SHWE TAUNG CEMENT COMPANY LIMITED

REPORT

ON

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FOR

THE APACHE CEMENT PLANT,

THAZI TOWNSHIP, MANDALAY REGION

SEPTEMBER 2014

Submitted by:

NBPS National Engineering & Planning Services Co., Ltd, Myanmar

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List of Acronyms and Abbreviation

CO2	Carbon Dioxide
dB	A-weighted Decibel
DoE	Department of Environment
ECO	Environmental Control Officer
EERT	External Emergency Response Team
EMS	Environmental Management System
EMP	Environmental Management Plan
ERT	Emergency Response Team
ERTL	Emergency Response Team Leader
ESO	Environmental Site Officer
FGD	Focus Group Discussion
GHG	Greenhouse Gas
GoM	Government of Myanmar
HHs	Household heads
HSE	Health, Safety and Environment
IEMS	integrated environmental management system
IPs	Indigenous Peoples
K	Kyat
KII	Key Informants' Interview
MoECF	Ministry of Environmental Conservation and Forestry
NOx	Nitrogen Oxide
PI	Performance Indicator
PPE	Personal Protective Equipment
SIA	Social impact assessment
USD	United States Dollar

EXECUTIVE SUMMARY

Introduction

Myanmar is facing large cement shortages and high demand to import. There are new cement plants which are being built in various part of the country to meet local demand. They are the activities which are a component of the umbrella under the Myanmar Ceramic Industries of Ministry of Industry.

APACHE Cement Plant is one of the cement plant projects, which daily production capacity is 1500 Tons of medium production in Myanmar and situated between Ku Byin and Pyi Nyaung village in Thazi Township.

Considering the impact of the cement plant on the environment, although Environment and Social Impact Assessment study is not conducted by independent organization before feasibility stages, but ESIA is undertaken before operation. It is due to changes of Government policy on environment. Preliminary surveys are carried out for baseline data and after analyzing and assessing, National Engineering and Planning Services have prepared this report. Environmental Assessment is taken up as a rapid assessment technique for determining the current status of the environment and identifying impact of critical activities on environmental parameters. Based on this analysis, an Environmental Management Plan that would ensure impact monitoring and mitigation planning, has been drawn for proper planning of the plant operation.

In Myanmar, Law for Environmental Conservation is enacted in 2012. The Ministry of Environmental Conservation and Forestry (MoEF) administers the legal framework and environmental legislation in Myanmar. At this time the regulations on environment and social impact assessment are only in draft form and have not been officially released.

The Department of Environmental Conversation under the MoEF has indicated in their announcement that the proposed activities in Thazi Township would require environmental impact assessment before operation of the plant.

The current institutional capacity in Myanmar to administer an environmental and social impact process is very limited. Further, at the present time the environmental authorities in Myanmar have insufficient staff, training, facilities and resources to provide effective on-going environmental monitoring of new projects in parallel, the plant has also some limited capacity for environmental management to overcome within reasonable time.

Project Area

The APACHE Cement plant is situated in a rural area approximately 31 miles east of the township of Thazi. It is the administrative centre for Meikhtila District which is within Mandalay Region. Physically the land in the Cement plant is foot step of Shan plateau land use surrounding Cement plant is Ku Byin reserved forest area.

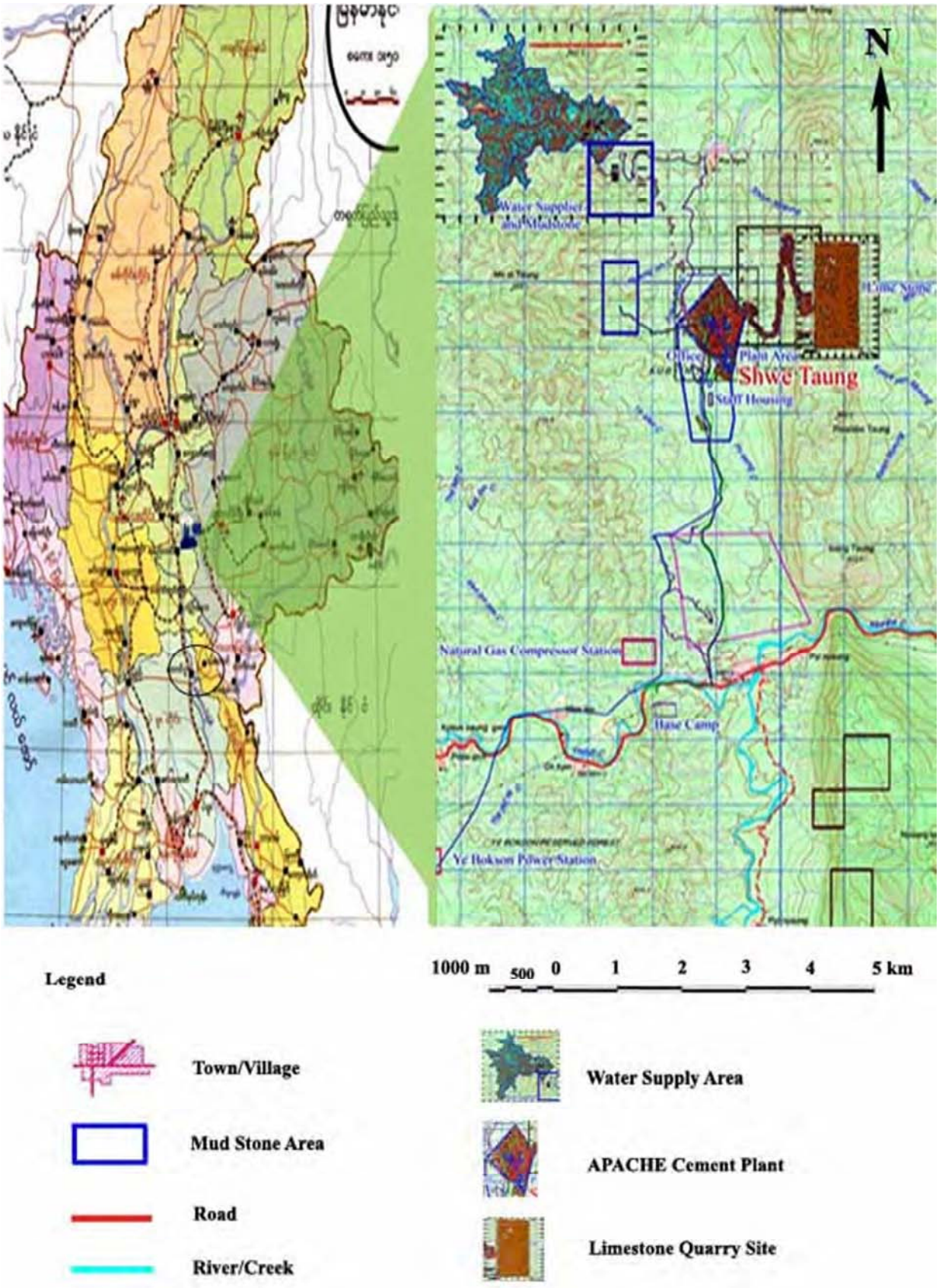

Figure a Location Map of APACHE Cement Plant

Environmental Issues

There are a number of environmental issues associated with operation of the plant;

Primarily related to HSE.

Table A Environmental Issues

Issue	Comment
Health and Safety	There are over 450 staffs employed at the site. Health and safety manuals exist. But awareness is needed to do more. There is regular safety training conducted, but health and safety audits should be added occasionally. The plant is to well prepare to care local safely concern from explosives. Staffs are issued with proper protective equipment (PPE). There are first aid trained staff in the plant itself; A clinic with facilities and staffed by a doctor, nurses and is contained on the compound. The nearest hospital is 6 km away; but transport facility is enough.
Noise	The current machines should operate at under the recommended noise levels in and around the plant.
Water supply	The site is on mains water supply. Process water is delivered to the plant and staff quarters. But supplied water is limited in summer.
Sanitation	The site is not on mains sewerage. All waste water and sewerage is discharged to ground. For healthy environment, careful inspection should be done.
Solid waste	There is a plan for handing of solid waste. Proper collection system is advised.
Flooding	Flooding of the site is not reported as an issue. Open drains carry away excess water to the surrounding fields in the rainy season. But regular cleaning of the drain is required as a maintainance purposes.
Monitoring	Environmental monitoring currently takes place. There is to be installed equipment to measure noise and air pollution levels. There should be wells to measure possible groundwater pollution in or around the site.

Environmental Management

Mitigation measures are applied in the report to potential negative impact as an environmentally and socially responsible way. They are to be supported by a management and monitoring framework.

Social Assessment

The two selected villages were empowered to roll out their local plant in operation to improve their lives as community level consultation.

The perceived benefits and impacts arising from Key Informants Interviews for social environment were as follow.

Positive Impact

- Road vehicle activity becomes increase for transport.
- Increase in income and livelihood opportunities due to development works.
- Increase in local trade, commercial incomes and opportunities.
- Uplift the capacity of basic education and level the human resource development.

Negative Impact

- Noise and ambient air pollution and possible waste materials are affecting the physical environment

However, there will be no displacement of households associated with land acquisition, no loss of business establishments, productive assets, cultural heritage or livelihood in implementing the project.

Table B Population and Ethnicity in the Study Area

Village Name	No. of HHS	No. of population	Distance from Project area	Ethnicity		
				Bamar (%)	Dahnu (%)	Kayin (%)
Pyi Nyaung	600	2427	5 km	100%	-	-
Kubyin	54	264	3.2 km	26%	59%	15%

Environmental Classification

The study area is covered 600 acres in geomorphology of the project area. Dolomitic and Calcitic limestones are founded in formation of Ma-U-Bin and Kalaw formations. Limestones habitats are carefully investigated to assess biological environment.

It is necessary to avoid deforestation in the project area because of threatening Shan landmark of high cliff with green forest.

The study concludes that JICA safeguard policies should be triggered concerning biodiversity, indigenous peoples or involuntary resettlement.

Given that there is a need to establish best practice for environmental and social impact accessment in Myanmar and (DoEC indicates the project should undergo an EIA) the suggested category is "B" according to JICA classification. (See Appendix A)

Monitoring

During the operation period systematic monitoring for ambient air and noise pollution must be essential for the sustainable development of this cement plant. So that remedial measures can be taken as necessary as possible in EMP.

1. INTRODUCTION

1.1 Objective

The purpose of environmental and social impact assessment (ESIA) study for APACHE Cement Plant Project is to survey the existing socio-economic and environmental conditions of the project area before operation of the proposed project. Both potential positive and negative impacts and their nature on the project area will then be identified. It is anticipated that this information will serve as a project baseline for socio-economic standards as well as environmental data for subsequent project monitoring with EMP. The survey in environmental study is to include the locals to participate before plant operation as a form of community driven development project. There is to be least possibility to affect people and flora and fauna also.

1.2 Methodology, Scope and Limitations

The ESIA survey works were carried out by a team comprising of experienced team leaders. Project was first disclosed and explained by the team to the various stakeholders concerned in the two villages so that they could clearly visualize the project. Scoping is defined as a procedure for determining the extent and the approach to an ESIA.

The study area has low population density. No resettlement issue is involved and no significant direct negative impact due to the project is foreseen. But there will be some long term and cumulative impacts on the surrounding areas of the project if required investment is limited to spend on community development.

The Socio – economic data were also collected for Thazi Township comprising of 7 quarters and 80 village-tracts, which situated in the vicinity of the project area. The Survey team had visited two nearest villages and had carried out KII (Key Informant Interviews) with the village heads and village households using random sampling method. Some additional secondary data were also collected from the relevant local administrative offices and government departments of Thazi Townships.

On the assessment on environmental data, flora and fauna conditions are investigated. Specimen collection, interviewing and visual observation were conducted. Possible impacts were investigated and mitigation measures were proposed. These acquired data will help as baseline ones to compare with those obtained from future monitoring works.

1.3 Environmental Policy

The Environmental Policy in Myanmar is as per Law for Environmental Conservation, enacted in 2012. But the regulations on environment and social impact assessment are only in draft form.

In Myanmar there is no specific policy required for social impact assessment before a development project is implemented. There is no specific law governing ethnic minorities. The Ministry of Immigration and Population is the agency responsible for data and issues on ethnic minorities. Clear provision on the rights and access to properties especially for ethnic minorities has not been defined.

Current projects undertaken by in Myanmar such as construction of roads and dams, mining, logging, as well as coal, oil, and gas extraction do not yet have any standardized EIA and the local people are not generally consulted. There are no requirements in the laws of Myanmar for mitigation measures of potential adverse impacts such as involuntary resettlement. Public participation is not considered mandatory, and usually done at the latter stage, and is determined by the government's discretion whether public participation is required or not, allowing the government to avoid public participation for controversial projects.

Within the context of the project's social assessment, relevant policies have been reviewed to ensure the protection on rights of vulnerable groups such as women, children and particularly the ethnic communities in the two nearby villages as follow.

Constitution 2008 – provision on the rights of the people and administration of the overall political, economic procedures of the nation, giving full power to the Union **Land Nationalization Act –** established in 1948 and amended in 1953, stipulating that the state maintains ownership of all lands.

Laws on Human Rights

- **The State Protection Law 1975 -** "The Law to safeguard the State against the dangers of those desiring to cause subversive acts". This law was amended in 1991 increasing the time someone could be held without arrest, trial or sentencing from 3 to 5 years.
- **Unlawful Association Act 1908** – Anyone deemed to be involved or connected with an organisation that is declared unlawful by the President of the Union, can be imprisoned.
- **The Printer and Publishers Registration Law 1962** – All publications in Burma are subject to censorship and prior to publication must be approved by the Press Censorship Board. Individuals who violate this law can be sentenced to 7 years imprisonment and/or fined 30,000 Kyat (US$50).
- **Emergency Provision Act 1950** – individuals seen to be disrupting the morality and stability of the country can be sentenced to up to 7 years imprisonment.
- **Video Law 1985 -** individuals making, copying or distributing unauthorised videos, including ammeter videos can be sentenced to up to 3 years imprisonment.

- **Law 5/95** – this law prohibits individuals from initiating discussion about the national convention in Burma, which was tasked with creating guidelines for the drafting of the 2008 Constitution. Violators of this law can be sentenced to 20 years imprisonment.
- **Penal code** – Legislation against child abuse, child pornography, kidnapping and human trafficking.
- **The Child Law**, 1993, promulgated by the State Law and Order Restoration Council Law stipulating protection for children.
- Article 371 of the Penal Code prohibits "habitual dealing in slaves" or buying or disposing of any person as a slaver (Article 370).
- **The Anti-Trafficking in Persons Law** – prohibits human trafficking in any form.

The 1993 Child Law has noted national, divisional state and township child rights committees established. However, cases on violations of child rights continue, particularly the recruitment of children into the armed forces by the Burmese army and use of child labour are still rampant. There have been criticisms that these committees do not provide avenues for people to make complaints, particularly the forced recruitment of children in to the army, or assist families in locating children who have reported to have been forced into the military.

1.3.1 Application of World Bank Safeguard Policies

The World Bank's policy on indigenous people is reflected in OP4.10, (July 2005). The policy, aims to ensure that the development process involving ethnic minority fosters full respect for their dignity, human rights, and culture uniqueness. More specially, the objective is to ensure that indigenous peoples do not suffer adverse effects during the development process, and that they receive benefits which are culturally appropriate to them. The Bank's policy is that the strategy of addressing the issue pertaining to indigenous peoples must be based on the free and informed participation of the indigenous people themselves which requires identifying local preferences through direct consultation.

At this time it is not anticipated that any World Bank safeguard polices will be triggered concerning biodiversity, indigenous peoples or involuntary resettlement.

Table 1.1 World Bank Safeguard Polices that may be triggered

Safeguard Policies	Triggered
Environmental Assessment OP/BP 4.01	**Yes**
Natural Habitats OP/BP 4.04	**No**
Forests OP/BP 4.36	**No**
Pest Management OP 4.09	**No**
Physical Cultural Resources OP/BP 4.11	**No**
Indigenous Peoples OP/BP 4.10	**No**
Involuntary Resettlement OP/BP 4.12	**No**
Safety of Dams OP/BP 4.37	**No**
Projects on International Waterways OP/BP 7.50	**No**
Projects in Disputed Areas OP/BP 7.60	**No**

1.3.2 Environmental Category

Given that there is a need to establish best practice for environmental and social impact assessment in Myanmar and DoE indicates the project should undergo an EIA the suggested category at this stage is "B" according to the World Bank classification. (See Appendix A)

"A Category B project has potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats - which are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects.

The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A assessment. Like Category A, a Category B environmental assessment examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance."

2. PROJECT DESCRIPTION

2.1 Location

The project area is situated on the valley surrounded by the mountains range and near the Thazi – Kalaw high-way road and 3 miles 6 furlong far from Pyin Nyaung Village, 2 miles far from Ku Byin Village, 25 miles from east of Tharzi Township, 30 miles from west of Kalaw, 124 miles from east of Mandalay and 330 miles from Yangon.

The APACHE Cement Plant and Employee Housing Areas are 400 acres (refer to Figure 2.3), limestone quarry site area is 600 acres (refer to Figure 2.4) in front of the cement plant and mud stone quarry site area (refer to Figure 2.4) is 165 acres behind of the cement plant.

Lime Stones are carried from Lime Stones quarry site on the Tha Pyae mountain range in Pyin Nyaung village, Thazi Township. Mud Stones are carried from Mud Stone quarry site of Pyin Nyaung village, Thazi Township. Bauxite is carried from Inya village, Pyin Oo Lwin Township. Red clay source is brought from Myin Ma Hti village, 43 miles far from Pyin Nyaung village. Laterite is brought from Htilon village, 87 miles far from Pyi Nyaung village.

The economics of cement manufacture require that the manufacturing plant be adjacent to the source of the major raw materials. It is proposed to transport the raw material with conveyor systems from the crusher in the quarry to the plant. Within the quarry, the raw material will be transported over a short distance with special trucks.

The Location Maps of Project Area and quarry sites of raw materials are as shown in Figure 2.1, 2.2, 2.3, 2.4 and 2.7 below.

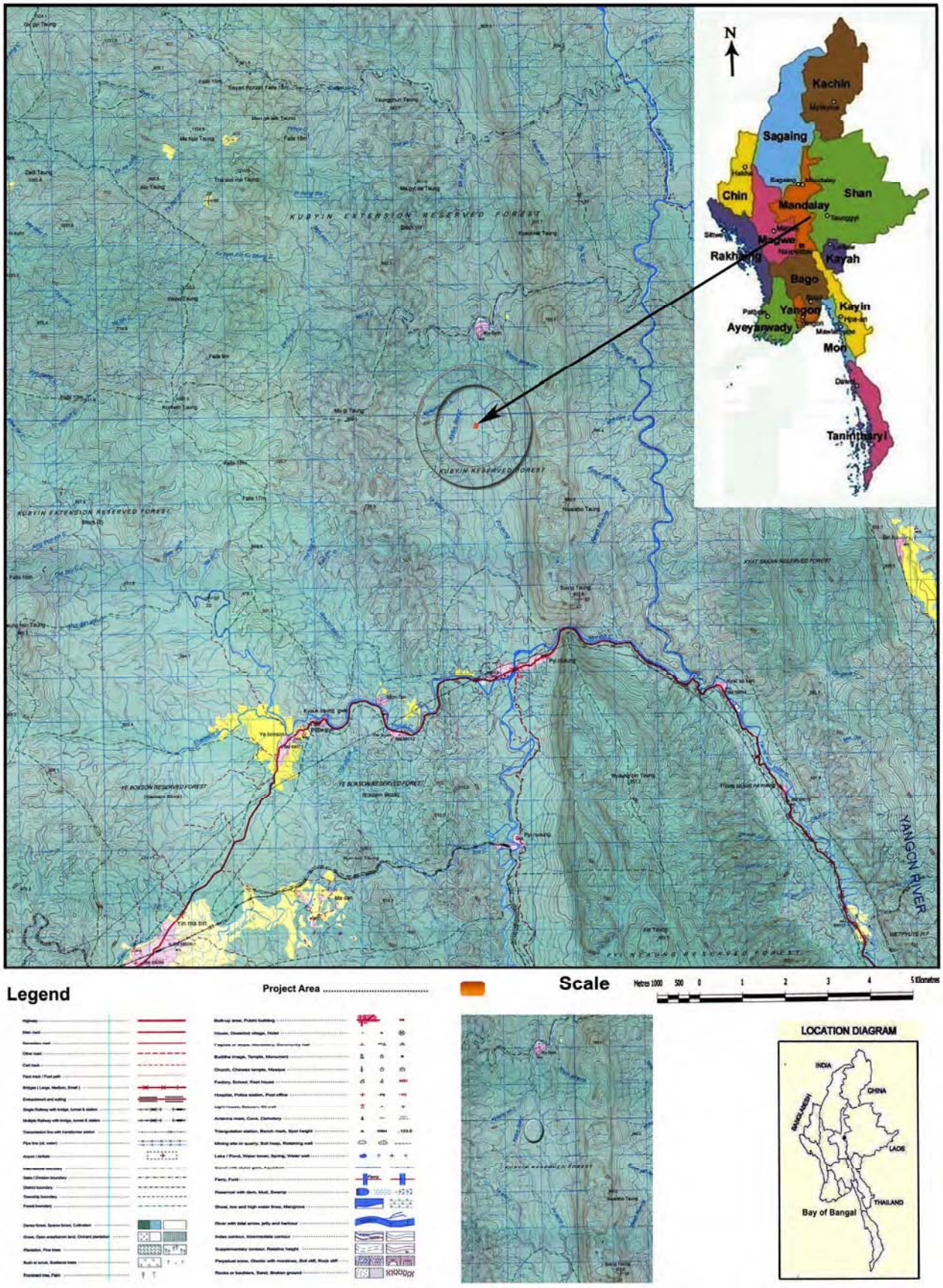

Figure 2.1: Location Map of APACHE Cement Plant of Shwe Taung Cement Co., Ltd.

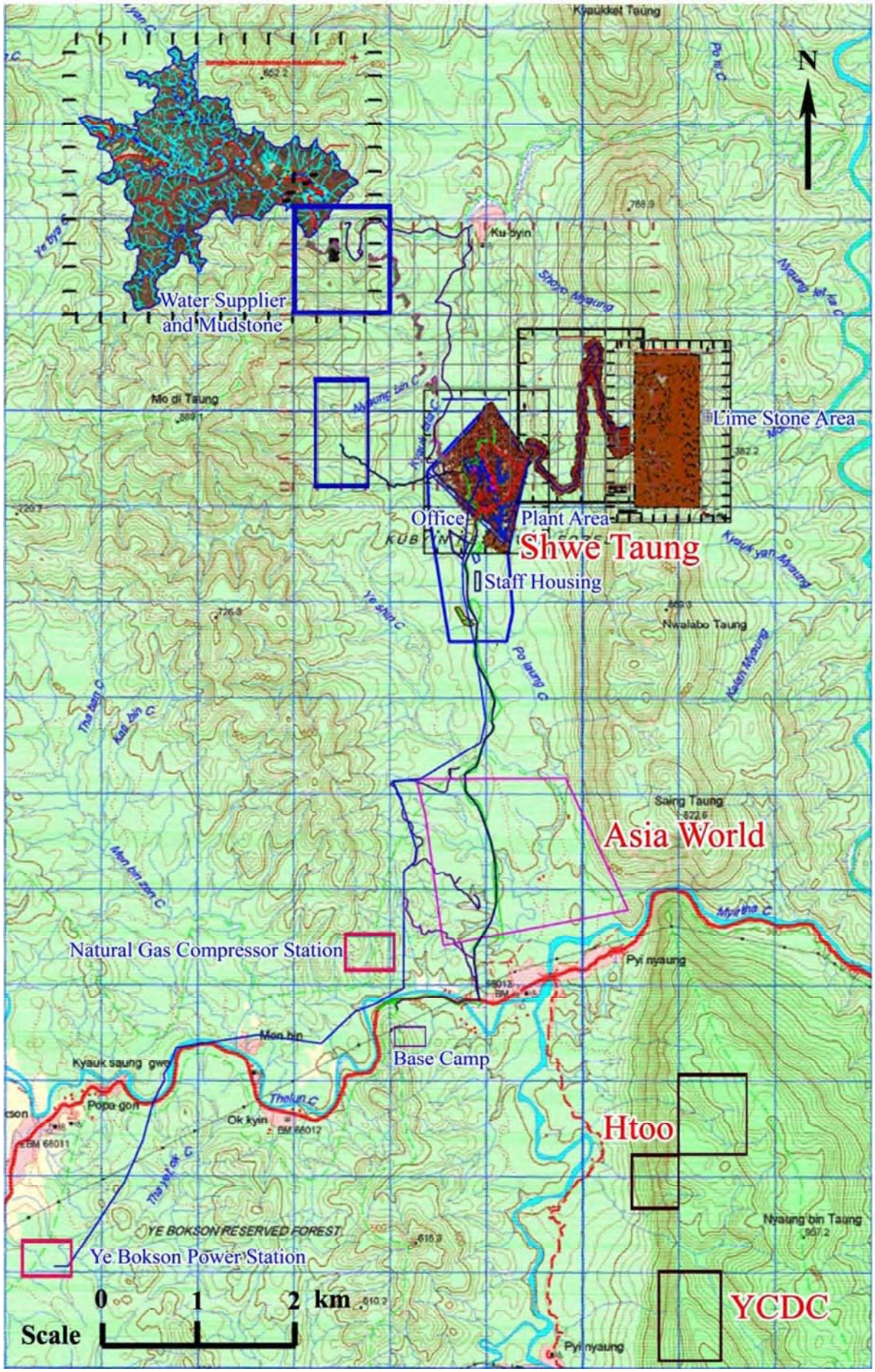

Figure 2.2 Locations of APACHE Cement Plant, Other Factories and Cement Plants

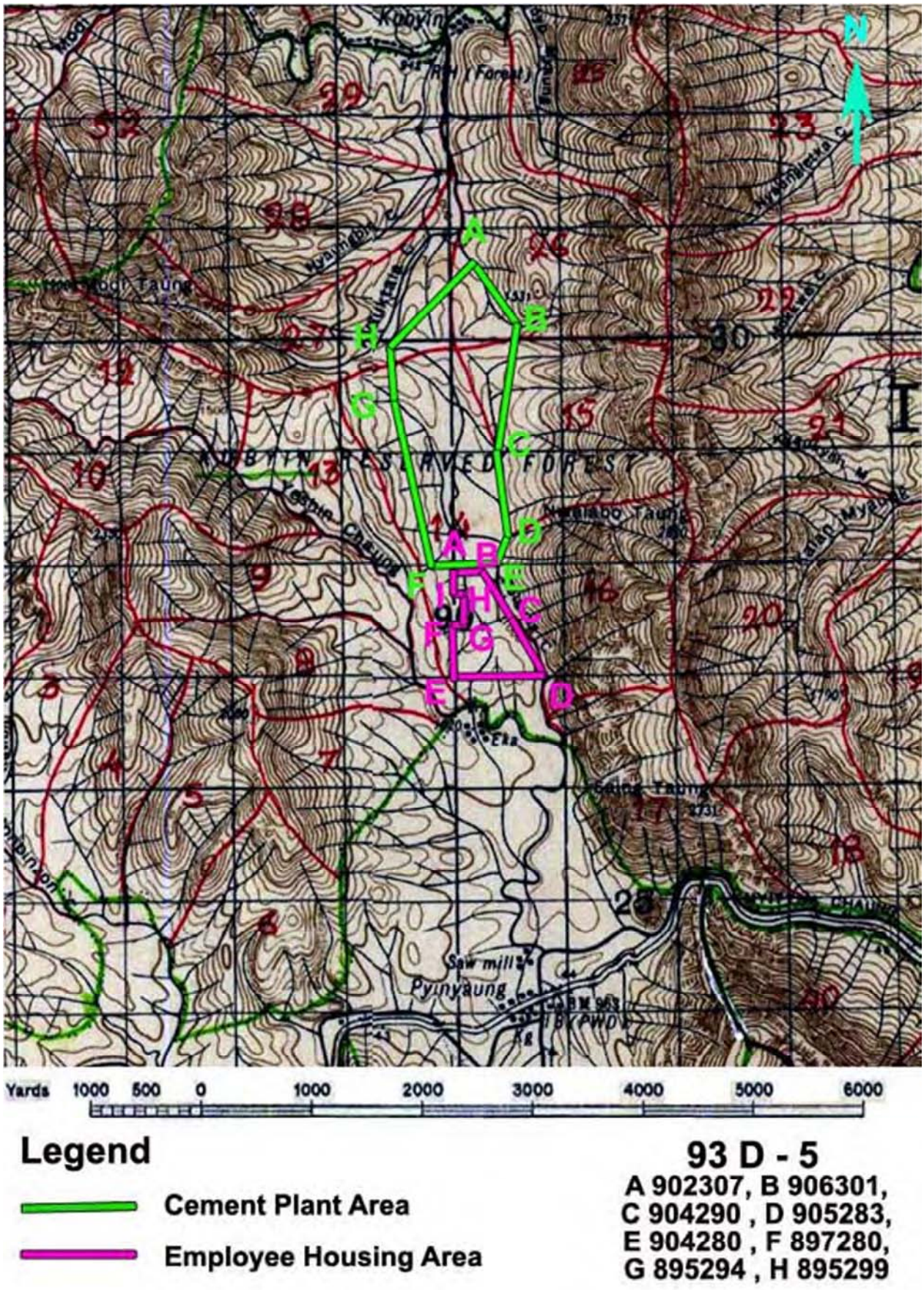

Figure 2.3 Showing Locations of Cement Plant Area and Employees Housing Area

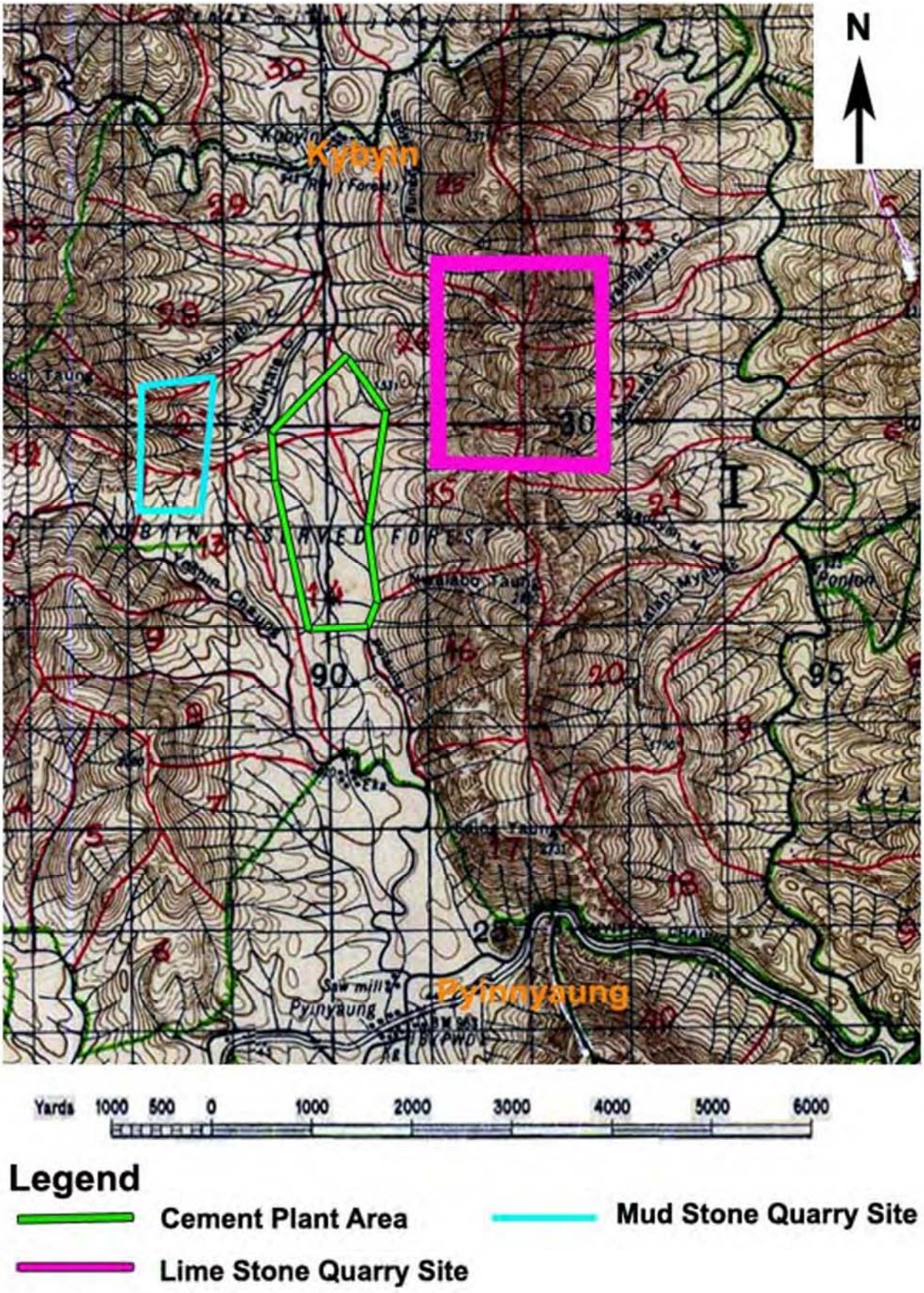

Figure 2.4 Showing Locations of Lime Stone Quarry Site and Mud Stone Quarry Site

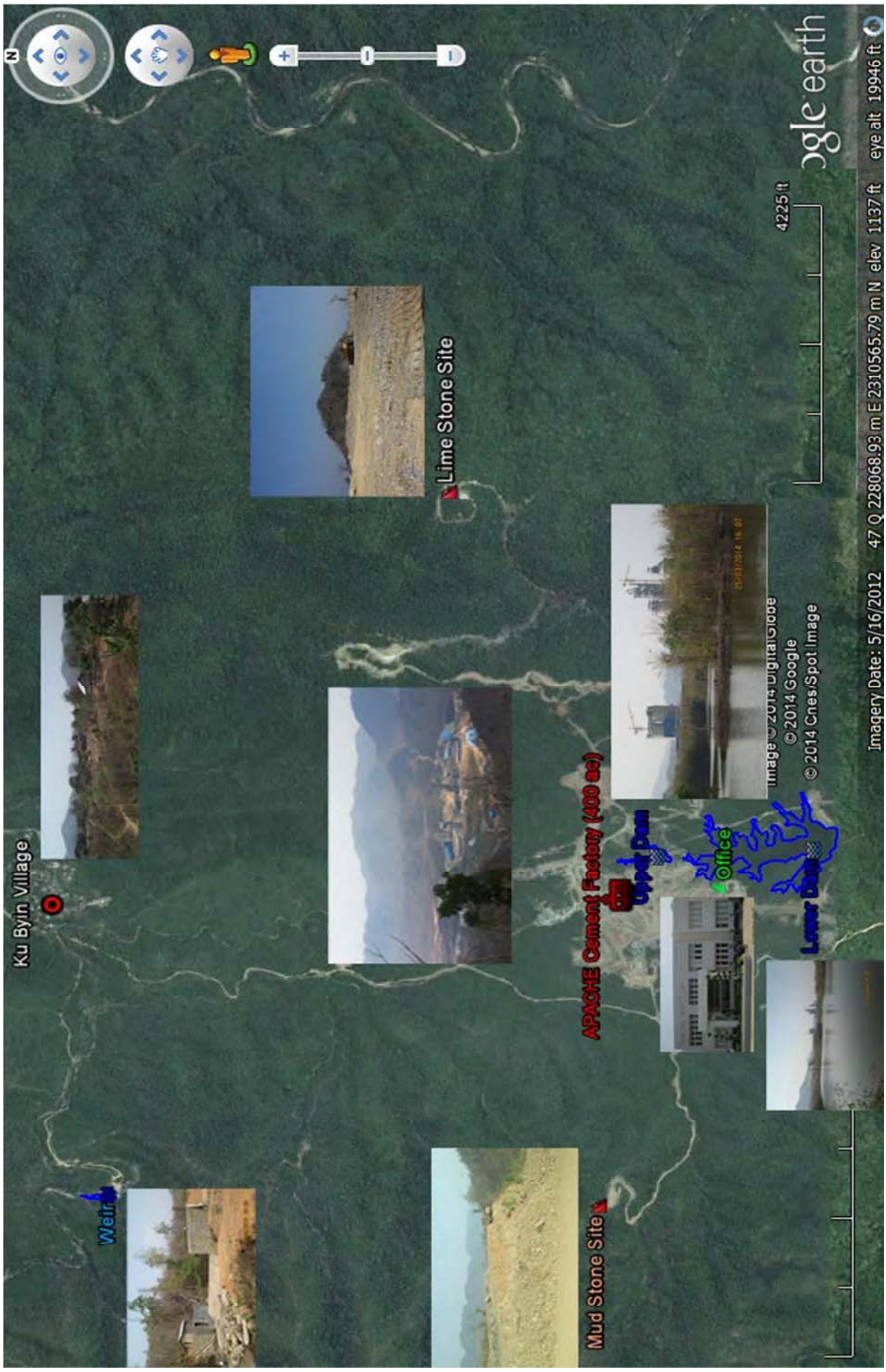

Figure 2.5 Satellite Image Map of APACHE Cement Plant Area (400acre)

