to the life of the community providing or regulating water supply and environmental sanitation in rural areas.
<b>Public Health Law</b>	1972	To promote and safeguard public health and to take necessary measures in respect of

		environmental health.
<b>Animal Health and Development Law</b>	1993	To prevent of dangers to animal feeds, prevention of infectious diseases, and prevention of cruelty to animals.

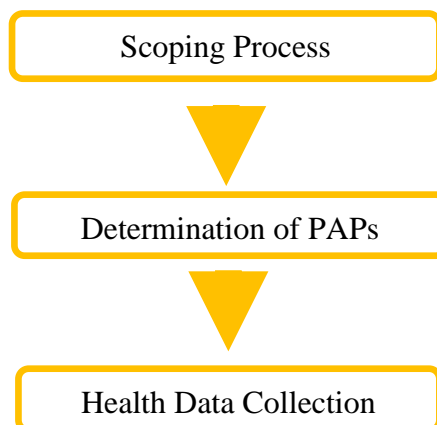
### 3. ALTERNATIVE ANALYSIS FOR HIA STUDY

As the proposed project will be built on existing compound of cement factory, the most appropriate alternative analysis will be “No Project Alternative” rather than other alternative (location alternative, design alternative, schedule alternative etc.,). A “No Action or No-project” implies that if the project were not to proceed, none of the positive or negative impacts identified in this study will materialize.

Although some potential environmental impacts and negative social impacts will be avoided by no-go option of the proposed project, the public benefits associated with the project such as (i) improvement in health care facilities in that region, (ii) improvement in public wellness and mental health due to the improvement of job opportunities and household income. According to the SIA study, all of the potential health impacts during construction and operation phases related to the development of the proposed project can be minimized by proper mitigation measures. So, the No-project Alternative would make poorer the development of health care facilities to nearest villages the lost opportunity for the region as well as for the country and should not be accepted in the present condition.

### 4. METHODOLOGY FOR HIA STUDY

Health impact assessment for proposed factory was conducted by the following procedures.







**Figure 4.1. Methodology Used in SIA Study**

#### **4.1. Phase I: Scoping Process for HIA Study**

Scoping for HIA study was done to determine HIA study area. Study area was considered after the discussions with key informers from local people, project manager, and the heads of Village General Administrative Offices of nearest villages. Based on the discussion results (possible environmental & socio impacts, location of nearest villages), the HIA team decided the study area should be within 3 km radius around the proposed project. Google Map and census are also used for determination of HIA study area. Potential health are also conducted during the scoping process.

#### **4.2. Determination of Project Affected Persons (PAPs) and Possible Socio-economic Impacts in the Study Area**

Key PAPs are considered by group discussions with administrative members of villages’ heads in nearest villages and key informers after consideration of HIA study area. According to the discussions, the key PAPs were considered as follow:

- (i) Local residents in Lauk Hpan Village;
- (ii) Local residents in Khe Hsan Village;
- (iii) Local residents in Pang Ti Village;
- (iv) Local residents in Ngokalay Village;
- (v) Local residents in Nan Ke Aik Village;
- (vi) Local residents in Lal Gyi Daw Village; and
- (vii) Local residents in Kone Mone Village.

#### **4.3. Health Data Collection**

To assess baseline health profile and potential health impacts, HIA team employed both quantitative and qualitative approaches as follow:

- (a) The primary health data collection of nearest villages in the study area, and
- (b) The secondary data collection for the whole Naung Hkio Township.

### **4.3.1. Primary Health Data Collection**

Household sample survey was conducted to study baseline health data together with SIA household survey. The aim of primary health data collection is to understand the health care facilities of nearest villages, most common diseases in nearest villages, and the need of health care services in nearest villages. Other primary health data are sourced from Health Station (Ban Bwe) and health clinic inside cement factory.

#### **(a) HIA Survey Team**

The HIA team organized 7 people (1 health consultant, 2 social consultant, 2 local people and 2 health surveyors). Two local people are members of quarter administrative offices and 3 surveyors are from qualified survey team. Roles and responsibilities of key consultants are as follow:

#### **HIA Survey Team for Proposed Cement Factory**

<b>No.</b>	<b>Consultants</b>	<b>Role</b>	<b>Responsibility</b>
1.	Dr. Khon Aung	Health Consultant	Health Impact Evaluation and Health Management Plan
2.	Dr. Kyaw Swar Tint	Social Consultant	Health Impact Rating
3.	Dr. Than Aung Htwe	Social Consultant	Mitigation Measures

#### **(b) Primary Health Data Analysis**

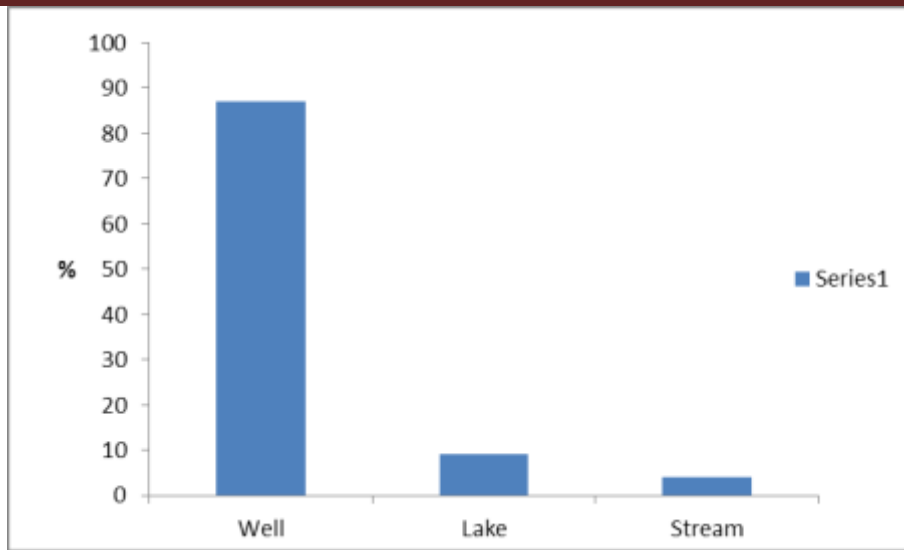
Primary data were coded and processed using Microsoft Excel.

### **4.3.1.1. Health Profiles and Baseline Information by Primary Data Collection**

This section of the HIA provides a high level overview of the existing health conditions in nearest villages. Primary data were collected by household survey from PAPs.

#### **(a) Domestic Use of Water**

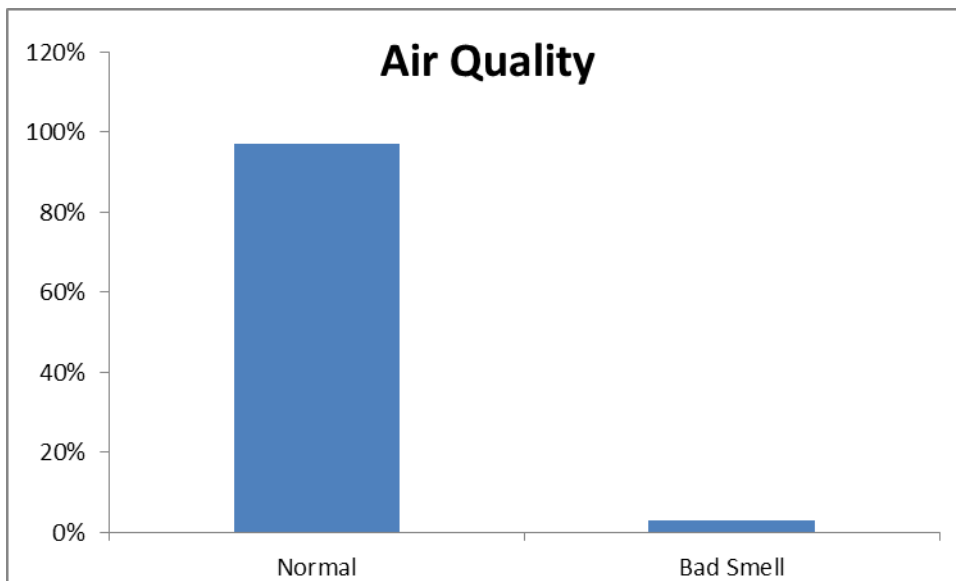
Access to clean and safe water is crucial to the health population and thus have a direct impact on the quality of life of local community. Majority of households in the project area obtained their domestic water from shallow well. Lake (10%) and Stream (5%) were found to be another source of domestic use of water in the area.