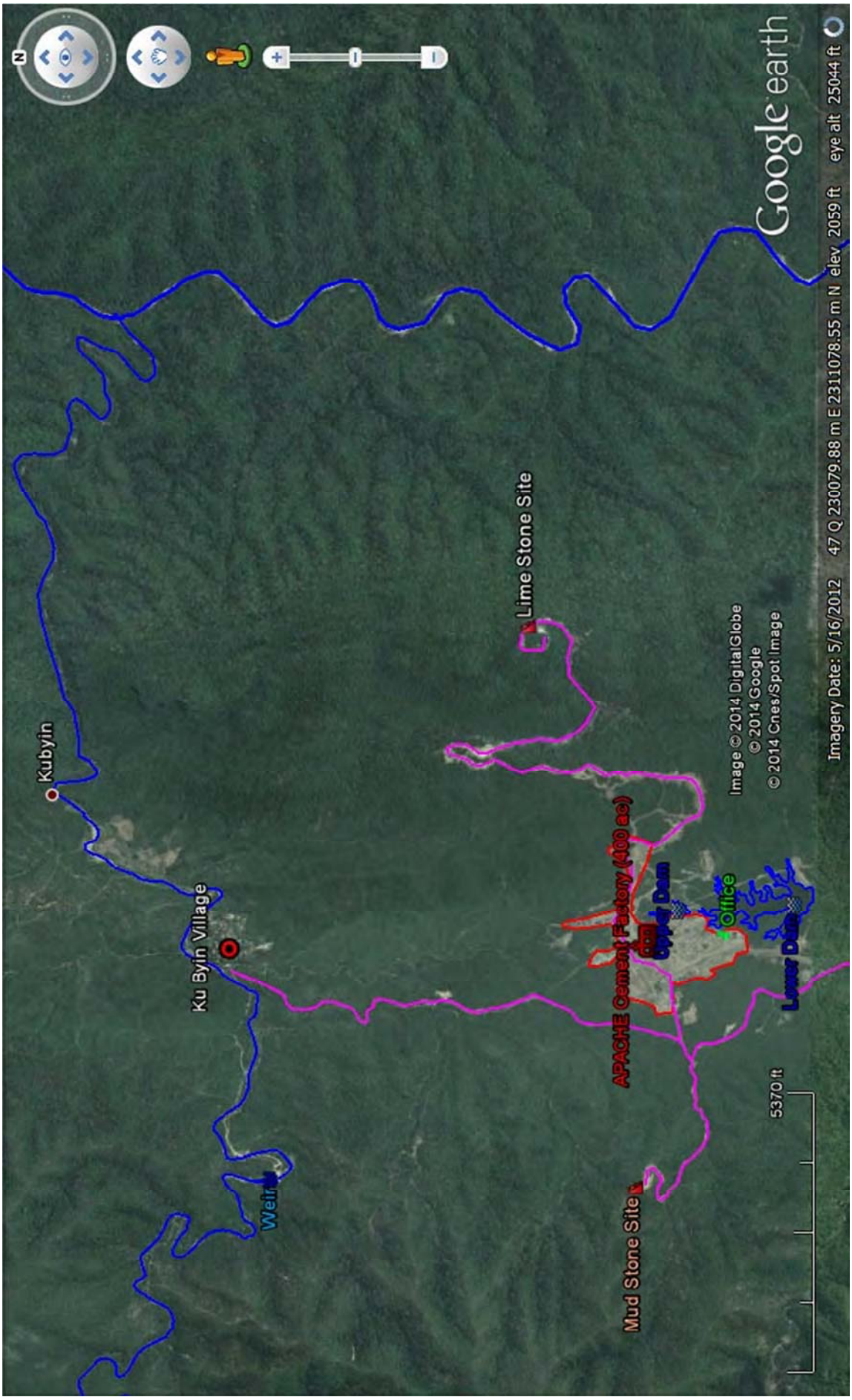

Figure 2.6 Satellite Image Map of APACHE Cement Plant

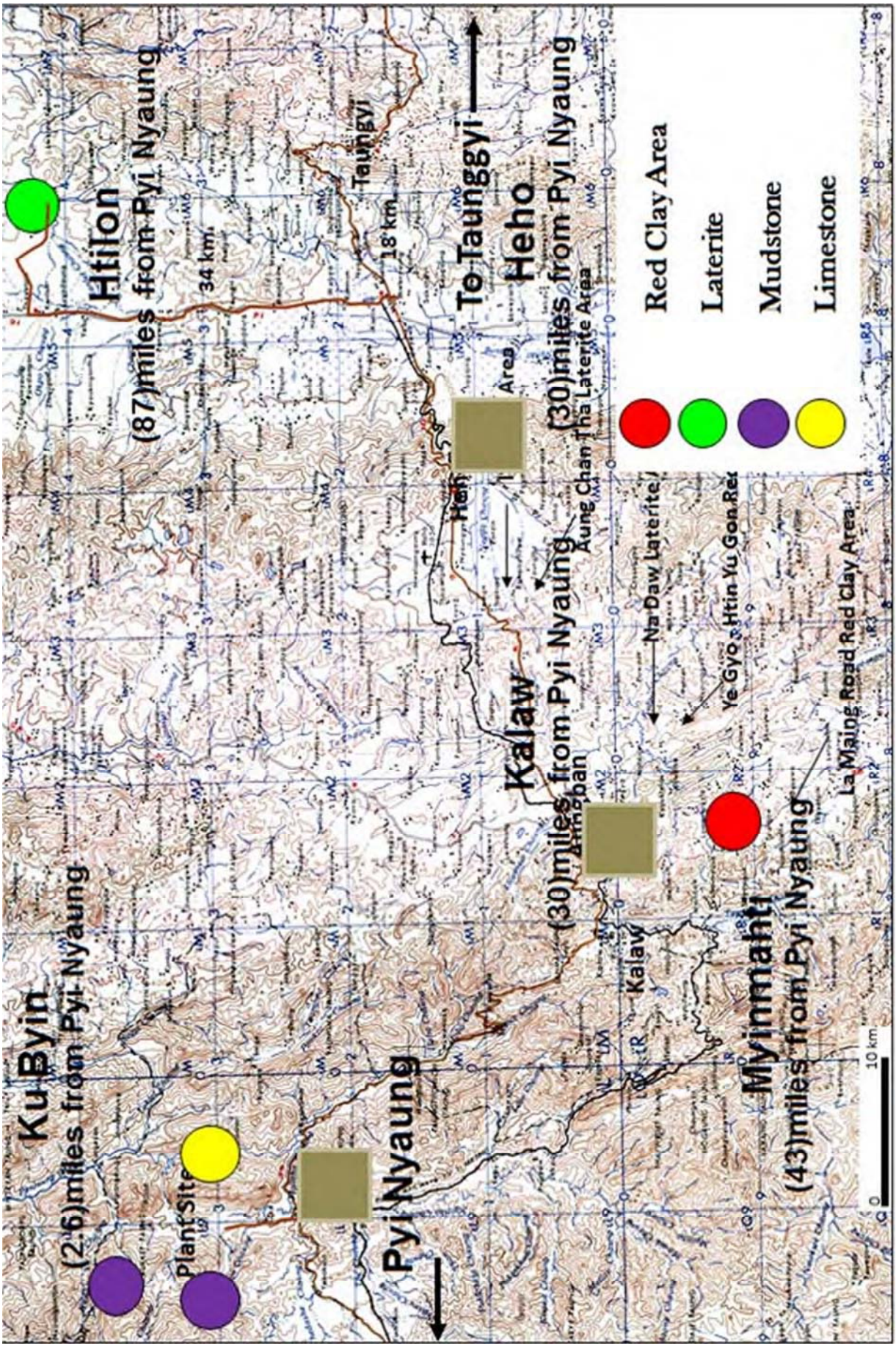

Figure 2.7 Locations of Raw Materials Sites for APACHE Cement Plant

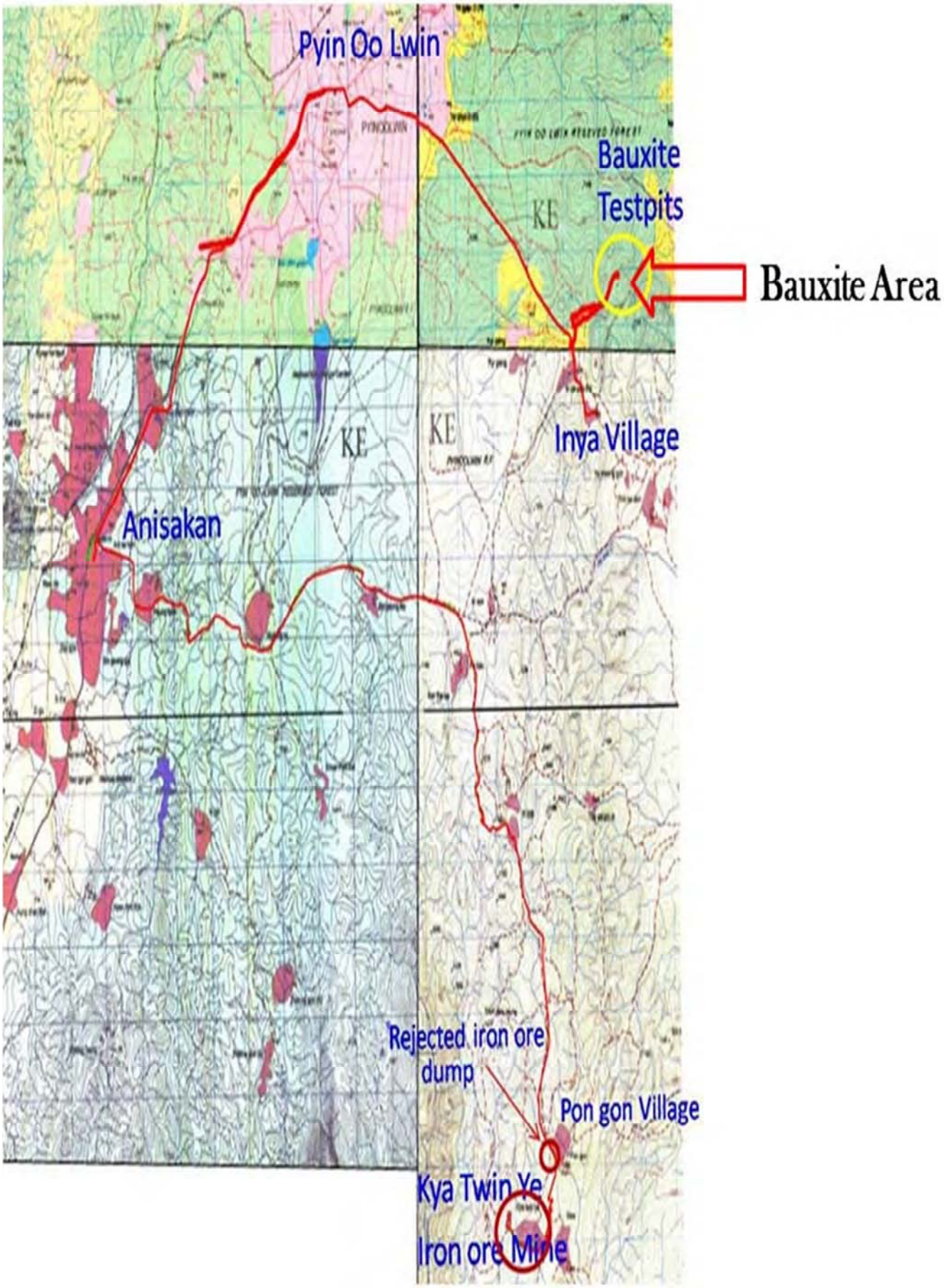

Figure 2.8 Location of Bauxite Source for APACHE Cement Plant

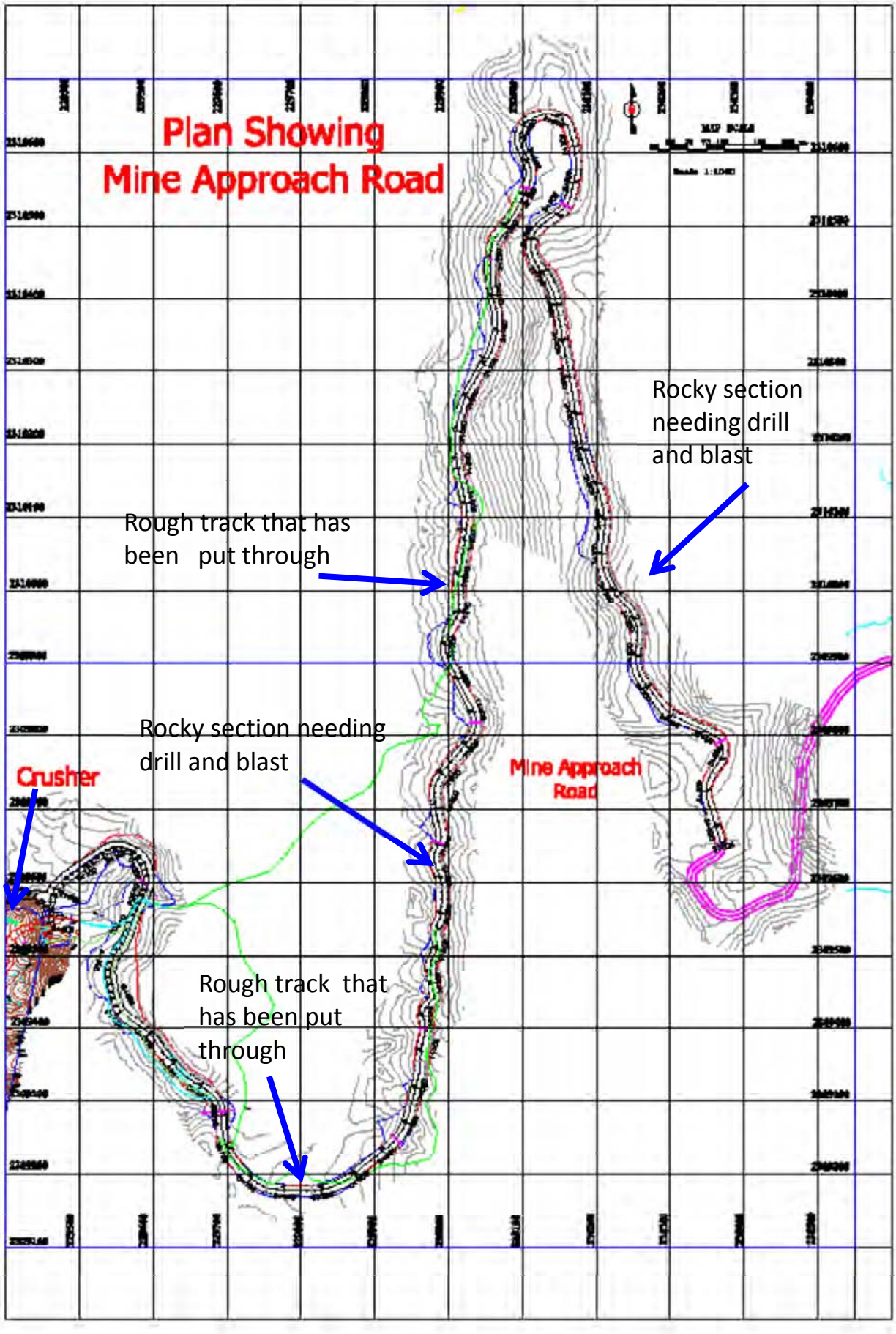

Figure 2.9 Plan Showing Mine Approach Road

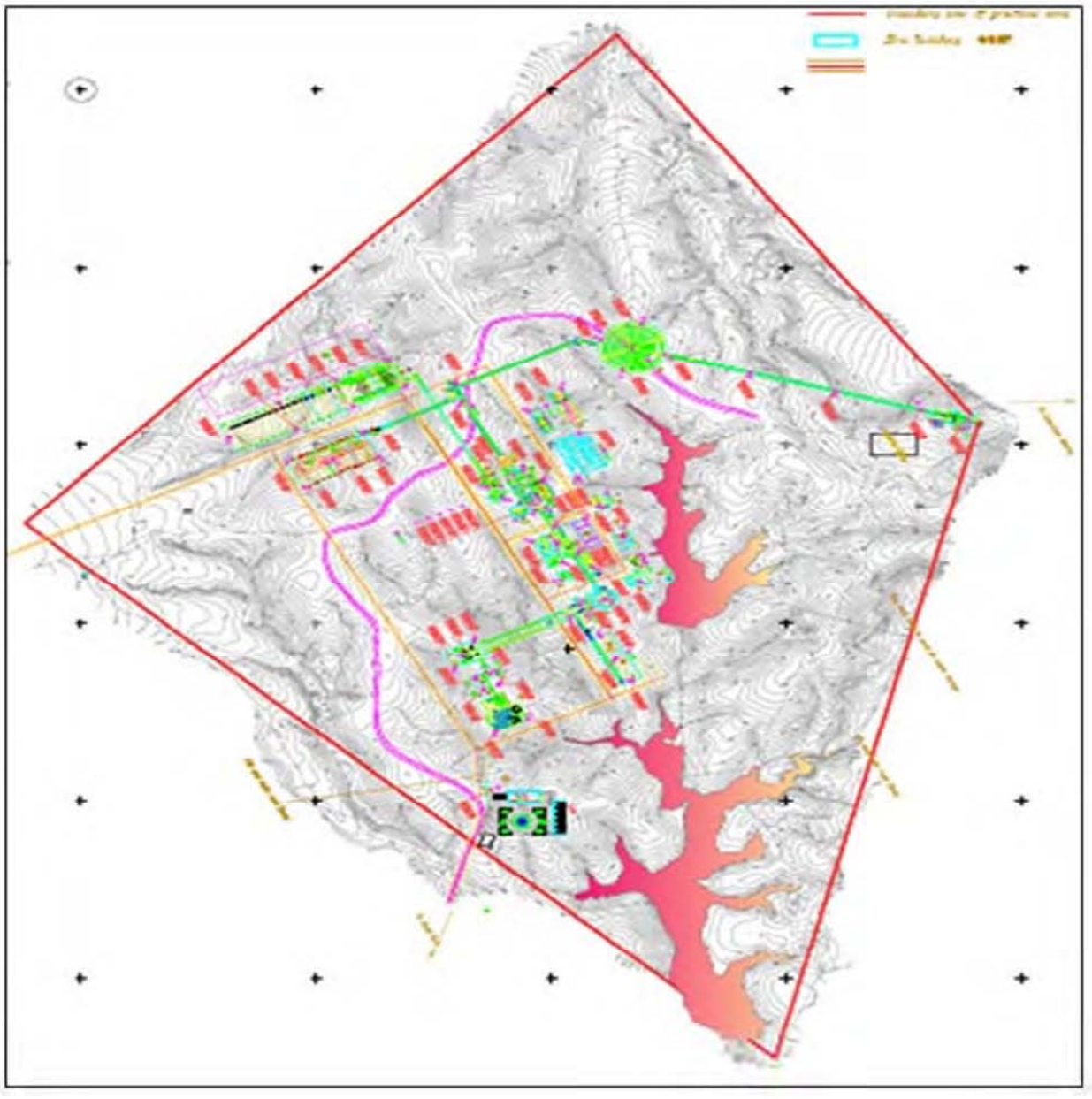

Figure 2.10 Layout Plan of APACHE Cement Plant

2.2 APACHE Portland Cement Production

The APACHE Cement Plant manufactures the type of ASTM C 150 Type I of Portland cement with dry process technology and packed with 50 kg cement bag, 2000kg (Jumbo Bag) cement bag and intends to produce with the bulk cement truck in future (Appendix H: Final Product of APACHE Cement Plant). The APACHE Cement Plant will be producing 1500 tons per day, approximately 500,000 tons per year and approximately 10 million (50 kg bag) per year .

The following are the raw materials that would be used to produce the finished products from APACHE Cement Plant:

- Lime Stone
- Clay / Mud Stone
- Iron Ore
- Bauxite

ASTM C 150 defines Portland cement as "hydraulic cement (cement that not only hardens by reacting with water but also forms a water-resistant product) produced by pulverizing clinkers consisting essentially of hydraulic calcium silicates, usually containing one or more of the forms of calcium sulfate as an inter- ground addition." Clinkers are nodules of a sintered material that is produced when a raw mixture of predetermined composition is heated to high temperature. The low cost and widespread availability of the limestone, shale, and other naturally occurring materials make Portland cement one of the lowest-cost materials widely used over the last century throughout the world. Concrete becomes one of the most versatile construction materials available in the world.

Portland cement is one of the building materials that are used in the construction industry. It is a very unique type of cement because in its dried form not only form a strong type of rock but also results in a water-resistant product.

Portland cement is a closely controlled chemical combination of calcium, silicon, aluminum, iron and small amount of other compounds, to which gypsum is added in the final grinding process to regulate the setting time of the concrete. Some of the raw materials used to manufacture cement are limestone, shale, chalk or marl, combined with shale, clay, slate or blast furnace slag, silica sand, and iron ore. Lime and silica make up of approximately 85 percent of the mass.

Different types of Portland Cement are manufactured to meet different physical and chemical requirements for specific purposes, such as durability and high-early strength. Eight types of cement are covered in ASTM C 150. These types and brief descriptions of their uses are listed in Table 2.1.

Table 2.1 Portland Cement Types and Their Uses

Cement type	Use
I	General purpose cement, when there are no extenuating conditions
II	Aids in providing moderate resistance to sulfate attack
III	When high-early strength is required
IV	When a low heat of hydration is desired (in massive structures)
V	When high sulfate resistance is required
IA	A type I cement containing an integral air-entraining agent
IIA	A type II cement containing an integral air-entraining agent
IIIA	A type III cement containing an integral air-entraining agent

Type I is a general purpose Portland cement suitable for all uses where the special properties of other types are not required. It is used where cement or concrete is not subject to specific exposures, such as sulfate attack from soil or water, or to an objectionable temperature rise due to heat generated by hydration. Its uses include pavements and sidewalks, reinforced concrete buildings, bridges, railway structures, tanks, reservoirs, culverts, sewers, water pipes and masonry units.

The difference between wet and dry process of cement manufacture is such that the wet cement has slurry formation due to water added to it. The dry process does not require the addition of water, but only dry materials that are added in proportion. The fundamental cement ingredient is calcium silicate.

In the dry and semi-dry processes, the raw materials are crushed and fed in the correct proportions into a grinding mill, where they are dried and reduced in size to a fine powder. The dry powder, called raw meal, is then pumped to a blending silo, and final adjustment is now made in the proportions of the materials required for the manufacture of cement. To obtain a uniform and intimate mixture, the raw meal is blended, usually by means of compressed air inducing an upward movement of the powder and decreasing its apparent density. The air is pumped over one quadrant of the silo at a time, and this permits the apparently heavier material from the non-aerated quadrants to move laterally into the aerated quadrant. Thus the aerated material tends to behave almost like a liquid and, by aerating all quadrants in turn for a total period of about one hour, a uniform mixture is obtained. In some cement plants, continuous blending is used.

In the dry process, the raw meal, which has a moisture content of about 0.2 percent, is passed through a pre-heater, usually of a suspension type; that means that the raw meal particles are suspended in the rising gases. Here, the raw meal is heated to about 800 °C before being fed into the kiln. Because the raw meal contains no moisture to be driven off and because it is already pre-heated, the kiln can be shorter than that in the wet process. The pre-heating uses the hot gas leaving the kiln. Because that gas contains a significant proportion of rather volatile alkalis and chlorides, a part of the gas may need to be bled off to ensure that the alkali content of the cement is not too high.

The major part of the raw meal can be passed through a fluidized calciner (using a separate heat source) introduced between the pre-heater and the kiln. The temperature in the fluidized calciner is about 820 °C. This temperature is stable so that the calcination is uniform and the efficiency of the heat exchange is high.

A part of the raw meal is fed direct into the kiln in the usual manner but, overall, the effect of the fluidized calciner is to increase the de-carbonation (dissociation of $CaCO_3$) of the raw meal prior to entry into the kiln and thus greatly to increase the kiln throughput.

It should be stressed that all processes require an intimate mixture of the raw materials because a part of the reactions in the kiln must take place by diffusion in solid materials, and a uniform distribution of materials is essential to ensure a uniform product.

On exit from the kiln, regardless of the type of process, the clinker is cooled, the heat being used to preheat the combustion air. The cool clinker, which is characteristically black, glistening, and hard, is inter-ground with gypsum in order to prevent flash setting of the cement. The grinding is done in a ball mill consisting of several compartments with progressively smaller steel balls, sometimes preceded by passing through a roll press. The cement discharged by the mill is passed through a separator, fine particles being removed to the storage silo by an air current, while the coarser particles are passed through the mill once again. Closed-circuit grinding avoids the production of a large amount of excessively fine material or of a small amount of too coarse material, faults often encountered with open-circuit grinding. Small quantities of grinding aids such as ethylene glycol or propylene glycol are used. The performance of a ball mill can be improved by pre-grinding the clinker in a horizontal impact crusher. The dry process is used nowadays in order to minimize the energy required for burning. Typically, the burning process represents 40 to 60 per cent of the production cost, while the extraction of raw materials for the manufacture of cement represents only 10 per cent of the total cost of cement.

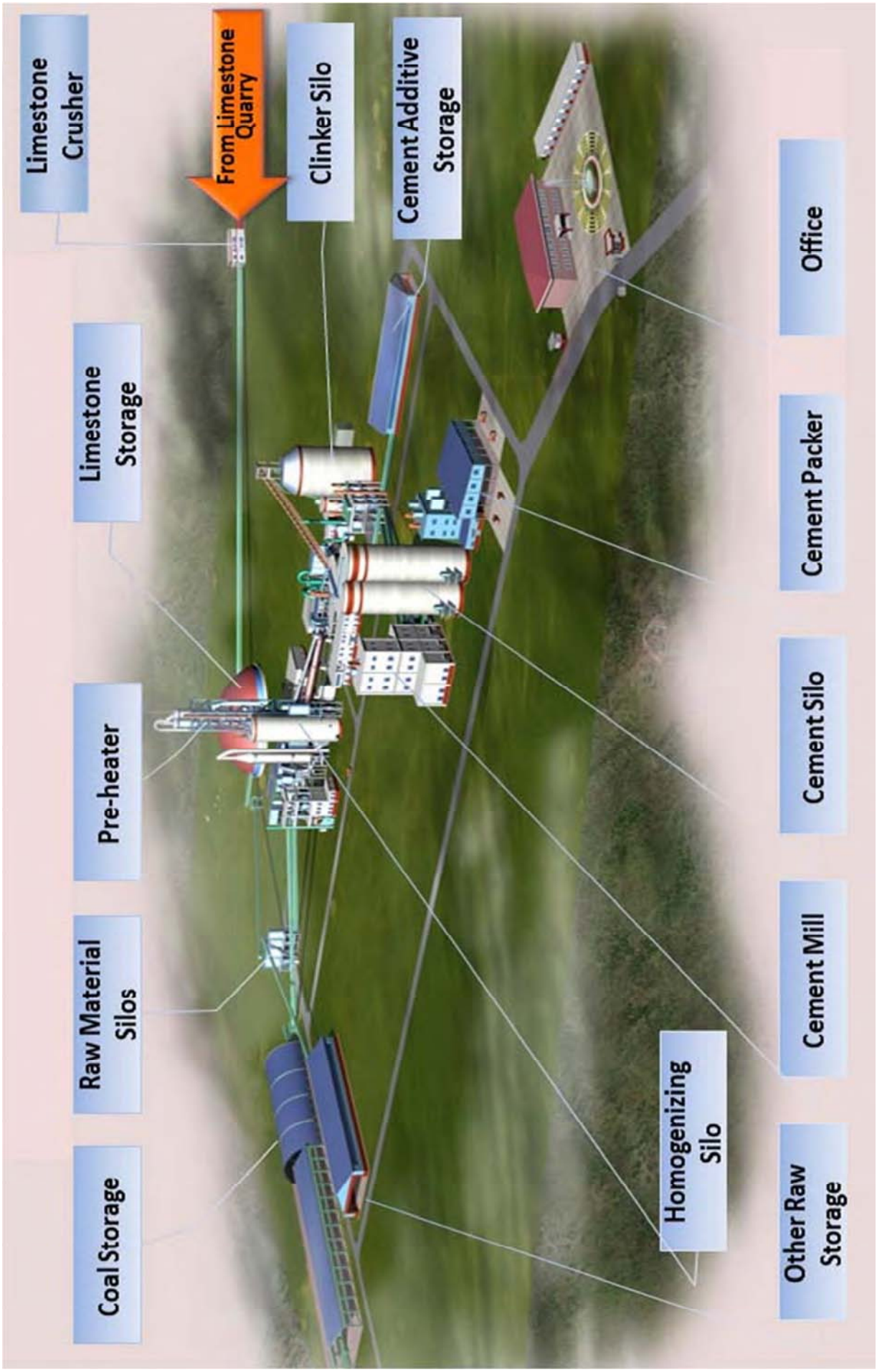

Figure 2.11 3D view of APACHE Cement Plant, Pyi Nyaung Village, Thazi Township

The APACHE Cement production processes are as follow figures.