According to the primary data collection, there have potential to dry up of domestic water in some nearest villages during summer and so Ngwe Yi Pale should have a plan to get continuous safe drinking water supply system to nearest village because getting of safe drinking water is very important to human health.

**(b) Ambient Air Quality**

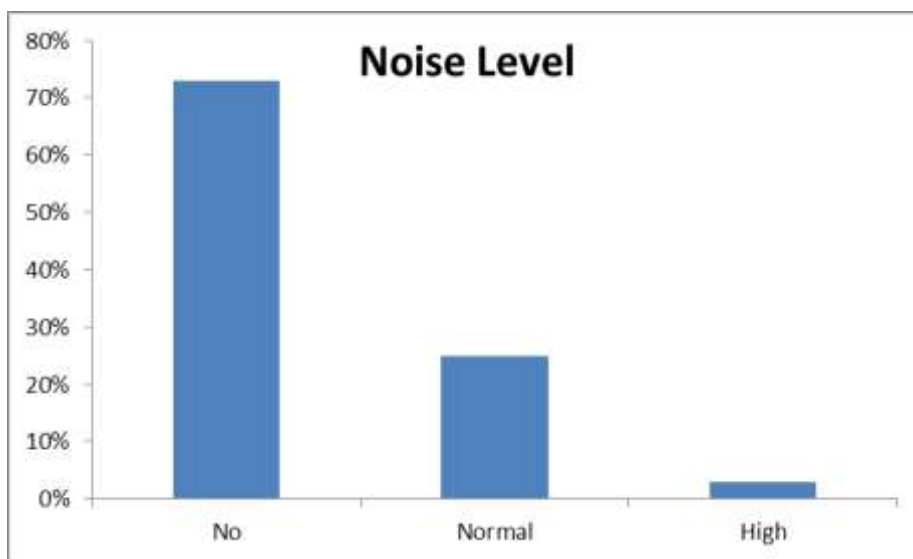
In the survey, respondents were asked to indicate outdoor air quality in the environment. More than 90% of respondents reported the air quality they experienced as normal. Less than 10% revealed that they perceived bad odor from the burning of lime from existing cement factory.



As unobjectionable smell can impact on mental health of local people and so Ngwe Yi Pale should control every smell from the factory.

**(c) Existing Noise Condition**

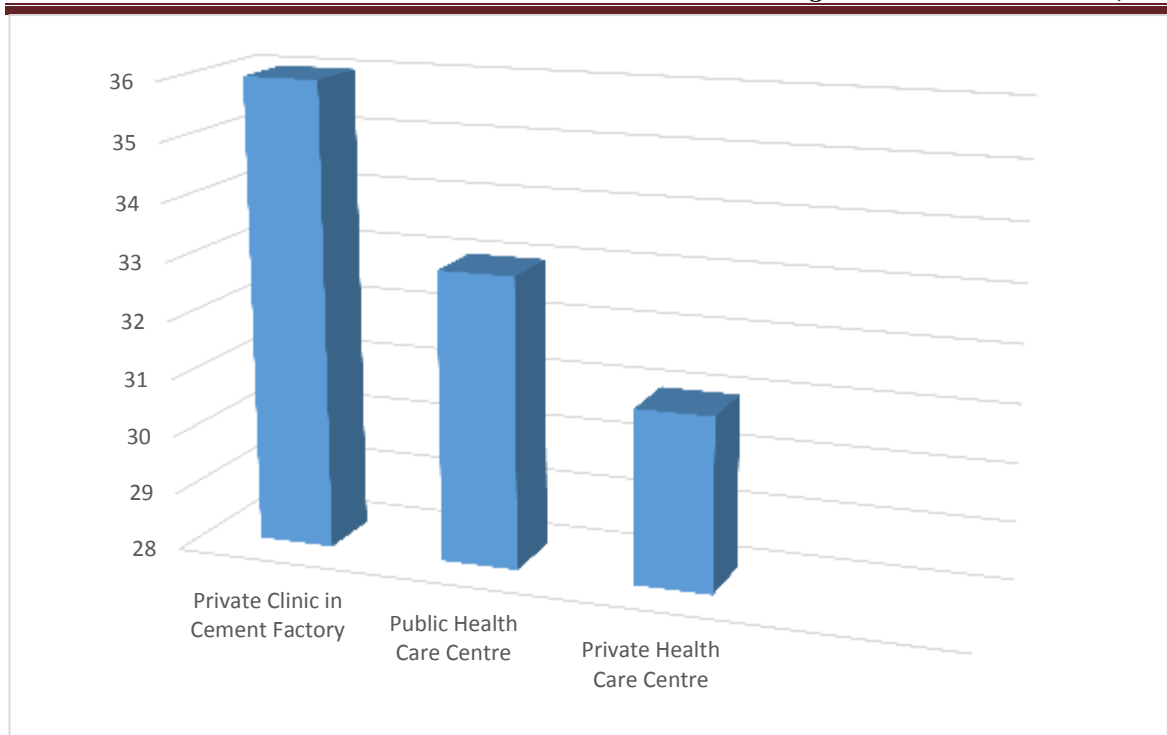
More than two-third of respondents indicated no noise while nearly 25% reported normal noise level, and few percent (3%) judged the noise level they daily experienced as high. Most of the people who answer high noise level are people in nearest villages (noise from existing cement factory) and people near the main road to the factory (noise from transportation).



Even low noise level at night can effect on local communities’ health and wellness. So, it is necessary to control every noise (noise from factory and noise from travelling of trucks) especially at night.

**(d) Existing Healthcare Facilities**

According to the household questionnaires, some local people answered that it is a little difficult to go to public hospital in Naung Hkio and Station Hospital (Ban Bwe). So, the private clinic inside the cement factory is the most dependable for local people in nearest villages. There were three types of healthcare centers people in the project area usually go for their illness and disease. As shown in the following figure, private clinics in Cement Factory and Naung Hkio Township were the most common centers people attended (36%), followed by public rural healthcare centers (33%), and government hospitals (31%) according to the household survey.



According to the HIA study, private health clinic inside the factory is not enough for additional people of extension cement factory. So, Ngwe Yi Pale should upgrade existing health care facilities of standing cement factory.

**(e) Public Needs and Concerns about Health by Primary Data Collection**

The most public needs about the improvement of local health conditions are as follow:

No.	Village Name	Most Public Need and Concerns	
		Public Concerns	Public Needs
1.	Lauk Hpan Village	- Noise at night (45% of respondents)	-
2.	Lal Gyi Taw Village	-	- Private clinic for health care
3.	Khe San Village	- Odour during line burning (16% of	-



**Health Impact Assessment Report  
For “Crown Cement Factory 5,000 TPD”**

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		respondents) - Noise (38% of respondents)	
4.	Kone Moe Village	-	- Tube well for constant water supply during summer (25% of respondents) - Private clinic for health care
5.	Ngokalay Village	-Dust during transportation of cement bag (68% of respondents) - Odour during lime stone burring (38% of respondents)	- Tube well for constant water supply during summer - Private clinic for health care
6.	Nan Ke Aik Village	High noise level at night (30% of respondents)	Private clinic for health care

**4.3.2. Secondary Health Data Collection**

The following are the profile for health and wellbeing of Naung Hkio Township by secondary data collection. Secondary data for health and wellbeing profile of nearest village are sourced from Department of Health (Naung Hkio), Station Hospital (Ban Bwe) and some data are sourced from Local Administrative Office (Naung Hkio).

**4.3.2.1. Healthcare and Wellbeing Profile by Secondary Data Collection**

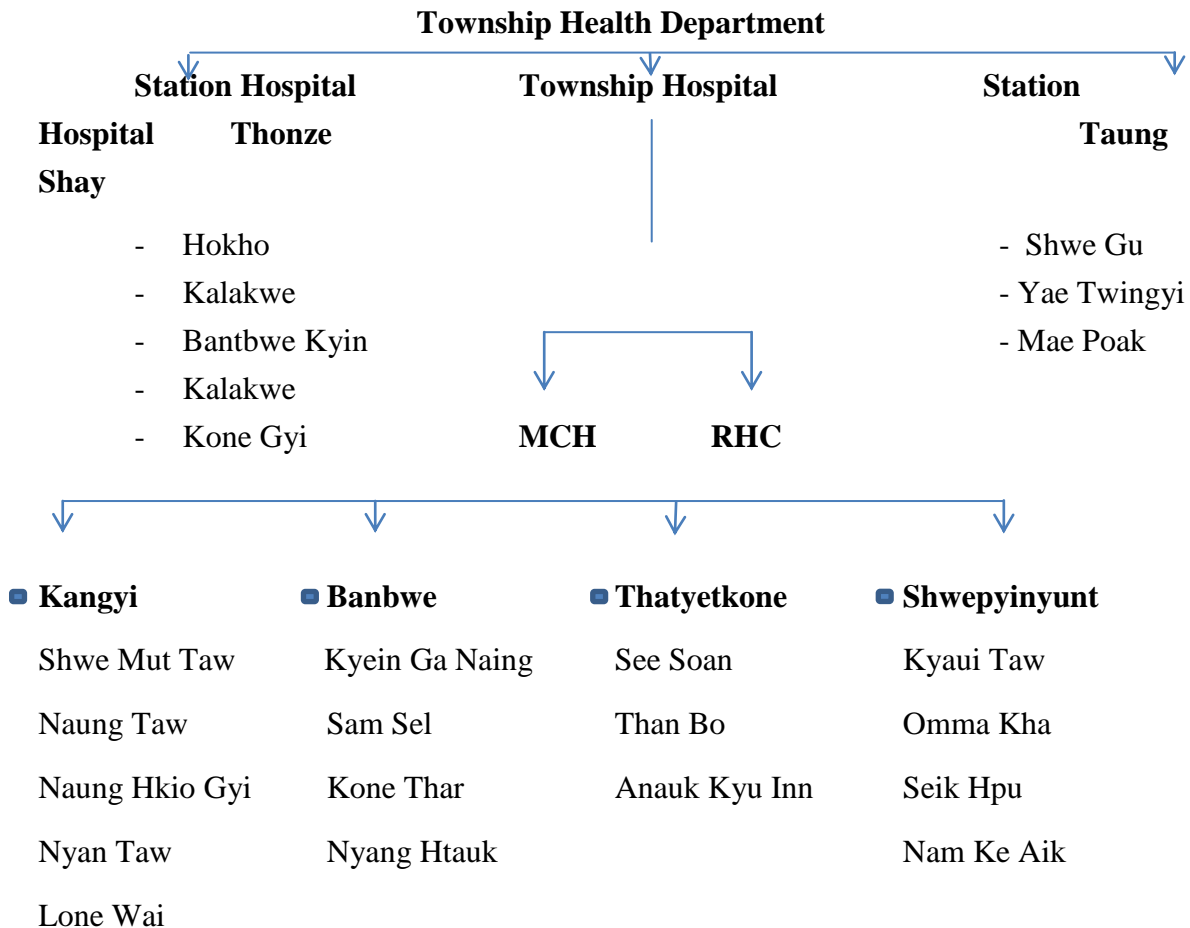
The following are the profile for health and wellbeing for the whole Naung Hkio Township based on secondary data collection.

**(a) Overall Health Profile of Naung Hkio Township**

Baseline health information on the overall Naung Hkio Township were collected through official records and government statistics. Organization of Naung Hkio Township Health Department is depicted in the following figure. There are one 25-bedded hospital, two 16-bedded hospitals, and four rural health centers. Under the township health department there

are 24 sub-centers for public health. There is one maternal and childcare clinic in the township.

**Organization of Naung Hkio Township Health Department**



**(b) Healthcare Services**

In public health sector, the ratios of medical service personnel and local population indicate the existing conditions of the insufficient healthcare facilities particularly for rural people. According to secondary data available, the most common diseases include Diarrhea, Malaria, stomach ailment, Tuberculosis, and Hepatitis. It was also found out that there were substantial amount of incidence of Diarrhea, Malaria, Tuberculosis and stomach ailment in the township. HIV/AIDS prevalence is significantly increased in 2014-15 than in 2013-14. As also noted in Table 4.2, there are one 25-bed hospital and two 16-bed hospitals in the township. There are also 6 rural healthcare centers and 24 rural health sub-centers.

**Table 4.1. Healthcare Facilities**

No. of Doctors	Ratio of doctor and population	No. of Nurses	Ratio of nurse and population	No. of Healthcare Assistant	Ratio of assistant and population
7	1:17895	24	1:5219	5	1:2505

**Table 4.2. Healthcare Infrastructure**

Health care center	No.
Township hospital	1
Station hospital	2
Station health unit	2
MCH	1
Rural health center	4
Sub-center	24

Official Data (Table 4.3, 4.4, and 4.5) show that there are eight medical doctors and 24 nurses for overall township in 2015-16. The ratios of healthcare personnel and total population indicate the existing insufficient condition of public health personnel in the township.

**Table 4.3 Healthcare Personnel**

Medical personnel	2012-13	2013-14	2014-15	2015-16
<b>No. of doctor</b>	5	8	7	8
<b>No. of nurse</b>	18	20	24	24
<b>No. of healthcare staff</b>	81	79	93	93

**Table 4.4. Man Power in Healthcare Sector**

Personnel	MO	HA1	THN	HA	LHV	PHS1	MW	PHS2
<b>Sanction</b>	4	1	1	5	7	2	33	29
<b>Appointed</b>	3	-	1	5	5	2	33	27

**Table 4.5. Ratios of Medical Personnel and Population**

No. of Doctors	Ratio of doctor and population	No. of Nurses	Ratio of nurse and population	No. of Healthcare Assistant	Ratio of assistant and population
<b>8</b>	1:17179	24	1:5219	5	1:2505

According to official statistics from Township health department, percentage of general clinic attendance in Naung Hkio is 15.7 in 2013 and 21.6 in 2014. Number of referral cases recorded as 703 in 2013 and 769 in 2014. Table 4.7 describes percentage of malnutrition in the township. Percentage of malnutrition under 5 year was found to be 3.8 in 2014 while that of extreme malnutrition was 0.4 in that year. Percentage of low birth weight (neonate) was 6.5 in 2013 and 8.5 in 2014. Table 4.8 compares family healthcare indicators in the year of 2013 and 2014. Number of home delivery and number of referral cases decline in 2014 and % of skill birth attended and AN care coverage increase in that year.

**Table 4.6. Health Service Indicator (Community Health)**

Community health	2013	2014
% of general clinic attendance	15.7	21.6
No. of referral cases	703	769

**Table 4.7. Nutrition**

Nutrition	2013	2014
% of Malnutrition < 5 year	3.3	3.8
% of severe malnutrition < 5 year	0.3	0.4

<b>% of low birth weight (neonate)</b>	6.5	8.5
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**Table 4.8. Family Healthcare**

<b>Family Healthcare</b>	<b>2013</b>	<b>2014</b>
<b>No. of Home Delivery (BHS)</b>	706	612
<b>% of skill birth attended</b>	47.2	55.23
<b>No. of referral cases</b>	322	305
<b>% of AN care above &gt;4</b>	79.6	70.4
<b>Average No. Attended (PN)</b>	4.8	3
<b>AN care Coverage</b>	90.4	92.5

Table 4.8 shows information on school health. Hundred percent of coverage of school examined was found in the overall township and coverage of students examined reached 65% in 2013 and 2014.

**Table 4.9. School Health**

<b>School Health</b>	<b>2013</b>	<b>2014</b>
Coverage of School Examined	100	100
Coverage of Students Examined	65.1	64.8
Coverage of Sanitary Latrine	95	100

Table 4.10 list leading causes of morbidity and mortality in the township in the years of 2013 and 2014. In 2013, malaria was found to be the prevalent disease with highest morbidity in the township, followed by Diarrhoea, Dysentery, Acute Respiratory Infection (ARI), and TB. Malaria and TB were found to be the leading causes of mortality in that year. In 2014, the incidence of Malaria, ARI and TB decreases and that of Diarrhoea and Dysentery increases. However, ARI was found to be the leading cause of mortality in 2014.