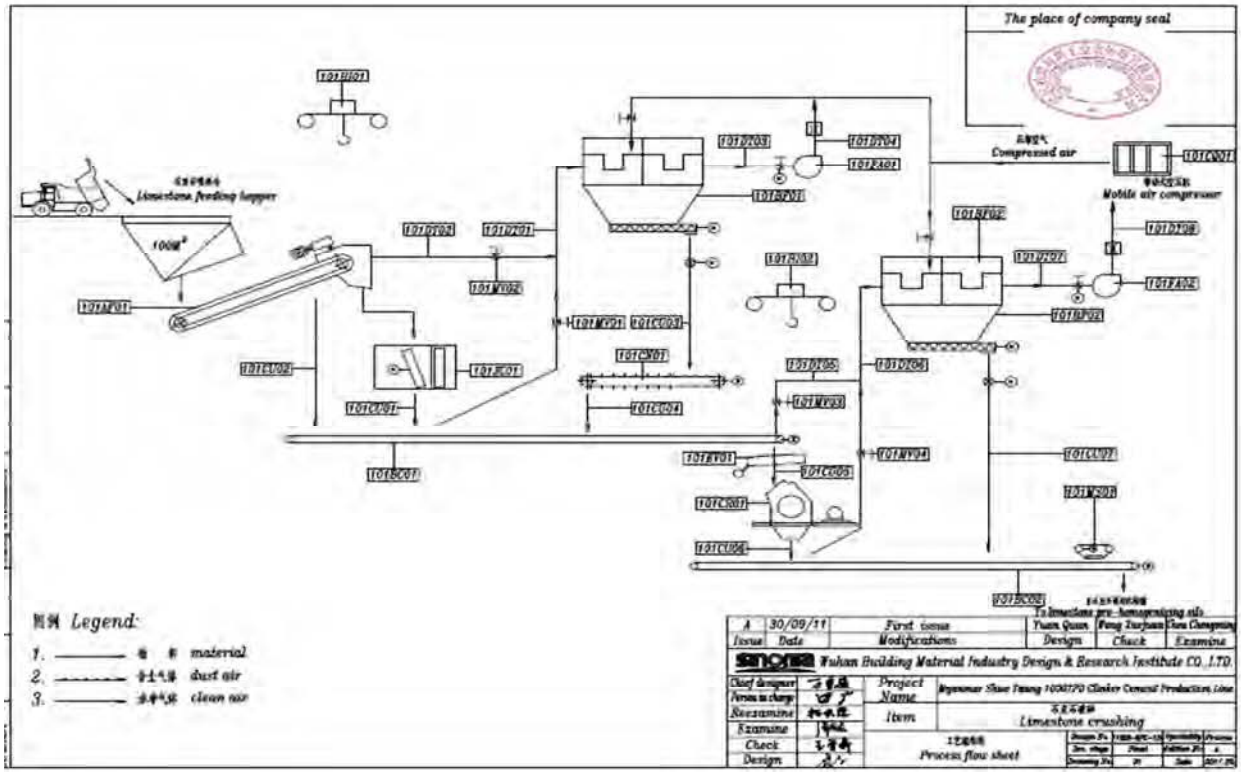

Figure 2.12 Limestone Crushing and Transporting Process

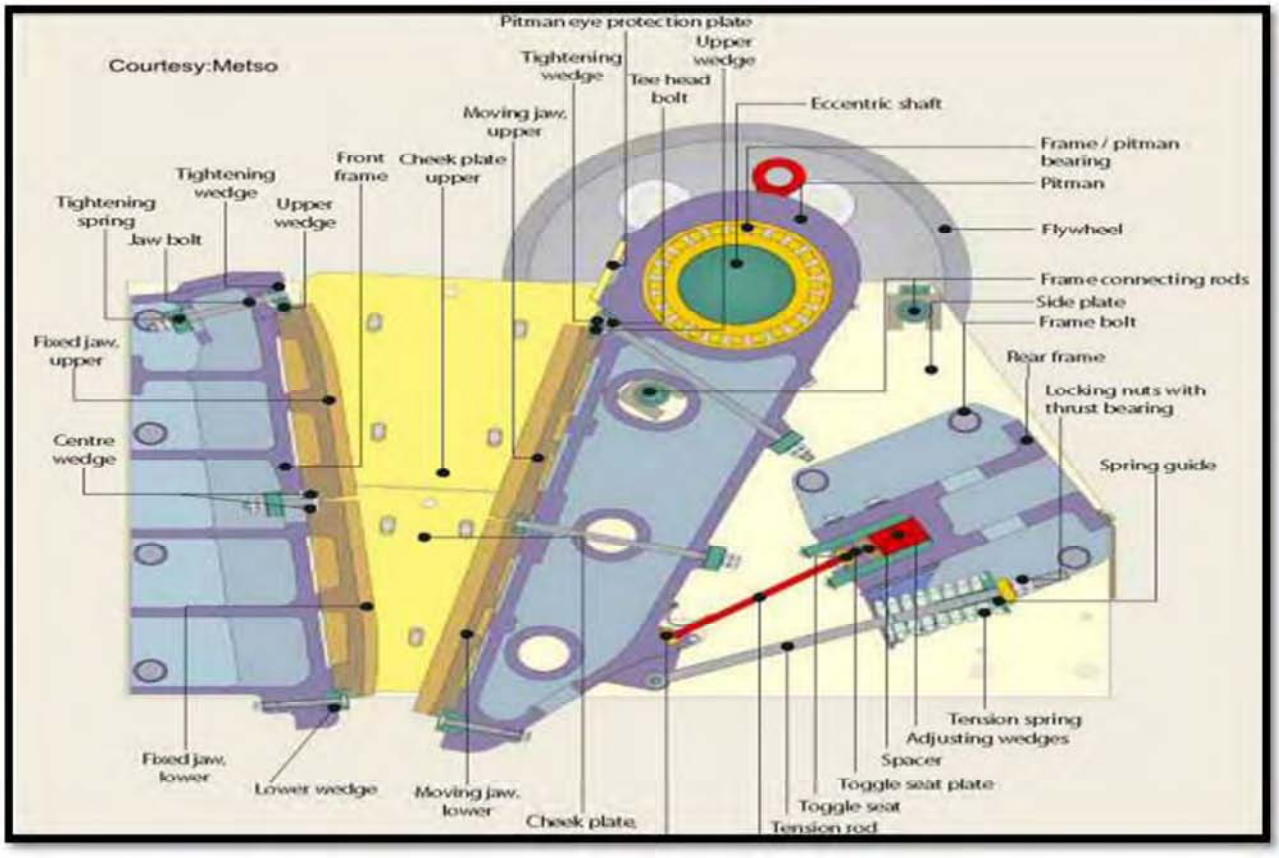

Figure 2.13 Description of Jaw Crusher

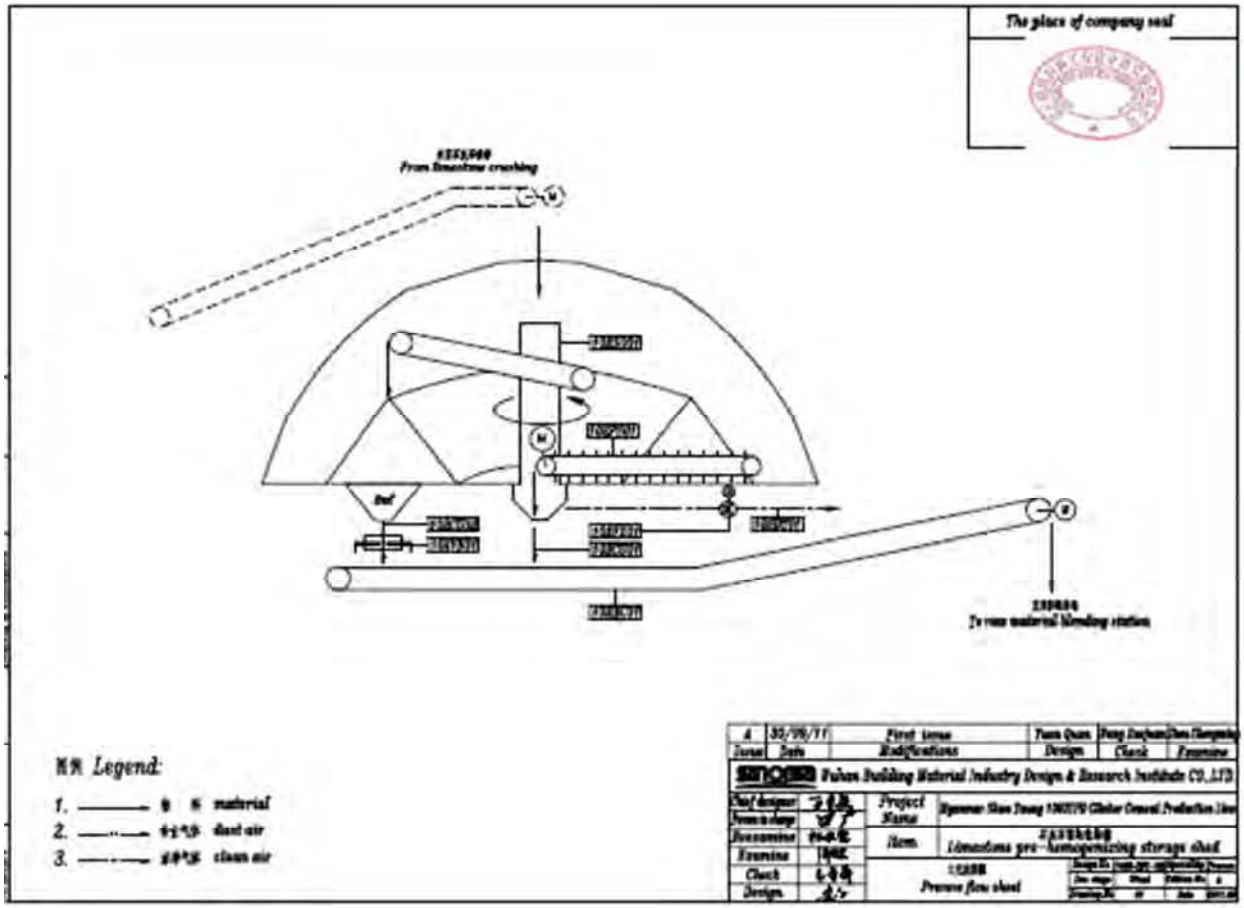

Figure 2.14 Limestone Pre-homogenizing Shed

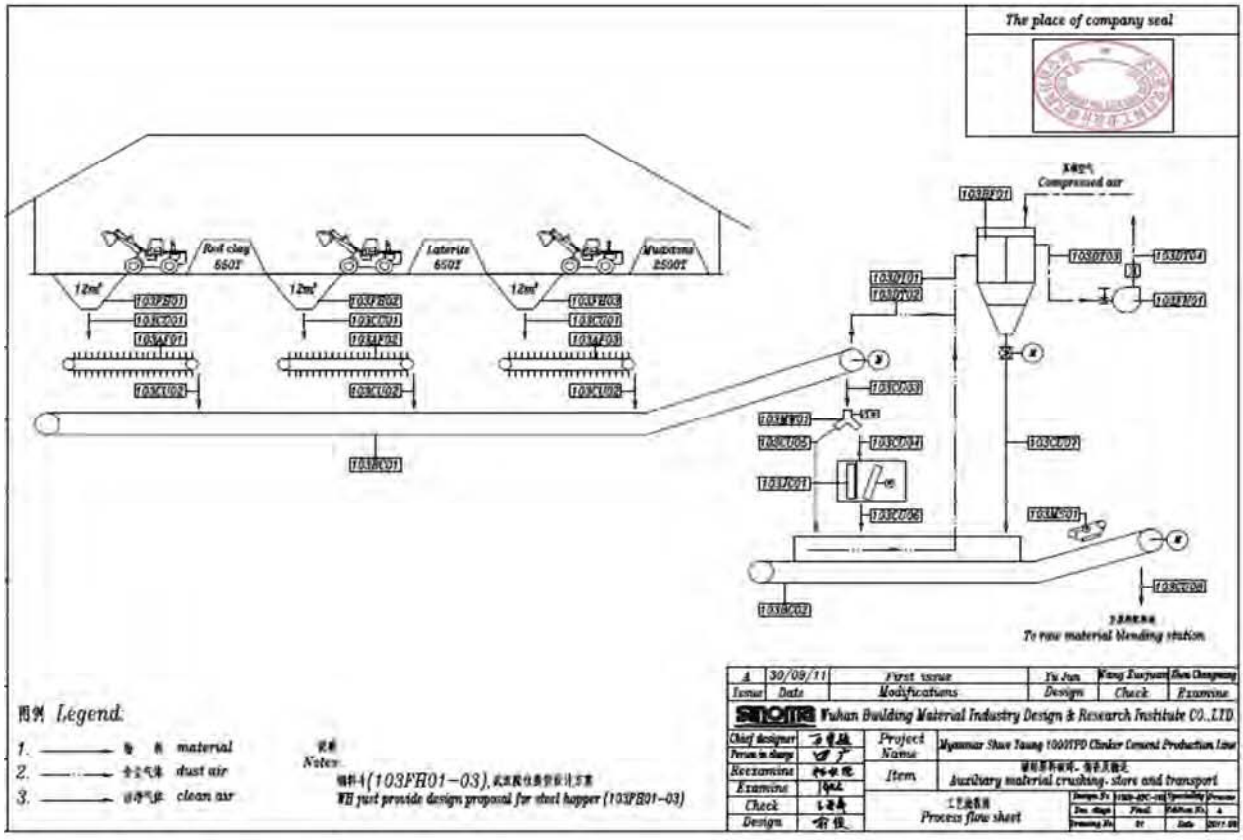

Figure 2.15 Auxiliary Material Crushing Store and Transport Process

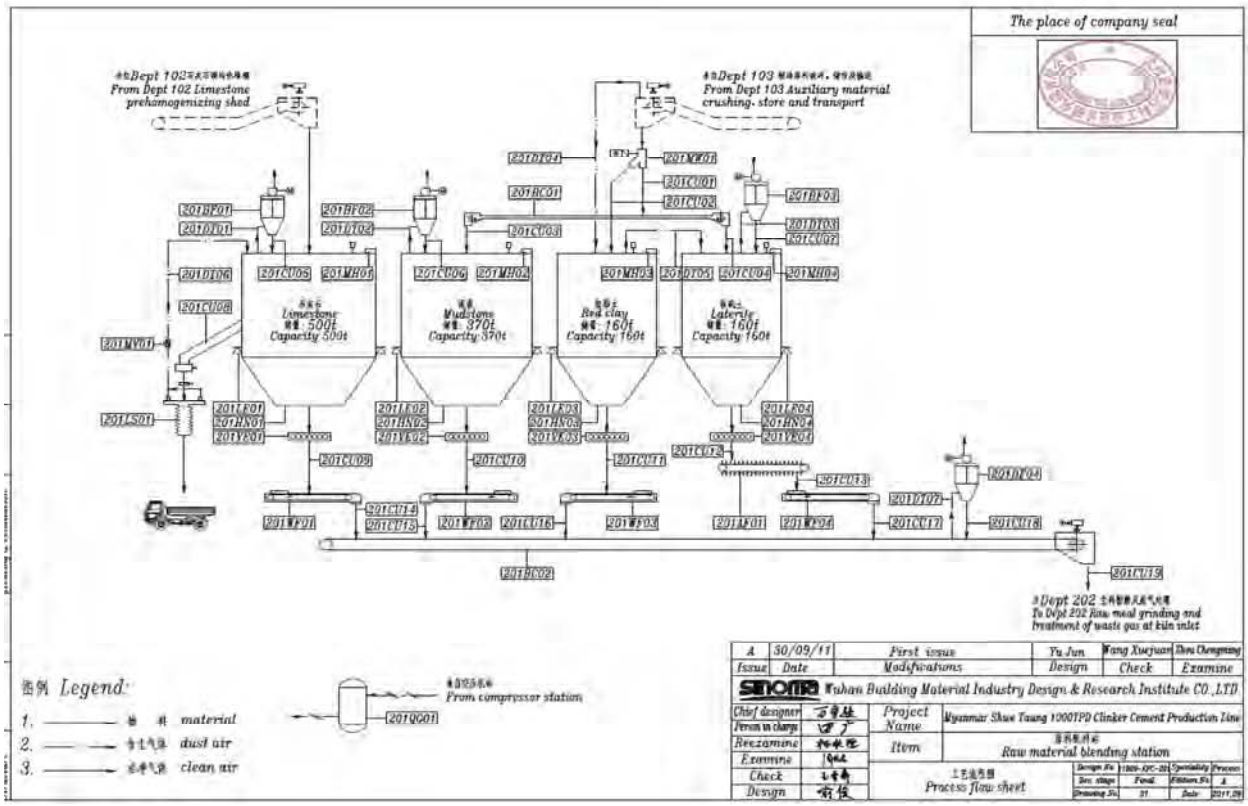

Figure 2.16 Raw Material Blending Station

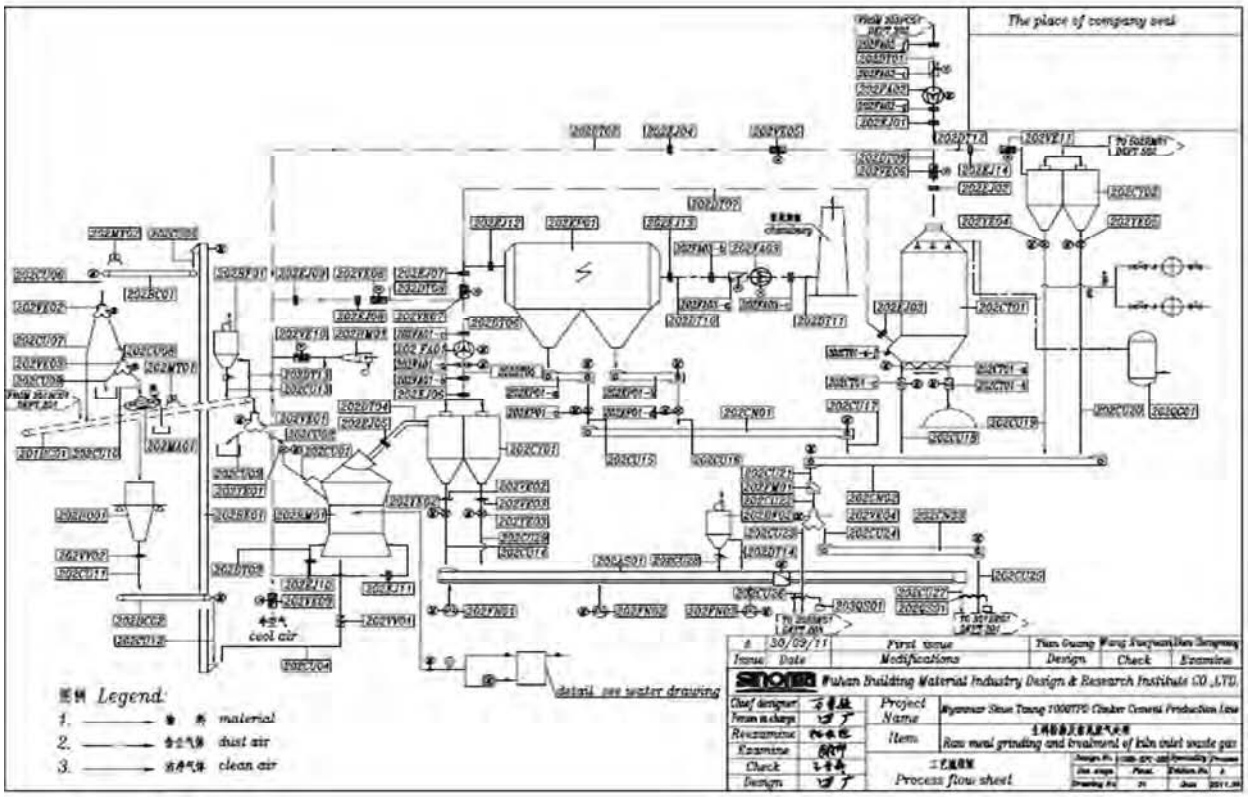

Figure 2.17 Raw Meal Grinding

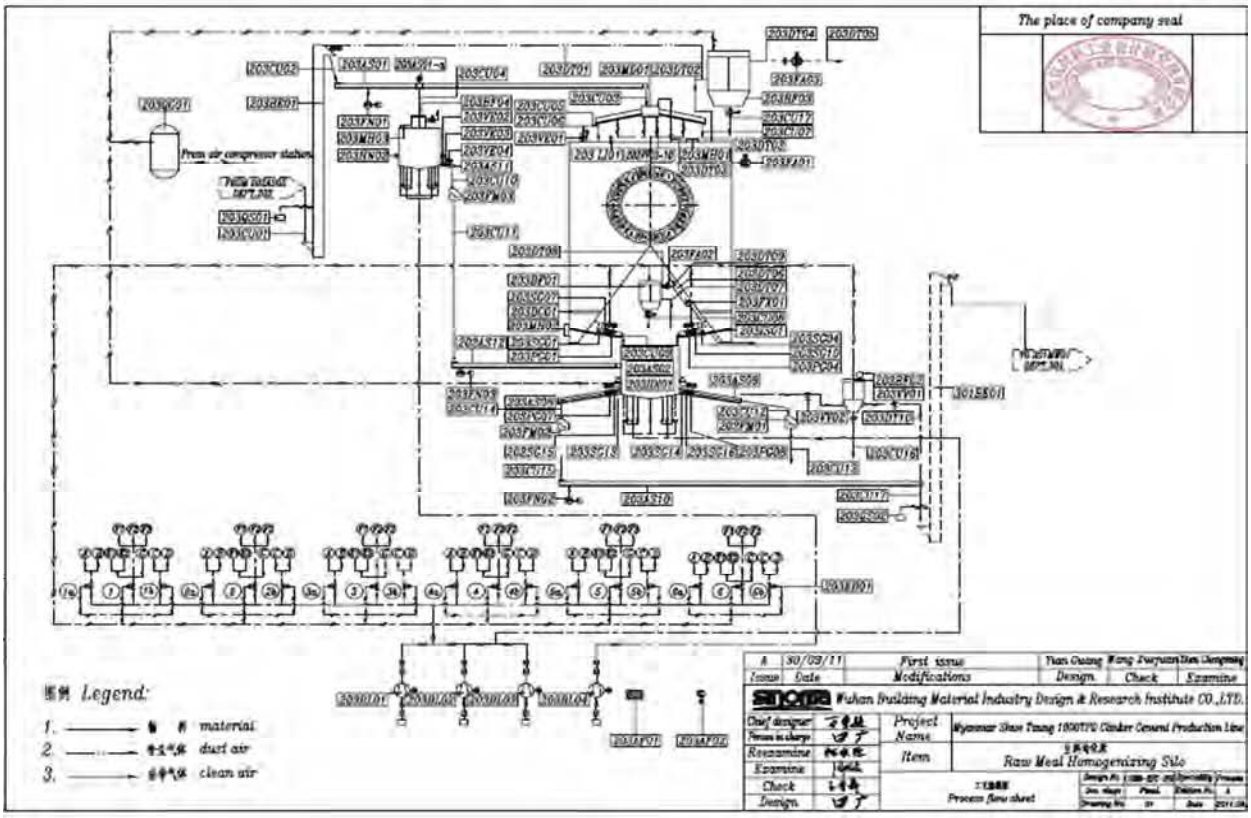

Figure 2.18 Raw Meal Homogenizing Silo

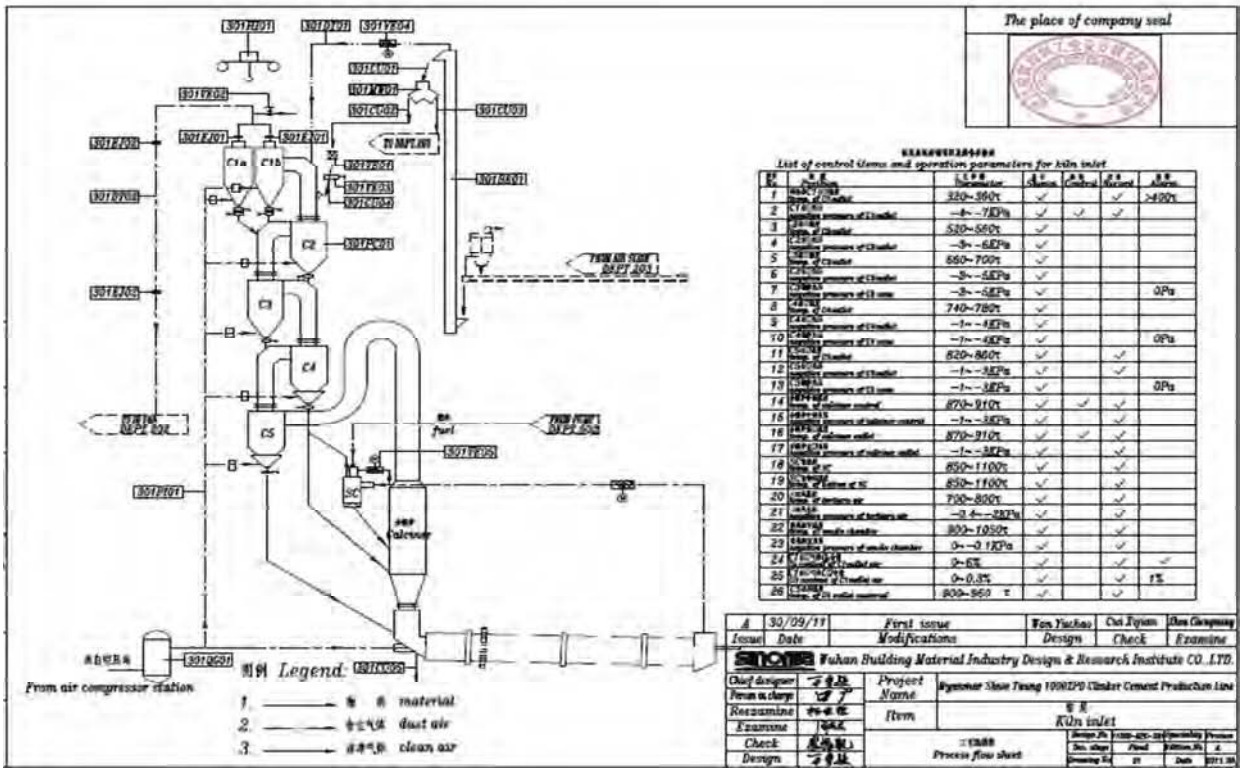

Figure 2.19 Kiln Inlet Preheater

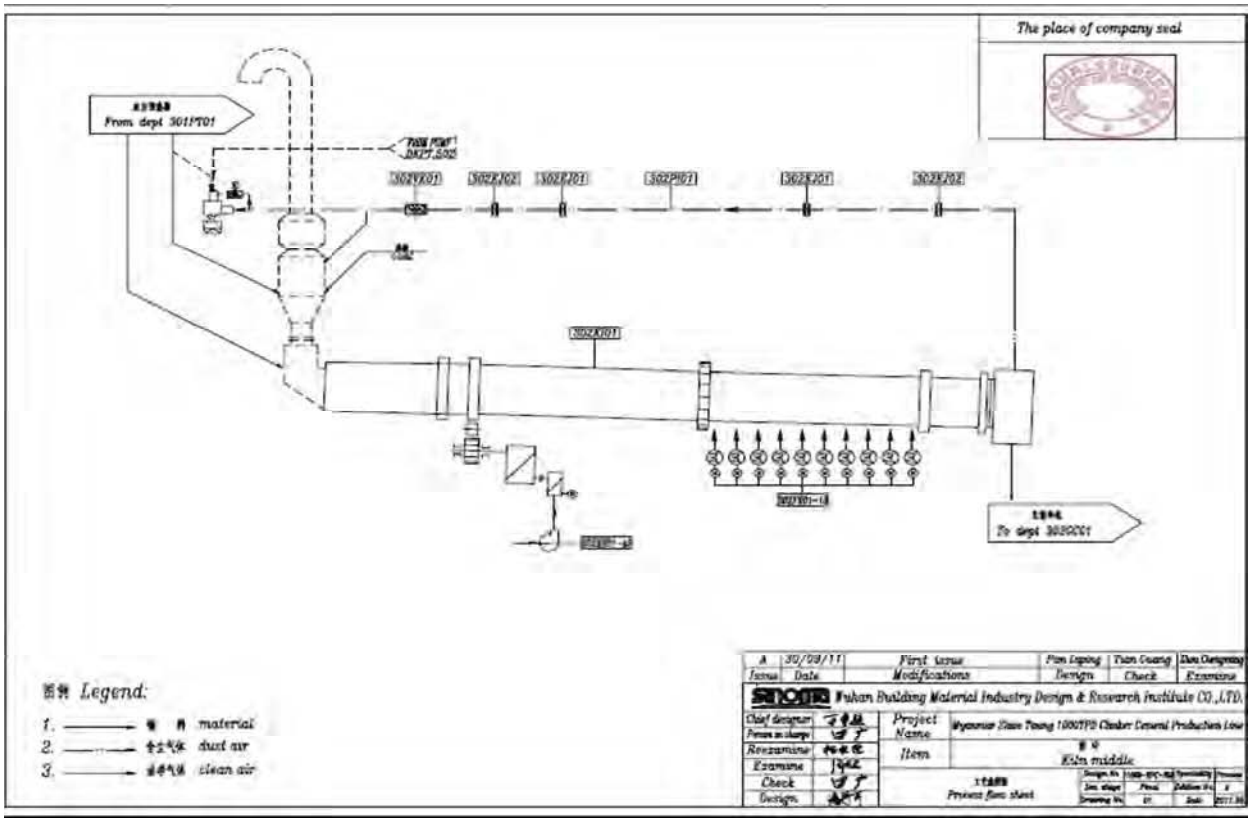

Figure 2.20 Kiln

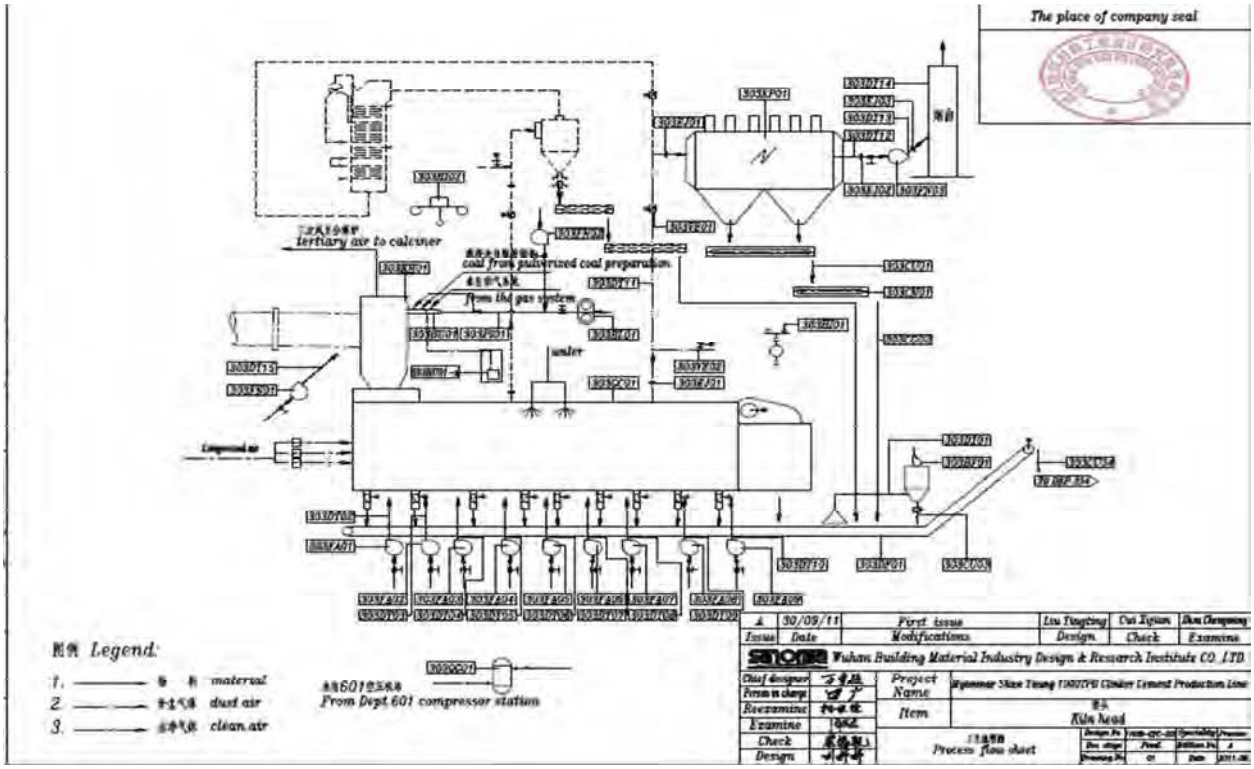

Figure 2.21 Kiln Head and Clinker Conveying

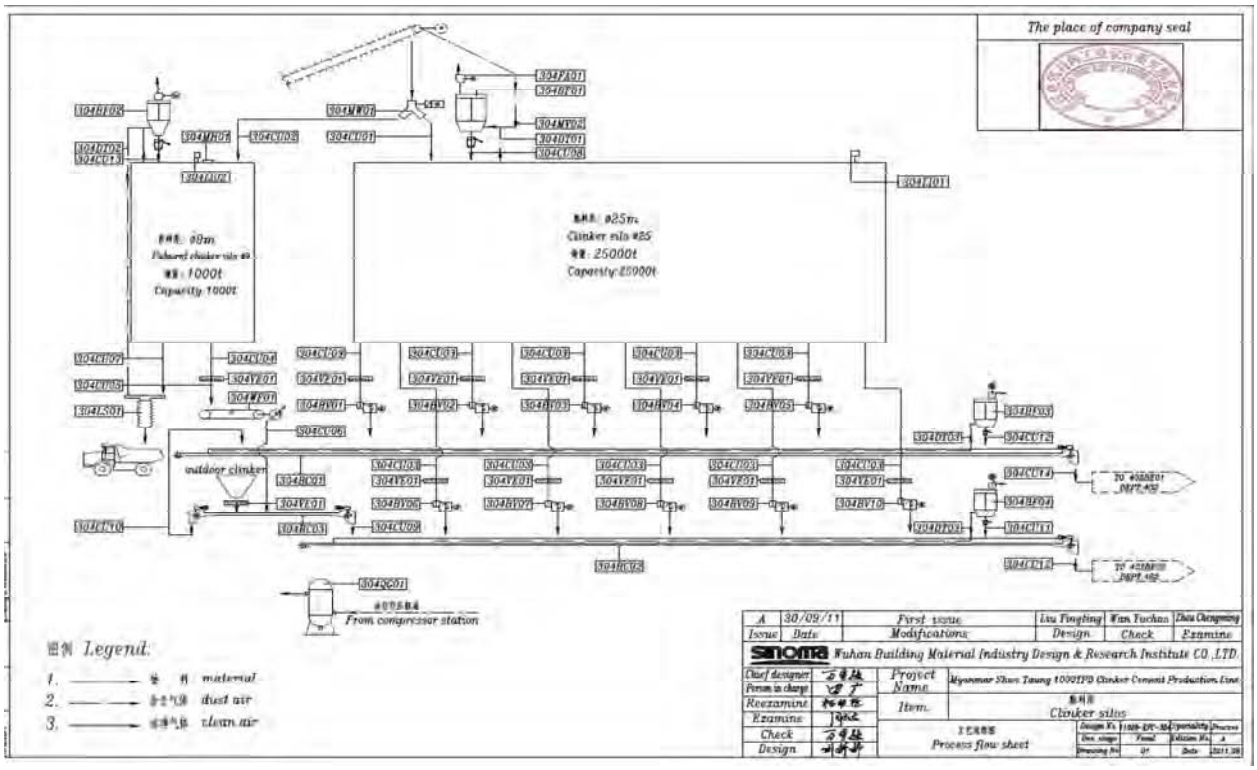

Figure 2.22 Clinker and Unburnt Clinker Silos

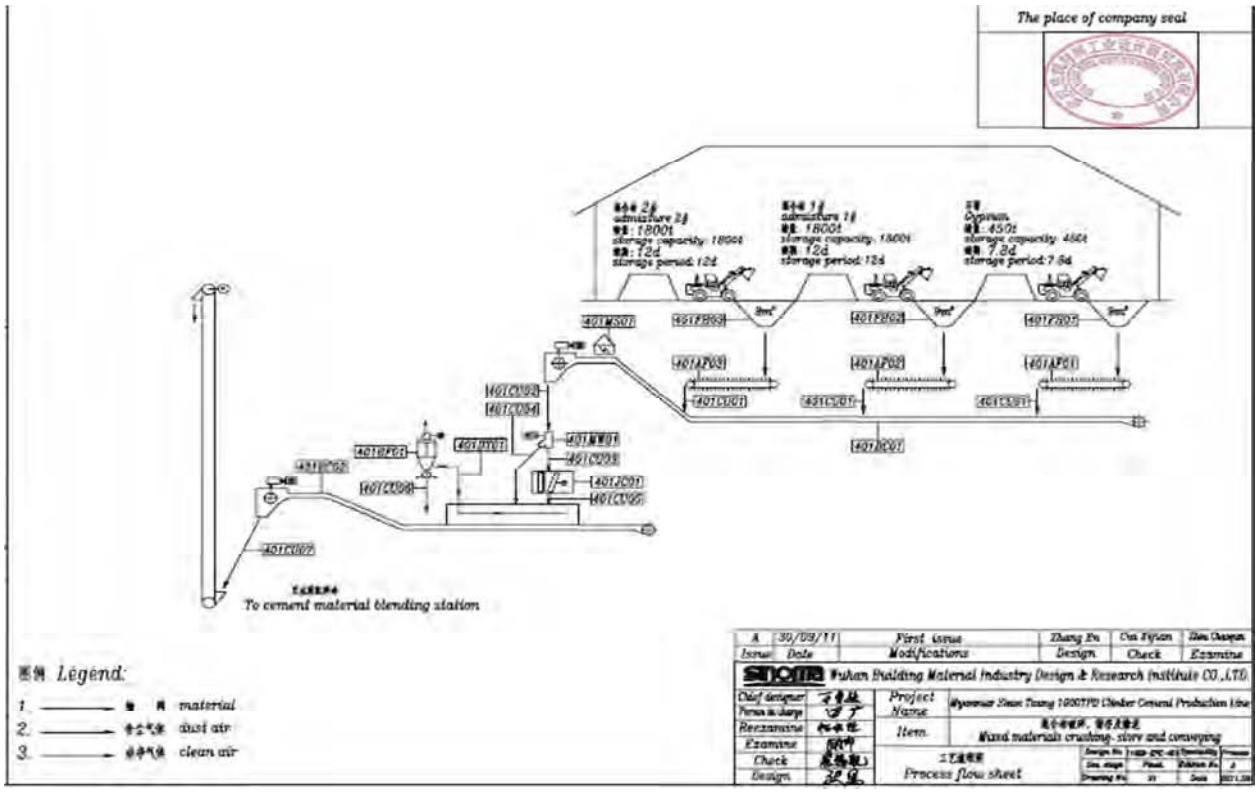

Figure 2.23 Mixed Materials Crushing Store and Transporting

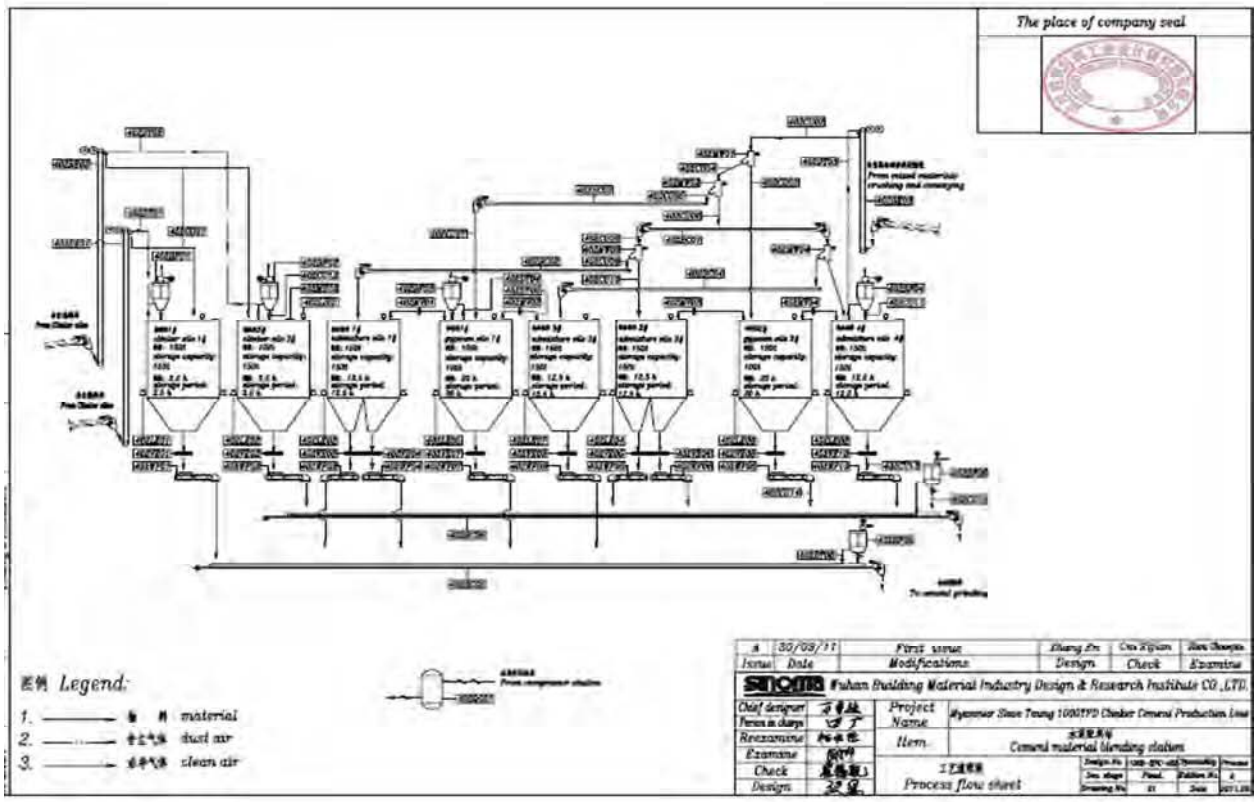

Figure 2.24 Cement Material Blending Station

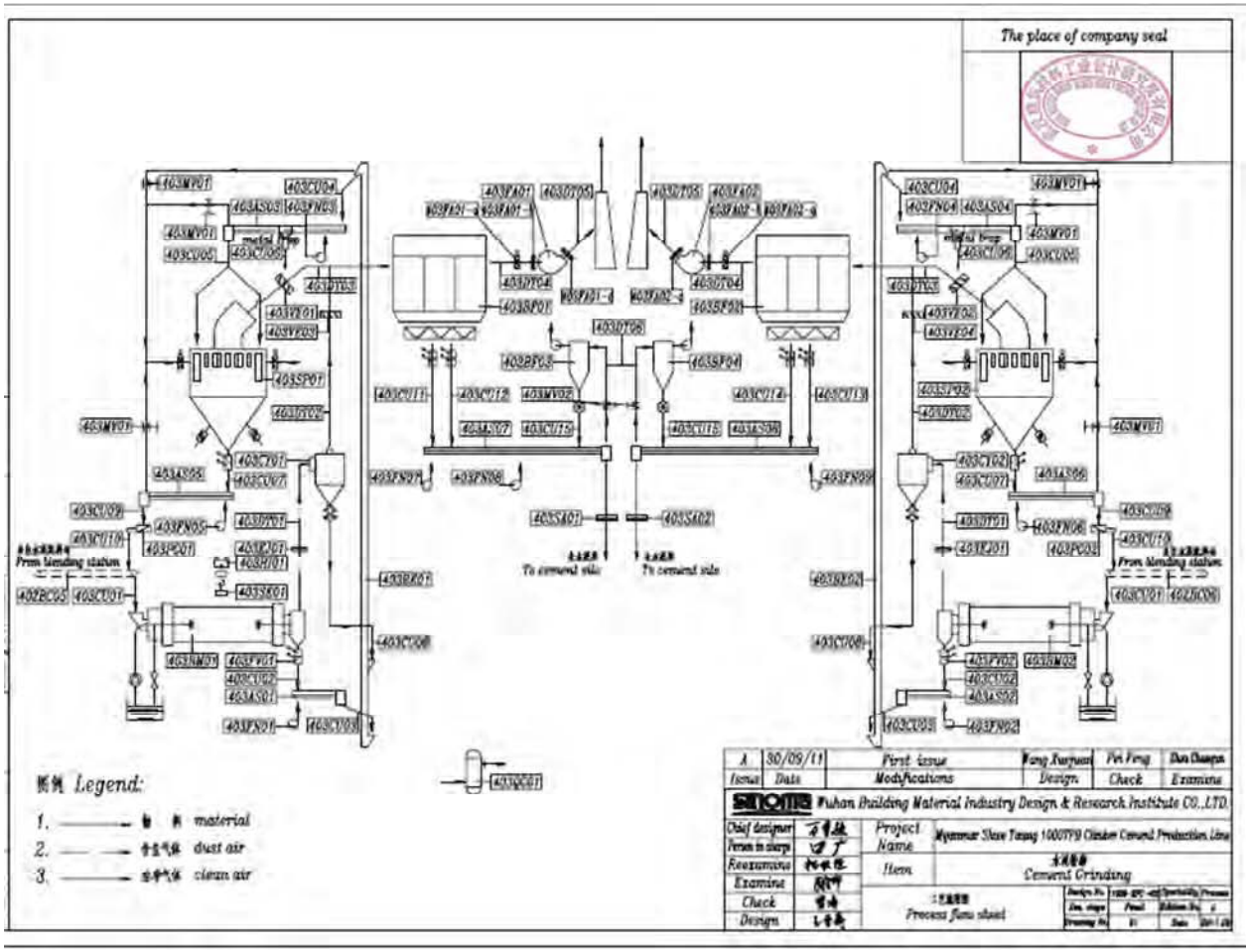

Figure 2.25 Cement Silo and Cement Bulk

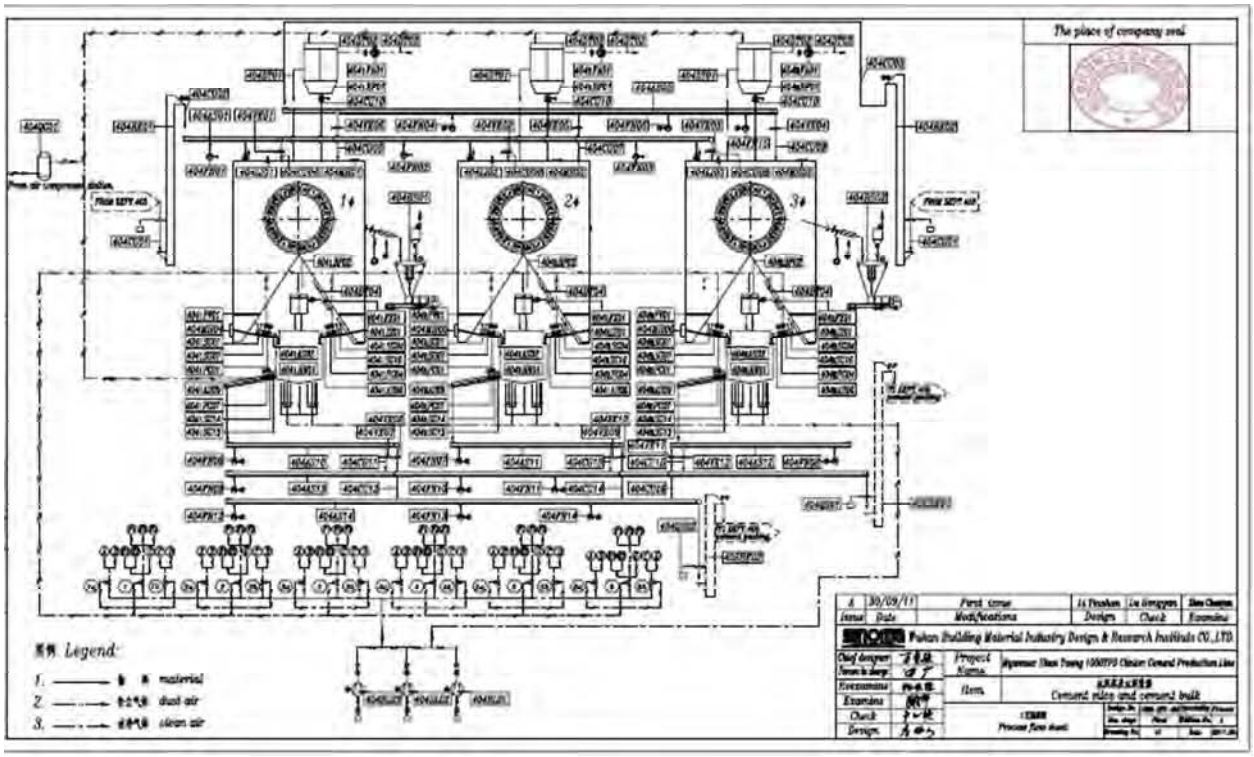

Figure 2.26 Cement Packing Process

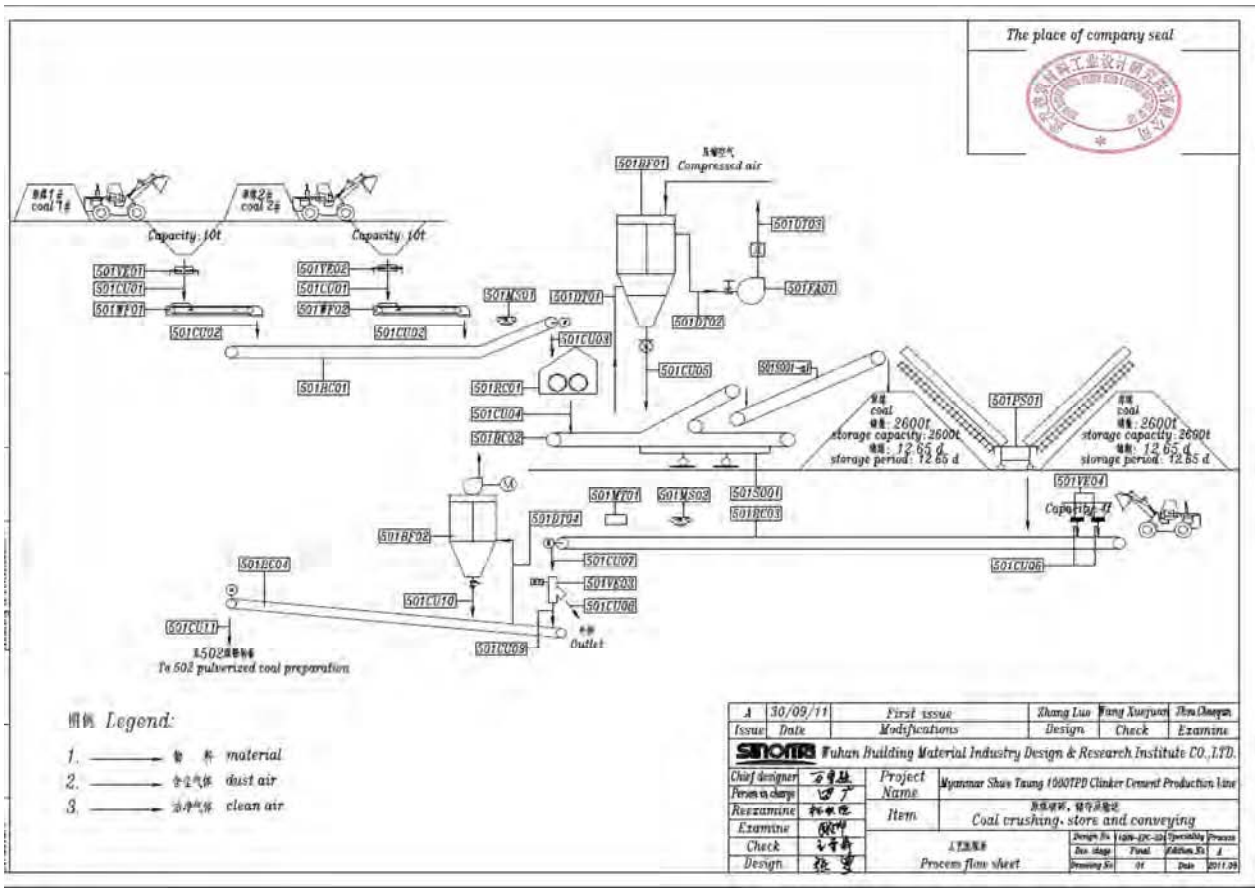

Figure 2.27 Coal Crushing, Store and Conveying

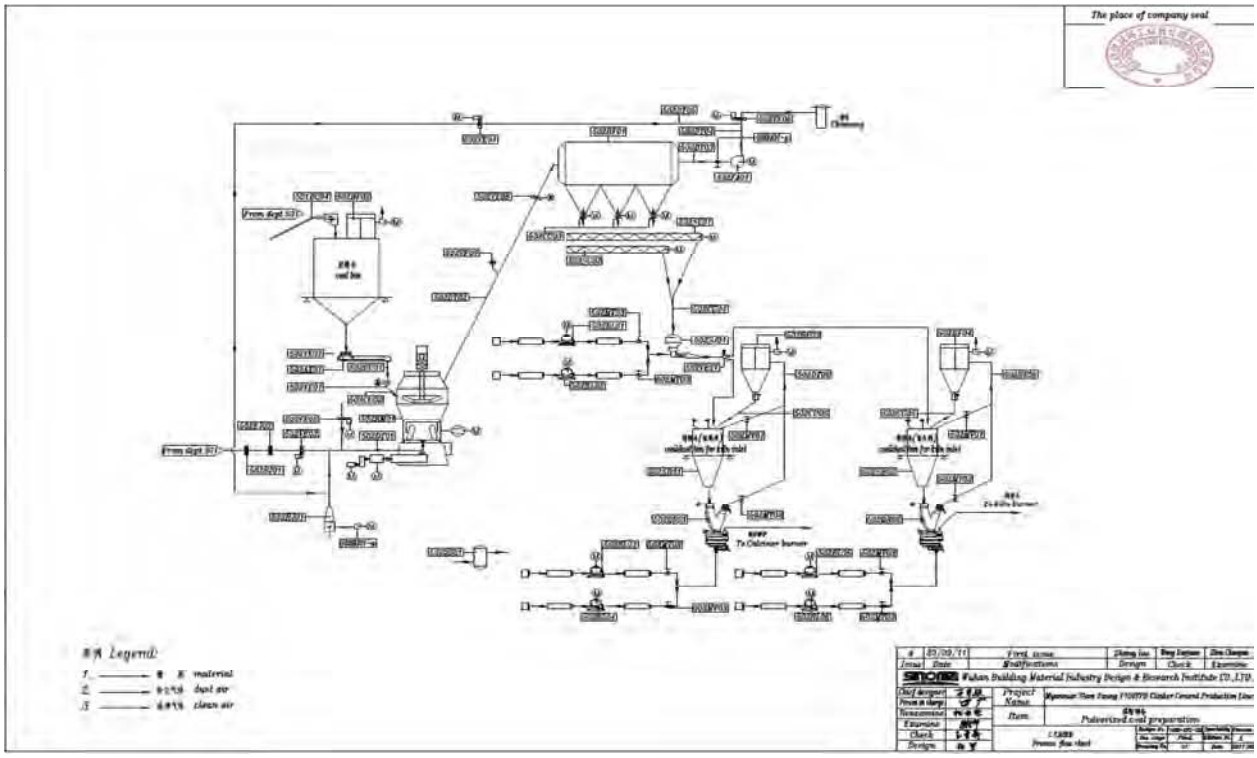

Figure 2.28 Pulverized Coal Preparation Process

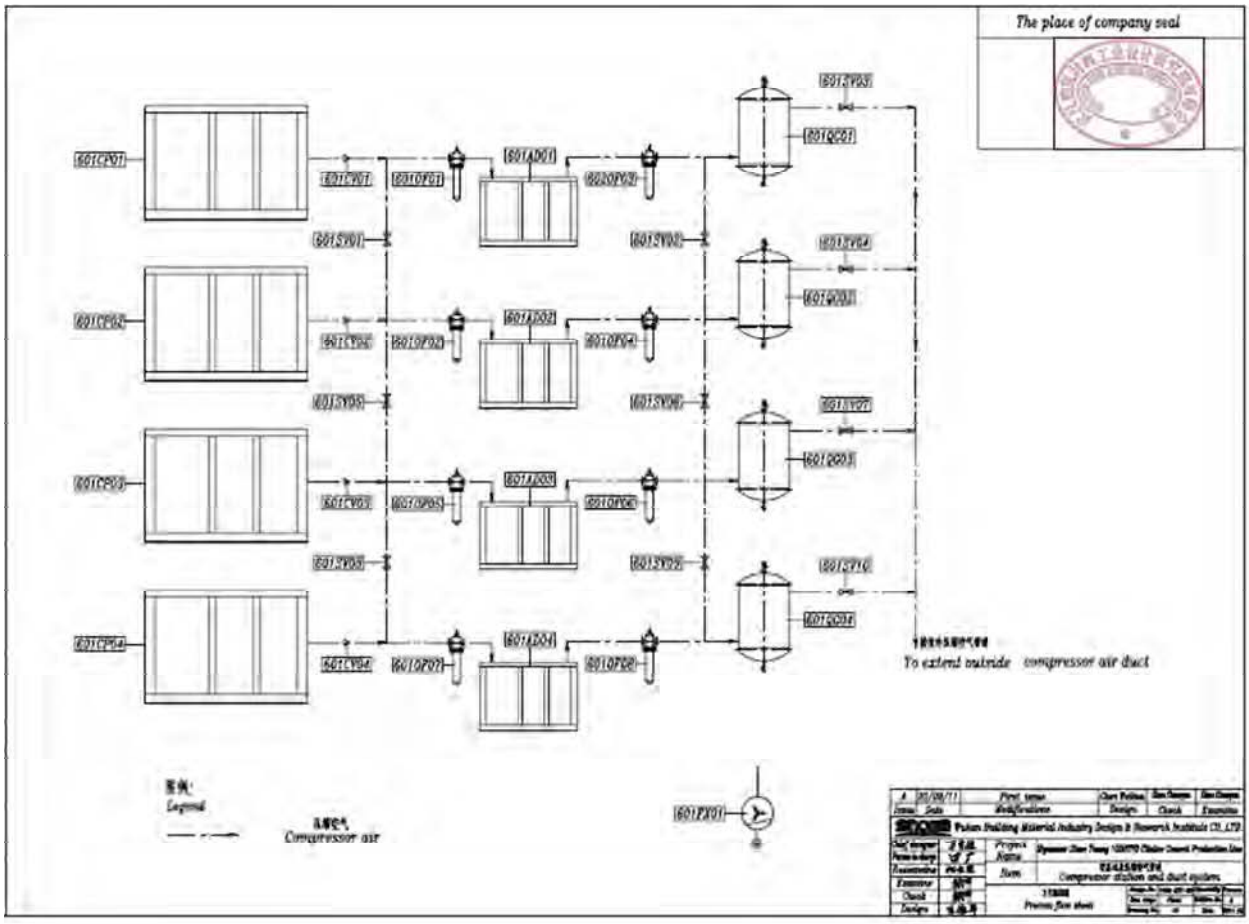

Figure 2.29 Compressor Station

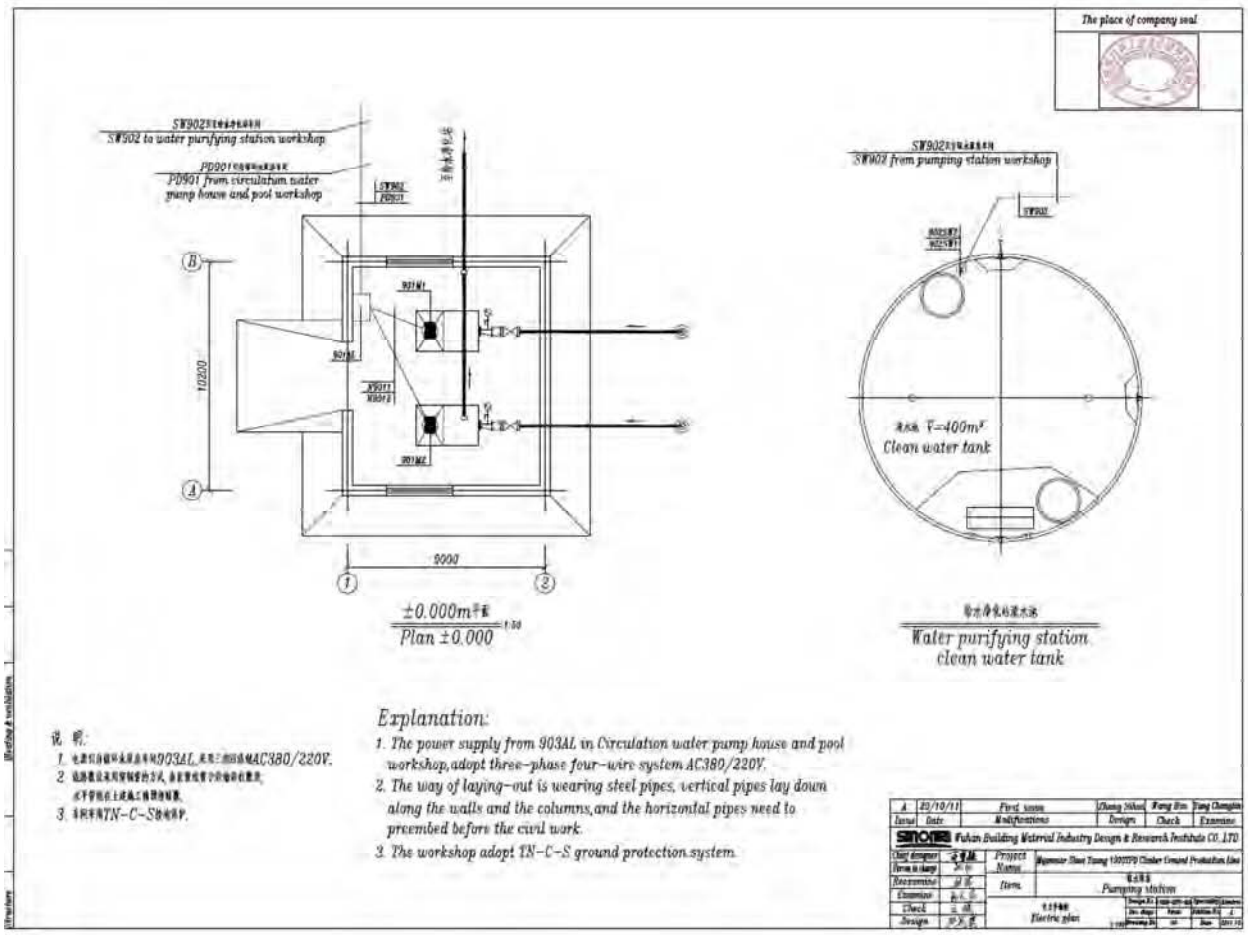

Figure 2.30 Circulation Water Pump House

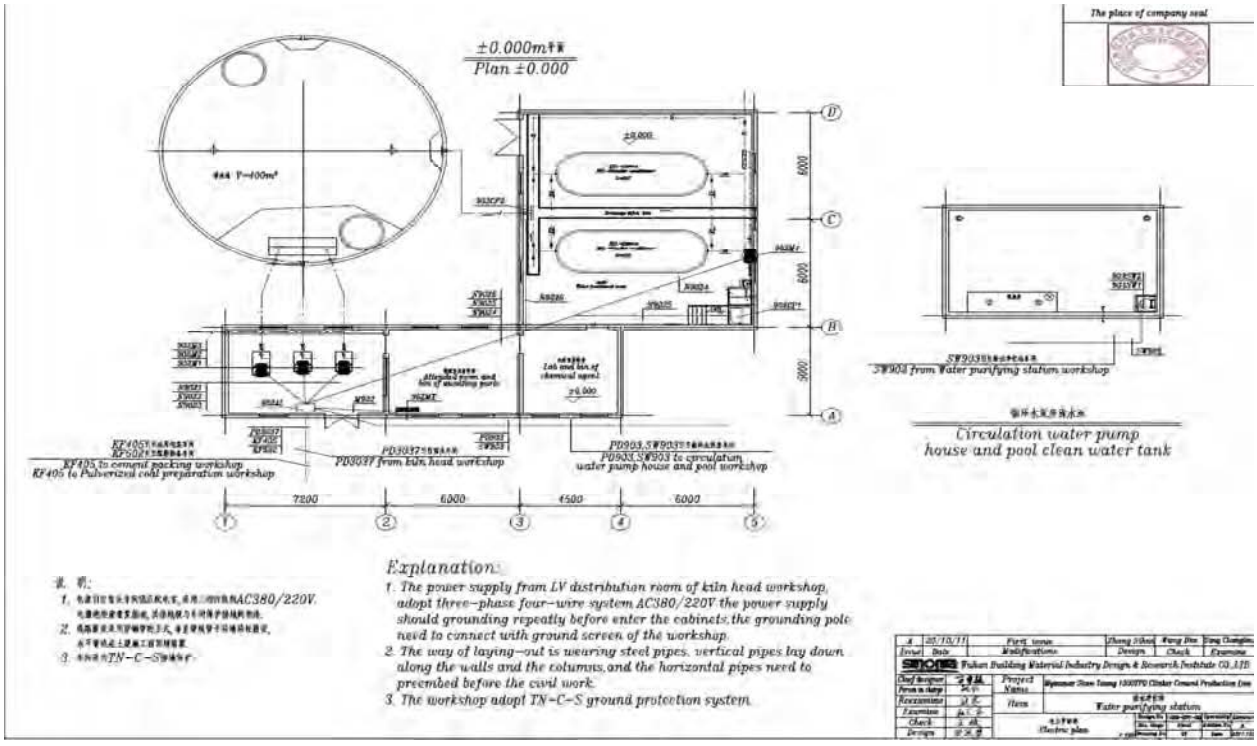

Figure 2.31 Water Purifying Station

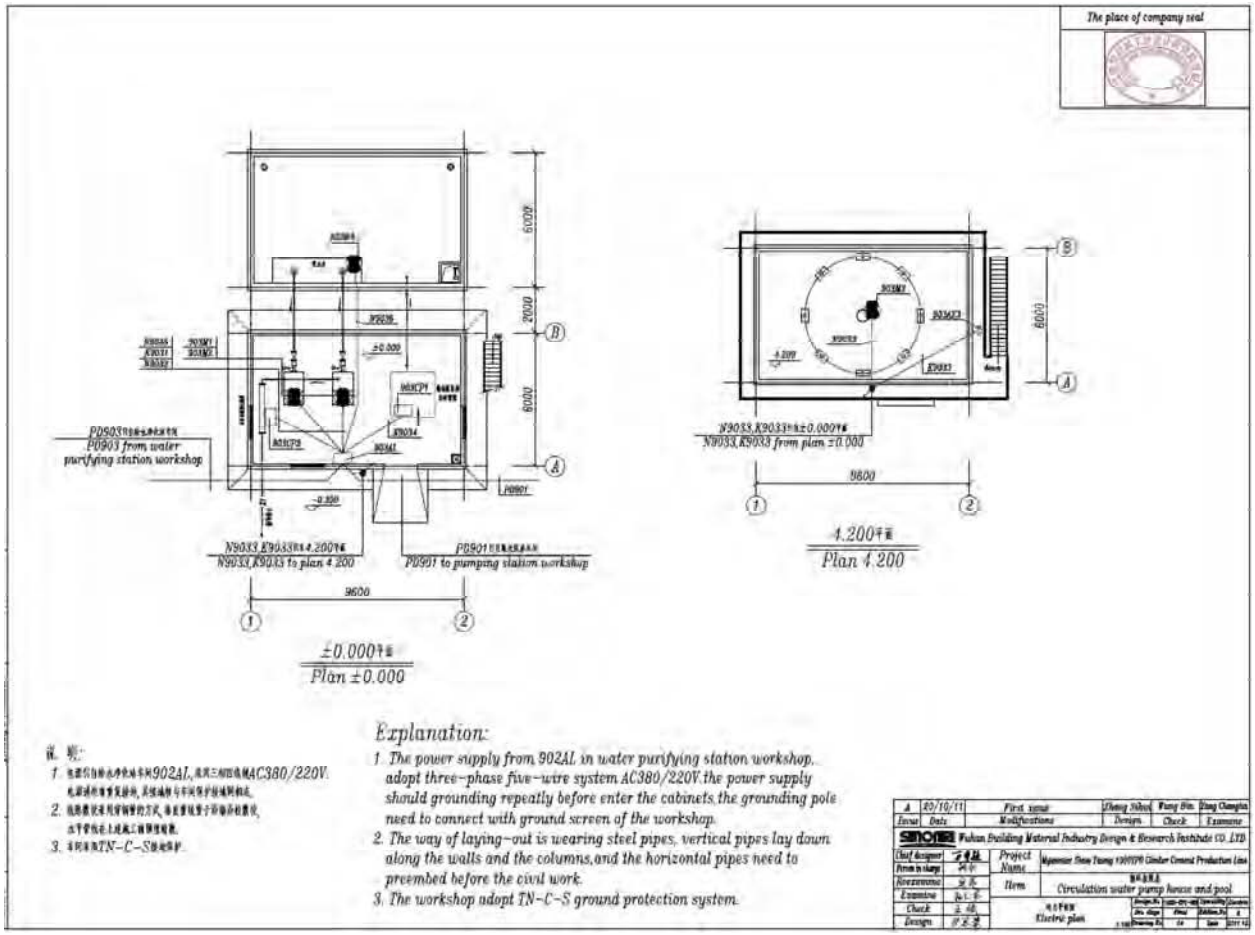

Figure 2.32 Water Pumping Station

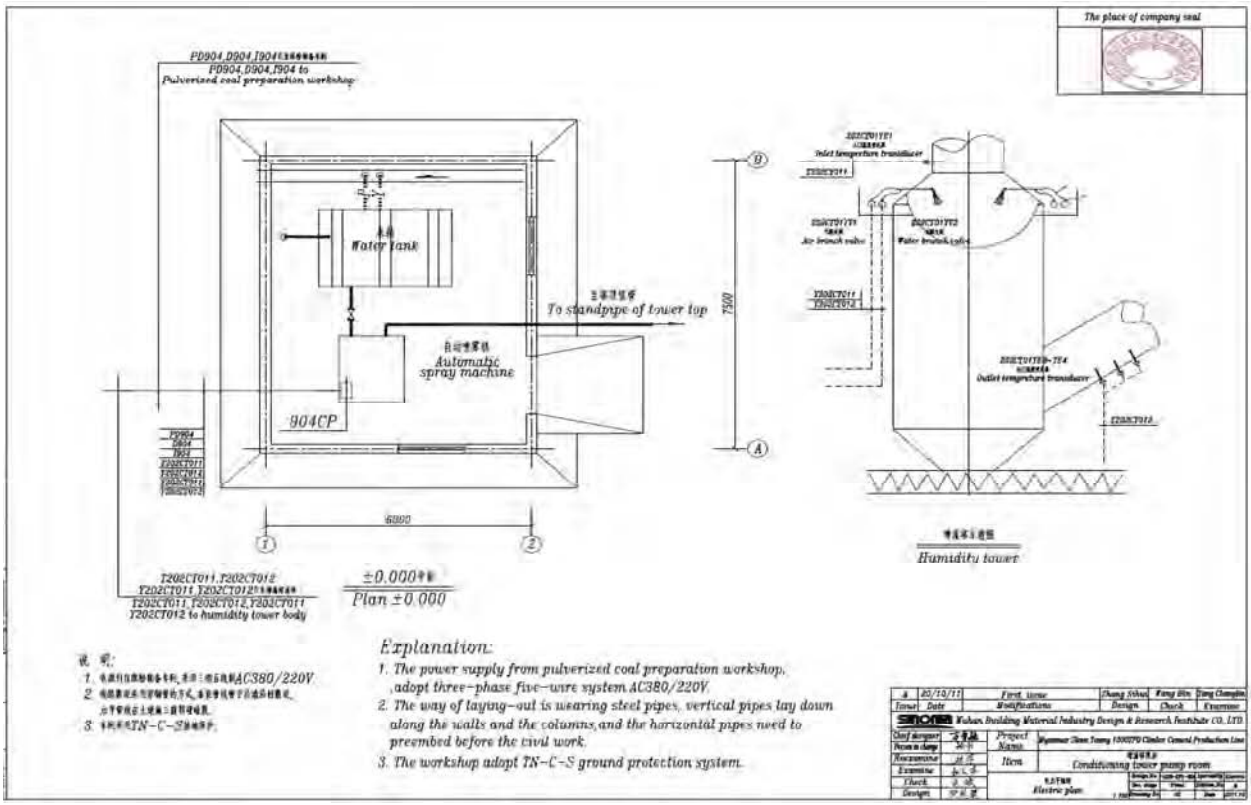

Figure 2.33 Condition Tower Pump Room

2.3 Lime Stone and Mud Stone Quarry Site and Production

The limestone and mud stone quarry sites are adjacent to the cement plant. Lime stone quarry site area situated on the Tha Pyae mountain range, its highest point is about 801 meters and the highest point of Nwalabo Taung is about 869.3 meters (according to on UTM Map and Google Earth) above mean sea level, temperature is between 5 degree centigrade and 39 degree centigrade and rainfall level get from 1000 millimeters to 2500 millimeters.

The volumes of limestone to be mined total approximately 114,000,000 tons. In 2012 to 2013, 349489 tonnes of lime stone is quarried for stage 1and 3423747 tonnes of lime stones will be quarried for stage 2. For the stage 3, 7607091 tonnes of lime stone will be mined from the Tha Pyae mountain range in front of the Ku Byin valley. The method of mining is open cut mining method and the processes are as follow:

- Vegetation Clearing
- Topsoil Stripping and Stockpiling
- Overburden Removal
- Ripping
- Waste Hauling and Dumping
- Drill and Blast
- Limestone Extraction
- Hauling and Dumping
- Land Preparation and Rehabilitation

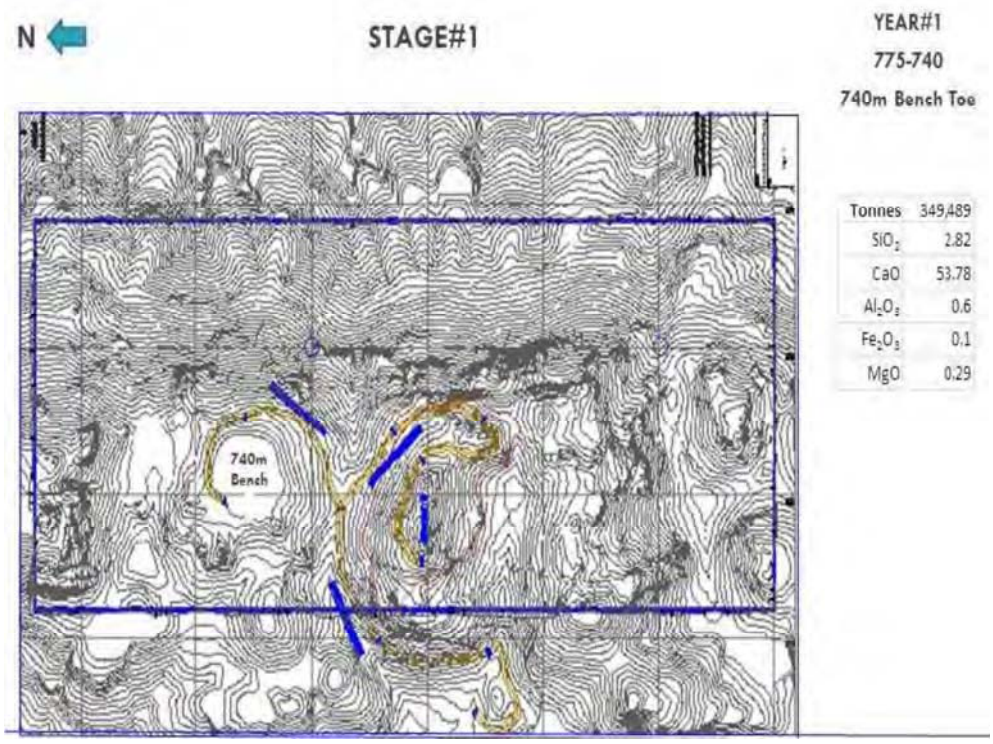

Figure 2.34 Stage 1 of Lime Stone Production

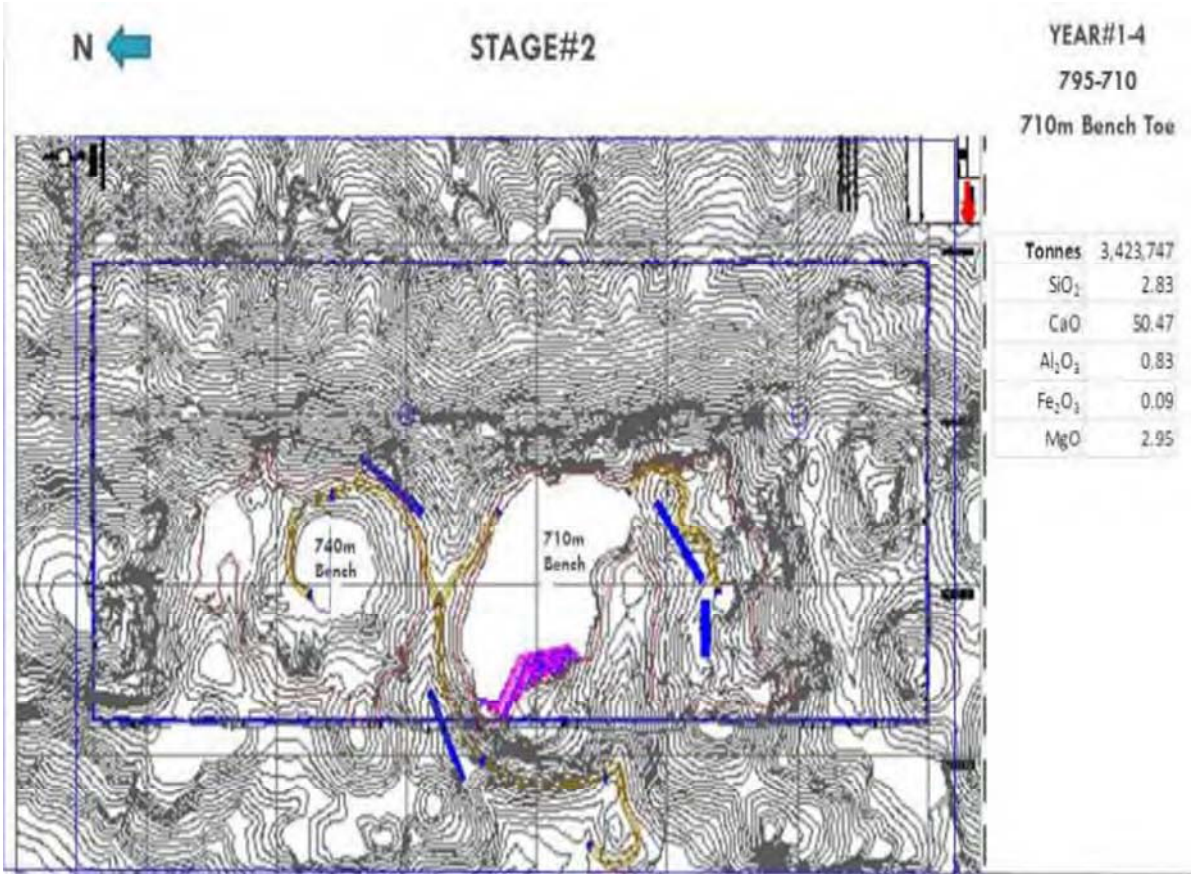

Figure 2.35 Stage 2 of Lime Stone Production

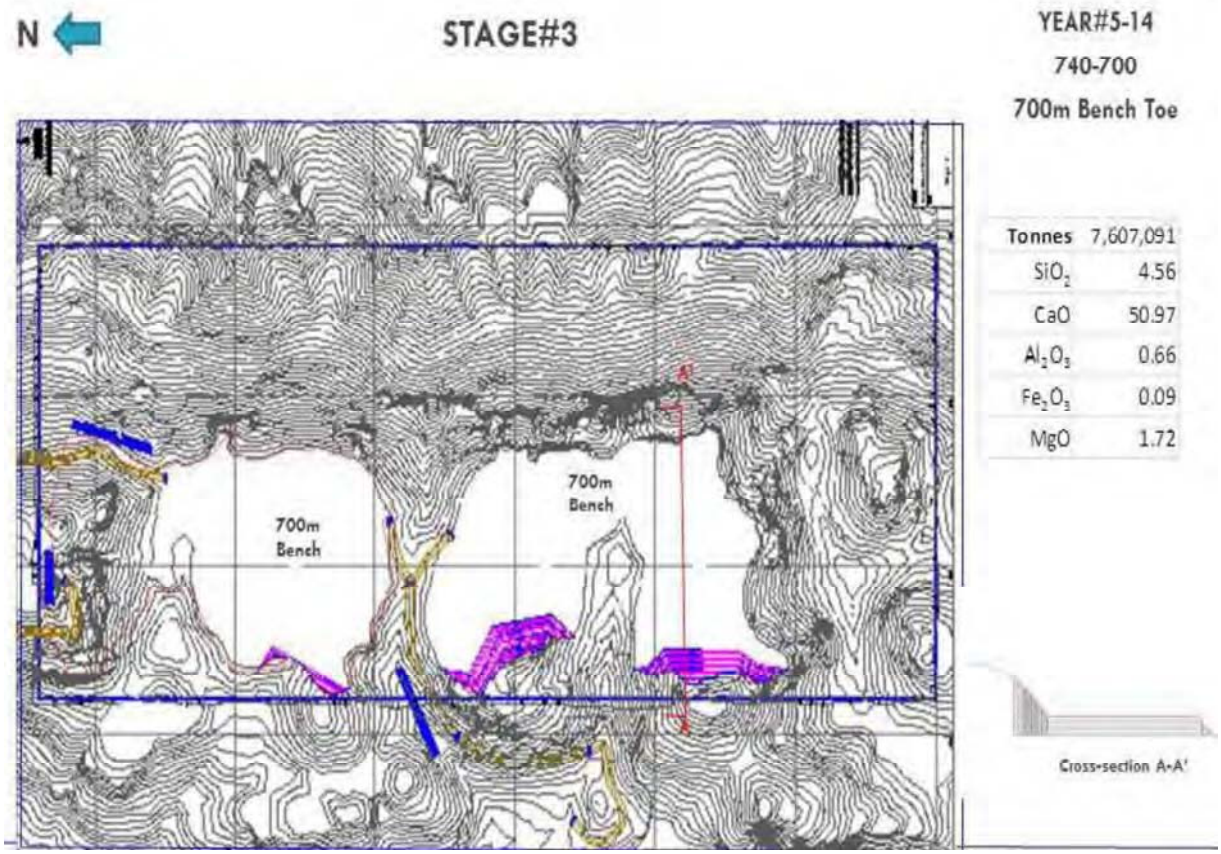

Figure 2.36 Stage 3 of Lime Stone Production

Figure 2.37 Location of Lime Stone Quarry Site

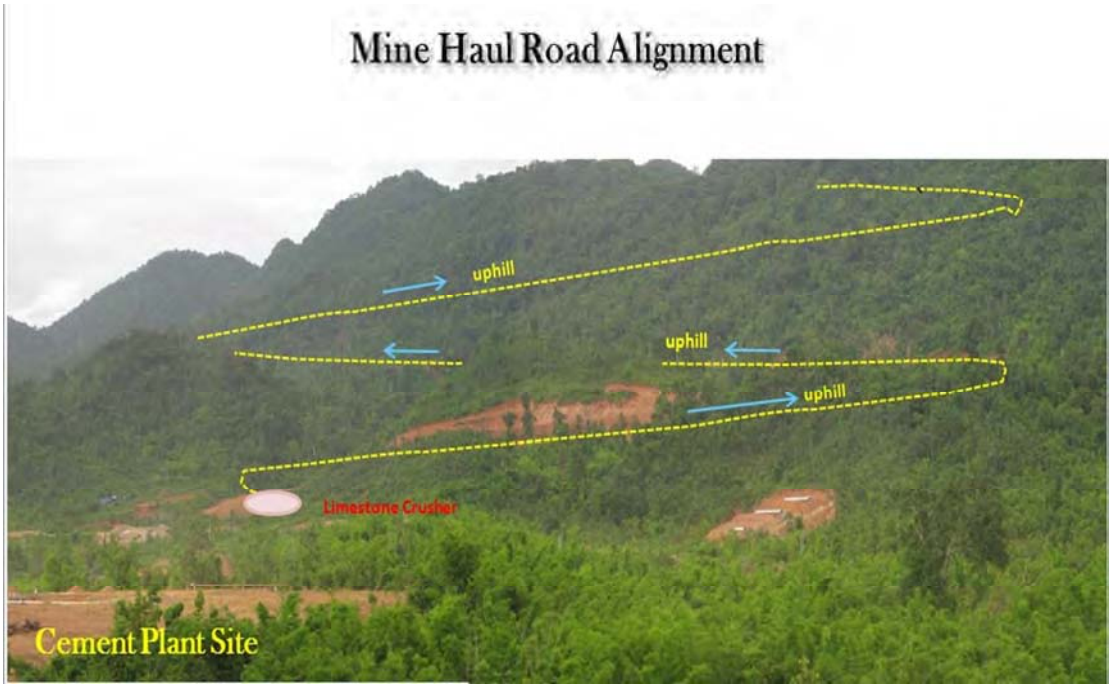

Figure 2.38 Mine Haul Road Alignment from Lime Stone Quarry Site to Lime Stone Crusher

2.4 Geology

2.4.1 Dolomitic Limestone

Distribution

The dolomitic limestone is found as lion's share in the N-S trending ridge from Northern Kyaukket Taung to Southern Thapyay Taung. They occupied in the area at western part of the ridge.

Lithology

The dolomitic limestone are dark grey, smokey grey, light brown colored, generally massive and seldom thin to medium bedded are found in north western part of southern Kyaukket Taung. Closely spaced criss-cross joints are common and it looks like elephant skin. According to magnesium rich limestone faint or lack of effervescence to dilute Hcl.

Contact Relationship

The contact between dolomitic limestone and calcitic limestone is comformable due to same deposition in same basin. The contact between calcitic Ma-U-Bin Formation is tectonic contact.

2.4.2 Calcitic Limestone

Distribution

The calcitic limestone are found in northern part of Kyaukket Taung, east of Kyaukket Taung peak, surrounding peak of Thapyay Taung, in southern part of Thapyay Taung (Area-D) calcitic limestone exposed in the area nearly half of the whole ridge. It is also recognized that two third of the area is cropped out with calcitic limestone in (Area-A). On the contrary the calcitic limestone is overlain by Ma-U-Bin Formation in the eastern part of (Area-A) unconformably.

Lithology

The calcitic limestones, strongly reactive to dilute Hcl in the field and above 50% CaO contant in laboratory, are dark grey, smokey grey, greenish to bluish grey colored. They are mostly micritic and massive. So bedding is very rare to see but same places faint stratification or striation which is imply as original bedding and measured the attitude by brunton compass. Although the calcitic limestone is spacious in (Area-D), on the contrary the segregation of chert nodules and chert bands are present in this limestone. There is also two cyclothem or facies of chert bands and nodules are also observed in Saing Taung (Personnel communication with AW geologists). The chert nodules and bands diminish to the north, because of lack of chert nodules are found in Northern Kyaukket Taung to Northern Thapyay Taung (Area-A to Area-C). To know the acceptable silica content or not, bulky samples or channel samples should be collected and analysed in the segregation area of chert nodules and chert bands.

Contact Relationship