**Table 4.10. Five Leading Causes of Morbidity and Mortality**

<b>2013</b>	<b>2014</b>
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Morbidity	incidence	Mortality	incidence	Morbidity	incidence	Mortality	incidence
Malaria	1349	Malaria	3	Diarrhoea	1896	ARI	2
Diarrhoea	904	TB	3	Dysentery	576	Malaria	1
Dysentery	371	Tetanus	2	Malaria	337	Tantus	1
ARI	356	Meningitis	1	ARI	331	Vital Hep;	1
TB	169	NNT	1	TB	60		

Data shown in Table 4.11 compares Malaria incidence in 2013 and 2014. As noted in the table, total number of Malaria exam, number of Malaria pf (+) OPD, number of Malaria pf (+) In, and cerebral Malaria cases significantly drop in 2014.

**Table 4.11. Malaria**

Malaria	2013	2014
Total No. of Malaria Exam	3669	3071
No. of Malaria pf (+) OPD	909	264
No. of Malaria pf (+) IN	333	82
Cerebral Malaria Cases	7	1

Data (Table 4.12) reveal that number of new cases (+) of TB was 38 in 2013 and 24 in 2014. Number of relapse cases of TB was found to be 3 in 2013 and 2 in 2014. There were seven registered cases and 7 new cases of Leprosy in 2013 and there were 3 registered cases and 2 new cases of Leprosy in 2014 (See Table 4.13).

**Table 4.12. TB**

TB	2013	2014
No. of new case (+)	38	24

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No. of relapse case	3	2
No. of EP + (-) case	67	34

**Table 4.13 Leprosy**

Leprosy	2013	2014
Registered cases	7	3
New cases	7	2

**Table 4.14. Health Impact Indicators**

Health Impact Indicators	2013	2014
CBR	21.3	22.8
CDR	4.8	4.9
MMR	2.4	1.6
U 5MR	11.5	15.6
Abortion Rate	4.5	5.28

Hospital service indicators of the township for two years (2013 and 2014) are listed in Table 4.15. Total number of outpatient significantly increases in 2014 compared to the number in 2013. Total number of death and that of abortion also increase in that year. Increased bed occupancy rate was also found in 2014. Table 4.16 describes existing NGOs in health sector in the township.

**Table 4.15. Hospital Service Indicators**

Hospital Service Indicator	2013	2014
Total No. of outpatient	5914	8559
Total No. of inpatient	3763	3639
Total No. of Delivery	639	634

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Total No. of Abortion	125	134
Total No. of Death	125	134
Average No. of inpatient per day	41	45
Average No. of Duration Stay Day	10	10
Bed occupancy rate % (Sanction bed)	61.6	78.1

**Table 4.16. NGOs in Healthcare Sector**

NGOs in healthcare sector	No. of Association
MMCWA	1
Red Cross	1
MWAF	1
Nurse Associations	1
H.A Associations	1

Data on HIV/AIDS cases show the greater infected cases in 2014-15 compared to 2013-14. Table 4.17 shows health indices in the overall township. There was relatively high infant mortality in the township compared to national average.

**Table 4.17. HIV/AIDS**

2013-14		2014-15	
Infected	Dead	Infected	Dead
13	-	23	-

**Table 4.18. Health Indices**

Per 1000					
Maternal population	Infant population				
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
31392	3085	22.8	1.6	13.3	5.3

#### 4.3.3. Public Meetings

Public meetings for active public participation are accomplished two times as follow:

##### 4.3.3.1. First Public Meeting

First public meeting was made in (4.4.2015). There were about 150 people from local authorities, communities, NGOs and INGOs, and those who are directly or indirectly affected by the proposed project are attended in this meeting.

##### 4.3.3.2. Second Public Meeting

Second public meeting was hold in (23.8.2015) and about (176) people are attended in this meeting.

##### 4.3.3.3. Public Concerns and Public Needs Related to Health Issues during Meetings

The most important positive outcomes from the project expected by the local people about health and wellbeing issues during public meetings are shown in Table 3.20.

Villages Name	Public Concerns			Public Needs			
	Road Safety	Noise	Odour from Factory	Drugs	Dust	Water supply	Health care facilities
Ngokalay	Yes	-	-	-	Yes	Yes	-
Naung Kwang	-	-	-	-	-	-	-
Kon Mone	Yes	-	-	-	-	-	-
Mone Mo	Yes	-	-	-	-	-	-

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Lal Gyi Taw	-	-	-	-	-	Yes	Yes
Nan Kal Aik	-	-	-	-	-	-	Yes
Local Authorities	Yes	Yes	-	Yes	Yes	-	Yes

**5. HEALTH IMPACT ASSESSMENT**

HIA for proposed cement factory was conducted by the following strategies.

**5.1. Health Impact Assessment Methodology**

There is no universally agreed formula for assessing public health significance, although assessments are mostly based on a subjective judgment about the magnitude of the potential health impacts (size of the affected population and scale of the positive or negative health impact); its likelihood of occurrence; and the degree of confidence in the impact actually occurring (based on scientific and other evidence of the health impact occurring in similar circumstances elsewhere). Table 5.1 shows a Health Impact Significance Rating Methodology of SRP Group.

**Table 5.1. Health Impact Significance Rating Methodology**

	Likelihood of Occurrence of Health Impact			Health Impact Rating
	Low	Medium	High	
Magnitude of Health Impact	Unlikely to occur	Likely to occur sometimes	Likely to occur often	
None	No significance	No significance	No significance	0
Low	Very Low	Low	Medium	1
Medium	Low	Medium	High	2
High	Medium	High	Very High	3



When analyzing health impacts, it is important to consider the magnitude, likelihood and public health significance of the potential impacts. This analysis involves expert judgment based on a consideration of the evidence gathered and its applicability to the local context and the specific project.

Distributional, health equity and inequality impacts are analyzed by examining how particular sub-groups within a population, particularly vulnerable groups, are likely to be affected by the project. The scoping and community profiling steps are likely to have already identified potentially vulnerable groups through existing local information on these individuals/groups or through community surveys and meetings with key informants e.g. community leader, community health worker or local NGO.

Health equity/inequality impacts occur when the projects benefits and harms are unevenly distributed. This includes where the risk is equally distributed, such as air pollution, but the impact is disproportionate – affecting particularly children, older people and those with existing ill health.

Analysis of health impacts involves systematically determining the range of potential impacts, their relative importance and where, when and how likely they are to occur. The information for the HIA was obtained from the primary data collection (household survey), literature review, community profile and Naung Hkio Health Data from Public Health Department (Naung Hkio) as well as knowledge and expertise of the HIA Consultant of SRP Group.

## **5.2. Phases for HIA**

HIA for IBIS Style Cement factory (Naung Hkio) will only be conducted into the following phases.

- (a) Phase I: Construction Phase; and
- (b) Phase II: Operation Phase.

Health related impacts during pre-construction and decommissioning phases will not significance due to short-term and low probability.

## **5.3. Anticipated Health Impact and Proposed Mitigation Measures**

One of the most important tasks in HIA is to analyze how the positive and negative health impacts are likely to be distributed within and across local communities. This section will discuss the potential health impacts and possible mitigation/enhancement measures during construction phase and operation phase. The following health related impacts are

considered in the assessment of health impact for IBIS Style Cement factory (Naung Hkio).

- (a) Infectious Diseases (Malaria, HIV and influenza);
- (b) Chronic diseases (Heart disease, cancer, bronchitis, and asthma);
- (c) Nutritional disorders (Malnutrition, vitamin deficiencies and obesity); and
- (d) Mental health and wellbeing (Depression, stress and anxiety).

### 5.3.1. Construction Phase

During construction phase, the anticipated health impacts are as follow:

#### 5.3.1.1. Increase in Road Accidents

Increases in transportation and traffic during project construction can impact health and safety of local community by increasing the risk of motor vehicle accidents, release of hazardous pollutants, creation of road dust, and impediment of walking and transportation routes. Due to the nature of the project there will an increase in traffic both within and to and from the site. The increase in traffic will be contributed to by construction activities and transporting of supplies within the site. This may potentially increase the number of accidents. Because children often walk without safety conscious, they are more vulnerable than most adults to the impacts of traffic safety during the construction phase.

#### *Impact Significance of Road Accidents*

The impact will be considered as medium as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

***HIR = Health Impact Rating***

#### *Mitigation Measures for Road Accidents*

The developer and construction contractors should communicate and coordinate with local authorities and official concerned to develop plan for transportation and safety needs of local community and children going to and from school by car, bus, motor cycle and walking to prevent injury to local people and school children.