The contact between Thitsipin Formation and Ma-U-Bin Formation is thrust fault contact. The thrust fault extends from Kyadwin Taung to Nyaungbin Taung, Ale Taung near Lebyin. According to Garson et.al. (1976) the deposition of limestone formation took place throughout the Permian period due to faunal evidence. But the younger sediment Ma-U-Bin formation which is resembling Upper Jurassic age is lying under the limestone. In Kubaung Chaung, exposures of limestone and turbidite beds alternate over a distance of (100) m, probably due to imbricate faulting and different style of intense folding, in Poni Chaung, suggests that the contact is almost certainly tectonic.

2.4.3 Ma-U-Bin Formation

Distribution

The Ma-U-Bin Formation exposed in the areas east of limestone ridge. The turbidites nature of Ma-U-Bin Formation is clearly visible in Kubaung Chaung, Poni Chaung, Kunge Chaung and Myittha Chaung. According to GSE Project Report (1972) the turbidite extends from east of Kyadwin Taung to Shweminbon Taung, it spaciously cropped out in the area west of Kalaw.

Lithology

The Ma-U-Bin Formation comprises interbedded sandstone, siltstone and mudstone with local limestone bands. The most common lithology is alternation of parallel bedded light grey to greenish grey sandstone, siltstone and black mudstone seldom carbonaceous. The thickness of siltstone, fine grained sandstone are varied from thinly laminated (less than centimeter) to thin bedded (about 10 to 15 centimeter). Sole mark in the form of flute, groove load cast are common in Kubaung chaung. The small scale tight folds are observed in stream cut sections of Poni Chaung.

Age and Correlation

The Upper unit of Ma-U-Bin Formation is not seen in the investigated area and there is tectonic contact between the turbidites and limestone which is overlain. The ill preserved fossil, tentatively identify by N.J. Morris (1978) as possible conchostracan fragments which is suggested that Upper Permian or Lower Mesozoic age. Tiny brachiopod shells previously identified as Estheria Sp. Which is a long ranging form were collected from a few localities and regarded the formation as probable Jurassic age.

2.4.4 Kalaw Formation

Distribution

The Kalaw Formation is found in the area west of kyaukket Taung, Thapyay Taung, Nwalabo Taung and Saing Taung ranges. The outcrops of the formation are well exposed in Kunge Chaung, Thitse Chaung, Magyida Chaung, Kubaung Chaung, Kyauktala Chaung and Yeshin Chaung.

Lithology

The Kalaw Formation formerly stated as Kalaw Red beds was originally proposed by Middlemiss (1900) to the rocks in the vicinity of Kalaw. During geological investigation in the area the field parties of D.G.S.E. renamed the Kalaw Red beds as Kalaw Formation. In the present studied area, the Formation composed of red to purple color sandstone, siltstone, grit and conglomerate. Red to reddish brown colored sandstone siltstone are generally poor sorting, rounding and pebble to cobble size clasts of vein quartz, limestone, dolomite, mudstone, sandstone, acid igneous rocks and metamorphic rock are present in Kalaw conglomerate with the sand to grit matrix.

Age and Correlation

After the Jurassic Period Eastern Highlands emerged as land with sporadically deposition of lacustrine because of the lands was never beneath the sea again (Myint Lwin Thein, 1973). Middlemiss and sahni considered that red beds are similar in lithology to purple sandstone and shale of Namyan Series of Northern Shan State. The Namyan Red beds overlie limestones which contain Bathonian (Middle Jurassic) brachiopods. The definite angular unconformity between Kalaw Conglomerate and Ma-U-Bin Formation were observed in several localities (Win Swe, 1976, UNDP/DGSE Team, 1979). In the area west of limestone ridge, Kalaw conglomerate boundary imply that the Formation is unconformably resting over Permian limestone and conclusion can be made the Kalaw Formation is assumed to probable of Cretaceous age.

2.4.5 Segregation of Chert Nodules and Chert Bands

In the Kyadwin Taung, Kyaukket Taung, Nwalabo Taung, Saing Taung Ranges, according to facies changes laterally towards south, silica accumulation and redeposition took place as chert nodules and bands in southern Thapyay Taung, Nwalabo Taung and Saing Taung. Two type of chert deposition is found as nodules and bands. They are separately mapped as group of nodules, and bands. In field observation in Area-D, the maximum chert band thickness is found up to (150) mm but majority thickness is (2-5) cm. The maximum length is also observed up to (12) meter and common length is about (150) cm. By observation the chert nodules, it is found that maximum diameter is (15) cm and minimum (1) cm. These nodules dispersed in (5% to 50%) in one meter circle of calcitic limestone matrix. The maximum accumulation of chert outcrop is seen as (60) meter diameter and minimum is (15) meter diameter.

2.5 Landuse

According to Soil Type and Characteristics of Myanmar, The soil in the project area is prominent mostly Red Brown Forest Soils (Rhodic Ferralsol). These soils include three units such as dark red brown forest, podzolied red brown forest and lateritic red brown forest. These are the typical soils of tropical evergreen forest of Myanmar. They occur on the well-drained hill slopes at the elevation from 1000 to 4000 feet above sea level. These soils also occur in the northern hills region. They can be found at the low uplands. Previously, this type of soil is used for forestry. The soils are well structured and have a good drainage from 5.5 to 6.5. Usually these soils have medium to heavy texture. The soils contain moderate amount of plant available nutrient. These soils can be regarded as forest land of good productivity. However, the soils on the lower elevation are suitable for garden plantation. At present, the analytical results of these soils are shown in following tables.

These are moderately productive for crops due to unfavourable soil condition. For agriculture purpose the good agriculture practice should be provided.

The soil samples were taken from project area and sent for analysis at the soil and water laboratory of Irrigation Department Yangon. The some selected analytical parameters are shown in the following table.

Table 2.2 Soil Analytical Data of Study Area

Profile No. : SS.No.1
Location : South of Ku Byin village
Soil : Red Brown Forest Soil

Depth in Inches	Horizon	pH H_2O	Moisture (%)	Texture (%)				ESP (%)	EMgP (%)	ESP & EMgP (%)	SAR
				Sand	Silt	Clay	Class				
0 - 12		7.2	5.07	40	24	36	CL	3.17	91.60	94.77	0.61
12 - 24		7.2	1.16	50	4	46	SC	4.83	89.37	94.20	0.99
24 - 36		7.0	1.37	40	24	36	CL	5.0	91.47	96.47	9.88
36 - 48		7.3	0.60	50	4	46	SC	6.12	90.55	96.67	0.97

Table 2.3 Soil Analytical Data of Study Area

Depth in Inches	Meq 100 g of soil							EC (1:5) micro umhos/cm
	Ca^{++}	Mg^{++}	Na^{++}	K^{++}	Al^{++}	H^{++}	CEC	
0 -12	0.28	15.60	0.54	0.49	0.12	ND	17.03	222.0
12 - 24	0.57	17.40	0.94	0.56	ND	ND	19.47	118.0
24 - 36	ND	12.98	0.71	0.50	ND	ND	14.19	112.8
36 - 48	ND	10.35	0.70	0.38	ND	ND	11.43	105.6

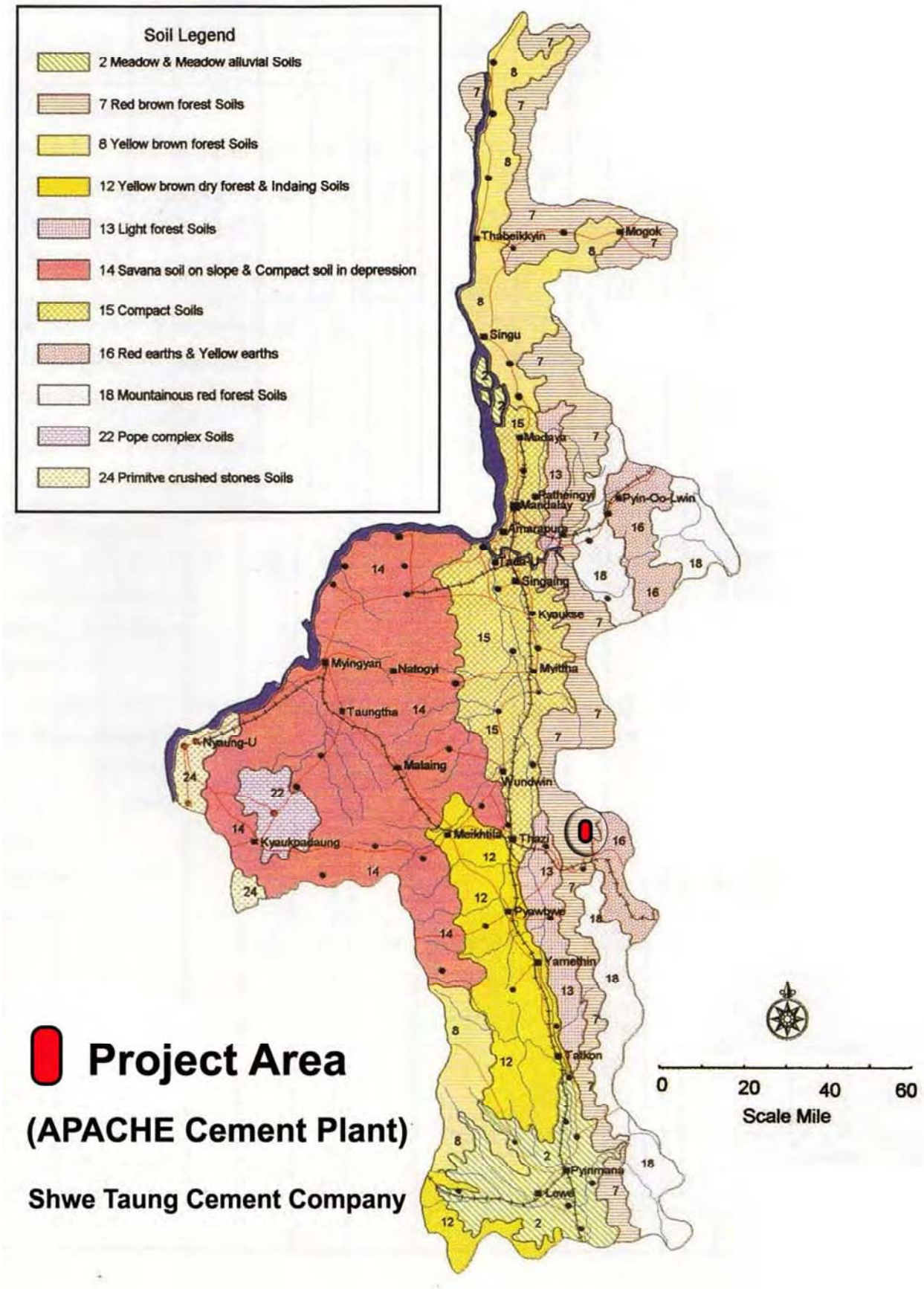

Figure 2.39 Soil Characteristic of Mandalay Region

Source: Soil Types and Characteristics of Myanmar, 2004, MOAI

2.6 Flora and Fauna

2.6.1 Terrestrial Ecological Characteristics

The study area is at the foot step of Shan plateau. This area is situated in Thazi Township, Meikhtila District, Mandalay Region. Deciduous forests are near project area. Moonsoon rain is approximately 2000 mm or more, maximum temperature is 39°C while minimum is 5°C. Therefore, the weather condition of the area is hot and humid that favours biodiversity. In this area, it may be assumed that areas of rich diverse species existed in previous times (over 20 years before the project).

2.6.2 Flora

Total number of tree species in this area is 28 species belonging to 26 genera. There is the vegetation clearing of almost all area. So the natural forest and natural landscape will totally change. The endangered tree species such as Dipterocarpus tuberculatus, Dalbergia cultrata will loss in this area in future. ***(See at Appendix – C)***

The biodiversity of limestone has important direct and indirect economic benefit as well as cultural and aesthetic values. The swiftest and bats dwelling in limestone cave contributes organic fertilizer to farmlands. The limestone reservoirs also provide hundreds people with clean drinking water.

Figure 2.40: Deciduous Forest

Figure 2.41: Indine Forest

Figure 2.42: Teak Plantation

Figure 2.43: Bamboo Forest

2.6.3 Fauna

There are total of 82 fauna species recorded from the APACHE Cement Plant project area. A total of 16 species of fish under nine families, three orders of the class Osteichthyes were observed in this project area.

A total of 13 herpet species under 8 families of 3 orders of amphibian and rereptiles were observed in this area. 15 bird species under 10 families, 5 orders were observed. Total of 9 mammal species were survey by interview abd animal body parts. One endangered species, Bos gnar was found, this isassuned disappeared in long time before the project.

In the survey site, 16 insects' speciesnand 2 Arachnida (Spider and Scorpion) species were collected. ***(See at Appendix - D)***

Figure 2.44 Collected Fish Species from Pyi Nyaung Apache Cement Factory Project Area

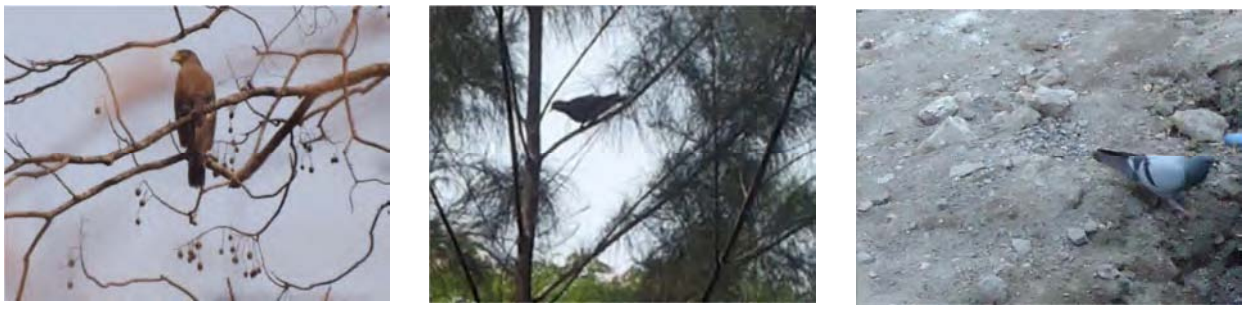

Figure 2.45 Collected Bird Species from Pyi Nyaung Cement Factory Project Area

Figure 2.46 Collected Insect species from Pyi Nyaung Cement Factory Project Area

The project area is assumed to be high diversity area in the past. Plants are important source for food and shelters directly and indirectly for all animals. Plantation is the best way for survival of animals.

2.7 Social Study

2.7.1 Objectives

The social assessment (SIA) has been undertaken to characterize the project affected persons (PAPs) that may be affected by the Project. The SIA outlines the nature and magnitude of direct and indirect impacts on the local communities and recommends appropriate mitigation measures and monitoring. The objective of SIA is to provide a framework to integrate the consultation process and participation, gender and social analysis into the operational planning framework of the project. The overall goal is to minimize identified social risks and vulnerabilities, and provide mitigation measures to address adverse impacts and enhance project benefits and opportunities.

2.7.2 Methodology

The socio-assessment preparation involved several activities which started with a reconnaissance survey undertaken by the study team on March 23, 2014 to identify the zone of influence of the project on neighboring settlements.

Key consultations and meetings have been held within the two respective target villages and key informants between the periods of March 23-26, 2014.

2.7.3 Focus Group Discussions

Similarly, a semi structured survey topical questionnaire was administered through focus group discussions (FGDs) among the two ethnic villages. This activity allowed wider public comments and a chance to identify issues affecting communities, affording both a more grounded understanding of local aspirations and needs, as well as securing community recommendations in developing positive social impacts and assisting with mitigating measures for any occurrence of potential adverse impacts. Consultations and meetings have been held within the respective target villages.

2.7.4 Socioeconomic Survey of Households

The socioeconomic survey was undertaken in order to gain an understanding of the living conditions of the IP households. The survey instrument data incorporated respondents from the two villages of Ku Byin and Pyi Nyaung. Data provided by administrative leadership and household in-depth interviews are expected to provide information highlighting the

socioeconomic condition, gender aspects, ethnicity, perceptions, issues and recommendations of households on the project. It is anticipated that this information will serve as project baseline for poverty and living standards, as well as a range of other social and economic data for subsequent project monitoring.

A clustered random sampling technique allowed for 5 percent of the settlement in the target villages. The survey was coordinated by the social team using local enumerators in gathering the data. Key local village partners have been engaged to help carry outthe household survey, along with a team of trained interviewers. This process is viewed as useful to building initial 'ownership' and an early awareness of the project and its objectives.

Table 2.4 Sample Size of Surveyed IP Respondent Households

Village	Total No. of HHS	Sample Size No.
Pyi Nyaung	600	27
Kubyin	54	4
Total	654	31

Source: Field Study, 2014

Figure 2.47: Interview with Residents of Pyi Nyaung Village

Figure 2.48: Interview with Residents of Ku Byin Village

The nearest villages are about 3.0 kilometers away from the project site, comprising of ethnic minorities. There is no anticipated displacement of households, loss of land or productive assets that will be affected by the project. The villages will not be directly affected with land acquisition or involuntary resettlement; the neighboring villages are comprised of indigenous people (IPs) which are considered as vulnerable households.

2.7.5 Social Context

A brief overview of the socioeconomic condition of Thazi Township is presented below taken from review of secondary data and Key Informants interview.

Table 2.5 Thazi Population

Urban		Rural		Total	
Male	**Female**	**Male**	**Female**	**Male**	**Female**
8242	10163	79475	87698	87717	97861
18405 = 9.9%		167173 = 90.1 %		185577 = 100 %	

Source: Township Administrative office, Thazi (2013)

Thazi comprises of 185,577 inhabitants, of which 9.9% are urban and 90.1% are rural residents. Main economic resource is agriculture representing 29% of the town's GDP.

Table 2.6 Economic Resources – Thazi, 2013

Economic Sources	Percent (%)
1. Agriculture	53 %
2. Services	40%
3. Industries	3.5 %
4. Construction	1.5%
5. Livestock / fishery	2 %

Source: Township Administrative office, Thazi

There are two villages surrounding the proposed project site. The two immediate villages include Pyi Nyaung and Ku Byin. Both villages lie about 3.0 kilometers from the project site. Both Pyi Nyaung and Ku Byin are administered by only one Administrator. The majority of people living in Pyi Nyaung are Bamar (100%) and in Ku Byin (27%). The remaining are other ethnic groups.

While there are varied ethnic groups, the IP villages are cohesive. Social integration and participation is observed in community affairs, children going to the same school, intermarriages and women are involved within the community social network.

Overall, the villages will not be directly affected by land acquisition and there will be no involuntary resettlement, loss of productive assets, loss of communal properties, or cultural heritage.

Table 2.7 Social Study Areas

Village Name	No. of HHS	No. of Persons	Distance from Project Site	Ethnicity		
				Kayin	Bamar	Dahnu
Pyi Nyaung	600	2427	4.5 km	-	100 %	-
Ku-byin	54	264	3 km	14 %	27 %	59 %

2.7.6 Survey Results

A total of 31 households were interviewed representing households.

Household size is 156 having an average of about 5 members per household. Of the total members, 54% (84) are male and 46% (72) are female. Majority of the respondents are Bamar (92%) which are predominant in all the villages.

2.7.6.1 Living Standards

The qualitative assessment on living condition showed that the majority of the IP respondents (60%) felt they belong to "poor" households while 20% rated themselves as "near poor" and 20% as average ".

2.7.6.2 Household Income and Expenses

Sources of income are varied and contributed by household members. There are households with one or more sources of income. However, the majority (16%) are wage earners, followed by, trading / buy and sell (7%), and others (not specified) 77%) as the respondents interview.

2.7.6.3 Living Conditions

The majority of the households (90%) have lived in the village for more than 10 year within the township of Thazi. Various reasons for staying longer include proximity to kinship, access to education, job and their affinity attached to the place as their ethnic village. The majority of the households (60%) have dwelling units which are single detached with temporary materials which are basically made of light materials. However, a significant 30% have semi permanent homes.

Ownership of housing units and land reveal stability of households. All IP households own their dwelling units. In terms of sanitation a high percentage (80%) has their own separate toilets. Sanitary facilities are mostly pit toilets.

2.8 Electricity for APACHE Cement Factory

Electrical Materials will be required as follow:

Table 2.8 Electrical Power for APACHE Cement Factory

Shwe Taung Cement Co., Ltd. Electrical Power	
Electrical Power Sub-station	33 Kv / 6.3 KV 15 MVA, DYN 11
Construction Work	500 KVA
Site Staff Housing	500 KVA
Base Camp	100 KVA

Ye Paung Sone Power Substation (132/33kV)

- Subsidized by Shwe Taung, Asia World, Htoo and YCDC Companies

Location

- Near Yepaungsone Village, far 7 miles to Shwe Taung Cement Project area, Thazi Township, Mandalay Region.

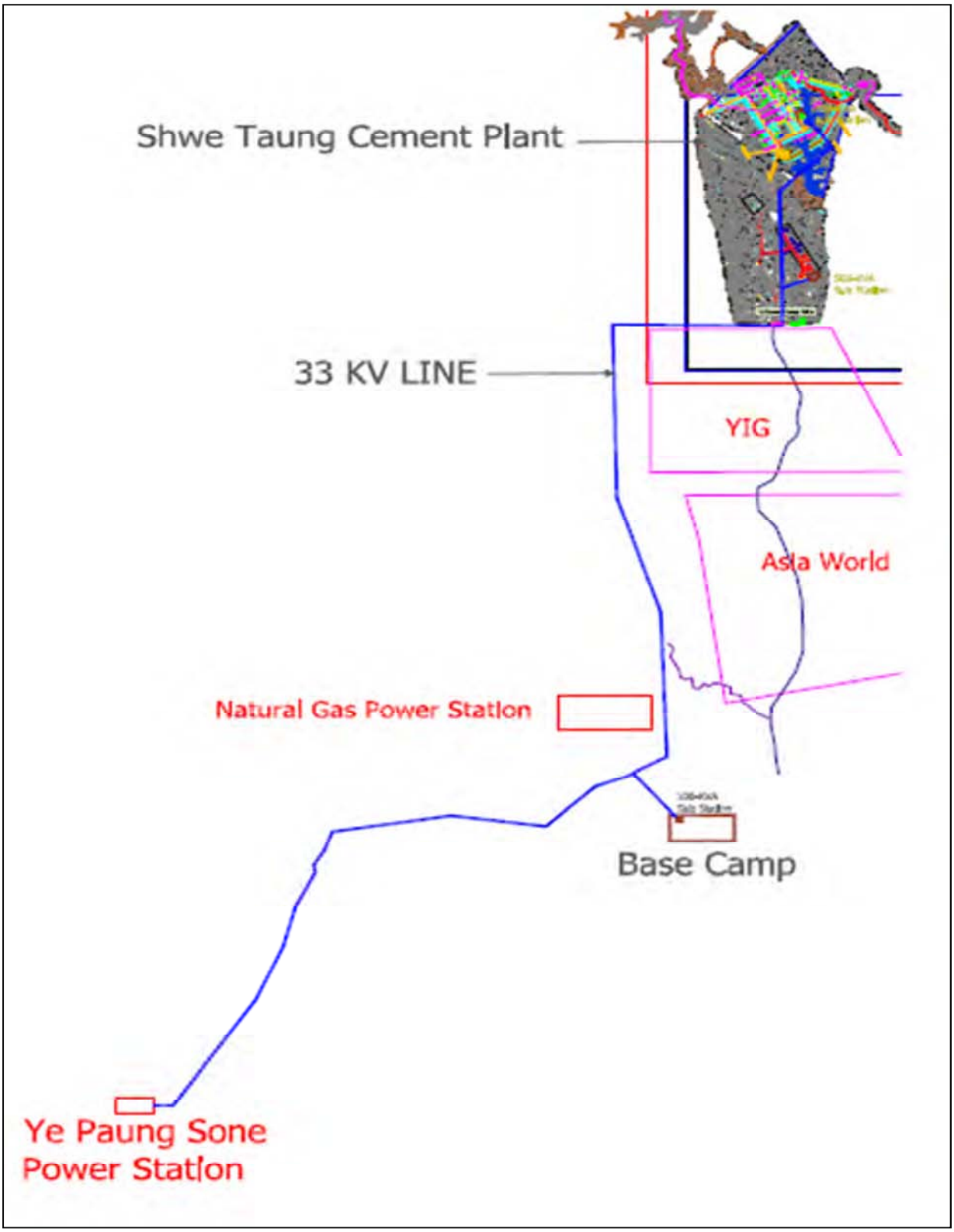

Figure 2.49 Electrical Power Supply Line Connections from Ye Paung Sone Power Station for all APACHE Cement Plant Compound

2.9 Building Requirement

There are two locations of operation by SHWE TAUNG Cement Co., Ltd in Pyin Nyaung village, Thazi Township, Mandalay Division. One location is the APACHE Cement Plant and another one is Base Camp compound area. Within the proposed area, the following structure buildings are built. (Photos as shown at Appendix-I and J)

Table 2.9 Buildings Requirement

Sr. No.	Kind of Building	No. of Building
1	Limestone crusher building	1
2	Limestone storage building	1
3	Limestone pre-homogenizing shed	1
4	Pre-heater building	1
5	Raw material silos building	1
6	Coal storage building	1
7	Homogenizing silo building	1
8	Other raw storage building	1
9	Cement mill building	1
10	Cement silo building	1
11	Cement packer building	1
12	Clinker silo building	1
13	Cement additive storage	1
14	Auxiliary material crushing store building	1
15	Raw material blending building	1
16	Instrument of lab and master control room	1
17	Main Office (Two – Storey building)	1
18	Site Office (One – Storey building)	1
19	Work Shop (One – Storey building)	1
20	Housings for Division Heads	6
21	Housings for Department Heads	2
22	Three Story building for bachelors and maidens	3
23	E-Type building(One – Storey building)	1
24	F- Type building(One – Storey building)	1
25	Clinic building	1

26	Staff housings	8
27	Housings for the married couples	40
28	Housings for labors	25
29	Messing	2
30	Bungalows for Chinese construction technicians	24
31	Staff housing- Chinese Expatriates	5
32	Library and Internet room	1
33	Guest-house at Basecamp	1
34	Messing at Basecamp	1
35	Base Camp Office	1
36	Briefing Hall at Basecamp	1
37	Executive Rest-house at Basecamp	1

2.10 Climatic Condition

The Climate at site can be described as a tropical monsoon climate. It is characterized by strong monsoon influences, has a considerable amount of sun, a high rate of rainfall, and high humidity.

The tables following illustrate the main climatic characteristics of the site.

Table 2.10 Monthly Rainfalls at "Thazi" Climatic Station (Unit – Inches)

No	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1	1951	2.00	0.00	0.00	0.91	2.64	2.61	3.87	3.13	6.75	5.21	0.14	0.80	28.06
2	1952	0.00	0.00	0.45	0.77	2.41	1.15	2.43	5.33	7.25	5.16	2.37	0.00	27.32
3	1953	0.00	0.00	0.00	2.44	5.17	2.42	2.54	1.83	2.09	3.55	1.67	0.96	22.67
4	1954	0.00	0.00	1.73	1.01	8.53	8.53	3.30	1.07	9.76	5.95	0.00	0.00	39.88
5	1955	0.00	0.00	0.42	0.42	7.83	4.34	0.71	5.72	7.54	2.89	2.34	0.00	32.21
6	1956	0.00	0.00	0.00	0.00	6.10	2.32	2.07	4.38	16.55	5.49	0.00	0.00	36.91
7	1957	0.00	0.00	0.30	0.30	6.39	5.46	4.88	0.78	4.88	2.06	0.00	0.00	25.05
8	1958	0.00	0.00	1.49	0.00	7.66	0.75	1.51	4.26	7.37	6.12	1.30	0.00	30.46
9	1959	1.21	0.00	0.00	1.85	2.31	6.81	5.79	9.38	6.62	4.50	0.00	0.00	38.47
10	1960	0.00	0.00	0.00	0.00	8.15	4.36	3.07	4.64	7.95	2.50	0.00	2.03	32.7
11	1961	0.00	0.00	0.03	5.31	6.66	3.52	1.93	3.69	9.68	2.64	0.91	0.00	34.37
12	1962	0.00	0.00	0.00	0.00	5.69	3.54	1.14	1.59	5.48	3.92	0.00	0.00	21.36
13	1963	0.00	0.00	1.43	1.83	8.83	4.49	2.70	4.07	4.41	14.06	0.00	0.00	41.82
14	1964	0.00	0.00	0.00	0.00	8.23	1.48	5.66	2.59	9.01	3.08	1.46	0.00	31.51
15	1965	0.00	0.33	0.00	0.00	5.10	6.91	1.60	5.11	5.20	9.15	7.90	1.68	42.98
16	1966	0.00	0.00	0.00	1.00	3.59	9.78	2.44	3.79	6.54	2.72	0.00	1.35	31.21
17	1967	0.22	0.00	0.00	0.40	4.20	5.87	4.63	2.65	4.03	2.62	1.82	0.08	26.52
18	1968	0.18	0.00	0.00	2.55	3.07	5.62	1.30	1.49	2.19	13.17	0.20	0.00	29.77
19	1969	0.00	0.00	0.00	0.00	6.23	2.16	2.20	5.05	4.67	8.37	0.00	0.00	28.68

No	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
20	1970	0.00	0.00	0.00	1.10	4.03	3.14	3.13	1.41	6.04	5.71	1.35	1.58	27.49
21	1971	0.00	0.00	0.00	0.94	5.25	2.24	5.48	5.25	5.57	5.05	0.00	0.14	29.92
22	1972	0.00	0.00	0.00	1.31	4.20	3.29	4.97	2.64	2.41	3.00	3.46	0.00	25.28
23	1973	0.00	0.00	0.18	0.10	12.26	5.63	1.76	13.35	5.21	12.21	1.22	0.00	51.92
24	1974	0.00	0.00	1.66	2.52	6.58	3.12	1.25	3.03	6.89	4.93	3.37	0.00	33.35
25	1975	3.69	0.00	0.00	0.00	3.32	6.89	1.96	7.96	6.94	9.26	1.83	0.00	41.85
26	1976	0.00	0.46	0.00	0.65	6.93	6.05	2.64	3.91	2.00	9.92	2.82	0.00	35.38
27	1977	0.00	0.00	0.00	3.13	2.46	2.31	4.36	2.45	10.55	3.57	0.00	0.28	29.11
28	1978	0.00	0.00	0.26	0.00	5.95	8.35	7.27	5.19	6.63	6.17	0.10	0.00	39.92
29	1979	0.00	0.00	0.00	1.96	0.94	2.68	3.62	7.28	2.66	1.64	0.00	0.24	21.02
30	1980	0.00	0.00	0.00	0.12	2.57	7.24	1.55	1.21	4.82	6.19	0.13	0.00	23.83
31	1981	0.00	0.13	0.00	0.33	2.73	1.39	7.86	1.93	5.03	5.78	3.46	0.00	28.64
32	1982	0.00	0.00	0.00	0.00	3.86	2.82	1.32	1.30	4.41	3.27	0.00	0.00	16.98
33	1983	0.00	0.29	0.48	0.55	0.54	4.93	5.68	1.48	4.20	8.19	7.48	1.68	35.50
34	1984	0.00	0.07	0.00	1.80	2.31	5.79	0.50	5.12	3.05	3.02	0.00	0.00	21.66
35	1994	0.00	0.00	0.09	1.41	2.61	2.81	1.85	3.29	1.73	2.50	0.99	0.00	17.28
36	1995	0.00	0.00	0.00	0.70	3.67	1.22	4.97	4.28	7.61	5.31	9.63	0.00	37.39
37	1996	0.00	0.90	1.96	5.97	5.12	6.75	1.91	7.09	10.44	6.16	2.69	0.00	48.99
38	1997	0.00	0.00	0.56	1.08	2.98	4.07	12.24	5.33	3.57	0.34	0.43	0.00	30.6
39	1998	0.00	0.00	0.00	0.20	3.99	0.48	4.17	1.27	4.28	3.75	0.17	0.00	18.31
40	1999	0.00	0.00	0.00	0.22	6.09	2.10	1.01	4.36	9.42	7.59	3.45	0.00	34.24
41	2000	0.00	0.00	1.02	0.38	10.39	1.68	3.05	4.05	7.19	4.65	0.00	0.00	32.41
42	2001	0.00	0.00	0.10	0.00	11.37	2.36	2.14	5.92	2.38	4.48	0.18	0.00	28.93
43	2002	0.00	0.00	0.00	0.09	5.28	4.10	3.64	6.45	4.34	3.16	5.44	0.00	32.5
44	2003	0.30	1.03	0.00	0.55	3.61	4.14	1.02	2.63	4.05	6.96	0.00	0.00	24.29
45	2004	0.00	0.00	0.00	0.05	5.65	4.85	1.91	1.45	6.15	4.70	0.18	0.00	24.94
46	2005	0.00	0.00	0.00	0.74	3.35	2.28	3.17	3.90	11.08	3.68	1.32	3.28	32.8
47	2006	0.00	0.00	1.50	3.09	6.75	1.92	2.40	4.67	8.96	4.30	0.68	0.00	34.27
48	2007	0.00	0.00	0.00	0.30	8.24	2.43	3.83	1.92	4.60	5.89	6.5	0.00	33.71
49	2008	0.00	0.00	0.00	2.38	7.65	3.41	2.81	0.40	6.98	6.8	0.00	0.48	30.91
	Mean	0.16	0.07	0.28	1.03	5.30	3.93	3.21	3.90	6.06	5.33	1.57	0.30	31.14

***Source*: Meteorological and Hydrological Department**

2.11 Water Supply System

Most inhabitants of Thazi Township get their water supply from Min Hla Reservoir. Generally, the residents at Pyin Nyaung village and Ku Byin village get its water supply from the rivers and creeks near the villages. As the production of APACHE cement plant is the dry process, the water requirement for the cement plant is relatively low. For the whole cement plant and all the project area, the upper dam with the storage capacity of 6 million gallons, and the lower dam, the storage capacity of 45 million gallons, were built near the APACHE cement plant and connected with the eight inches pipe lines to Ku Byin Weir, Ku Byin village.

2.11.1 The Water Quality

The water samples were taken from surface water at weir site, at dam site and up stream of dam site of the project area. These samples were analysed at soil and water laboratory of Irrigation Department, Yagon. These samples analysed, similary routine one. Also some selected parameter of heavy metals, such as Arsenic (as As) Lead (as Pb) and mercury (as Hg) were analysed. At present these were not dected respectively.

At present there is no set up of approved drinking water standard in Myanmar. The World Health Organization (WHO) drinking water standards are referred as a guide line which is currently used in Myanmar. The analytical results are shown in the table (Appendix E) compared with WHO drinking water standards.

The results show that these water samples were observed chemically potable water except turbidity.The turbidity in all surface water was observed 95 NTU at weir site, 120 NTU at dam site and 130 NTU at up stream of dam site. These results are higher than maximum permissibly limits of 25 NTU. The turbidily may impart a brown or other colour to water in natural water bodies depending upon the light absorbing properties of the solids and may interfere with light penetration and photo synthesis reactions in stream and lakes. According to research on the subject of water borne diseases has stressed very strongly need to reduce the turbidity as much as possible. It is therefore important that drinking water has a very low turbidity to qualify as safe and pure water for domestic water supply.

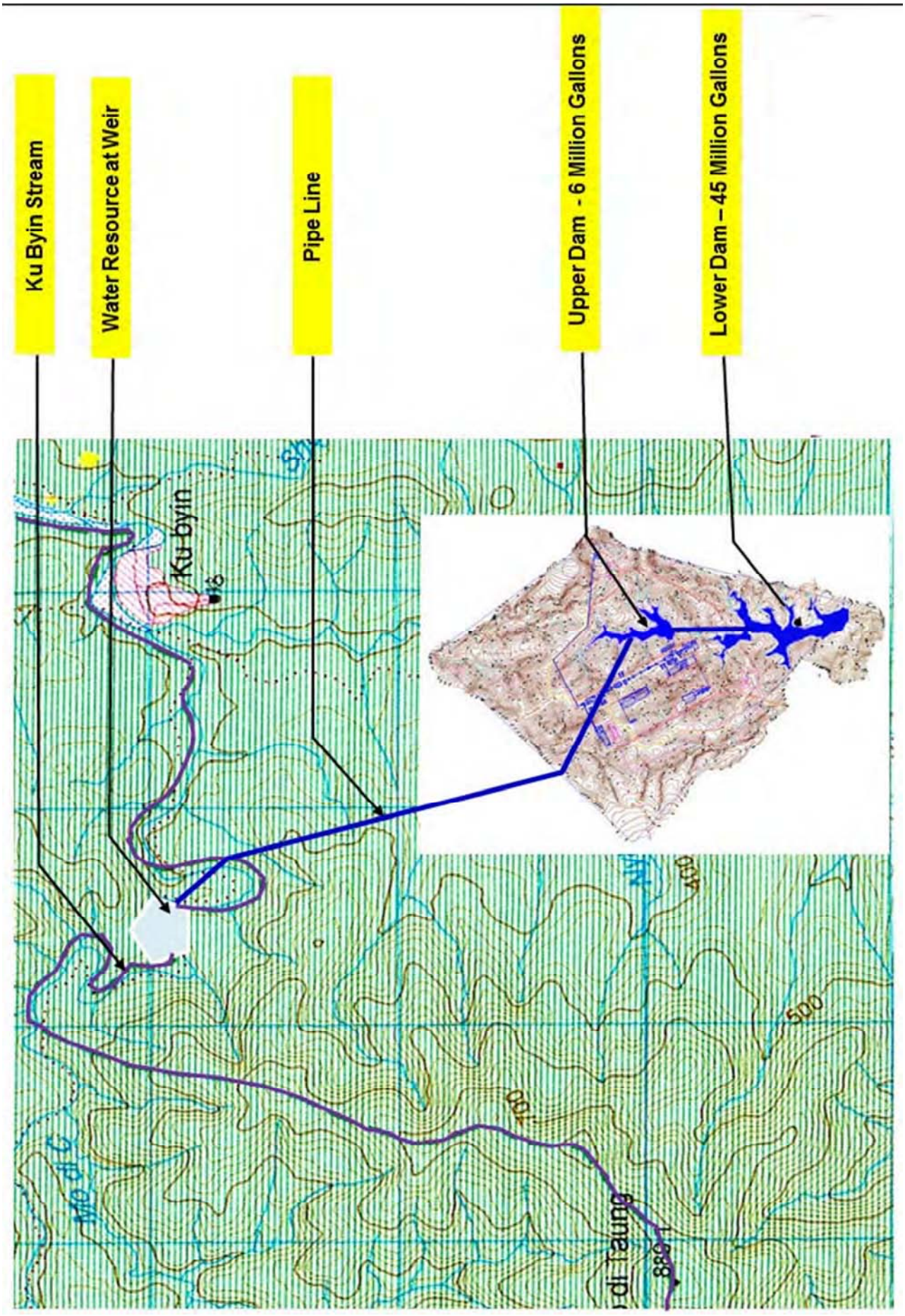

Figure 2.50 Water Supply Systems for APACHE Cement Factory

3 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Following the establishment of the baseline and the environment and social screening an initial assessment of potential impacts has been undertaken against a standardized checklist of potential issues.

Impacts have been assessed on a qualitative basis according to four parameters, i.e. extent, duration, magnitude and probability. Reviewing potential impacts against these four parameters allows and assessment of significance to emerge. Impacts are indicated as being of low, medium or high significance and in addition are identified as being of a positive or a negative character (+ or -). Where no (or negligible) changes are anticipated or an issue does not apply a "NA" designation is awarded.

The assessment covers both the installation and the operational phase of the project. All impacts are assessed assuming no specific mitigation or management measures applied. Given the very limited scale of the project the assessment is essentially qualitative though the improvement in the operational phase for air pollution and noise parameters is outlined previously in this report.

Table 3.1 Impact Issue for Bio Physical and Chemical

Ref.	Impact/Issue	Significance
Bio-Physical & Chemical		
BPC/1	Changes in water quality	NA
BPC/2	Changes in rates of erosion and siltation	NA
BPC/3	Changes to surface water regime	NA
BPC/4	Changes to groundwater regime	NA
BPC/5	Changes to air quality	High (+)
BPC/6	Changes to ambient noise levels	High (+)
BPC/7	Changes to aquatic biota	NA
BPC/8	Changes in disease vector populations	NA
BPC/9	Changes to terrestrial biota	NA
BPC/10	Changes to land cover	NA
BPC/11	Changes to areas of natural habitat	NA

Table 3.2 Impact Issue for Socio-Economic and Culture

Ref.	Impact/Issue	Significance
Socio-Economic & Cultural		
SEC/1	Changes involving loss of private assets	NA
SEC/2	Changes involving loss of cultural heritage	NA
SEC/3	Changes involving displacement of people	NA
SEC/4	Changes to traffic patterns	NA
SEC/5	Changes in public health status	NA
SEC/6	Changes in wage labour incomes/livelihood Opportunities	Low (+)
SEC/7	Changes in trade/commercial incomes/opportunities	Low(+)
SEC/8	Change in visual amenity	NA
SEC/9	Changes involving loss of public Infrastructure / community resources	NA

Overall, the assessment concludes that only minor changes or impacts are expected to occur to the bio-physical and socio-economic environment as a result of project implementation.

4 ENVIRONMENTAL MANAGEMENT AND MONITORING

4.1 Overarching Measures

To ensure the Project is implemented in an environmentally and socially responsible way mitigation measures should be applied to potential negative impacts and supported by a management and monitoring framework. The main recommendations are:

1. An environmental management plan (EMP) should accompany the operation phase

2. The EMP be followed-up to be further developed as an environmental management system (EMS) for the Plant

3. Health, safety and environment (HSE) routines be implemented and enforced for both casual worker and permanent operational staff

4. Actions be taken to ensure that there is independent third party inspection and validation of the effectiveness of health, safety and environment controls

Prior to operation, the owner should prepare for an integrated environmental management system (IEMS) which draws environment mitigation measure, EMP recommendations, HSE priorities and monitoring procedures for operational phases.

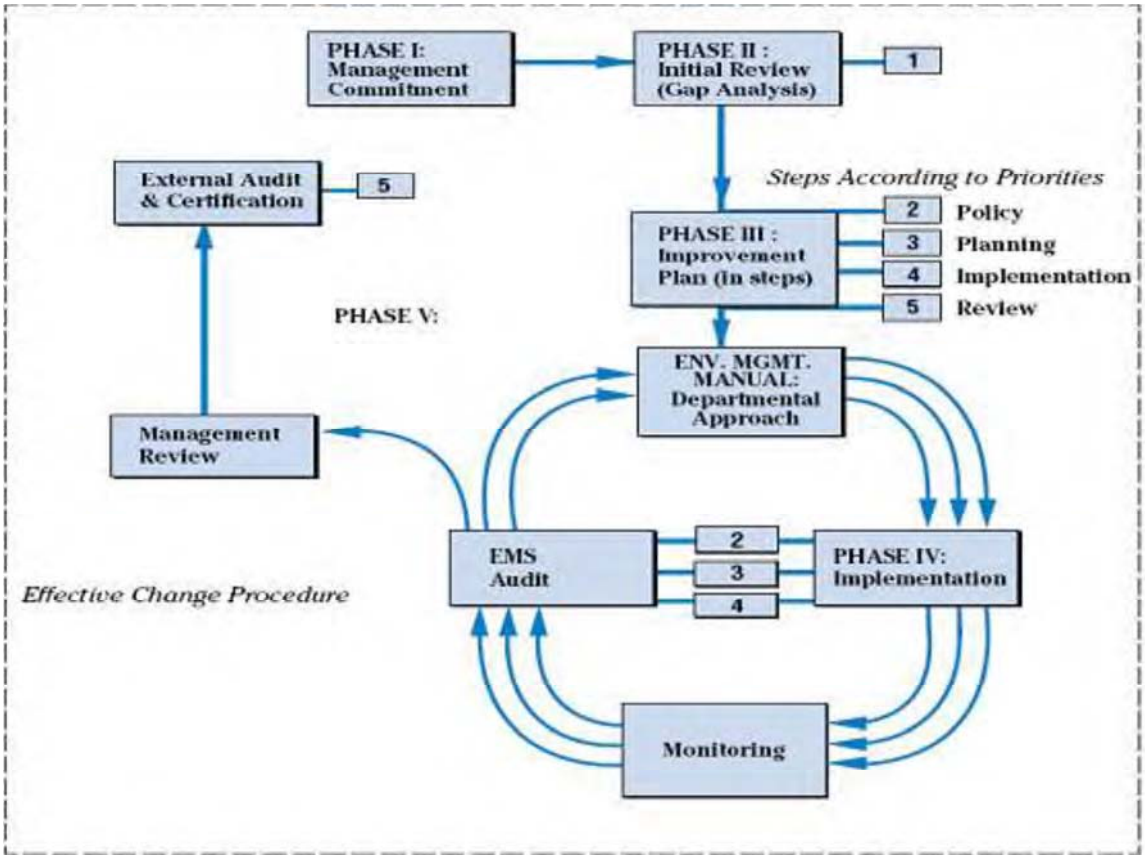

Figure 4.1 Integrated Environmental Management System

Given the limited skills and capacity available within APACHE Cement Plant for setting up and monitoring an integrated environmental management system, it is recommended that a suitable entity be identified to assist in development of the IEMS and the cost of this be built in to the overall project allocation.

Important in verifying the success of the various measures comprising IEMS is independent third party audit and verification. To ensure that appropriate systems and routines are developed, implemented and monitored (and that they achieve the necessary results relative to compliance with national and international best practice) an experienced auditor will be required. Therefore, as for the implementation of IEMS it is recommended that a suitable entity be identified to assist in development of the audit regime and the cost of this be built in to the overall project allocation.

The frequency of environmental audit should be calibrated to the project phases with enhanced oversight perhaps reverting to an annual performance audit in the operational phase. Crucially, though, the audit must have an active feedback mechanism attached that allows the results and recommendations to be fed back in to the owner in such a way that senior management is involved and that actions are taken to rectify problems or improve procedures as appropriate.

4.2 Proposed Roles and Responsibilities for Environmental Management Operation

4.2.1 Environmental Control Officer (ECO)

A suitably qualified environmental control officer (ECO) should be nominated from MEPE and trained before installation begins.

The ECO should ensure

- implementation of the EMP
- regular monitoring and site inspections
- Enforcement of contractor to abide by the EMP

The ECO should undertake regular site inspections and the results should be recorded and as part of EMP reporting.

4.2.2 Environmental Site Officer (ESO)

An ESO should be appointed / nominated by the Contractor from his site personnel to:

- ❖ Attend all site meetings.
- ❖ Undertake the activities required in the terms of the EMP.
- ❖ Brief workers regularly.
- ❖ Undertake regular monitoring.
- ❖ Submit reports to the ECO on the implementation of the EMP compliance with the conditions of approval and implementation of the mitigation measures in the EMP.
- ❖ Report to the ECO any departures from the EMP promptly with explanations for such.

4.3 EMP Framework

Mitigation measures that compromise the framework for an EMP are outlined below.