The contractor should instruct drivers of construction vehicles to reduce truck speed limits in the project area to prevent accidents and to reduce the severity of injury when an accident occurs. The contractor should install speed control measures and should post decreased speed limits signs, real time speed measurement signs, and place speed bumps in the area to prevent workers from speeding.

The contractor should mark pedestrian/motor cycle high use routes and establish safe crossing zones to alert drivers, potential pedestrians and motor-cyclers. Safe driver training for workers penalty system for unsafe drivers should be implemented to encourage safe driving.

**5.3.1.2. Health Impact Related to Increase in Noise Level**

Construction activities normally generate a lot of noise. Noises will also arise from various construction machinery at site. Both acute loud noise and chronic lower level noise have been associated with a variety of negative health effects. Hearing loss and impairment are known to occur as a result of exposure to acute, high decibel noise (greater than 85 dB). Noise annoyance can lead to stress related impacts on health such as feelings of displeasure, interference with thoughts, feelings, and activities and disturbed sleep and can have impacts on mood, performance, fatigue, and cognition.

***Impact Significance of Increase in Noise Level***

The impact will be considered as low for local people due to the distance of nearest villages and medium to construction workers inside the construction site as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest	√	-	-	-	√	-	√ (HIR)		-

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residents							1)		
Workers at site	-	√	-	-	-	√	-	-	√ (HIR 2)

**Mitigation Measures Health Impact Related to Increase in Noise Level**

The Occupational Safety and Health Administration (OSHA) has recommended permissible noise exposure limit for industrial workers, which is based on 90 dB (A) for 8 hours exposure a day with 5 dB (A) trading rates. The limits are given in Table 5.2.

**Table 5.2. Permissible Exposure Noise Limits**

<b>Total Time of Exposure Per Day in Hours</b>	<b>Noise Level dB(A)</b>
8	90
6	92
4	95
3	97
2	100
1	105
½	110
¼	115

According to OSHA, the maximum allowable noise level for the workers is 90 dB (A) for 8 hours exposure a day. Therefore, adequate protective measures in the form of ear muffs/ear plugs to the workers working in high noise areas need to be provided if actual noise level monitoring result (in dB(A)) is more than 90dB(A) at worksite for working time 8 hrs. The following are some of the suggested ways to reduce the potential impact of noise and vibration.

1. Reduce speed limits for trucks in the project area to reduce noise and vibration levels.

2. Apply best available noise reduction technology for heavy equipment, including trucks and truck brakes, to reduce noise levels.
3. Alert residents of anticipated noise, including time, duration, decibel levels, and machinery to be used to protect public health.
4. Develop and implement a plan that includes a variety of noise control strategies to protect public health and to prevent long-term nuisance noise levels.

**5.3.1.3. Increase Infection of Air-borne Diseases**

An influx of large groups of workers can lead to overcrowded conditions where air-borne diseases such as tuberculosis, influenza and meningitis can spread easily. Various construction activities will have adverse health impacts on by increasing air pollution in the immediate vicinity and the surrounding community. Particulate matter emissions from construction activities will also expose the workers and the local people in nearest villages to bronchial and other respiratory tract diseases.

**Impact Significance for Increase Infection of Air-borne Diseases**

According to the secondary data collection, infections of TB are continuously increased in Naung Hkio Region. So, impact rating for air-borne diseases will be considered as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	-

**Mitigation Measures for Infection of Air Borne Diseases**

This potential impact will be minimized by implementing the following mitigation measures:

- Dust control measure - wetting of roads, dust screens and equipment which generates low dust emissions;



- Ensuring that the premises are watered during construction;
- Provide medical check for workers who are susceptible infection of air-borne diseases;
- Provide healthcare program to prevent infection of air-borne diseases.

**5.3.1.4. Increase Infection of Water Borne Diseases**

The incidence rate of water borne diseases such as cholera and diarrhea will increase if there will be no proper sanitation practices at the construction site. Improper waste disposal of construction debris will also have potential to increase water borne diseases. Project activities could become sources of pollution, as a result of infiltration into the surface stream. The possible negative impacts considered significant are:

- Loose soil from earthworks may be washed into stream.
- During the construction phase, activities such as mixing of cement and stockpiling of waste potentially lead to contamination.
- Irresponsible dumping of domestic solid waste can lead to underground water contamination, due to contaminants emanating from various products into the groundwater and filtering through to the aquifers. This will be a particular problem during the rainy season.
- Potential surface water pollution can emanate from waste products generated by construction activities entering the surface drainage.

***Impact Significance for Increase Infection of Water Borne Diseases***

According to the secondary data collection, infections of water borne diseases such as diarrhea are still the most public healthcare problems in Naung Hkio Region and so the impact will be considered as medium as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

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Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	
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***Mitigation Measures for Increase Infection of Water Borne Diseases***

Proper sanitation system should be provided for construction workers during construction period. Construction debris should be disposed at suitable location that does not impact on local water resources. Construction activities should ensure that no loose soil is permitted into watercourses and stockpiles are located away from surface water. All mixing of cement should be carried out in a designated area away from surface water and areas of potential runoff. All areas of fuel storage should be banned to prevent hydrocarbon pollution of surface water.

**5.3.1.5. Potential to Increase Infections from Mosquito**

The blockage of drainage system along the access road to proposed cement factory will cause breeding zone for mosquitoes and can cause potential to cause infections from mosquitoes especially in rainy season.

***Impact Significance of Potential to Increase Infections from Mosquito***

As malaria is one of the most infection diseases in Naung Hkio Region, impact significance will be considered as medium as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-
Construction workers	-	√	-	-	√	-	-	√ (HIR 2)	

***Mitigation Measures for Potential to Increase Infections from Mosquito***

Proper temporary or permanent drainage system should be compensated as the blocked drainage system along the access road. Ensure that there are no stagnant pools of water during the construction phase. Provide local people with impregnated mosquito nets and/or better access to malaria prophylaxis and treatment.

**5.3.1.6. Impacts on Community Wellness**

Community wellness is characterized by a compilation of factors such as school enrollment, rates of sexually transmitted infection, incidence of criminal activity, substance abuse, and other immeasurable factors such as quality of life, social cohesion, and social capital.

An inflow of construction workers and their dependents from other areas may also be accompanied by possible concomitant increase in social pathologies and crime including drug and alcohol abuse, assault, theft and violence.

Negative effects on community wellness may include increased substance abuse, crime, sexually transmitted infection, heavier industrial traffic and visible impacts to natural environment, demands on the education system beyond current capacity, interference with recreational activity and decreased social cohesion. The demand for public services will be affected by increases in population. Social service facilities to be impacted due to the increase in population will be healthcare services, water, electricity, housing, and sanitary facilities among others.

It is possible that the elderly or youth of the community are more vulnerable to impacts on community well-being. Elderly may be more vulnerable to crimes of theft or burglary, and are the likely group most affected by changes in social service availability and accessibility. Children would be most affected by changes in school enrollment and class size.

***Impact Significance of Impacts on Community Wellness***

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur	Low	Medium	High

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						often			
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

***Mitigation Measures for Impacts on Community Wellness***

The following are some of the suggested ways to reduce the potential impact to community wellness.

1. Establish a mechanism to facilitate on-going community engagement between the developer and local residents for early identification of impacts to community wellness.
2. Review sexually transmitted infection clinic access and education, with particular attention to in-migrant workforce to reduce spread of sexually transmitted infections within the community.
3. Encourage contractors to implement drug and alcohol free work-place programs and to reduce drug and alcohol abuse.
4. Develop plans to address temporary and permanent population influx that may affect demand and capacity of social services, schools and other key community facilities and programs.

***5.3.1.7. Impact on Health Care Infrastructure***

Health infrastructure can include private and public medical services, hospitals, and emergency transport services. The impact will be mainly on existing health care facility within the factory compound due to the increase number of construction workers. It will also impact on local people in nearest villages who are rely on health care facility of existing cement factory. The impact will be considered as medium because there are limited health care facilities in nearest villages and most of the local people are rely on private health care clinic inside the existing cement factory.

***Impact Significance of Impacts on Health Care Infrastructure***

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur	Likely to occur	Low	Medium	High

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					sometimes	often			
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

***Mitigation Measures for Impacts on Health Care Infrastructure***

During the construction phase, the project proponent and contractors should develop plans to address temporary population influx that may affect demand and capacity of existing health care services and facilities.