Table 4.1 Outline of Possible Mitigation Issues for EMP

Operation Mitigation Measures		Bio Physical			Socio-Economic					Responsibility
		Air Quality		Water Quality						
		Noise and vibration generation	Dust and polluting air emission	Impacts on water quality	Temporary flooding	Impacts on underground utilities	Impact on access and traffic	Security of power supply	Public and Worker Health and Safety	
1	Periodically clear drainage	+		+	+				+	Owner
	Conduct public awareness raising on environment								+	Owner
	Ensure the available budget and annual maintenance for the system	+	+	+				+	+	Owner
	Develop Health, Safety & Environment system	+	+	+	+	+	+	+	+	
2	Secure site of existing cement plant and quarry sites	+	+						+	Owner
	Collect and treat any contaminated water			+					+	Owner
	Check no noise interference to local communities								+	Owner
	Operate waste management to best practice			+					+	Owner
	Ensure emergency plan in place	+	+	+	+	+	+	+	+	Owner
	Audit efficiency of EMP	+	+	+	+	+	+	+	+	Owner Independent Auditor

4.4 Project Performance Monitoring

4.4.1 Operation Phase

Table 4.2 Implementation of Monitoring Activities for the Project to Evaluate Contractor's Conformity in the EMP

Environmental Issue	Performance indicator(PI)	Frequency to monitor	Timetable to check PI	Locations to implement PI	Responsible to implement PI	Responsible for PI supervision	Cost Assignment
1. Air Quality	1. Reduced GHG emissions 2. Reduced burning of waste	1. Annually 2. 6 monthly	During operation	1. Flu 2. compound	Owner	Auditor	Owner
2. Water Quality	Surface and groundwater quality within national and World Bank guidelines	6 monthly	Throughout project operation	Affected areas/storm water discharge areas	Owner	Auditor	Owner
3. Waste Management	1. garbage is not burned or buried in the compound; hazmats contained and system for disposal in place; garbage collection contract in place	Annually	Throughout project operation	Affected areas	Owner	Auditor	Owner
4. Social	Grievance redress mechanism in place; no complaints from local community	Annually	Throughout project operation	Affected areas	Owner	Auditor	Owner
5. Integrated Environmental Management System	IEMS manuals, tools and routines developed, staff trained to implement IEMS; HSE measures evident at site	Once on commissioning thereafter annually	Throughout project operation	Apache cement plant compound and periphery	Owner	Auditor	Owner

4.4.2 Indicative cost for Environmental Mitigation and Management

The indicative cost estimate for basic implementation of the environmental components under the IEMS is provisionally set at USD 1,035,000.

Table 4.3 Indicative cost estimate for environmental management

Activity	Indicative Cost (USD)			
	Integrated in to installation Contract	EMP	IEMS	Training, Technical Assistance & Services
Environmental Mitigation				
A. Operation Phase				
A.1 Implementation	×	×	×	×
A.2 Implementation of operational practices as mitigation measures	×	×	**500,000**	**120,000**
Environmental Effect Monitoring				
A. Operation Phase				
A.1 Monitoring of air, noise, water (5 years)	×	×	**100,000**	**40,000**
A.2 Monitoring of community & workers health and safety (5years)	×	×	**100,000**	**40,000**
Total			**700,000**	**200,000**
Contingency at 15%			**105,000**	**30,000**
Grand Total			**805,000**	**230,000**
				1,035,000

5 CONCLUSIONS

5.1 Social Findings

The characteristics of the populations within the two focal villages are defined by their ethnicity, and they would rely on non-agricultural activities, and have a lack of basic service community infrastructure, e.g. drainage, water treatment, and electricity. Key statistical findings from socio economic survey show the current condition of the IP villages.

- 55% viewed themselves as poor, 30% as near poor;
- Poor infrastructure such as inadequate drainage, water supply, roads.
- Low access to regular employment
- Low educational status

The social assessment affirms that there will be no displacement, no loss of land or any assets, or impact on cultural heritage. While there are varied ethnic groups, the IP villages are cohesive and social integration and participation is observed in community affairs, children going to the same school, intermarriages, and openness within the community social network.

It is found that the APACHE Cement Plant is undertaking the Corporate Social Responsibility (CSR) activities in the project area and adjoining villages in according with the creation of Global Compact under the Millennium Development Goals (MDGs). They are fulfilling the programs of health, education, community development and conservation of environment as much as they can. (See Appendix S)

The negative impact of the project is limited to noise and pollution in the operation phase but it will be insignificant through effective mitigation.

The social assessment showed high acceptability as affirmed by socioeconomic survey. There is a clear demand for water supply as over 90% of households. There is also willingness to pay more for their service.

In the operational phase, the project should deliver benefits to reduce dust and noise levels, and also selected GHG emissions. It is to introduce an IEMS that will require investment by the owner in training, tools and professional support.

In addition, it is to ensure that environmental performance in the operational phase must be acceptable to national and international standards and experienced independent environmental auditor will be needed for practicable keeping up the healthy environment.

This report will strengthen the role of locals in decision making process before the plant operation in priority of neighboring villages.

5.2 Environmental Findings

Table 5.1 Environmental Issues

Issue	Comment
Health and Safety	There are over 450 staffs employed at the site. Health and safety manuals exist. But awareness is needed to do more. There is regular safety training conducted, but health and safety audits should be added occasionally. The plant is to well prepare to care local safely concern from explosives. Staffs are issued with proper protective equipment (PPE). There are first aid trained staff in the plant itself; A clinic with facilities and staffed by a doctor, nurses and is contained on the compound. The nearest hospital is 6 km away; but transport facility is enough.
Noise	The current machines should operate at under the recommended noise levels (70 dbA) in and around the plant.
Water supply	The site is on mains water supply. Process water is delivered to the plant and staff quarters. But supplied water is limited in summer.
Sanitation	The site is not on mains sewerage. All waste water and sewerage is discharged to ground for healthy environment, careful inspection should be done.
Solid waste	There is a plan for handing of solid waste. Proper collection system is advised.
Flooding	Flooding of the site is not reported as an issue. Open drains carry away excess water to the surrounding fields in the rainy season. But regular cleaning of the drain is required as a maintainance purposes.
Monitoring	Environmental monitoring currently takes place. There is to be installed equipment to measure noise and air pollution levels. There should be wells to measure possible groundwater pollution in or around the site.

APPENDIX - A

Appendix A

Category Classification of Projects as per JICA (Japan International Cooperation Agency)

Category	Explanation
Category A	Projects which are likely to have a significant adverse impact on the environment. In principle, they include the following: 1. Projects in sensitive sectors. 2. Projects that have characteristics; that are liable to cause adverse environmental impacts. 3. Projects located in or near sensitive areas.
Category B	Projects whose adverse impacts on the environment and society are less adverse than those of Category A projects.
Category C	Projects which are likely to have minimal or little adverse impact on the environment and society.
Category F1	Projects in which JICA's funding of projects is provided to a financial intermediary or executing Agency and for which the sub-projects cannot be specified prior to JICA's approval of funding (or project appraisal).

SOURCE: TRANSLATION OF JAPANESE VERSION: JICA GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS, APRIL 2010

Asian Development Bank Project Categories

Category	Explanation
Category A	Typically require and EIA
Category B	Require and IEE but not an EIA
Category C	Typically do not require and environmental assessment

SOURCE: PRESENTATION BY DR. SIRINIMIT BOONYUEN AT MES (MYANMAR ENGINEERING SOCIETY), FUNCTION HALL ON 9 NOVEMBER 2

World Bank Project Categories

Category	Explanation
Category A	Typically require an EIA
Category B	Usually require an Environmental Review but at a level of effort less than that of an EIA Study
Category C	Typically do not require an environmental assessment.

SOURCE: PRESENTATION BY DR. SIRINIMIT BOONYUEN AT MES (MYANMAR ENGINEERING SOCIETY), FUNCTION HALL ON 9 NOVEMBER 2

APPENDIX - B

1. Location, Topography, Boundary, Area and Extent

Thazi Township is a township of Meiktila District in the Mandalay Region of Myanmar.It is located in the southern part of Mandalay. Mountains or high plateaus can be found in the eastern border of the township. The township comprises 7 quarters and 80 village tracts and now is separately governed with the four station as Hlaing Tat, Nyaung Yan, Hanzar, Yinmar sub-townships. The western part of the township is flat land and shares borders with Shan State in the east at where there is the mountain ranges and hilly region. The flat land region of the western of the township is about 700 feet above the mean sea level and the eastern part of the township is about 6000 feet above the mean sea level.

Table 1.1 Location of Thazi Township

Sr. No	Township	Location				Mean Sea Level (ft)
		North Latitude		East Longitude		
		From	To	From	To	
1	Thazi					700

Thazi Township was appointed by a governor at Hlaing Tat in 1886 and then in 1887 this was nominated as Thazi Township. In 1891 the area of Thazi Township was 540 square miles and then in 1969 it widens about 787.606 square miles, 504068 acres. The urban area is about 410 acres and the rural area is about 5469 acres. Thazi is a small town where travellers change from the main Yangon to Mandalay line, for travel on the scenic branch line to Inle Lake and Kalaw. Around 20 kilometres to the east of Meiktila, **Thazi** is another Central Burma junction town, this time on the north-south railway line, the terminal of the line up east to Kalaw and Shwenyaung (for Nyaung Shwe and Inle Lake) and the west-east Meiktila-Kalaw highway. Thazi is really little more than a train station and a through road. The train station is central and the through road to Kalaw a short walk from there. Nowadays, Many Companies invested and constructed many plants and factories at Thazi Township.

Table 1.2 Boundary Township of Thazi Township

Sr. No	Township	Boundary			
		East	West	South	North
1	Thazi	Kalaw Township Pintaya Township Ywa Ngan Township	Meiktila Township	Pyawbwe Township Yamethin Township	Wun Dwin Township

Table 1.3 Area of Thazi Township

Sr. No	Township	Expanse		Mile Length	
		Square miles	Acre	East – West	South - North
1	Thazi	787.61	504068	46.4	24

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 1.4 Extent of Thazi Township

Sr. No	Township	Township's Area (Sq-M)	Village's Area (Sq-M)	Total Area (Sq-M)
1	Thazi	0.64	8.55	9.19
	Total	0.64	8.55	9.19

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Figure 1.1 Location Map of Thazi Township

2 Meteorology

Thazi Township has a warm wet temperate climate. Average temperatures of the region are between 70°F (21°C) and 75°F (24°C) in April. The average temperature in the coldest months is 60°F (15.6°C). The lowest temperature sometimes reaches the freezing point.

Table 2.1 Thazi Township Rainfall Data

Sr. No	Township	Rainy Day	Rainfall (inch)			Temperature(F)			
			One year Average	Minimum	Maximum	Summer(F)		Rainy Season(F)	
						Lowest	Highest	Lowest	Highest
1	Thazi	48	32.33	0.14	6.68	100˙	104˙	90˙	95˙

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 2.2 Meteorological Status

Sr. No	Name of Month	2007		2008		2009	
		Rainy Day	Inch	Rainy Day	Inch	Rainy Day	Inch
1	January			2	0.8		
2	February	1	0.1				
3	March						
4	April	2	0.3	1	2.38	2	0.28
5	May	14	9.53	8	7.65	7	3.42
6	June	9	2.68	6	3.41	3	2.16
7	July	6	3.28	5	2.81	1	0.14
8	August	5	2.07	4	0.41	11	6.67
9	September	10	4.6	11	6.98	5	4.86
10	October	11	5.89	13	6.8		
11	November	5	6.38				
12	December			1	0.48		
	Total	63	34.83	51	31.72	29	17.53

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

3 Population

Table 3.1 Thazi Township Male and Female Population

Sr. No	Quarter/Village Track	Under 18year			Over 18year			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Urban	2546	2507	5053	5696	7656	13352	8242	10163	18405
2	Rural	28515	28602	57117	50960	59096	110056	79475	87698	167173
3	Total	31061	31109	62170	56656	66752	123408	87717	97861	185578

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 3.2 Urban and Rural population

Sr. No	Township	Urban			Rural			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Thazi	8242	10163	18405	79475	87698	167173	87717	97861	185578
	Percentage	44.78%	55.22%	100%	47.54%	52.46%	100%	47.27%	52.73%	100%

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 3.3 Houses and household data of Thazi Township

Sr. No	Quarter/Village Track	Houses	Households
1	Urban	3919	3966
2	Rural	32724	32961
3	Total	36643	36927

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 3.4 Foreigner residents' data in Thazi Township

Sr. No	Township	Foreigner					
		China	India	Pakistan	Bangladesh	Other	Total
1	Thazi	-	59	12	21	48	140
	Percentage	0	42.14	8.57	15	34.29	100

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 3.5 Thazi Township Ethnicity Data, 15 January 2013

Sr. No	Township	Ethnic									
		Kachin	Kayar	Kayin	Chin	Burma	Mon	Rahkhine	Shan	Other	Total
1	Thazi	15	-	36	10	178303	-	6	14	7214	185578
	Percentage	0.008		0.019	0.005	96.15		0.003	0.0075	3.81	100

Foreigner (140) + Native (185438) = Total Population (185438)

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 3.6 The Religion of the Inhabitants of Thazi Township, 2013

Sr. No	Township	Buddhists			Christian			Hindu			Islam			Population
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	
1	Thazi	84633	94426	179059	31	42	73	14	21	35	3039	3372	6411	185578
	Percentage (%)			96.49			0.039			0.19			3.45	100

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

4 Economy

The Gross Domestic Product (GDP) structure of Thazi Township, Mandalay Division for 2009-2012 is 59009.6 million kyats, the income of each person for 2009-2010 is 414004 in and the income of each person for 2010-2011 is 490596 in Pyin Nyaung village tract. Within the Thazi Township, there are many plants, factories owned by Government, YIG, YCDC, Asia World, Htoo, Max Myanmar and Shwe Taung Cement Companies.

Table 4.1 Gross Domestic Product (GDP) Value and Service Value

Sr No	Township	2009-2010 Year (GDP) value	2010-2011 Year target value	2010-2011 Year implementation		
				value	Implementation %	progress
1	Thar-zi	59009.6	63173.9	32137.2	50.9	(-)6.1

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

5 Coastal / Marine Ecology

Within Thazi Township, the western part of the township is the flat plain area with many creeks and the eastern part of the township is the hill region with many creeks.

Most of the creeks and rivers are normally flowing from north to south into Samone creek and then flow from west to east at Yin Mar Bin village, the highland to the junction of the river near Pyin Nyaung village, the lowland valley and then flow from south to north into Pan Laung river. Nyaung Bin creek and Kyauk Tala creek flow into Mo Di creek near Kubyin village. Thelun creek, Kwe the creek, Kyauk O creek, Aing thone zin creek, The byu creek, Gwe dauk creek, Na din creek and Thin gan yon creek combine with Thedache creek near Ye bokson village and then flow into Thelun creek.

Po Laung creek, east of APACHE Cement Plant and Ye Shin creek, south of APACHE Cement Plant, flow from north to south into Myit Tha creek and then combine with Taung Wun Dwin creek and Pan Laund creek.

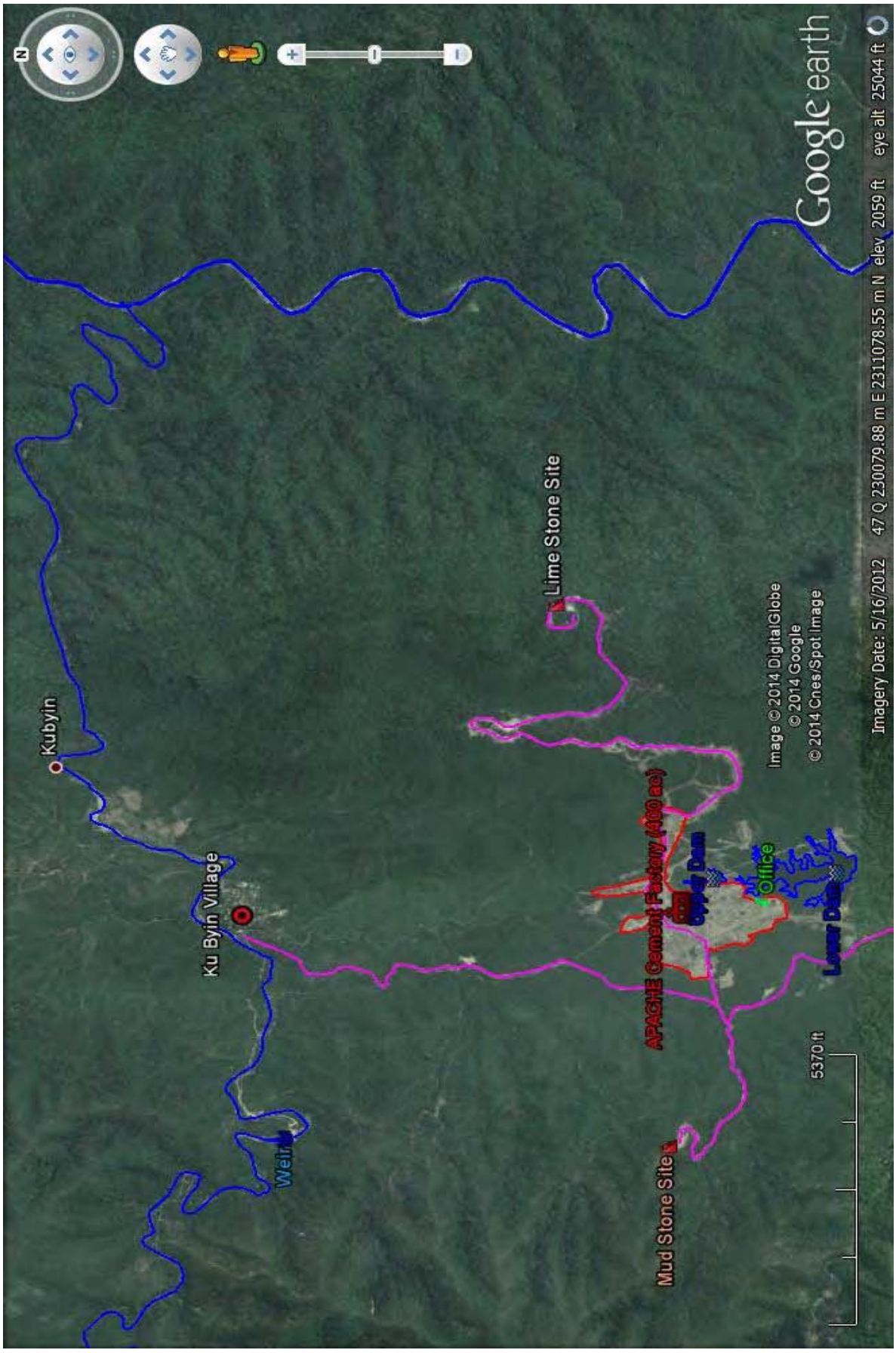

Figure 5.1 The Rivers and Creeks Map near the project area in Thazi Township

6 Flora and Fauna

The native plants at Thazi Township are briefly as follows.

Table 6.1 Flora in Thazi Township, Mandalay

Sr. No	Township	Plants
1	Thazi	On the hill region, grow of Teak, Large timber tree, Sal tree, Gum-kino tree, Ironwood tree, Resinous (Em), Than, Tectona tree and other species of the plants, and on the flat land region, grow of Acacia catechu, Acacia tree, Rain tree, Neem tree, White thorn and other thorns.

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Species at Thazi Township are briefly as follows.

Table 6.2 Fauna in Thazi Township, Mandalay

Sr. No	Township	Animals
1	Thazi	On the hill region, are living Elephant, Barking deer, Sambur, Deer, Chamois, Tortoise and other habits, and on the flat land region,are habitable Rabbit, Tortoise and other animals.

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

7 Land

Table 7.1 Land Utilization in Thazi Township (Acre)

Sr. No	Township	Arable Land	Forest	Virgin	Vacant Land	Un-arable land	Total
1	Thazi	171176	189674	320	2749	140149	504068
	Percentage	33.96%	37.63%	0.63%	0.55%	27.8%	100%

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 7.2 Net Arable Area

Sr. No	Township	Paddy Land	Upland	Alluvial Land	Garden land	Hillside cultivation	Other land
1	Thazi	89090	76789	-	1158	-	1543

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

8 Road and Communications and Transportation Status

Table 8.1 Road and Communications in Thazi Township

Sr. No	Township	Land Route				Riverine route (Voyage)		Air Route (Airway)
		Motor road		Railway		Quantity of river and creek	Mile	
		Quantity	Mile	Quantity	Mile			
1	Thazi	3	61.8	3	119.25	-	-	-
	Total	3	61.8	3	119.25	-	-	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 8.2 Transportation Status

Sr. No	Township	Bus line				Riverine route (Voyage)			
		Government		Private		Government		Private	
		No: of bus line	No: of bus	No: of bus line	No: of bus	No: of-water-craft line	No: of-water-craft	No: of water-craft line	No: of water-craft
	Thazi	-	-	2	25	-	-	-	-
	Total	-	-	2	25	-	-	-	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 8.3 Road at Downtown

Sr. No	Township	Tar / coal-tar / Bituminous Road				Macadam		Concrete		Laterite		Earthen	
		Public Service Dept.		Township Development Committee									
		No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong
1	Thazi	3	61.8	4	0.516	-	-	-	-	-	-	-	-
Total		3	61.8	4	0.516	-	-	-	-	-	-	-	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 8.4 Street at rural

Sr. No	Township	Tar / coal tar / Bituminous Road				Macadam		Concrete		Laterite		Earthen	
		Public Service Work		Township Development Committee									
		No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong	No:	Mile / Furlong
1	Thazi			4	1.8/0							1	1.16/0
Total				4	1.8/0							1	1.16/0

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 8.5 Access road connect with each other town

Sr. No	Township	From	To	Type of road	Mile post no.		Length mile/furlong
					From	To	
1	Tharzi	Meiktila	Taunggyi	Bituminous	7/0	53/4	46/4
2		Pha-ya-nga-hsu	Pyaw-bwe	Bituminous	0/0	6/2	6/2
3		Thazi	Tha-bey-wa	Bituminous	0/0	9/2	9/2
4		Pyaw-bwe	Wun-dwin	Bituminous	80/4	106/1	25/5
Total				Four street	-	-	87/5

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

9 Bridges

Table 9.1 Above 180 ft bridges

Sr.No	Township	Location	Mile post	Name of bridge	Type	Length (ft)
1	Thar-zi	Pyi-nyaung	43/7	Pyi-nyaung bridge	RPT-CH	210
Total		-	-	-	Bailey	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 9.2 Under 180 ft bridges

Sr.No	Township	Location	Mile post	Name of bridge	Type	Length (ft)
1	Tharzi	Meiktila-Taunggyi road	16/5	Ywa-mon-tha bridge	RCC	124
2		Meiktila-Taunggyi road	20/4	Hlaing-tet	RCC	129
3		Meiktila-Taunggyi road	28/7	Kywe-tut-sone	RPC bailey	100
4		Meikhtila-Taunggyi road	2/44	Pyi-nyaung	RCC	100
5		Meikhtila-Taunggyi road	6/44	Pyi-nyaung	RPT-CH bailey	100
6		Meikhtila-Taunggyi road	21/0	Khwe-thay	RCC	120

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

10 Livestock Breeding Status

The vocational activities of Thazi Township are:

- Poultry and animal breeding
- Fish breeding
- Chicken, duct, duck and eggs
- Goat, sheep, pig, cow and buffalo

Table 10.1 Animal husbandry in Thazi Township (number of animals)

Sr. No	Township	Buffalo	Cow	Chicken	Pig	Duck	Goat
1	Thazi	6249	96783	288471	14871	15353	36364

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

11 Agriculture Status

Table 11.1 Production of main crop (10) items

Sr No	Crop Name	2010-2011	Cultivated	Harvested	Rate	Yield	Implementation (%)	Cost per acre (Kyats)
1	Paddy (Total)	77056	38808	28383	66.5	1887470	78.93	
	- Monsoon	75656	38808	28383	66.5	1887470	78.93	15000
	- Summer	1400	-	-	-	-	-	-
2	Sesame	27860	24408	24408	3.66	89241	100	75400
3	Ground nut	1248	986	986	27.05	26670	100	134200
4	Sunflower	3045	225	225	17.35	3904	100	74220
5	Green gram	-	-	-	-	-	-	-
6	Green gram seed	9704	13052	13052	6.85	89406	100	101300
7	Maize	-	-	-	-	-	-	-
8	Pigeon pea	4419	3224	3226	12.63	40744	100	99700
9	Sugar cane	-	-	-	-	-	-	-
10	Cotton	19000	16304	760	330.8	252070	100	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

12 Food supplies status

Table 12.1 Sufficient of rice for region in percent (2010 – 11 (estimate))

Sr no	Township	Population	Productive basket (Paddy)			Requirement for food	Wastage (3%)	Requirement of seed	Rice sufficient %
			Monsoon	Summer	Total				
1	Thazi	260880	38808	920	19728	3690981	119184	79456	65.2

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 12.2 Sufficient of oil for region in percent (2010 – 11 (estimate))

Sr. No	Township	Population	oil requirement (viss)	Productivity of relevant oil crop (viss)						Oil sufficient rate
				Palm oil	Ground nut	Sesame	Sunflower	Niger	Total	
1	Thazi	260880	1565280	-	8331	31869	16757	-	56957	137.27

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

13 Using of machinery for land for cultivation status

Table 13.1 Using of machinery for land for cultivation

Sr no	Front area	Plough and harrow	Rotary harrow	Seeding machine	Large tractor	Hand tractor	Threshing machine	Harvester	Water pump	Bullock cart
1	Myoma	4413	122	30	20	65	2	2	248	2397
2	Hlaingtet	7060	92	80	2	93	10		267	3778
3	Nyaungyan	3010	125	5	1	62	8		255	2023
4	Hanzar	4910	146	5	1	123	10	1	296	2993
Township Total		**19393**	**485**	**120**	**24**	**343**	**30**	**3**	**1066**	**11191**

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

14 Forestry Enterprise Performance statuses

Table 14.1 Forest Department Performance

Sr No	Village Track	Reserved Forest(ace)	Other Wood Land(acre)	Village Fuel Wood Plantation (acre)
1	Hlaing-tet	Yubadaung 28818 acre		Kyauk-oh (1) acre
2	Kywe-tut-sone		Kyauk-pan-oh 2560 acre	
3	Kywe-tut-sone		Thet-thawt Proposed 2281 acre	Thet-thawt (1) acre
4	Thet-ke-deik Ohat-twin	Sin daung 16773 acre		
5	Yin-mar-pin	Yin-mar-pin (R/F) 6400 acre		
6	Yin-mar-pin	West Ye-bok-son 4031 acre		
7	Yin-mar-pin	North Ye-bok-son 3200 acre		
8	Yin-mar-pin	East Ye-bok-son 3286 acre		
9	Pyi-nyaung	Kyu-byin (R/F) 16227 acre	Sone-gyi (other wood land) 2450 acre	
10	Pyi-nyaung	Ku-byin extension(1) (R/F) 18154 acre		
11	Pyi-nyaung	Ku-byin extension(2) (R/F) 8829 acre		
12	Pyi-nyaung	Pyi-nyaung (R/F) 30593 acre		
13	Kyat-sa-kan	Kyat-sakan (R/F) 18560 acre		
14	Myin-dike	Myit-thar (R/F) 52707 acre		
15	Sin-daung	Kalaw (extension R/F) 480 acre		
16	Nga-thet		Shwe-nat taung 2580 acre	(1)acre
17	Bo-kone			(1)acre
18	Pha-ya-lay-kone			(1)acre
19	Ywar-mon-thar			(1)acre
20	Zee-pin-bauk			(1)acre
	Total	**208058 acre**	**9770 acre**	**7 acre**

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

15 Market, Industry and Enterprise

Thazi Township famous as junction town and situated on the main highway connected with Meiktila and Kalaw and Taunggyi. So there is good transportation township.

There are the markets in the Thazi Township as follow:

Table 15.1 Main markets in Thazi Township

Sr. No	Township	Location	Name	No. of shop	Owner	
					Government	Public
1	Thazi	No. 5	Myoma	653	653	-
2		Nyaung-yan	Nyaung-yan			-
4		Phaya-nga-su	Phaya-nga-su	34	34	-
5		Hanza	Hanza			-
6		Yin-ma-pin	Yin-ma-pin	14	14	-
7		Pyi-nyaung	Pyi-nyaung			-
	Township Total			701	701	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 15.2 Factory and workshop in Thazi township

Sr.No	Quarter / Village Track	Factory and workshop				
		Government	Company	Private	Cooperative	Total
1	Number - 2	2	-	-	-	2
2	Number - 4	1	-	-	-	1
3	Ywa-pa-le	-	-	1	-	1
4	Hlaing-tet	1	-	-	-	1
5	Sin-taung	-	-	1	-	1
	Township Total	**4**	**-**	**2**	**-**	**5**

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

At present, Many Cement Plants were invested by many companies such as Shwe Taung, Htoo, Max Myanmar, YIG and Asia World Cement Companies at Pyin Nyaung village, Thazi township, Mandalay division.

16 Banks, Dam, Reservoir and Tanks

Table 16.1 Banks at Thazi Township

Sr. No	Township	Government Bank	Private Bank	Miniature of Lending	Agrarian Corporation of Bank
1	Thazi	1	-	1	1
	Total	1	-	1	1

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 16.2 Dams at Thazi Township

Sr No	Township	Region	Dam/ Tank	Type	H.F.L	Full Tank Capacity	2011	
							Water Level	Storage Capacity
1	Thazi		Nyaungyan	Earthern	561.5	9150	558.6	3360
2			Minhla	Earthern	560.0	20743	557.5	12672
3			Samon Retention Dam	Earthern	454.0	7913	453.1	6281
4			Thettaw	Earthern	700.0	15200	676.7	2610

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 16.3 Tanks at Thazi Township

Sr No	Township	Village	Name of dam	Type of dam	Irrigable Area
1	Thazi	Thaminzar-kone	Natsinkan	Earthern	500
2		Kanshe	Tookangyi	Earthern	400
3		Yinmar-yoe	Metaw kan	Earthern	400
4		Kanshe	Kanshe kan	Earthern	600
5		Yinmar-yoe	Yinmar-yoe kan	Earthern	350
6		Nyaungbintha	Tamar kan	Earthern	300
7		Nyaungbintha	Htan kan	Earthern	300
8		Wettoe	Ngathet kan	Earthern	500

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

17 Communication Status

Table 17.1 Communication at Thazi township

Sr. No	Township	Post Office	Telegraph	Numbers of Telephones					Manual Phone
				Auto	PABX	Cordless	CDMA	GSM	
1	Thazi	5	1	476	-	-	10	998	-
Town Total		5	1	476	-	-	10	998	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

18 INFRASTRUCTURE

18.1 Sewerage System

- Septic Tank system,
- Direct Pit latrine.

18.2 Waste Disposal System

The domestic waste is collected by Municipal trucks and dumped at specified land fill in Thazi township.

18.3 Electricity Condition

The electrical power distribution status of Thazi Township is as shown in the following.

Table 18.3.1 Electricity status in Thazi township

Sr.No	Township	Requirement in (KW)	Government		Private	
			Production (KW)	No. of hours per day	Power station	Production (KW)
1	Thazi	8000	5600	20	-	-
	Township Total	**8000**	**5600**	**20**	-	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Ye Paung Sone Power Sub-station (132/33 KV) is subsidized by Shwe Taung, Asia World, Htoo and YCDC Companies at near Ye Paung Sone village, Thazi township, Mandalay Division. It is 7 miles far from the APACHE Cement Plant.

Table 18.3.2 Energy status in Thazi township

Sr. No	Township	Petroleum filling station		CNG Filling Station	Electricity Supply Mill					Electricity Distribution Sub-station
		Quantity	Distribution (gal)		Hydro power	Natural gas	Waste	H.S.D	Others	
1	Thazi	1	-	-	-	-	-	-	-	4
	Total									4

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

18.4 Education Status

Table 18.4.1 Education Status in Thazi Township

Sr. No	Township	BEHS				BEMS				BEPS				Total
		Main	Sub	Attch	Total	Main	Sub	Attch	Total	Main	Sub	Attch	Post Primary	
1	Thazi	4	4	1	9	3	9	7	19	149	2	2	17	170

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.2 Population of Teachers and Students in Thazi Township

Sr. No	Township	Teacher				Student			
		High	Middle	Primary	Total	High	Middle	Primary	Total
1	Thazi	104	254	723	1081	2218	8029	19128	29375
	Percentage	9.62	23.5	66.88	100	7.55	27.33	65.12	100

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.3 Teacher and Student Ratio

Sr. No	Township	High School	Middle School	Primary School	Remark
1	Thazi	1:21	1:32	1:26	

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.4 Pre-primary School

Sr. No	Quarter/Village Track	Number of School	Teacher quantity		Student quantity	
			Male	Female	Male	Female
1	No (5)	1	-	3	20	25
	Township Total	1	-	3	20	25

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.5 Monastic Education School

Sr. No	Quarter/Village Track	Number of School	Teacher quantity	Student'quantity	State's support
1	No (7)	1	4	70	360000/- per year
2	Kyant Pa Nar	1	2	25	-
3	Hlain Tat	1	7	120	-
4	Wan Thar	2	-	160	
5	Han Zer	2	-	150	
	Township Total	7	13	525	

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.6 Entrance of novice for school

Sr. No	Township	Age - (5) year			School entrance			Entrance Percentage
		Male	Female	Total	Male	Female	Total	
1	Thazi	2771	2730	5501	2771	2730	5501	100

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.7 Status of matriculation examination pass

Sr. No	Name of School	(2008-2009) Year			(2009-2010) Year		
		Sit	Pass	Pass Percentage	Sit	Conquest	Pass Percentage
1	B.E.H.S (1)	503	113	22.47	585	108	18.46
2	B.E.H.S (2)	155	24	15.48	138	32	23.29
3	B.E.H.S (Han Zer)	108	18	16.67	108	19	17.59
4	B.E.H.S (Nyung Yan)	199	46	23.12	245	40	16.33
5	B.E.H.S (Mezali Kan)	81	8	9.88	50	13	26.00
6	B.E.H.S (Myay So)	52	8	15.38	76	8	10.53
7	B.E.H.S (Yin Mar Pin)	63	18	28.57	36	6	16.67
8	B.E.H.S (Thar Ga Ya)	40	6	15.00	37	6	16.22
9	B.E.H.S (Shwe Toke Kone)	38	4	10.53	20	2	10.00
10	External	865	227	26.24	1358	248	18.26
	TownshipTotal	2104	472	22.43	2653	482	18.17

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 18.4.8 Establishment of Teaching and Learning Aid Classroom

Sr. No	Township	High School						Middle School						Primary School					
		List	Media Fixed	3PLT Fixed	2PLT Fixed	1PLT Fixed	Total	List	Media Fixed	3PLT Fixed	2PLT Fixed	1PLT Fixed	Total	List	Media Fixed	3PLT Fixed	2PLT Fixed	1PLT Fixed	Total
1	Thazi	4	4	4	-	-	4	8	-	-	8	-	8	176	-	-	-	176	176
	Total	4	4	4	-	-	4	8	-	-	8	-	8	176	-	-	-	176	176

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

19 Health Status

Healthcare Hospitals and Clinics

Healthcare Status for the inhabitants of Thazi Township is as shown in the following tables.

Table 19.1 Hospital/ Dispensary

Sr. No	Township	Hospital				Dispensary						Maternal Ward
		Government			Private	Government					Private	
		16 Beds	25 Beds	Over 25 Beds		Rural Health center	Rural Health branch	Leprosy elimination	Malaria elimination	Tuberculosis elimination		
1	Thazi	2	1	-	-	6	24	1	1	1	-	1
	Total	2	1	-	-	6	24	1	1	1	-	1

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 19.2 Health Care Rate

Sr. No	Township	Population	Rate of HealthCare by doctors		Rate of HealthCare by nurse		Rate of HealthCare by Health Assistant	
			Number of Doctors	Ratio	Number of Nurses	Ratio	La/Hta Number of Health Man	Ratio
1	Thazi	188127	10	1:18813	10	1:18813	4	1:47032
	Township Total	188127	10	1:18813	10	1:18813	4	1:47032

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 19.3 Most Occurring Diseases

Sr. No	Township	Type of Disease									
		Malaria		Diarrhea		Tuberculosis		Dysentery		Hepatitis	
		Born	Decease	Born	Decease	Born	Decease	Born	Decease	Born	Decease
1	Thazi	100	1	440	-	24	-	98	-	2	-
	Township Total	100	1	440	-	24	-	98	-	2	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 19.4 Health Index

Sr. No	Township	For (1000) people		
		Rate of birth	Rate of Decease	Rate of Miscarriage
1	Thazi	8.6	2.6	30
	Township Total	8.6	2.6	30

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

The most common diseases suffered in Thazi Township area are dysentery, diarrhea, malaria, hepatitis and tuberculosis.

20 Recreation

20.1 Entertainment

Table 20.1 Entertainment (Cinema/Stadium/Garden)

Sr. No	Township	Cinema	Stadium	Garden
1	Thazi	1	1	1
	Township Total	1	1	1

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

20.2 Constructed and Renovated Projects

Table 20.2.1State Government Constructed and Renovated the Projects Beyond Year-1988

Sr. No	Township	Bridge	Sluice Gate	Embankment	Reservoir	Pump Irrigation	Jetty	Ship yard	Road	Golf Course	Real Estate	Hospital	Sanpya Village	Industrial Zone	University	Gas	New Satellite Town
1	ThaZi	-	-	1	1	-	-	-	2	-	-	-	24	-	-	-	-
	Township Total	-	-	1	1	-	-	-	2	-	-	-	24	-	-	-	-

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

21 Social Organizations

There have five Social Organizations (Non-Government) within the Thazi Township.

Table 21.1 Population of Social Organizations in Thazi Township

Sr. No	Township	Woman Affair	Maternal and child	War Veteran Association	Red Cross	Fire Brigade
1	Thazi	28678	33600	350	331	2485

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 21.2 Co-operative Teams

Sr.No	Township	Total of co-operative team	Co-operative team syndicate	Total
1	Thazi	97	2	99
Township grand total		97	2	99

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

22 Establishment of Libraries

Table 22.1 Libraries at Thazi township

Sr. No	Township	Established						
		Information /Communication Department	Regional Plan					
			Private Building	Additional Number				Total
				Administrative Office	School	Monastery	Other	
1	Thazi	219	85	20	58	67	33	257

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

23 Historical Structures and Religious Building

Table 23.1 Historical Structures

Sr. No	Township	Building				
		Location	Name	Type	Built Sevens	Conservation Institutional
1	Thazi	Ywa Gyi	Shwe Yin Myaw	Pagoda	ThiriDamarthawka Min Reign	Pagoda Trustee
2		Nyun Yan City Proper	Shwe Gu Gyi	Pagoda	ThiriDamarthawka Min Reign	Pagoda Trustee
3		Hlain Tat	Shin Sin Hla	Pagoda	King Anawyahtar	Pagoda Trustee
4		Nyun Yan Market	Peetdakat Kyautsar Tite	Pagoda		Pagoda Trustee

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

Table 23.2 Distinctive Places

Sr. No	Township	Building				
		Location	Name	Type	Built Sevens	Conservation Institutional
1	Thazi	No.(2)	Thazi Station	Station	-	Myanma Train

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

24 Vocational Works

Table 24.1 Populations of Workers

Sr.No	Township	staff	worker	agriculture	breeding	marketing	technical	random	others
1	Thazi	3562	2500	69669	1322	52113	200	43027	13186
		3562	2500	69669	1322	52113	200	43027	13186

Source: Township Administrative Office, Thazi Township (as of 15 January 2013 data)

25 Firebrigade

Table 25.1 Strength of Fire brigade and vehicles

Sr. No	Township	Thandae Resource	Auxiliary Force	Squadron	Platoon	Fire Craft	Water Bowser	Supporting vehicle	Light Machine
1	Thazi	5	2485	-	-	2	-	-	1
	Town Total	5	2485	-	-	2	-	-	1

Appendix – B(1- i)

Thazi Township, Pyinyaung (car) Village, Pyinyaung Village Tract

Questionnaires for Socio - Economic Data

(Village Authority)

Village Name ..Pyinyaung(Car)... Village Tract ....Pyinyaung..... Sr. No. ( )

Township / District / Region / State.....Thazi/Meiktila/Mandalay.....

1/ Household / Population Data

Year	No. of House	No. of Household	Population			Ethic Group		Religion %	
			Male	Female	Total		%		
2013	564	580	1259	1128	2387	Bamar	100	Buddhist	100
2014	594	600	1279	1148	2427	Bamar	100	Buddhist	100

2/ Livelihood

Household	Farming	Agro forestry	Selling / Trading	Employer	Daily worker	Fishery	Others
No.	30	2	15	10	30	-	513
%	5	0.3	2.5	1.7	5	-	85.5

3/ Number of Households moving in or out of the Village

Year	In	Out
2009	15	-
2010	20	-
2011	25	-
2012	30	-
2013	-	-

4/ Communication System

[√] Cell Phone (120) [ ] Telephone [ ] Post office [ ] Others ----------

5/ Means of Transportation

5-1 By Vehicle (By Motorcycle) [√] Summer [√] Monsoon [√] Winter [√] Bus

5-2 By Stream (By Boat) [ ] Summer [ ] Monsoon [ ] Winter [ ] Jetty ship/Jetty boat

5-3 By air [ ] Summer [ ] Monsoon [ ] Winter [ ] Aeroplane

6/ Agricultural Land (Acre)

Paddy	Upland Crop	Hill side cultivation	Fruit / orchards	Other	Total
12	-	70	10	-	92

7/ Farm Implements

Cart	Harrow / plough	Hand Tractor	Tractor	Pump	Threshing machine	Sprayer	Others
20	25	-	-	-	-	-	-

8/ Cropping Calendar

Crops	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Paddy								←	—	—	—	→
Upland Paddy						←	—	—	—	→		

9/ Mechanism / Household Appliances

Trawlergyi	Bicycle	Motor Bike	Genera-tor	Motorcar	TV	Video	Radio	Refrigerator
68	5	200	30	18	275	120	400	20

10/ Priority needs for Livelihood

(A) Electricity

(B) Drinking Water

(C) Job Opportunity

11/Livestock Breeding

Buffalo	Cattle	Dairy Cattle	Goat	Sheep	Pig	Chicken	Duck	Others
42	30	-	-	-	65	230	20	-

12/Infrastructures

B.E.H.S	B.E.M.S	B.E.P.S	Monastery Education	Nursery	Library	Police Station	Fire Station	Market
-	1	-	1	-	-	1	-	1

Station Hospital	Rural Health Centre	Maternity and Child	Village Tract Office	Cemetery	Access Road	Pipe Water	Private Clinic
-	1	-	-	1	1	1	-

13/Village Facilities

Saw Mill	Rice Mill	Repair Workshop	Restaurant
-	-	2	7

14/Religious / Cultural Heritage

Pagoda	Monastery	Num	Church	Mosque	Dhama House
2	1	-	-	-	2

15/Health / Education Service

Doctor	Health Assistant	Nurse	Midwife	High School		Middle School		Primary School	
				Teacher	Pupil	Teacher	Pupil	Teacher	Pupil
-	-	-	2	-	-	22	752	-	-

16/Fishery (per month)

Fish Culture	Selling viss (Monthly)	Food (viss)
-	720	720

17/Energy / Electric Consumption (per month)

Fuel Wood (Bundle)	Charcoal (Viss)	Kerosene (gal)	Electricity (KWh)
6000	-	-	-

18/Needs for Electrification

☑ urgent want ☐ want ☐ if not

19/Development Projects

Sr. No.	Past Project	Government	NGO	Completed year	Up to date effect	
					Yes	No
1	Bridge	Yes	-	2011	Yes	
2	School	-	Shwe Taung Company	2013	Yes	

20/Water Resources for Drinking and Domestic Use

Sr. No.	Utilization	Resources	Sufficient
			Yes / No
(A)	Drinking	Chaung	No
(B)	Domestic	Chaung	Yes
(C)	Livestock	Chaung	Yes
(D)	Agriculture	Chaung	Yes
(E)	Others	Chaung	-

21/Electricity Supply for Village

☐ 24 hour ☐ 12 hour ☐ 6 hour ☑ 3 hour ☑ nothing

22/If yes, How many hour get electricity per day 18:00 pm from 21:00 pm hour

23/Which is source of electricity you get?

☐ Government Unit rate

☑ Private Unit rate

☐ Others Unit rate ---9000ks/month----------

Interviewer Respondent

Signature ..... Signature .....

Name .....U Thike Tun..... Name U Aung Chin Bo.

Date / 25- 3- 2014

Appendix – B(1-ii)

Thazi Township, Ku Byin Village, Pyinyaung Village Tract

Questionnaires for Socio - Economic Data

(Village Authority)

Village Name ...Ku Byin... Village Tract ....Pyinyaung..... Sr. No. ( )

Township / District / Region / State.....Thazi/Meiktila/Mandalay.....

1/ Household / Population Data

Year	No. of House	No. of Household	Population			Ethic Group		Religion %	
			Male	Female	Total		%		
2014	54	54	133	131	264	Bamar	70	Buddha	226
						Karen	38	Christian	38
						Danu	156		

2/ Livelihood

Household	Farming	Agro forestry	Selling / Trading	Employer	Daily worker	Fishery	Others
No.	3	30	7	2	12	-	-
%	5.5	55.5	13	3.7	22.3		

3/ Number of Households moving in or out of the Village

Year	In	Out
2009	-	-
2010	-	-
2011	-	-
2012	-	-
2013	-	-

4/ Communication System

☐ Cell Phone (8) ☐ Telephone ☐ Post office ☐ Others ----------

5/ Means of Transportation

5-1 By Vehicle (By Motorcycle) ☑ Summer ☑ Monsoon ☑ Winter ☑ Cycle / Trawlergy

5-2 By Stream (By Boat) ☐ Summer ☐ Monsoon ☐ Winter ☐ Jetty ship/Jetty boat5-3 By air Summer Monsoon Winter Aeroplane

6/ Agricultural Land (Acre)

Paddy	Upland Crop	Hill side cultivation	Fruit / orchards	Other	Total
4	-	75	-	-	79

7/ Farm Implements

Cart	Harrow / plough	Hand Tractor	Tractor	Pump	Threshing machine	Sprayer	Others
-	3	-	-	3	-	-	-

8/ Cropping Calendar

Crops	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Paddy								←	—	—	—	→
Upland Paddy						←	—	—	—	→		

9/ Mechanism / Household Appliances

Trawlergyi	Bicycle	Motor Bike	Genera-tor	Motorcar	TV	Video	Radio	Refrigerator
5	-	30	2	-	5	5	10	3

10/ Priority needs for Livelihood

(A) Drinking Water

(B) Electricity

(C) Job Opportunity

11/Livestock Breeding

Buffalo	Cattle	Dairy Cattle	Goat	Sheep	Pig	Chicken	Duck	Others
80	-	-	-	-	30	600	-	-

12/Infrastructures

B.E.H.S	B.E.M.S	B.E.P.S	Monastery Education	Nursery	Library	Police Station	Fire Station	Market
-	-	1	-	-	-	-	-	-

Station Hospital	Rural Health Centre	Maternity and Child	Village Tract Office	Cemetery	Access Road	Pipe Water	Private Clinic
-	-	-	-	1	1	-	-

13/Village Facilities

Saw Mill	Rice Mill	Repair Workshop	Restaurant
-	-	-	-

14/Religious / Cultural Heritage

Pagoda	Monastery	Num	Church	Mosque	Dhama House
-	1	-	1	-	-

15/Health / Education Service

Doctor	Health Assistant	Nurse	Midwife	High School		Middle School		Primary School	
				Teacher	Pupil	Teacher	Pupil	Teacher	Pupil
-	-	-	-	-	-	-	-	8	43

16/Fishery (per month)

Fish Culture	Selling viss (Monthly)	Food (viss)
-	-	200

17/Energy / Electric Consumption (per month)

Fuel Wood (Bundle)	Charcoal (Viss)	Kerosene (gal)	Electricity (KWh)
500	-	-	-

18/Needs for Electrification

☐ urgent want ☑ want ☐ if not

19/Development Projects

Sr. No.	Past Project	Government	NGO	Completed year	Up to date effect	
					Yes	No
1	Kupyin - Pyinyaung Road (18' wide, 5 mile)	-	Shwe Taung Company	2011	Yes	
2	For Primary school in village (900000) ks	-	Shwe Taung Company	2010	Yes	

20/Water Resources for Drinking and Domestic Use

Sr. No.	Utilization	Resources	Sufficient
			Yes / No
(A)	Drinking	Chaung	Yes
(B)	Domestic	Chaung	Yes
(C)	Livestock	Chaung	Yes
(D)	Agriculture	-	
(E)	Others		

21/Electricity Supply for Village

☐ 24 hour ☐ 12 hour ☐ 6 hour ☑ 3 hour ☐ nothing

22/If yes, How many hour get electricity per day 18:00 pm from 21:00 pm hour

23/Which is source of electricity you get?

☐ Government Unit rate

☐ Private Unit rate

☐ Others Unit rate ---1200ks/month----------

Interviewer

Signature .....

Name ..... U Thike Tun.....

Date / 24- 3- 2014

Respondent

Signature .....

Name U Than Sein.

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
1	Thazi / Kubyin	Daw Aye Thet Wai	U Tun Shwe	U Tun Shwe	Husband	51	Danu/Buddhist	√	-	-		-		√	-	-	48(year)
2				Daw Khin Mar Sann	Wife	46	‖	√	-	-		-		-	-	-	
3				Ma Myint Myint Aye	Daughter	22	‖	-	-	-		-	√	√	-	-	
4				Ma Wai Wai Tun	Daughter	19	‖	-	-	-		-	√	√	-	-	
5				Ma Lae Lae Win	Daughter	16	‖	-	-	-		-	√	√	-	-	
6	Thazi / Kubyin	U Kyaw Min Aung	U Thein Kyaw	U Thein Kyaw	Husband	54	Barmar/Buddhist	√	-	-		-		√	-	-	14(year)
7				Daw Own Kyein	Wife	43	‖	√	-	-		-		√	-	-	
8				Mg Than Htike Aung	Son	12	‖	-	-	-		-	√	√	-	-	
9				Ma Aye Thuzar	Daughter	9	‖	-	-	-		-	√	√	-	-	
10				Ma Khin Thuzar	Daughter	6	‖	-	-	-		-	√	√	-	-	
11	Thazi / Kubyin	Ma Aye Thet Wai	U Myint Than	U Myint Than	Head	50	Bamar/Buddhist	√	-	-		-		√	-	-	44(year)
12				Daw Mar Lar Ye	Wife	40	‖	√	-	-		-		-	-	-	
13				Mg Khine Win	Son	17	‖	√	-	-		-		√	-	-	
14				Mg Aung Thu Swe	Son	16	‖	√	-	-		-		√	-	-	
15				Ma Thu Zar Hlaing	Daughter	14	‖	-	-	-		-	√	√	-	-	
16				Ma Moe Sandar Hlaing	Daughter	12	‖	-	-	-		-	√	√	-	-	
17				Mg Hein Htet Aung	Son	7	‖	-	-	-		-	√	√	-	-	
18				Mg Tun Tun Naing	Son	5	‖	-	-	-		-	√	√	-	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
19	Thazi / Kubyin	U Kyaw Min Aung	U Than Sein	U Than Sein	Husband	42	Bamar/Buddhist		-	√		-		-	√	-	20(year)
20				Daw Win Tin	Wife	41	Danu/Buddhist	-	-	-		-	√	√	-	-	
21				Ma Cho Cho Win	Daughter	19	Bamar/Buddhist	-	-	-		-	√	-	-	√	
22				Ma Shwe Si Hlaing	Daughter	16	‖	-	-	-		-	√	-	√	-	
23				Mg Sain Law Shwe	Son	12	‖	-	-	-		-	√	-	√	-	
24	Thazi / Kubyin	Daw Aye Thet Wai	Daw Nyo	Daw Nyo	Head	70	Bamar/Buddhist	-	-	-		-	√	-	-	-	54(year)
25				Mg Zan Thi	grandson	19	‖	√	-	-		-		√	-	-	
26	Thazi / Pyinyaung	U Thike Tun	Daw Khine	U Phoe Tailk	Husband	48	Bamar/Buddhist	√	-	-		-		√	-	-	20(year)
27				Daw Khine	Wife	38	‖		-	√		-		√	-	-	
28				Mg Zaya Tun	Son	17	‖	-	-	-		√		-	√	-	
29				Mg Zaya Phyo	Son	12	‖	-	-	-		-	√	√	-	-	
30				Mg Hein Htet	Son	9	‖	-	-	-		-	√	√	-	-	
31	Thazi / Pyinyaung	Daw Aye Thet Wai	Daw Khin Than Aye	U Ni	Husband	44	Bamar/Buddhist	√	-	-		-		√	-	-	24(year)
32				Daw Sann Wai	Wife	42	‖	√	-	-		-		-	-	-	
33				Mg Sann Kyaing	Son in law	30	‖	√	-	-		-		√	-	-	
34				Ma Khin Than Soe	Daughter	24	‖	-	-	-		-	√	-	√	-	
35				Ma Yon Wady Soe	Grand Daughter	1.6	‖	-	-	-		-	√	-	-	-	
36				Mg Aung Kyaw Soe	Son in law	27	‖	√	-	-		-		-	√	-	
37				Ma Khin Than Aye	Daughter	21	‖	-	-	-		-	√	-	√	-	
38				Mg Aung Myo Thu	Son	18	‖	√	-	-		-		-	√	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
39	Thazi / Pyinyaung	U Kyaw Min Aung	U Htay	U Htay	Husband	44	Bamar/Buddhist	-	-	√		-		-	√	-	37(year)
40				Daw Sandar Aye	Wife	42	‖	\	-	-		-	√	-	√	-	
41				Mg Phae Phyo Thar	Son	14	‖	-	-	-		-	√	-	√	-	
42				Mg Khant Phyo Thar	Son	10	‖	-	-	-		-	√	√	-	-	
43	Thazi / Pyinyaung	U Kyaw MinAung	U Zaw Zaw Hlaing	U Maung Soe	Husband	48	Bamar/Buddhist	√	-	-		-		-	√	-	30(year)
44				Daw Khin Win Hlaing	Wife	47	‖	-	-	-		-	√	√	-	-	
45				Mg Zaw Zaw Hlaing	Son	25	‖	√	-	-		-		-	-	√	
46				Ma Moet Moet Tun	Daughter	25	‖	-	-	√		-		-	-	√	
47				Ma Su Su Hlaing	Daughter	23	‖	-	-	-		-	√	-	-	√	
48				Mg Soe Thiha Hlaing	Son	18	‖	-	-	-		-	√	-	√	-	
49	Thazi / Pyinyaung	U Thike Tun	U Thaung Wai	U Thaung Wai	Husband	47	Bamar/Buddhist			√		-		√	-	-	12(year)
50				Daw Lae Yin Win	Wife	40	‖	-		-		-	√	-	√	-	
51				Ma Thae Nu	Daughter	21	‖			√		-		√	-	-	
52				Ma Phue Phue Wai Maw	Daughter	7	‖	-	-	-		-	√	√	-	-	
53	Thazi / Pyinyaung	Daw Aye Thet Wai	U Tun Win Aung	U Tun Win Aung	Husband	31	Bamar/Buddhist	√	-	-		-		-	√	-	22(year)
54				Daw Myo Htwe	Wife	25	‖	-	-	-		-	√	√	-	-	
55				Ma Myo Thandar Tun	Daughter	3.6	‖	-	-	-		-	√	-	-	-	
56	Thazi / Pyinyaung	Daw Aye Thet Wai	Daw Kyin Mwe	U Maung Myint	Husband	48	Bamar/Buddhist	√	-	-		-		-	√	-	22(year)
57				Daw Kyin Hmwe	Wife	47	‖	-	-	-		-	√	√	-	-	
58				Mg Ye Win	Son	26	‖	√	-	-		-		-	√	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
59				Mg Ye Naung	Son	20	‖	√	-	-		-		-	√	-	
60				Mg Sann Myo	Son	13	‖	-	-	-		-	√	-	√	-	
61				Mg Thant Zin Htay	Son	7	‖	-	-	-		-	√	√	-	-	
62	Thazi / Pyinyaung	U Thike Tun	U Maung Cho	U Maung Cho	Husband	61	Bamar/Buddhist	-	√	-		-		-	√	-	10(year)
63				Daw Htay Htay	Wife	55	‖	-	-	-		-	√	-	√	-	
64				Ma Sandar Cho	Daughter	38	‖	-	-	-		-	√	-	-	√	
65				Mg Min Thu Yain	Son in law	37	‖	√	-	-		-		-	-	√	
66				Mg Tin Htoo Aung	Grandson	1	‖	-	-	-		-	√	-	-	-	
67				Mg Thant Sin Tun	Son	35	‖	√	-	-		-		-	-	√	
68				Ma Phyu Phyu Thin	Daughter in law	29	‖	-	-	-		-	√	-	√	-	
69				Mg Kaung Sat Yan	Grand son	1	‖	-	-	-		-	√	-	-	-	
70	Thazi / Pyinyaung	U Kyaw Min Aung	U Sann Lwin	U Sann Lwin	Husband	49	Bamar/Buddhist	-	-	√		-		√	-	-	20(year)
71				Daw Htay Htay	Wife	42	‖	-	-	-		-	√	√	-	-	
72				Ma Hla Hla San	Daughter	23	‖	-	-	-		-	√	-	-	√	
73				Mg Phoe La Pyae	Son	18	‖	-	-	-		-	√	-	√	-	
74				Ma Nan Pyae Phyo	Daughter	8	‖	-	-	-		-	√	√	-	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
75	Thazi / Pyinyaung	U Kyaw Min Aung	U Win Soe	U Win Soe	Husband	47	Bamar/Buddhist	-	-	√		-		-	√	-	30(year)
76				Daw Ni Ni Mar	Wife	40	‖	-	-	-		-	√	√	-	-	
77				Mg Aye Chan Aung	Son	19	‖	-	-	-		-	√	-	-	√	
78				Mg Aye Chan Maung	Son	17	‖	-	-	-		-	√	-	√	-	
79				Ma Khin Thuzar	Daughter	14	‖	-	-	-		-	√	-	√	-	
80				Ma Aye Thaw Tar	Daughter	7	‖	-	-	-		-	√	√	-	-	
81	Thazi / Pyinyaung	U Thike Tun	U Aung San	U Aung San	Husband	44	Bamar/Buddhist	√	-	-		-		√	-	-	17(year)
82				Daw Pyon Ye	Wife	40	‖	-	-	-		-	√	√	-	-	
83				Mg Tun Naing Oo	Son	15	‖	√	-	-		-		-	√	-	
84				Ma Ei Phyo Thaw	Daughter	13	‖	-	-	-		-	√	-	√	-	
85				Ma Thin Thin Oo	Daughter	11	‖	-	-	-		-	√	-	√	-	
86				Mg Hein Min Aung	Son	9	‖	-	-	-		-	√	√	-	-	
87	Thazi / Pyinyaung	U Thike Tun	U Thet Naing Oo	U Thet Naing Oo	Husband	45	Dahnu/Buddhist	√	-	-		-		√	-	-	19(year)
88				Daw Hinn May	Wife	45	‖	-	-	-		-	√	√	-	-	
89				Mg Hinn Oo	Son	27	‖	√	-	-		-		-	√	-	
90				Mg Ye Oo	Son	25	‖	√	-	-		-		-	√	-	
91				Mg Kyaw Myo Oo	Son	18	‖	√	-	-		-		-	√	-	
92				Mg Nyein Chan Oo	Son	10	‖	-	-	-		-	√	√	-	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1													Q-2
				Household Particular													How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
93	Thazi / Pyinyaung	U Kyaw Min Aung	Daw Myint Myint	Daw Myint Myint	Head	52	Bamar/Buddhist		-	√		-		√	-	-	32(year)
94				Ma Khine Thinza Myint	Daughter	20	‖		-	√		-		-	√	-	
95	Thazi / Pyinyaung	U Kyaw Min Aung	U Thein Maung	U Thein Maung	Husband	82	Bamar/Buddhist	√	-	-		-		√	-	-	82(year)
96				Daw Hla Yin	Wife	75	‖		-	-		-	√	√	-	-	
97				Ma Hinn Kyi	Daughter	45	‖	√	-	-		-		-	-	-	
98				Mg Win Nyunt	Son	42	‖	√	-	-		-		√	-	-	
99				Mg Than Lin	Son	39	‖	√	-	-		-		√	-	-	
100				Ma Kyu	Daughter	36	‖	√	-	-		-		√	-	-	
101	Thazi / Pyinyaung	U Thike Tun	U Sann Myint	U Sann Myint	Head	48	Bamar/Buddhist	-	-	-		√		√	-	-	26(year)
102				Daw San Htwe	Sister	32	‖	-	-	-		-	√	√	-	-	
103	Thazi / Pyinyaung	U Kyaw Min Aung	U Thet Naing Tun	U Thet Naing Tun	Husband	29	Bamar/Buddhist	-	-	√		-		-	√	-	2 (year)
104				Daw Aye Aye Thwe	Wife	26	‖	-	-	√		-		√	-	-	
105	Thazi / Pyinyaung	U Thike Tun	U Tin Tun	U Tin Tun	Husband	38	Bamar/Buddhist	-	-	√		-		-	√	-	38(year)
106				Daw Kyu	Wife	35	‖	-	-	-		-	√	√	-	-	
107				Ma Yamin Tun	Daughter	13	‖	-	-	-		-	√	-	√	-	
108				Mg Nay Myo Khant	Son	7	‖	-	-	-		-	√	√	-	-	
109	Thazi / Pyinyaung	U Kyaw Min Aung	U Aung San Htay	U Aung San Htay	Husband	27	Bamar/Buddhist	-	-	-				√	-	-	27(year)
110				Daw Wai Soe	Wife	25	‖	-	-	-		-	√	√	-	-	
111				Mg Swan Htet	Son	5	‖	-	-	-		-	√	√	-	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1													Q-2
				Household Particular													How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
112	Thazi / Pyinyaung	U Kyaw Min Aung	U Thaung Nyunt	U Thaung Nyunt	Husband	52	Bamar/Buddhist	-	-	√		-		-	√	-	32(year)
113				Daw Khin Mar Ye	Wife	45	‖	-	-	-		-	√	√	-	-	
114				Mg Hein Min Zaw	Son	25	‖	-	-	-		-	√	-	√	-	
115				Mg Zay Yar Tun	Son	16	‖	-	-	-		-	√	-	√	-	
116				Ma Pyae Pyae Phyo	Daughter	3	‖	-	-	-		-	√	-	-	-	
117	Thazi / Pyinyaung	U Thike Tun	U Thein Win	U Thein Win	Husband	45	Bamar/Buddhist	√	-	-		-		-	√	-	45(year)
118				Daw Khin Ye	Wife	45	‖	√	-	-		-		√	-	-	
119				Mg Sai Sai	Son	20	‖	√	-	-		-		-	√	-	
120				Mg Aung Kyaw Myint	Son	17	‖	-	-	-		-	√	-	√	-	
121				Mg Kyaw Min Htwe	Son	8	‖	-	-	-		-	√	√	-	-	
122	Thazi / Pyinyaung	U Kyaw MinAung	Daw Khin Swe Oo	Daw Nyunt Mhwe	Head	68	Bamar/Buddhist	-	-	√		-		√	-	-	47(year)
123				Daw Khin Swe Oo	Daughter	47	‖	-	-	√		-		√	-	-	
124				Mg Zaw Wan	Son	32	‖	√	-	-		-		-	√	-	
125				Ma Khin Mar Zin	Daughter	30	‖	-	-	-		-	√	-	-	√	
126				Ma Khin Mar Htwe	Daughter	26	‖	-	-	-		-	√	-	-	√	
127				Ma Nway Thandar Aung	and Daugh	21	‖	-	-	-		-	√	-	-	√	
128				Mg Sai Wunna Aung	Grand Son	11	‖	-	-	-		-	√	√	-	-	
129	Thazi / Pyinyaung	U Thike Tun	Ma Thin Thin Aye	U Ohn Lwin	Husband	65	Bamar/Buddhist	-	-	-		-	√	-	√	-	40(year)
130				Daw Khin Win	Wife	64	‖	-	-	-		-	√	√	-	-	
131				Mg Min Zaw	Son inlaw	46	‖	√	-			-		√	-	-	
132				Ma Thin Thin Aye	Daughter	41	‖	-	-	√		√		-	√	-	
133				Mg Lwin Myo	Grand Son	16	‖	-	-	-		-	√	-	√	-	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Interviewer	Respondent	Q-1												Q-2
				Household Particular												How many year have you been living here?
				Name	Relation-ship	Age	Nationality/Religious	Occupation						Education			
								Casual Labour	farmer	Selling	Employor	Private Staff	Other	Primary	Second-ary	Univer-sity	
134				Mg La Pyae	Grand Son	12	‖	-	-	-		-	√	-	√	-	
135				Mg Aung Myo Thant	Son	27	‖	-	-	√		-		-	√	-	
136				Ma Thu Zar Win	aughter inla	17	‖	-	-	-		-	√	-	√	-	
137	Thazi / Pyinyaung	U Kyaw Min Aung	U Sein Myaing	U Sein Myaing	Husband	51	Bamar/Buddhist	√	-	-		-		-	√	-	22(year)
138				Daw Thi Thi Myint	Wife	47	‖	-	-	-		-	√	√	-	-	
139				Mg Aye Ko Ko Paing	Son	23	‖	-	-	-		-	√	-	-	√	
140				Mg Arkar Zaw	Son	20	‖	-	-	-		-	√	-	-	√	
141				Ma Ei Thandar Myint	Daughter	16	‖	-	-	-		-	√	-	√	-	
142	Thazi / Pyinyaung	U Kyaw Min Aung	U San Win	U Sann Win	Husband	45	Bamar/Buddhist	-	-	-	√	-	-	-	√	-	22(year)
143				Daw Aye Aye Thin	Wife	35	‖	-	-	-		-	√	√	-	-	
144				Ma Phyo Thuzar Oo	Daughter	18	‖	-	-	-		-	√	-	√	-	
145				Ma Nan Shwe Yei Oo	Daughter	16	‖	-	-	-		-	√	-	-	√	
146				Ma Thwe Thwe Phyu	Daughter	14	‖	-	-	-		-	√	-	√	-	
147				Mg Thar Htoo Sam	Son	8	‖	-	-	-		-	√	√	-	-	
148	Thazi / Pyinyaung	U Thike Tun	U Win Tint	U Win Tin	Husband	38	Bamar/Buddhist		-	-	√	-	-	-	-	√	14(year)
149				Daw Htar Htar	Wife	32	‖	-	-	-		-	√	√	-	-	
150				Mg Ye Min Thu	Son	11	‖	-	-	-		-	√	-	√	-	
151				Ma Khin Htar Win	Daughter	9	‖	-	-	-		-	√	√	-	-	
152	Thazi / Pyinyaung	U Kyaw Min Aung	U Aung Soe Lwin	U Aung Soe Lwin	Husband	36	Bamar/Buddhist	√	-	-		-		-	-	-	36(year)
153				Daw Phyu	Wife	36	‖	-	-	-		-	√	√	-	-	
154				Mg Khant Si Thu Lwin	Son	15	‖	-	-	-		-	√	-	√	-	
155				Mg Toe Toe	Son	6	‖	-	-	-		-	√	√	-	-	
156				Mg Aung Aung	Son	1.3	‖	-	-	-		-	√	-	-	-	
Total								50	1	10		4		70	53	15	

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
1	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	-	-	-	√	√	-
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	√	-
7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-	-
12		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
19	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	√	√	√	-	√	√	-	Laptop (Computer)
20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	-
25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Thazi / Pyinyaung	-	-	√	-	-	-	-	-	√	-	√	-	-	-	-	-	√	-	-	-	√	-	-
27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	Thazi / Pyinyaung	-	√	-	-	-	√			-	-	-	-	√	-	-	-	√	-	√	-	√	-	-
32		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
39	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	-	-	√	√	-	√
40		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	-	√	√	√	√	-
44		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	-	-	-	√	-	-
50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	-	-	-	-	√	-
54		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	√	-	-	√	-	-
57		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
59		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	√	√	√	-	√	-	-
63		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	√	√	√	√	√	-
71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
75	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	√	-	-	√	-	-
76		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-
82		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	√	-	-	√	√	-
88		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
93	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	-	-	-	-	-	-
94		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	√	-	-	√	-	-
96		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	-	-	-	√	-	-
102		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	-
104		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	√	-	-	√	-	-
106		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
107		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
109	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	√	-	-	-	√	-	-
110		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
111		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
112	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	√	-	-	-	√	-	-
113		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
115		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
116		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
117	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	√	-	-	-	√	-	-
118		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
122	Thazi / Pyinyaung	-	-	-	√	-	√	-	-	-	-	-	-	√	-	-	-	√	√	-	-	-	-	-	
123		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
124		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
127		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
128		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	√	√	√	-	√	√	-	-
130		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
133		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-3									Q-4													
		Does one of your familyworks away from home.									Property													
		Who					Where				Housing				Implements						Home Property			
		husband	wife	son	daugh-ter	other	capital	nearestdistrict	over sea	other	Bamboo-Thatch	Bamboo-CGI	Timber-CGI	Brick-Concrete	Cart	Boat	Bicycle	Motor bike	Farm Truck	Car	Refrige-rator	TV	Radio	Other
134		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
136		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
137	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	√	√	√	-	√	-	-
138		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
139		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
141		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
142	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	-	-	-	-	-	-
143		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
144		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
147		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
148	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	√	√	-	-	√	-	-
149		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
151		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
152	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-
153		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
154		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
155		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
156		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total											4	12	6	9			2	25	11	4	5	23	6	1

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
1	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	9	-	20	-	3	-	-	1000	-	-	-	-	-	900	-	1900
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
3		-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	80	-	-	-	-	-	700	-	780
7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	4	-	15	-	1	-	-	100	-	180	-	-	-	1400	-	1680
12		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
19	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	6000	-	-	-	-	2000	8000
20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	Thazi / Kubyin	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	270	-	-	-	600	-	870
25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	720	720	-	840	-	-	2280
27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	12000	-	-	-	-	-	12000
32		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
39	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5400	-	-	-	-	5400
40		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2700	2500	5200
44		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	Thazi / Pyinyaung	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-	-	1200
50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	1000	-	-	-	360	-	1360
54		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
55		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
56	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1800	-	-	-	-	800	2600
57		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
59		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1626	-	-	3600	5226
63		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-	13600	13600
71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
75	Thazi / Pyinyaung	-	-	5	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2400	2400
76		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1440	-	1440
82		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2900	1000	3900
88		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
93	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-	-	1200
94		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	Thazi / Pyinyaung	-	-	15	-	-	-	-	-	500	-	-	-	-	-	-	500	-	-	-	-	-	-	-	-	700	1200
96		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	360	-	-	-	720	1080
102		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1500	-	-	-	-	1500
104		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1800	1800
106		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
107		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
109	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1080	-	1080
110		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
111		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
112	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11000	-	-	-	-	11000
113		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
115		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
116		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
117	Thazi / Pyinyaung	-	-	3	-	-	-	-	-	-	-	8	-	6	-	-	-	-	-	-	-	-	-	-	2400	-	2400
118		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
122	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10800	-	-	-	-	10800
123		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
124		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
127		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
128		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129	Thazi / Pyinyaung		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000	-	-	-	3600	5600
130		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
133		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-5									Q-6						Q-7										
		Farming									Livestock						Income (Average per year x 1000)										
		Crop (acre)			Production (Bsk)			Price (Kyats)			Cow	Buf-falo	Goat	Chic-ken	Duck	Pig	Agri-culture	Vege-table	Live-stock	Fish-ing	Agro-Fore-stry	Selling (Particular)	Gover-nment Staff	Priva-te Staff	Daily worker/ work charge	Other	Total
		Paddy	Maize	Other	Paddy	Maize	Other	Pad-dy	Mai-ze	Other																	
134		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
136		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
137	Thazi / Pyinyaung	-	-	-	-	-	20	-	-	-	4	-	-	6	-	-	-	-	-	-	-	-	-	-	-	12000	12000
138		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
139		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
141		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
142	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2400	2400
143		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
144		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
147		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
148	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	1500	1500
149		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
151		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
152	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1260	-	1260
153		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
154		-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
155		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
156		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total												23		148		11	500		1180		15520	34180	1626		15740	48620	124656

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
1	Thazi / Kubyin	1200	-	360	300	-	-	450	84	2394	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
6	Thazi / Kubyin	540	50	40	100	100	-	50	-	880	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
9		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
11	Thazi / Kubyin	1440	20	50	20	-	-	50	-	1580	√	-	-	-	-	-	-	-	-	√	Candle	Fire Wood	-
12		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
19	Thazi / Kubyin	1800	6000	50	400	-	-	200	-	8450	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
20		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
21		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
23		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
24	Thazi / Kubyin	720	-	-	-	-	-	60	144	924	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
25		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
26	Thazi / Pyinyaung	1800	100	20	100	-	-	200	144	2364	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
27		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
28		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
29		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
30		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
31	Thazi / Pyinyaung	3650	-	300	360	-	-	600	504	5414	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
32		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
33		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
34		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
35		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
36		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
37		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
38		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
39	Thazi / Pyinyaung	2100	1500	50	500	-	-	-	100	4250	√	-	-	-	-	-	-	√	-	-	Generator	Fire Wood	-
40		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
41		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
42		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
43	Thazi / Pyinyaung	2800	2000	300	-	-	-	200	-	5300	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
44		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
45		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
46		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
47		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
48		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
49	Thazi / Pyinyaung	720	100	40	200	-	-	50	-	1110	√	-	-	-	-	-	-	-	-	√	Battery	Fire Wood	-
50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
51		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
52		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
53	Thazi / Pyinyaung	1200	-	70	50	-	-	30	-	1350	√	-	-	-	-	-	-	-	-	√	Battery	Fire Wood	-
54		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-
55		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
56	Thazi / Pyinyaung	2000	-	300	60	-	-	200	50	2610	√	-	-	-	-	-	-	-	-	√	Generator	Fire Wood	-
57		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
58		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
59		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
60		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
61		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
62	Thazi / Pyinyaung	4000	-	200	500	-	-	400	-	5100	√	-	-	-	-	-	-	-	-	√	Battery	Fire Wood	-
63		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
64		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
65		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
66		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
67		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
68		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
69		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
70	Thazi / Pyinyaung	5400	2200	200	1800	-	-	1000	-	10600	√	-	-	-	-	-	-	√	-	-	Electric	Fire Wood	-
71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
72		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
73		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
74		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
75	Thazi / Pyinyaung	1440	800	20	180	-	-	60	-	2500	√	-	-	-	-	-	-	√	-	-	Generator	Fire Wood	-
76		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
77		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
78		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
79		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
80		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
81	Thazi / Pyinyaung	1200	60	50	50	-	-	50	-	1410	√	-	-	-	-	-	-	-	-	√	Candle	Fire Wood	-
82		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
83		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
84		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
85		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
86		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
87	Thazi / Pyinyaung	2800	400	50	100	-	-	200	200	3750	√	-	-	-	-	-	-	-	√	-	Solar Battery	Fire Wood	-
88		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
89		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
90		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
91		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
92		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
93	Thazi / Pyinyaung	540	-	240	50	-	-	100	-	930	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
94		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
95	Thazi / Pyinyaung	720	-	5	15	-	35	30	144	949	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
96		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
97		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
98		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
99		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
100		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
101	Thazi / Pyinyaung	720	-	10	30	-	-	30	120	910	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
102		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
103	Thazi / Pyinyaung	1080	-	150	150	-	-	100	144	1624	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
104		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
105	Thazi / Pyinyaung	1080	120	30	100	-	-	150	120	1600	√	-	-	-	-	-	-	-	√	-	Electric	Fire Wood	-
106		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
107		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
108		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
109	Thazi / Pyinyaung	1080	-	-	100	-	-	40	-	1220	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
110		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
111		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
112	Thazi / Pyinyaung	1260	1000	80	500	150	-	200	1800	4990	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
113		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
114		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
115		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
116		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
117	Thazi / Pyinyaung	1400	100	120	100	-	-	150	156	2026	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
118		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
119		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
120		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
121		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
122	Thazi / Pyinyaung	2880	50	500	700	-	-	600	-	4730	√	-	-	-	-	-	-	-	√	-	Electric	Fire Wood	-
123		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
124		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
125		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
126		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
127		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
128		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
129	Thazi / Pyinyaung	2800	2000	100	300	-	-	300	300	5800	√	-	-	-	-	-	-	-	-	-	0wn Generator	Fire Wood	-
130		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
131		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
132		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
133		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q-8									Q-9					Q-10					Q-11		
		Expenses (Average per year x1000)									Drinking Water					Electricity					If electricity is not available what are the current energy sources?		
		Food	Educat-ion	Health	Social/ Religion	House repair	Farm Inputs	Domestic use and cloths, etc.	Others	Total	River/ Stream	Open Well	Lake	Tube Well	Pipe Line	24 hour	12 hour	6 hour	3 hour	None	Lightion	Fuel	Others
134		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
135		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
136		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
137	Thazi / Pyinyaung	1500	500	300	300	200	-	500	300	3600	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
138		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
139		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
140		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
141		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
142	Thazi / Pyinyaung	1600	200	300	150	-	-	-	260	2510	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
143		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
144		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
146		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
147		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
148	Thazi / Pyinyaung	720	150	150	100	-	-	150	144	1414	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
149		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
150		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
151		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
152	Thazi / Pyinyaung	900	35	-	200	-	-	100	70	1305	√	-	-	-	-	-	-	-	√	-	Generator	Fire Wood	-
153		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
154		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
155		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
156		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Total		53090	17385	4085	7515	450	35	6250	4784	93594	29							3	21		28		

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
1	Thazi / Kubyin	-	-	-	-	√	-	√	-	-	-	-	-	-	-	-	-	√	-	√	-	√
2		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	Thazi / Kubyin	-	-	-	-	√	-	-	√	-	-	-	-	-	-	-	√	-	-	√	-	√
7		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Thazi / Kubyin	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-	-	√	-	√
12		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
19	Thazi / Kubyin	-	-	-	-	√	√	√	-	√	-	-	-	-	-	-	√	-	√	-	√	-
20		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	Thazi / Kubyin	-	-	-	-	√	√	-	-	-	-	-	-	-	-	-	-	-	-	√	√	-
25		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	-	-	√	-	√	-
27		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	√	-	-	√	-	√	-
32		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
39	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	√	-	-	-	-	-	√	-	-	√	-	√	-
40		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42		-	-	-		-	-	-	-	-	-	-	-	-		-	-	-		-	-	-
43	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	√	-	-	-	-	-	√	-	-	√	-	√	-
44		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47		-	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
48		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	Thazi / Pyinyaung	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-	√	-	√
50		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	Thazi / Pyinyaung	-	-	-	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	√	-
54		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	Thazi / Pyinyaung	-	-	-	-	√	√	-	-	-	-	-	-	-	-	-	-	-	√	-	√	-
57		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
58		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
59		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
64		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
69		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	√	-	-	-	-	-	-	-	√	√	-	√	-
71		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
75	Thazi / Pyinyaung	-	-	-	-	√	√	-	-	-	-	-	-	-	-	-	√	-	√	-	√	-
76		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
77		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
78		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
81	Thazi / Pyinyaung	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
83		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
85		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
86		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
87	Thazi / Pyinyaung	-	-	-	-	-	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
88		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
89		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
92		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
93	Thazi / Pyinyaung	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	-	√	-	√
94		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
95	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
96		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
98		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
99		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
102		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
104		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
106		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
107		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
109	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
110		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
111		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
		Government	Private	Village Lighting Committee		Ligh-ting	TV	Video	Radio	Refrige-rator	Electric Motor	Other	Agricul-ture	Chicken farm	Restau-rant	Home industry	No idea	Others	For initial cost		For monthly	
		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
112	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
113		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
115		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
116		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
117	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
118		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
122	Thazi / Pyinyaung	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	√	-	√	-
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125		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
127		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
128		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	√	-	-	-	-	-	-	√	-	√	-	√	-
130		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
133		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix - (B-2) Questionnaries for Household data of Indirect Affected Area

Sr.No	Township/ Village	Q- 12			Q-13	Q-14							Q-15						Q-16			
		Where you get electricity?			Average electricty use per month total unit	The use of present electric appliances							If you can electricity in future, what kind of productive activities will you start by using electricity						For new electricity Services			
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		Unit rate (Kyat)	Unit rate (Kyat)	Unit rate (Kyat)															Yes	No	Yes	No
134		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
136		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
137	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
138		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
139		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
141		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
142	Thazi / Pyinyaung	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	√	-	√	-
143		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
144		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
145		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
147		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
148	Thazi / Pyinyaung	-	-	-	-	√	√	√	-	-	-	-	-	-	-	-	√	-	√	-	√	-
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150		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
151		-	-	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
152	Thazi / Pyinyaung	-	-	-	-	√	-	-	-	-	-	-	-	-	-	-	√	-	√	-	√	-
153		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
154		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
155		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
156		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total						26	21	18	2	5									4	5	3	2

Appendix B - 3

Photo-1 : Interview with Pyi Nyaung Village administrators party

Photo-2 : Interview with residents of Ku Byin Village

Photo-3 : Households interview of Ku Byin Village

Photo-4 : Households interview at Ku Byin Village

Photo-5: Interview with residents of Pyi Nyaung Village at Pyi Nyaung Village

Photo-6 : Interview with residents of Pyi Nyaung Village at Pyi Nyaung Village

Photo-7 : Interview with residents of Pyi Nyaung Village

Photo-8 : Interview with residents of Pyi Nyaung Village

Photo-9 : : Interview with residents of Pyi Nyaung Village

Photo-10 : : Interview with residents of Pyi Nyaung Village

Photo-11 : : Interview with residents of Pyi Nyaung Village

Photo-12 : Interview with residents of Pyi Nyaung Village

Photos of Study Area

Photo-1 : The pagoda at Pyi Nyaung village

Photo-2 : Meikhtila – Thazi – Kalaw high way

Photo-3 : Monastery at Pyi Nyaung village

Photo-4 : Monastery at Pyi Nyaung village

Photo-5 : B.E.M.S at Pyi Nyaung village

Photo-6 : B.E.M.S at Pyi Nyaung village

Photos of Study Area

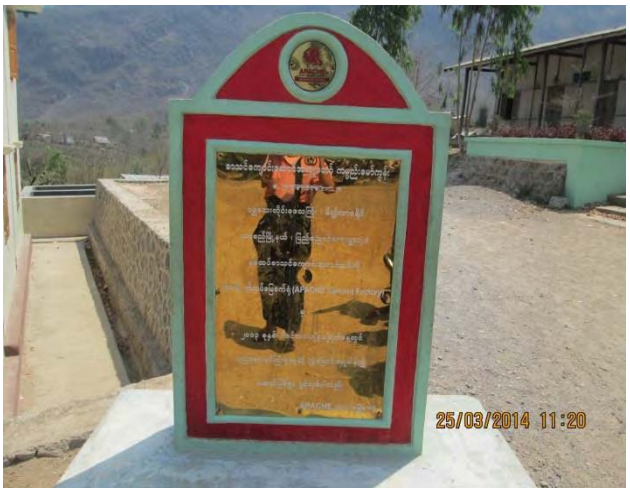


Photo-7 : Stone inscription of APACHE Cement Plant's donation

Photo-8 : BEHS at Pyi Nyaung village

Photo-9 : Max Cement Company Limited at Pyi Nyaung village

Photo-10 : Htoo International Industry Group Company at Pyi Nyaung village

Photo-11 : USDP of Pyi Nyaung village

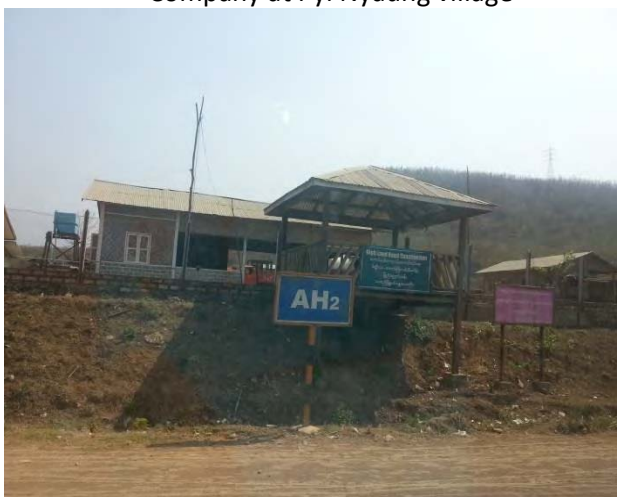


Photo-12 : High Land Road Construction

Photos of Study Area

Photo-13 : Convenience store and mini market at Pyi Nyaung village

Photo-14 : Coffee shop at Pyi Nyaung village

Photo-15 : Bridge at the Pyi Nyaung

Photo-16 : Banana trees at Pyi Nyaung village

Photo-17 : House at Pyi Nyaung village

Photo-18 : House at Pyi Nyaung village

Photos of Study Area

Photo-19 : Monastery at Ku Byin village

Photo-20 : Church at Ku Byin village

Photo-21 : Stone inscription of Church

Photo-22 : BEPS at Ku Byin village

Photo-23 : The children Buddha training at monastery

Photo-24 : Discussion at the administrator of Ku Byin village

Photos of Study Area

Photo-25 : Street at Ku Byin village

Photo-26 : Ku Byin Creek

Photo-27 : Houses in Ku Byin village

Photo-28 : Houses in Ku Byin village

Photo-29 : Forest plantation at Ku Byin village

Photo-30 : The point of view of Tha Pyae Hill from Ku Byin village

APPENDIX - C

SHWE TAUNG CEMENT FACTORY PROJECT

FLORA REPORT

April 2014

SHWE TAUNG CEMENT FACTORY PROJECT

FLORA REPORT

I. INTRODUCTION

1.1 Background history

The Project area is located in the Kupyin Resrve Forest, Pyinyaung Village tract, Thasi Township, Meiktila District, Mandalay Division. The area is compost of four separate parts: the factory area 161.87 hectare (400 acre), limestone mining area 242.8 hectare (600 acre), mudstone mining area 66.77 hectare (165 acre) and mudstone mining and weir 28.7 hectare (71 acre). The total project area is therefore 500.19 hectare (1236 acre).