**5.3.1.8. Increased Risk of Sexually Transmitted Infections**

During construction phase, the improved economic status of the area and the influx of new people, living away from their families, can also lead to an increased risk of sexually transmitted infections such as HIV/AIDS, gonorrhoea and chlamydia. Major outbreaks of infectious diseases can have a devastating effect not only on or near the cement factory site but also on local communities.

***Impact Significance of Increase Risk of Sexually Transmitted Infections***

Impact rating for sexually transmitted infection can be considered as high due to the increased in HIV/AIDS infection rate from 2012 to 2013 in Naung Hkio Township. Impact significance of increase risk of sexually transmitted infections during construction phase can be considered as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people	-	-	√	-	√	-	-	-	√ (HIR 3)



***Mitigation Measures for Increase Risk of Sexually Transmitted Infections***

Review sexually transmitted infection clinic access and education to reduce spread of sexually transmitted infections within the community. Provide information and education to workers about safe sex and implement HIV control program for workers.

**5.3.2. Operation Phase**

The following will be the anticipated health impacts of the operation of proposed Cement factory (Naung Hkio).

**5.3.2.1. Improve Mental Health**

Access to jobs, income, goods and services can enhance mental health and wellbeing and reduce stress. Having a sense of control over one’s life is crucial for mental wellbeing, so proposed cement factory project can improve mental health by reducing poverty, increasing self-esteem and empowering local communities.

***Impact Significance of Improve Mental Health***

Job opportunity in proposed cement factory will help to improve mental health to local people. Impact can be rated as low due to the low number of workers in cement factory.

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in Naung Hkio	√	-	-	-	√	-	√ (HIR 1)	-	-

***Enhancement Measures for Improve Mental Health***

Appoint local people with relevant skills as much as possible during operation period.

**5.3.2.2. Increase Chronic Diseases**

Sudden improvement can bring changes that affect people’s lifestyles (e.g. diet, level of physical activity, smoking, alcohol and drug consumption) that increase their risk of chronic illnesses such as heart disease, diabetes, and cancer and can also affect the mental health status of the local population. Obesity and micronutrient deficiencies can co-occur

when calorie intake is high and the food eaten is low in essential vitamins and minerals. This is a particular risk in regions of rapid economic development, where the influx of cash income into a subsistence economy can disrupt traditional patterns of food production, food distribution, land access and water use. This can be through increased incomes as well as the increased availability of tobacco and alcohol. Alongside infectious diseases, cardiovascular diseases (heart disease and strokes) are one of the leading causes of death, ill health and disability worldwide.

***Impact Significance of Increase Chronic Diseases***

Even small changes in these chronic disease risk factors can have significant long term effects on local community health and wellbeing. So, this kind of impact can be rated as medium.

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people in nearest villages	-	√	-	-	√	-	-	√ (HIR 2)	-

***Mitigation Measures for Increase Chronic Diseases***

Provide awareness program for workers and local people in nearest villages about disadvantages of smoking, drug consumption, and nutrients disorder to human health.

**5.3.2.3. Increase Risk of Sexually Transmitted Infections**

Increased risk of sexually transmitted infections such as HIV/AIDS, gonorrhoea and chlamydia will be continued during operation phase. Major outbreaks of infectious diseases can have a devastating effect not only on or near the cement factory site but also on local communities. Moreover, the influx of large groups of, generally, male workers can sometimes lead to social unrest which may include violence and sexual assault in Naung Hkio region. Similarly, an increase in commercial sex workers (CSW) can have

significant, long term, negative individual and community health and wellbeing impacts. It will also impact on custom of local people.

***Impact Significance of Risk of Sexually Transmitted Infections***

Increased transmission of sexually transmitted infections and other social harms can cause serious health problem for local people. Impact rating for sexually transmitted infection can be considered as high due to the increased in HIV/AIDS infection rate gradually increase in Naung Hkio Region (13 infected people in 2013-14 and 23 infected people in 2014-15).

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people in Naung Hkio	-	-	√	-	√	-	-	-	√ (HIR 3)

***Mitigation Measures for Risk of Sexually Transmitted Infections***

Review sexually transmitted infection clinic access and education to reduce spread of sexually transmitted infections within the community. Provide information and education to workers about safe sex and implement HIV control program for migrant construction workers.

***5.3.2.4. Pressure on Social Care and Public Services***

Proposed cement factory project may also place additional pressures on social care and public services (including emergency services) due to the increase in population that they can bring, particularly if they also cause disruption and lead to new, or exacerbate existing, health and social problems. These can be overwhelmed by local people demanding to be treated in them if existing public services are seen to be inaccessible or expensive. Pressure on local water resources may occur because the project uses local water for its own processes and workers at the expense of local community’s sanitation systems and access to clean drinking water. This in turn can lead to the spread of water borne diseases such as typhoid and cholera (bacterial); hepatitis A and polio (viral); schistosomiasis and guinea worm (parasites); and amoebiasis and giardiasis (protozoal).

**Impact Significance of Pressure on Social Care and Public Services**

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
Local people in Naung Hkio	-	√	-	-	√	-	-	√ (HIR 2)	-

**Mitigation Measures for Impact Significance of Pressure on Social Care and Public Services**

This potential impact can avoid by well planned to avoid the use of local resources and develop plans to reduce demand and capacity of social services and other key community facilities. Adequate sanitation facilities should be provided at site. The contractor should ensure that the construction site is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, fire-fighting and clean and safe water supply.

**5.3.2.5. Impact on Health Care Infrastructure**

Health infrastructure can include private and public medical services, hospitals, and emergency transport services. The impact will be mainly on existing health care facility within the factory compound due to the increase number of workers. It will also impact on local people in nearest villages who are rely on health care facility of existing cement factory. The impact will be considered as medium because there are limited health care facilities in nearest villages and most of the local people are rely on private health care clinic inside the existing cement factory. Moreover, health care facilities of existing cement factory is just enough for current condition and will pressure for additional workers according to the social survey.

**Impact Significance of Impacts on Health Care Infrastructure**

As the general clinic attendance percent is continuously increased in clinics and hospital (both private and public sections), there will be medium impact on community health care facilities due to increase in number of cement factory workers.

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Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

***Mitigation Measures for Impacts on Health Care Infrastructure***

The project proponent and contractors should develop plans to address temporary population influx that may affect demand and capacity of existing health care services and facilities.

**5.3.2.6. Impact on Community Wellness**

The commencement of proposed cement factory project may stimulate some forms of social pathologies and crime including increased substance abuse, crime, human trafficking and decreased social cohesion. It will impact on mental health of people in nearest villages.

***Impact Significance of Impact on Community Wellness***

Impact significance of impact on community wellness will be as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-

***Mitigation Measures for Impact on Community Wellness***



The following are some of the suggested ways to reduce the potential impact to community wellness.

1. Establish a mechanism to facilitate on-going community engagement between the developer and local residents for early identification of impacts on community wellness.
2. Implement drug free programs.
3. To protect local communities in case of disease outbreaks among the workforce, a premedical examination for workers should be conducted, followed by routine medical examination during the works and a final post medical examination.

#### 5.3.2.7. Odour

During operation phase, odour will be emitted from lime burning process.

#### *Impact Significance of Odour*

Impact significance of impact of odour on community health will be as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	-	√	-	-	√	-	-	√ (HIR 2)	-

#### *Mitigation Measures for Odour*

Be careful not to release odour from lime burining process and install odour control system if necessary.

#### 5.3.2.8. Noise

Noise will produce during operation of the proposed cement factory. Both acute loud noise and chronic lower level noise have been associated with a variety of negative health effects. Although noise from cement factory during operation phase cannot cause hearing loss and impairment as a result of exposure to acute, noise annoyance can lead to stress related impacts on health such as feelings of displeasure, interference with thoughts,

feelings, and activities and disturbed sleep and can have impacts on mood, performance, fatigue, and cognition.

***Impact Significance of Noise***

Impact significance of impact of noise on community health will be as follow:

Who will affected?	Magnitude/Consequence of impact			Likelihood/Probability of impact			Health Impact Significance Rating		
	Low	Medium	High	Unlikely to occur	Likely to occur sometimes	Likely to occur often	Low	Medium	High
People in nearest residents	√	-	-	-	√	-	√ (HIR 1)	-	-

***Mitigation Measures for Noise***

Noise from cement factory during operation phase should be controlled and use noise control system if noise level in nearest residents is higher than allowable limit (national guidelines).

**5.3.2.9. Occupational Health and Safety**

The most significant occupational health and safety for factory workers when impacts occur during the operational phase of cement manufacturing projects and primarily include the following:

- Noise
- Heat
- Volatile Organic Compounds (VOCs)
- Dust

***(1) Noise and Vibrations***

Exhaust fans and grinding mills are the main sources of noise in cement and lime plants.

***Mitigation Measures***

Control of noise emissions may include the use of silencers for fans, room enclosures for mill operators, noise barriers, and, if noise cannot be reduced to acceptable levels, personal hearing protection, are shown in the following,

- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the ‘allowed’ exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible
- Periodic medical hearing checks should be performed on workers exposed to high noise levels

## ***(2) Heat***

The principal exposures to heat in this sector occur during operation and maintenance of kilns or other hot equipment, and through exothermic reactions in the lime-hydrating process.

### ***Mitigation Measures***

Recommended prevention and control techniques include the following:

- Shielding surfaces where workers’ proximity and close contact with hot equipment is expected, using personal protective equipment (PPE), as needed (e.g. insulated gloves and shoes);
- Minimizing the work time required in high temperature environments by implementing shorter shifts at these locations;
- Making available and using, as needed, air- or oxygen- supplied respirators;
- Implementing specific personal protection safety procedures in the lime-hydrating process to avoid potential exposure to exothermic reactions.

### ***(3) Volatile Organic Compounds (VOCs)***

The most common sources of fugitive VOC emissions are associated with industrial activities that produce, store, and use VOC-containing liquids or gases where the material is under pressure, exposed to a lower vapor pressure, or displaced from an enclosed space. Typical sources include equipment leaks, open vats and mixing tanks, storage tanks, unit operations in accidental releases.

#### ***Mitigation Measures***

Recommended prevention and control techniques include the following:

- Implementation of engineering and administrative control measures to avoid or minimize the release of VOC substances into the work environment keeping the level of exposure below internationally established or recognized limits
- Equipment leaks, open vats and mixing tanks should be easy to clean and maintain, and not allow for accumulation of fugitive VOC compounds.
- Keeping the number of employees exposed, or likely to become exposed, to a minimum
- Training workers in the use of the available information, safe work practices, and appropriate use of PPE

### ***(4) Dust***

Exposure to fine particulates is associated with work in most of the dust-generating stages of cement manufacturing, but most notably from quarry operation, raw material handling, and cement grinding. Exposure to active (crystalline) silica dust (SiO<sub>2</sub>), when present in the raw materials, is a relevant potential hazard in the cement manufacturing sector.

#### ***Mitigation Measures***

Methods to prevent and control exposure to dust include the following

- Control of dust through implementation of good housekeeping and maintenance;
- Use of air-conditioned, closed cabins;
- Use of dust extraction and recycling systems to remove dust from work areas, especially in grinding mills;
- Use of air ventilation (suction) in cement-bagging areas;
- Use of PPE, as appropriate (e.g. masks and respirators) to address residual exposures following adoption of the above-referenced process and engineering controls;
- Use of mobile vacuum cleaning systems to prevent dust buildup on paved areas;

## **6. HEALTH IMPACT MANAGEMENT PROGRAM**

The Health Impact Management Program (HIMP) identifies the relevant responsible institutions, authorities and stakeholders to manage the negative social impacts and enhance potential benefits and to monitor these impacts to adjust mitigation strategies. The following tables show health impact significance rating and responsible stakeholders for mitigation and enhancement measures.



**Table 6.1. Summary of Anticipated Health Impacts during Construction Phase**

No.	Pathway of health impact	Nature of health impact	Who is negatively affected?	Who benefits?	Health Impact Significance Rating			Mitigation/ Enhancement Required	Responsibility
					Low	Medium	High		
1.	Increase in Road Accidents	Negative	Local people in nearest residents and construction workers	-	-	√ (HIR 2)	-	Yes	Construction contractors
2.	Increase in noise level	Negative	Local people in nearest residents	-	√ (HIR 1)	-	-	Yes	Construction contractors
			construction workers	-	-	√ (HIR 2)	-	Yes	Construction contractors
3.	Increase infection of Air-borne Diseases	Negative	Local people in nearest residents	-	√ (HIR 1)	-	-	Yes	Construction contractors
			Construction workers	-	-	√	-	Yes	Construction

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						(HIR 2)			contractors
4.	Increase infection of water borne Diseases	Negative	Local people in nearest residents	-	-	√ (HIR 2)	-	Yes	Construction contractors
			Construction workers	-	-	√ (HIR 2)	-	Yes	Construction contractors
5.	Potential to increase infections from mosquito	Negative	Local people in nearest residents and construction workers	-	-	√ (HIR 2)	-	Yes	Construction contractors
6.	Impacts on community wellness	Negative	Local people in nearest residents	-	-	√ (HIR 2)	-	Yes	Construction contractors
7.	Impact on health care infrastructure	Negative	Local people	-	-	√ (HIR 2)	-	Yes	Construction contractors
8.	Increase Risk of	Negative	Local people in Naung Hkio	-	-	-	√ (HIR	Yes	Construction contractors

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	Sexually Transmitted Infections						3)		
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**Table 6.2. Summary of Anticipated Health Impacts during Operation Phase**

No.	Pathway of health impact	Nature of health impact	Who benefits? Who is negatively affected?	Health Impact Significance Rating			Mitigation/ Enhancement Required
				Low	Medium	High	
1.	Improved mental health	Positive	Local people in nearest residents	√ (HIR 1)	-	-	Yes
2.	Increase chronic diseases	Negative	Local people in nearest residents	-	√ (HIR 1)	-	Yes
3.	Increase Risk of Sexually Transmitted Infections	Negative	Local people in Naung Hkio Township	-	-	√ (HIR 3)	Yes
4.	Pressure on social care and public services	Negative	Local people in nearest residents	-	√ (HIR 2)	-	Yes

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5.	Impact on health care infrastructure	Negative	Local people	-	√ (HIR 2)	-	Yes
6.	Impact on community wellness	Negative	Local people in nearest residents	√ (HIR 1)	-	-	Yes
7.	Odour from lime burning	Negative	Local people in nearest residents	-	√ (HIR 2)	-	Yes
8.	Noise	Negative	Local people in nearest residents	√ (HIR 1)	-	-	Yes

## **6.1. HIV/AIDS Awareness Training Plan**

### *Objective*

To improve the knowledge on HIV/AIDS prevention among the worker personnel and their families, especially new recruits so that they are able to protect themselves and continue the HIV/AIDS education activities by themselves.

Public health package for STI (Sexually Transmitted Infection) control: the key elements

- Promotion of safer sexual behaviour and primary prevention
- Condom programming—full range of activities from condom promotion to supply and distribution
- Promotion of appropriate healthcare seeking behaviour
- Integration of STI prevention and care into primary health care, reproductive healthcare facilities, private clinics, and others
- Comprehensive STI case management (using syndromic approach)
- Specific services for populations at high risk—such as female and male sex workers, adolescents, migrant populations, uniformed forces, and prisoners
- Prevention and care of congenital syphilis and neonatal conjunctivitis
- Early detection of symptomatic and asymptomatic infections

### *Activities*

- KAP (Knowledge, attitude and practice) questionnaire/guidelines were developed both qualitative and quantitative study
- will be studied with KAP questionnaire at factory and nearest villages.
  - the age of the sample population ranged from 18 to 59 and usually spend their leisure time by reading or chatting.
  - sources of information were health staff ,IEC materials, and health talks and discussions about knowledge on safer sex, STIs, and condom.but correct use of condom required further discussion and demonstration.
- will discuss with group(focus group discussion)for their knowledge, attitude and practice on HIV/AIDS at factory and nearest villages
- total number of (6) police person were interviewed as key informants from police training depots.
- curriculums developed based on existing care’s training curriculums and used at tot of worker/staff training center
- awareness training or meeting at nearest villages at least one time per year



Training will be conducted as three days training sessions by using the TOT trainer’s manual. At the end of the each training session, trainees developed an action plan for continuous education sessions. Care provided IEC materials and condom for continuous education sessions.

After completion of the program, responsibilities to conduct the continuous education sessions will be handed over to workers and family members. They will continue the health education sessions by themselves.

## **6.2. Health Impact Monitoring Program**

Any monitoring program should monitor both the positive and negative community health impacts and provide an early warning system that health problems are occurring at community level. Some changes such as the prevalence of infectious diseases can be easier to monitor than project-related chronic disease and the economic and social benefits of the project that lead to positive health and wellbeing impacts. Table 6.3 shows proposed monitoring parameters for IBIS Style Cement factory (Naung Hkio) during construction and operation phases.

**Table 6.3. Proposed Monitoring Parameters for Cement factory (Naung Hkio)**

No.	Impact Type	Affected People	Health Issues	Monitoring	Frequency	Responsibility
<b>Construction Phase</b>						
1.	Negative Impact	Local people in nearest villages	Particulate air emissions	PM <sub>10</sub> and PM <sub>2.5</sub>	Monthly	Construction contractors
2.	Negative Impact	Construction workers	Infection of diseases	Regular medical check to construction worker	Biannually	Construction contractors
3.	Negative Impact	Construction workers	Infection of air borne diseases	Medical check to new construction workers	As soon as the construction start	Construction contractors
<b>Operation Phase</b>						
1.	Positive Impact	Local people in nearest villages	Mental health and wellbeing	Improvement of access road to nearest villages	Yearly	Ngwe Yi Pale
2.	Positive Impact	Local people in nearest villages	Improve health care facilities	Improvement of health care services in nearest villages before and after the project	Yearly	Ngwe Yi Pale
3.	Negative Impact	Local resources use and impact on local	Impact on community	No pressure on local resources use and health	Yearly	Ngwe Yi Pale

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		health care services	wellness	care facilities		
No.	Impact Type	Affected People	Health Issues	Monitoring	Frequency	Responsibility
3.	Negative Impact	Local people in nearest villages	Impact on community health	Odour from Cement factory	Monthly	Ngwe Yi Pale
4.	Negative Impact	Local people in nearest villages	Impact on community welfare	Noise from Cement factory	Monthly	Ngwe Yi Pale

### **6.3. HIA Monitoring Team**

HIA monitoring team of the proposed cement factory project should be the same or similar members of EIA or SIA monitoring team. Typically, the HIA team involves:

- (i) project manager,
- (ii) health and safety advisor or coordinator,
- (iii) community health and development workers,
- (iv) public health officials and/or community representatives.

### **6.4. Stakeholder and Community Involvement**

Stakeholders are those individuals and groups that are affected by, or express an interest in, the project. Stakeholder and community involvement is concerned with developing two-way dialogue and information/knowledge exchange between the HIA specialist, project team, key stakeholders and local communities. However, stakeholders and communities do not always have the time to be involved throughout the process and are likely to engage to a greater or lesser degree as time and interest permits.

### **6.5. Evaluation and Auditing**

A public health evaluation of a project involves asking whether the project achieved its overall aims and objectives in a way that protected and enhanced the health and wellbeing of local communities. An evaluation of the project and its potential impacts on local communities’ health and wellbeing should be undertaken at regular intervals, e.g. every three years, by an independent agency or consultancy as part of an adaptive project management process. As with the monitoring program, a steering or advisory group made up of a range of stakeholders can enhance the credibility, effectiveness and value of the evaluation. Evaluation and auditing of the proposed cement factory can also be done together with environmental and social audit team.

The findings and recommendations of a monitoring and evaluation processes for HIA monitoring parameters should be written up in summary form and reported to HIA Steering or Advisory Group, local government, health and social care agencies and community representatives. Where feasible the findings should form part of the project information that is made public.

## **7. PROPOSED HEALTH CARE FACILITIES FOR LOCAL PEOPLE**

The construction of cement factory, other facilities and landscaping should have been carefully considered to ensure that the potentially positive health impacts of the local residents. The following are the proposed health care facilities as one portion of the CSR program to improve public health.

### **7.1. Facilities for Public Relaxation**

The new landscaped within the cement factory such as water dam should be open space for use by local residents in the scheme. The design of the open space should encourage interaction between residents of the new apartments by providing seating in a pleasant and tranquil setting. The new seating should be arranged to parents to watch toddlers and young children enjoying the play facilities. It will also improve the mental and health conditions of local residents.

### **7.2. Extend Health Care Facilities**

The developer intends to provide private health care services for workers’ of cement factory. According to the HIA survey, most of the nearest villages do not have private or public health care services for local people. So, health care service for workers should also be provided for local people in nearest villages with sufficient capacity. Moreover, the developer should be provided private health care facilities in nearest villages.

### **7.3. Planting**

The landscape strategy during construction and operation of proposed cement factory should include the planting of new trees. The location of the plantation trees should be carefully considered to provide shade for the main roads, recreational areas, seating areas and the surface car parking spaces to reduce heat stress and to improve mental health.

### **7.4. Health Awareness Program for the Utilization of Insecticide**

According to the primary data collection, farming is the major source of household income and respiratory and lung diseases will cause due to the use and inhalation of insecticide during farming. So, it is necessary to make awareness program for the hazard of inhalation of insecticide to human health as part of CSR program.

## **8. RECOMMENDATIONS**

The HIA process provides a useful framework for bringing the developer and the health care facilities of Cement factory (Naung Hkio) together to think about the impact of cement factory construction on public health. It is important to use HIA early in the cement factory planning process to inform policy decision-makers on the potential impact of their policy or plan on health. A set of recommendations was developed that highlighted the initiatives that support health and included ways to maximise health benefits as follow:

- All of the mitigation and enhancement measures described in this report should be implemented by Ngwe Yi Pale Cement Co., Ltd.
- Extend health care facilities of cement factory to local people or provide health care clinic to nearest villages.



## 9. CONCLUSION

According to the health impact assessment, the proposed cement factory project will have both positive and negative impacts on public health. There will no significant health impact according to HIA study due to proposed cement factory project. All of the anticipated health impact can be minimized to acceptable levels with proposed mitigation measures. On the positive side, potential to improvement of health care facilities and recreation place to nearest villages can have significant beneficial effects on local people. CSR programmes for local health and wellbeing improving program (development of private clinic, health and wellbeing awareness program, etc.) will also benefit the healthiness of local people. So, the development of cement factory project will have more beneficial impacts rather than negative ones.

## 10. REFERENCES

- (1) Department of Administration Office, Regional Facts for Naung Hkio Township, 2014.
- (2) ICMC, International Council on Mining and Metals, Good Practice Guidance for Health Impact Assessment.
- (3) Huston SL, Evenson KR, Bors P and Gizlice Z. (2003) Neighbourhood Environment, Access to Places for Activity, and Leisure-time Physical Activity in a Diverse North Carolina Population. *American Journal of Health Promotion* 2003, 18(1), 58-69.
- (4) Lawlor DA, Ness AR, Cope AM, Davis A, Insall P and Riddoch C. (2003) The challenges of evaluating environmental interventions to increase population levels of physical activity: the case of the UK National Cycle Network. *Journal of Epidemiology & Community Health* 2003; 57(2): 96-102.
- (5) Neville, L, Furber, S, Thackway, S, Wallin, T, Gray, E, Mayne, D, Campbell L & Hindmarsh D. (2004) Health Impact Assessment: Shellharbour Foreshore Management Plan. Illawarra Health & Shellharbour City Council.
- (6) Neville, L, Furber, S, Thackway, S, Gray, E, Mayne, D. (2005) A health impact assessment of an environmental management plan: the impact on the physical activity and social cohesion, *Health Promotion Journal of Australia*, 16(3), 194-199.
- (7) Phoolcharoen, W, Sukkomnoed, D and Kessomboon, P. (2003) Development of Health Impact Assessment in Thailand: Recent Experiences and challenges, *Bulletin of World Health Organisation*, 81 (6).
- (8) US Department of Health and Human Services. (1996) Physical Activity and health: A report of the Surgeon General. Atlanta, Georgia: US Department of Health and Human Services, Public Health Service, CDC, National Center for Chronic Disease Prevention and Health Promotion.

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- (9) World Health Organisation (WHO)/Food Agricultural Organisation (FAO) Joint Report. (2002) Diet, Nutrition and the Prevention of Chronic Disease, Geneva, Switzerland.
- (10) World Health Organisation. Basic documents. 45<sup>th</sup> ed. Geneva: WHO, 2005.