The project operation system also include two separate processes: cement production and limestone and mudstone mining. Limestone and mudstone are raw material for cement production.

1.2 Climate

The climate is monsoonal. Since the area lies at the elevation of 310m and 770m, the lowest temperature measured are 39°C in March/April and 5°C in December/January. The total precipitation during raining season ranges from 1000mm to 2500mm.

1.3 Wind

During Monsoon season the wind blows from the southwest and in the cool season from the northeast.

1.4 Geology

The area is composed of dolomitic limestone which is formed as a lion share in north-south trending ridge from northern Kyaukket Taung to southern Thapyay Taung and calcitic limestone which is formed in northern and eastern part of Kyauket Taung and southern part of Thapyay Taung. So calcitic limestone in the area is composed nearly half of the whole ridge. Since the project mining site is located in Thapyay Taung area, the type of limestone may be calcitic which is rich in calcium oxide.

1.5 Population

Since the project area is located in the reserve forest, there is only village, named Kupyin village 3.2 kilometer (2 miles) away from the project site. This village was planned to relocate outside the reserve forest. There are 54 families comprising 264 peoples.

The Pyinyaung village is located side the forest reserve, 6 kilometer (3.6 miles) away from the project site. There are -------- families comprising 2427 peoples. Most of them are Danu, Kayin and Myanmar.

The livelihood of the villager is shifting cultivation of crops, fire-wood cutting and selling, Bamboo and bamboo products production.

1.6 Kupyin Reserve Forest

The Kupyin Reserve forest was founded since the colonial period. The total forest area including extension was 11800 hectare (29158 acre). It was subdivided into 56 blocks for timber extraction. The timber extraction was started since in colonial period. It is seem to follow the Myanmar Selection System to sustain timber yield and to conserve the natural forest. Myanmar Selection System (MSS) was a worldwide famous system for sustainable timber yield. The extracting of timber one block for one year would take 30 years round for one cycle, definitely ensure sustainable timber yield according to MSS. The evidence for this may be seen still existing of rounded about 78 teak trees with 155cm in GBH and 7.6m in height near Kupyin village. These teak trees may be 100 years old.

According to terrestrial Eco-regions of the Indo-Pacific (WWF), Kupyin Reserve Forest lies within the eco-region of Irrawaddy Moist Deciduous Forest and quite close to the Northern Indochina Subtropical Forest. So that the area is rich in limestone unlike Irrawaddy series which is rich in the fluvial sand with silicified wood fossil.

Topographically the forests are found on well-drained hilly or undulating land up to 800m or more. The common species are teak, Pyinkado, ***Pterocarpus macrocarpus,*** (the characteristic is species of northern Indochina subtropical forest) and high Indaing, ***Dipterocarpus tuberculatus, Shorea*** species (the characteristic of Irrawaddy). Bamboo species, such as ***Bambusa*** spp., ***Dendrocalamus*** species and ***Cephalostachyum*** spp. are also rich in this area.

1.7 Limestone Habitat

Limestone habitats are famous for supporting rare plants and animals. (Tony Whitten: WWF.2000) Therefore limestone habitat deserves special attention from conservationists because of extreme biological specialization of species found there. The prominent characteristics of limestone habitat are

(1) The fossil coral reef in the lowland of Southeast Asia now stands as an impressive forested limestone outcrop. This limestone outcrops host a large fauna of land snails.

(2) The limestone cave system in Indonesia comprises ponds and puddles which are the unique habitat of minute blind crustaceans, delicate pink fishes with minute eyes, pygmy crabs with long appendages and aquatic arthropods. These animals are totally dependent on the cave system.

(3) The slipper orchid ***Paphiopedilum sunderianum*** grow in limestone hills of Sarawak. The attractive plants such as gesneriads and balsams grow on limestone in restricted range.

The biodiversity of limestone has important direct and indirect economic benefit as well as cultural and aesthetic values. The swiftest and bats dwelling in limestone cave contributes organic fertilizer to farmlands. The limestone reservoirs also provide hundreds people with clean drinking water.

Limestone landscapes and caves are important tourist attractions. The caves often are the side source of archaeological information and the cave deposits contain information about past climates as well as fossils for geologists.

It is important to consider those limestone environments are highly interactive ecological systems of water, air, soil, rock, life and energy. The integrity of limestone environments depends on these interactions.

The location and protection of areas with high biodiversity value should be part of any project that includes the exploitation of limestone resource. The limestone hills with underground water-course should be ovoid. The isolated limestone hills (remote from other hills) for exploitation should be avoided because the most isolated hills tend to host the largest number of species endemic to one particular hill.

II. AIMS AND OBJECTIVES

1. To collect, identify and list the plant species in the area.
2. To record the dominant tree species and evaluate the forest types.
3. To identify the threats and environmental impact in the area.
4. To collect the ecological data and evaluate the existing ecosystem.
5. To identify and record the endangered species in the studied area.

III. MATERIALS AND METHODS

3.1 Method

The floristic data and ecological data collection were conducted by the following methods in the study Area.

3.1.1 Sample Ploting

The Global Positioning System was used to navigate and mark the coordinates of the sample plots. In order to obtain essential data for predicting of tree species composition in the mangrove forest, 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.

3.1.2 Random Transecting

To get representative checklists of the plant species, collection was also carried out by random transect lines within the direct impact zone and indirect impact zone of the project site.

3.1.3 Maping

Location maps are set by the method based on the Google map and mark the GPS position of vegetation survey.

3.2 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), 10x lens, permanent marker, field note books, field press, drying press and dryers.

3.3 Data Analysis

After field survey, data entry was carried out in excel work sheet. Analysis of population per hectare percentage was conducted using excel work 2007.

3.3.1 Population of individual species (Per hectare)

The population of species will show not only the composition of species but also the richness of the species in the study area. According to R.He'dl, M Sva'tek, M. Dancak, Rodzay A.W., M. Salleh A.B., Kamariah A.S.(2009), population of individual species (per hectare) is determined by following formula.

$$\text{Population of Individual Species} = \frac{\text{Total Individual species}}{\text{Total Plots Area } (m^2)} \times 10000 m^2 (1ha)$$

3.3.2 Relative Density of Tree specis

The density of a species refers to the numerical representation of its individual and the availability of space in a unit area. The density index shows not only the richness of the texa but also the relative distribution of the individuals. According to Curtis (1959), the density index is determined by the following formula.

$$\text{Relative Density of Tree species} = \frac{\text{No. of Individual species}}{\text{Total no. of all individual Species}} \times 100$$

3.3.3 Relative frequency of Tree species

The relative frequency of a species refers to the percentage occurrence of its individuals and shows the frequency of different species growing in the study area. The species which fall in high frequency class can be considered as the most common species in the study area. According to Curtis (1959), the relative frequency is determined by the following formula.

$$\text{Relative frequency of Tree species} = \frac{\text{No. of sample plot occurs}}{\text{Total no. of all species occur}} \times 100$$

3.3.4 Species distribution by frequency class

According to Raunkiaer's Law of frequency (1934), each species was grouped into one of five frequency class (FC); Frequency range (1-20%) represents rare species, (20 - 40%) represents seldom species, (40 - 60%) represents often species, (60 - 80%) represents mostly species, and (80 - 100%) represents constantly present species. This frequency class will also clarify the homogeneity or heterogeneity of the floristic distribution in the study area.

3.3.5 Tree species in GBH class interval

Tree species in GBH class interval is calculated by

$$\text{Population of GBH class interval} = \frac{\text{No. of species}}{\text{Total no. of all species}} \times 100$$

Low GBH class interval shows the degraded and secondary forest height GBH class interval shows the primary forest.

3.3.6 Tree species in Height class interval

Tree species in Height class interval is calculated by

$$\text{Population of Height class interval} = \frac{\text{No. of species}}{\text{Total no. of all species}} \times 100$$

Low height class interval shows the degraded and secondary forest and high height class interval shows the primary forest.

IV. PARTICIPANTS

(1) Dr. Win Myint (Associated Professor, ex.), Ecologist

(2) U Nyo Maung (Retired Professor), Taxonomist

(3) Dr. Ei Ei Phyoe (Taxonomist)

(4) U Tun Thura (Botanist & GIS/RS)

V.RESULTS

Deciduous Forest

Indine Forest

Teak Plantation

Bamboo Forest

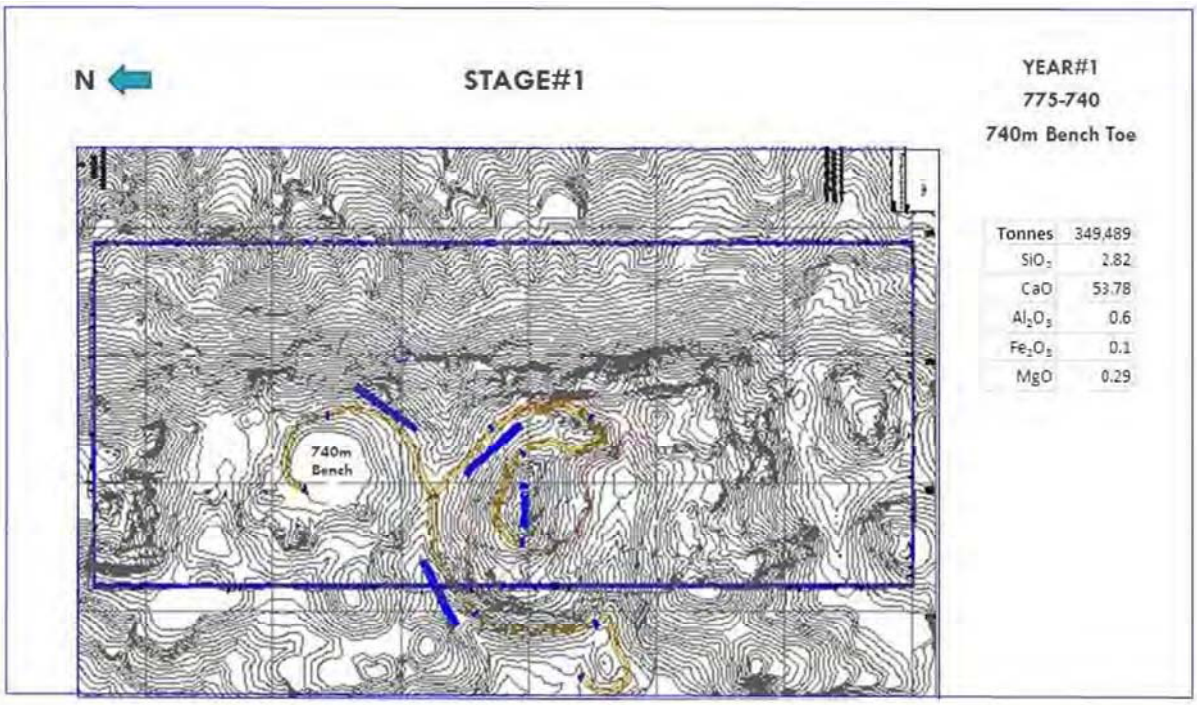
Teak Plantation near Kupyin Village

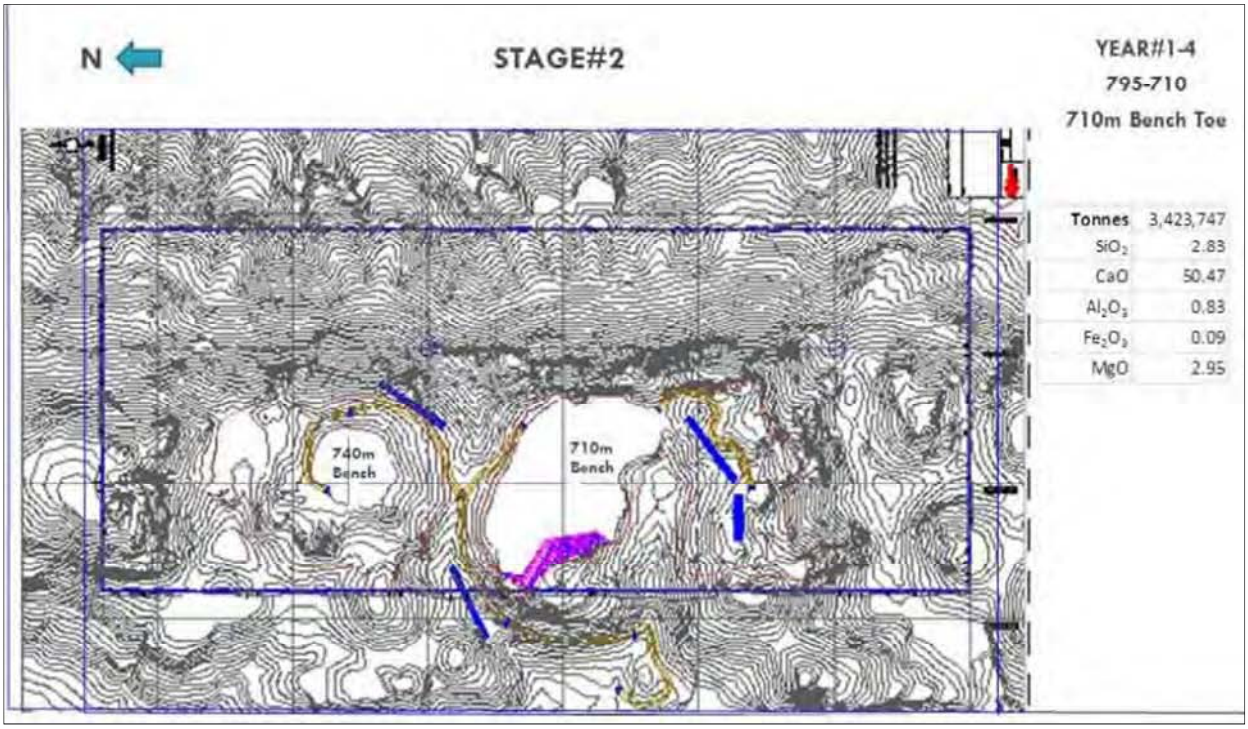
5.1 Present Vegetation

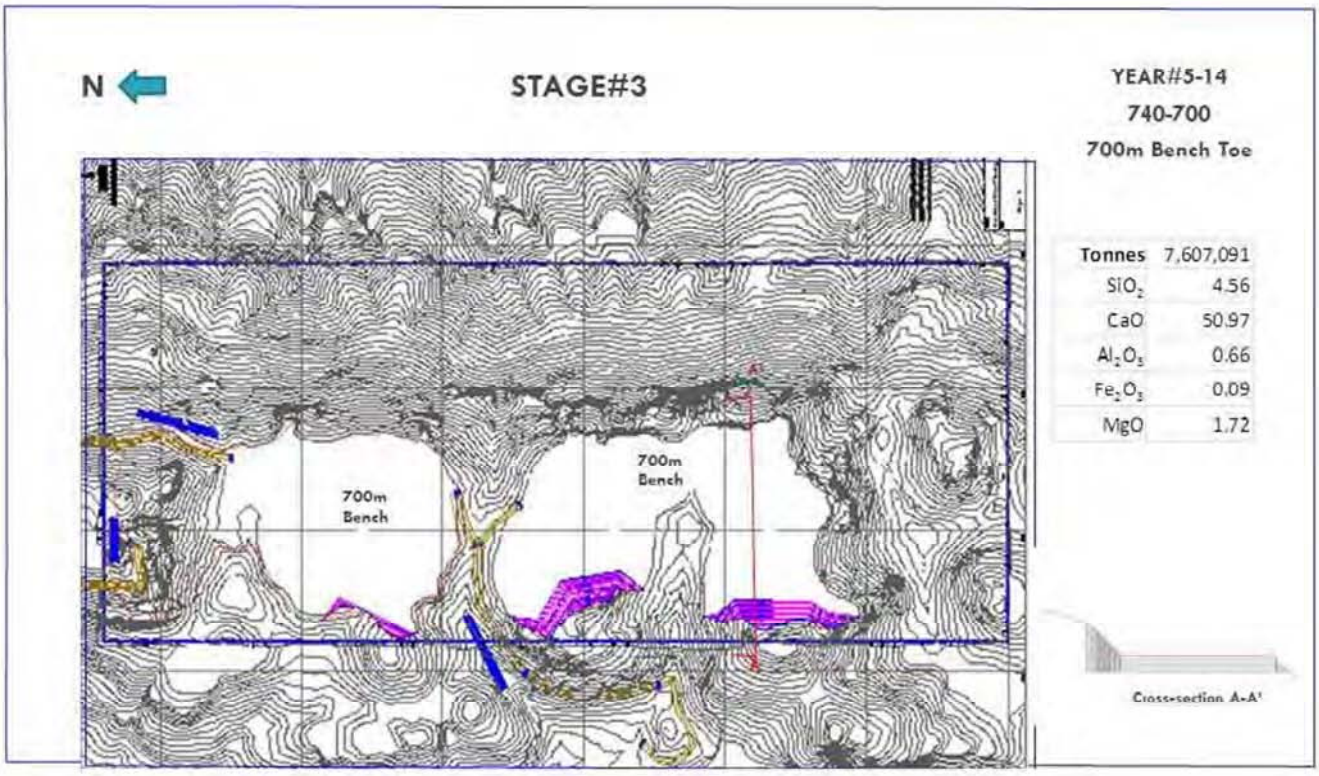
The project area (including factory area and mining area) is lying within the Kyauket Taung, Nwalabo Taung and Thapyay Taung Ranges. The forest cover within these area is mostly Deciduous Forest, occupied by Dipterocarpus Forest (Indine forest). The area, dissolved by the project will be 11800 hectre (29158 Acre) which will occupied block No. 14+15+16+17+26+27+29 of the Kupyin reserved forest (Map I, II & III). The major tree species within the area are ***Dipterocarpus tuberculatus*** (In)***, Shorea obtusa*** (Thit-ya), ***Shorea siamensis*** (In-gyin), ***Avogeissus accuminata*** (Yon), ***Dalbergia cultrata*** (Yin-daik), ***Pterocarpus microcarpus*** (Pa-dauk), ***Bombax sp:*** (Let-pan) and ***lannea sp:*** (Na-be), close to this area is the flattened plain. The land cover of flattened plain is occupied by degraded forest with bamboo patches and composed of economically valued tree species such as ***Tectona grandis*** (Kyun), ***Xylia xylocarpa*** (Pyin-ka-do).

It was learnt that Mining operation will take 50 years duration and if necessary another 20 years will be extended. The extraction of limestone will be 2500 ton/day. The 600 acre mining area consist of 3 to 4 hill, at the height of 700 meter to 795 meter (see photo).

The mining system is open-cut mining method. The mining process includes vegetation clearing, topsoil stripping and stock piling, overburden removal, ripping drilling and blasting, waste hauling and dumping (Fig 1, Fig 2, Fig 3)


N
STAGE#1
YEAR#1
775-740
740m Bench Toe
Tonnes 349,489
SiO2 2.82
CaO 53.78
Al2O3 0.6
Fe2O3 0.1
MgO 0.29
740m Bench


N
STAGE#2
YEAR#1-4
795-710
710m Bench Toe
Tonnes 3,423,747
SiO2 2.83
CaO 50.47
Al2O3 0.83
Fe2O3 0.09
MgO 2.95
740m Bench
710m Bench



The impact of mining is very great. There will be total lost of landscape. The hills will become flattened plain or open pit or pit lake and lost forever. The ecosystem and habitat will totally change. The ecosystem services of forest will loss forever.

5.2 List of Species Distribution

No.	Common Name	Scientific Name	Family Name	Habits
1	Ba-du-ma-wa/Wa-nwee	***Dinochloa maclellandii*** Kurz	Poaceae	B
2	Baing	***Tetrameles nudiflora*** R. Br.	Datiscaceae	T
3	Ban-bwe	***Careya arborea*** Roxb.	Lecythidaceae	T
4	Baw-lon-pan	***Scadoxus multiflorus***	Amaryllidaceae	H
5	Baw-za-gaing	***Leucaena leucocephala*** (Lam.) De.Wit	Mimosaceae	ST
6	Be-bya	***Cratoxylum neriifolium*** Kurz.	Hypericaceae	ST
7	Be-bya	***Cratoxylum polyanthum***Korth.	Hypericaceae	ST
8	Bein-new	***Hiptage benghalensis*** (L.) Kurz	Malpighiaceae	ST
9	Bin-ga	***Mitragyna rotundifolia*** (Roxb.) Kuntze	Rubiaceae	T
10	Bi-zet	***Chromolaena odorata*** (L.) R.M. King & H Robinson	Asteraceae	S
11	Bladderwort	***Utricularia*** sp.	Lentibulariaceae	Aq
12	Bon-ma-ya-sa	***Rauvolfia serpentina*** (L.) Benth.	Apocynaceae	H
13	Byauk-o	***Corchorus aestuans*** L.	Tiliaceae	S
14	Dana-thu-kha	***Scoparia dulcis*** L.	Scrophulariaceae	H
15	Dan-gwe	***Senna tora*** (L.***)*** Roxb	Caesalpiniaceae	S
16	Dauk-salat	***Telosma minor*** (Andrews) Craib	Asclepiadaceae	Cl/Cr
17	Daung-ta-laung	***Dalbergia rimosa*** Roxb.	Fabaceae	ST
18	Daung-ta-laung	***Dalbergia volubilis*** Roxb.	Fabaceae	ST
19	Da-yin-kauk	***Cibotium barometz*** (Linn.) J. Sm.	Dicksoniaceae	F

20	De-du	***Bombax insigne*** Wall.	Bombacaceae	T
21	Doe-nwee	***Entada scandens*** Benth.	Mimosaceae	Cl/Cr
22	Done-shaw	***Sterculia ornata*** Wall. ex Kurz	Sterculiaceae	T
23	Floating-leaf Pondweed	***Potamogeton natans*** L.	Potamogetonaceae	Aq
24	Gan-gaw	***Mesua ferrea*** L.	Hypericaceae	ST
25	Gon-kha	***Leptadenia reticulata*** Wight & Arn.	Asclepiadaceae	Cl/Cr
26	Gon-shaw-yine	***Corchorus capsularis*** L.	Tiliaceae	S
27	Gwe-dauk	***Wattakaka volubilis*** (L. f.) Stapf.	Asclepiadaceae	Cl/Cr
28	Gyo	***Schleichera oleosa*** (Lour.) Oken	Sapindaceae	T
29	Gyut-nwe	***Calycopteris floribunda*** Lam.	Combretaceae	Cl/Cr
30	Hin-nu-nwe-yaing	***Amaranthus gracilis*** Desf.	Amaranthaceae	H
31	Hle-sa-nwee	***Connarus paniculatus*** Roxb.	Connaraceae	Cl/Cr
32	Hmo-chin	***Oxalis corniculata*** L.	Oxalidaceae	H
33	Hmyin-wa	***Dendrocalamus membranaceus*** Munro	Poaceae	B
34	Hnaw	***Adina cordifolia*** Hook. f.	Rubiaceae	T
35	Hnin-nu-new-su-bauk	***Amaranthus spinosus*** L.	Amaranthaceae	H
36	Htauk-kyant	***Terminalia alata*** (Heyne) Roth	Combretaceae	T
37	Hti-ka-yone	***Thyrsostachys siamensis*** (Kurz ex Munro) Gamble	Poaceae	B
38	In	***Dipterocarpus tuberculatus*** Roxb.	Dipterocarpaceae	T
39	In-gyin	***Shorea siamensis*** (Kurz) Miq.	Dipterocarpaceae	T
40	Ja-pan-zi	***Muntingia calabura*** L.	Tiliaceae	S
41	Ka-baung-ye-kyi	***Strychnos nux-blanda*** A.W. Hill	Loganiaceae	ST
42	Ka-det	***Crateva magna*** (Lour.) DC.	Capparaceae	ST
43	Ka-di	***Samadera indica*** Gaertn.	Simaroubaceae	ST
44	Ka-du-byan	***Cyanthillium cinereum*** (L.) H. Robinson	Asteraceae	H
45	Ka-lein	***Caesalpinia crista*** L.	Caesalpiniaceae	Cl/Cr
46	Ka-mon-chin	***Acacia concinna*** (Willd.) DC.	Mimosaceae	Cl/Cr
47	Ka-na-soe	***Baccaurea sapida*** Muell. Arg.	Euphorbiaceae	T
48	Ka-thaw-hmwe-htu	***Senna hirsuta*** (L.) Irwin & Barneby	Caesalpiniaceae	S
49	Ka-thit	***Erythrina stricta*** Roxb.	Fabaceae	T
50	Kha-aung	***Ficus hispida*** L.	Moraceae	ST
51	Khat-cho	***Dioscorea bulbifera*** L.	Dioscoreaceae	Cl/Cr
52	Kha-yae	***Mimusops elengi*** L**.**	Sapotaceae	T
53	Kha-yan-gyin	***Lycopersicon esculentum*** Mill.	Solanaceae	Cl/Cr
54	Kha-yan-ka-zawt	***Solanum torvum*** Swartz	Solanaceae	S
55	Khu-san	***Hymenodictyon orixense*** (Roxb.) Mabb.	Rubiaceae	T
56	Khwe-ei-pok-nwee	***Paederia scandens*** Lour.	Rubiaceae	Cl/Cr
57	Khwe-lae-ya	***Mucuna pruriens*** (L.)DC.	Fabaceae	Cl/Cr
58	Khwe-sha	***Trema orientalis***	Ulmaceae	ST
59	Khwe-thay-pan	***Ageratum conyzoides*** L.	Asteraceae	H
60	Kin-pa-lin	***Antidesma velutinum***Tul.	Euphorbiaceae	ST
61	Ko-khe	***Bombax anceps*** Pierre	Bombacaceae	T

62	Kyar-hin-nwe	***Operculina turpethum*** (L.) Silva Mansa	Convolvulaceae	Cl/Cr
63	Kya-thaung-wa	***Bambusa polymorpha*** Munro	Poaceae	B
64	Kyaug-dauk	***Pajanelia longifolia*** (Willd.) K. Schum.	Bignoniaceae	ST
65	Kyauk-nyin-saba/Ye-paw-thay	***Oryza rufipogon*** Griff.	Poaceae	G
66	Kyauk-pan	***Canscora diffusa*** (Vahl) R.Br.	Gentianaceae	H
67	Kyaung-sha	***Oroxylum indicum*** (L.) Kurz.	Bignoniaceae	ST
68	Kye-hmi	***Flemingia congesta*** Roxb.	Fabaceae	S
69	Kyet-ma-oke	***Ardisia humilis*** Vahl	Myrsinaceae	S
70	Kyet-tet-nwee	***Combretum pilosum*** Roxb.	Combretaceae	Cl/Cr
71	Kyet-tha-hin	***Phyllanthus niruri*** L.	Euphorbiaceae	S
72	Kyet-yoe	***Vitex pubescens*** Vahl	Verbenaceae	T
73	Kyi-hnok-thi-khayan	***Thunbergia laurifolia*** Lindl.	Acanthaceae	Cl/Cr
74	Kyi-hnok-thi-phyu	***Thunbergia grandiflora*** (Roxb. ex Rottl.) Roxb.	Acanthaceae	Cl/Cr
75	Kyi-paung	***Loranthus pulverulentus*** Wall.	Loranthaceae	E
76	Kyun	***Tectona grandis*** L. f.	Verbenaceae	T
77	Kywe-kyaung-hmin-se	***Euphorbia hypericifolia*** L.	Euphorbiaceae	H
78	Kywet-nwee	***Getonia floribunda*** Roxb.	Combretaceae	Cl/Cr
79	Lae-sa	***Lagerstroemia tomentosa*** Presl.	Lythraceae	T
80	Lauk-thay	***Tadehagi triquetrum*** (L.)H. Ohashi	Fabaceae	S
81	Lay-nyin-gyi	***Ludwigia octovalvis***	Onagraceae	H
82	Lay-nyin-thay	***Ludwigia hyssopifolia***	Onagraceae	H
83	Lein-pin	***Terminalia pyrifolia*** Kurz	Combretaceae	T
84	Let-htok-thein	***Wrightia arborea*** (Dennst.) Mabb.	Apocynaceae	ST
85	Let-khok	***Sterculia foetida*** L.	Sterculiaceae	T
86	Let-pan	***Bombax ceiba*** L.	Bombacaceae	T
87	Mae-zae	***Madhuca longifolia*** (Koen.) Macbride	Sapotaceae	ST
88	Ma-gyi	***Tamarindus indica*** L.	Caesalpiniaceae	T
89	Magyi-bauk	***Vangueria spinosa*** Roxb.	Rubiaceae	S
90	Ma-hlwa	***Markhamia stipulata*** (Wall.) Seem.ex K.Schum.	Bignoniaceae	ST
91	Ma-u	***Nauclea orientalis*** L.	Rubiaceae	T
92	Ma-u-let-tan-shae	***Anthocephalus morindaefolius*** Korth.	Rubiaceae	T
93	Ma-yanin-kyet-su	***Zanthoxylum budrunga*** Wall.	Rutaceae	T
94	Ma-yoe	***Calotropis gigantea*** (L.) Dryand. ex W.T. Aiton	Asclepiadaceae	S
95	Min-ko-ka	***Argyreia barbigera*** Choisy	Convolvulaceae	Cl/Cr
96	Myauk-chaw	***Homalium tomentosum*** Benth	Flacourtiaceae	T
97	Myauk-hle-kha	***Bauhinia ornata*** Kurz	Caesalpiniaceae	Cl/Cr
98	Myauk-ngo	***Duabanga grandiflora***	Lythraceae	T
99	Myay-sa	***Cynodon dactylon*** (L.) Pers.	Poaceae	G
100	Myay-zi-phyu	***Phyllanthus urinaria*** L.	Euphorbiaceae	H
101	Myet-cho	***Cyanotis barbada D.Don.***	Commelinaceae	H
102	Myin-khwa	***Hydrocotyle sibthorpioides*** Thunb	Apiaceae	H
103	Na-be	***Lannea coromandelica*** (Houtt.) Merrr.	Anacardiaceae	T

104	Nan-lon-kyaing	***Acacia farnesiana*** (L.) Willd.	Mimosaceae	ST
105	Na-sha-gyi	***Cryptolepis buchanani*** Rome.& Schult	Asclepiadaceae	Cl/Cr
106	Na-ywe	***Flacourtia cataphracta*** Roxb.	Flacourtiaceae	T
107	Nga-yan-padu	***Clerodendrum siphonanthus*** R.Br	Verbenaceae	S
108	Ngu	***Cassia fistula*** L.	Caesalpiniaceae	T
109	Ni-ba-sae	***Morinda tinctoria*** Roxb.	Rubiaceae	S
110	Not known	***Argyreia nervosa***	Convolvulaceae	Cl/Cr
111	Not known	***Combretum alfredii*** Hance	Combretaceae	S
112	Not known	***Drynaria quercifolia***	Polypodiaceae	F
113	Not known	***Firmiana kerrii***	Sterculiaceae	ST
114	Not known	***Hydrolea zeylanica*** (L.) Vahl	Hydrophyllaceae	H
115	Not known	***Justicia procumbens***L.	Acanthaceae	S
116	Not known	***Lepidagathis semiherbacea*** (Clarke) Nees	Acanthaceae	H
117	Not known	***Lygodium japonicum*** (Thunb.) Sw.	Lygodiaceae	F
118	Not known	***Mazus pumilus*** (Burm.f.)Steenis	Scrophulariaceae	H
119	Not known	***Myriopteron extensum*** (Wight) K. Schum.	Asclepiadaceae	Cl/Cr
120	Not known	***Solanum verbascifolium*** L.	Solanaceae	S
121	Not known	***Spermacoce mauritiana***	Rubiaceae	H
122	Not known	***Sterculia oblongata***	Sterculiaceae	ST
123	Not known	***Polygonum*** sp.	Polygonaceae	H
124	Nwee-chin	***Merremia hirta***	Convolvulaceae	Cl/Cr
125	Nwee-cho	***Albizia myriophylla*** Benth.	Mimosaceae	T
126	Nyaung	***Ficus benghalensis***	Moraceae	ST
127	Nyaung-chin-phu	***Ficus virens*** Aiton	Moraceae	T
128	Nyaung-gyat	***Ficus obtusifolia*** Roxb.	Moraceae	T
129	Ok-shit	***Aegle marmelos*** L.	Rutaceae	T
130	On-don	***Litsea monopetala*** (Roxb.) Pers	Lauraceae	T
131	Pa-dauk	***Pterocarpus macrocarpus*** Kurz	Fabaceae	T
132	Pa-det-sa	***Kaempferia candida*** Wall.	Zingiberaceae	H
133	Pan-zauk-htoe	***Crassocephalum crepidioides*** (Benth.) S. Moor.	Asteraceae	H
134	Pauk	***Butea monosperma*** (Lam.) Kuntze	Fabaceae	T
135	Pauk-nwee	***Butea superba*** Roxb.	Fabaceae	Cl/Cr
136	Pa-zun-sa-yaing	***Alternanthera sessilis*** (L.) R.Br.	Amaranthaceae	H
137	Peik-swe	***Typha angustifolia*** Chaub. & Bory	Typhaceae	Aq
138	Pein-yaing	***Colocasia esculenta***	Araceae	H
139	Pe-le-nyin	***Acmella calva*** (DC.) R.K. Jansen	Asteraceae	H
140	Pha-lan-taung-hmwe	***Costus speciosus*** Sm.	Costaceae	H
141	Phan-kha	***Terminalia chebula*** Retz.	Combretaceae	T
142	Phet-than	***Heterophragma adenophyllum*** Seem.	Bignoniaceae	T
143	Phon-ma-thein	***Blume balsamifera*** DC..	Asteraceae	S
144	Pilaw-agyi	***Melochia corchorifolia*** L.	Sterculiaceae	H
145	Pwe-gaing	***Senna alata*** L.	Caesalpiniaceae	S

146	Pyan-u	***Amorphophallus paeoniifolius*** (Dennst.) Nicolson	Araceae	H
147	Pyauk-seik	***Holoptelea integrifolia*** Planch.	Ulmaceae	T
148	Pyin-ka-doe	***Xylia xylocarpa*** (Roxb.)Taub.	Mimosaceae	T
149	Pyin-ma	***Lagerstroemia speciosa*** (L.) Pers.	Lythraceae	T
150	Sa-ba-wa/Myo-pwar-saba/Lon-pu-saba	***Oryza sativa*** L.	Poaceae	G
151	Seik-phu	***Boesenbergia rotunda*** (L.) Mansf.	Zingiberaceae	H
152	Sein-pan-gyi	***Delonix regia*** (Bojer ex Hook) Rafin.	Caesalpiniaceae	T
153	Sha-saung-la-pet	***Aloe vera*** L.	Aloaceae	H
154	Shaw	***Sterculia urens*** var. ***thorelii***	Sterculiaceae	T
155	Shaw-phyu	***Sterculia versicolor*** Wall.	Sterculiaceae	T
156	Shin-ma-tet	***Asparagus racemosus*** Willd.	Asparagaceae	Cl/Cr
157	Sin-don-ma-nwee	***Tinospora nudiflora*** Kurz	Menispermaceae	Cl/Cr
158	Sit-se	***Melanorrhoea usitata*** Wall.	Anacardiaceae	T
159	Su-bok	***Acacia intsia*** Willd.	Mimosaceae	Cl/Cr
160	Su-gyin	***Harrisonia perforata*** Merr.	Simaroubaceae	S
161	Swe-daw	***Bauhinia variegata*** L.	Caesalpiniaceae	ST
162	Swe-daw-phyu	***Bauhinia acuminata*** L.	Caesalpiniaceae	ST
163	Ta-bin-taing-mya-naing	***Vitis discolour***	Vitaceae	Cl/Cr
164	Ta-byet-si	***Sida acuta*** Burm f.	Malvaceae	S
165	Ta-ma-lan	***Dalbergia oliveri*** Gamble	Fabaceae	T
166	Taung-htan	***Livistona*** sp.	Arecaceae	T
167	Taung-kya	***Stephania venosa*** (Blume) Spreng.	Menispermaceae	Cl/Cr
168	Taung-ma-gyi	***Albizia lebbekoides*** (DC.) Benth.	Mimosaceae	T
169	Taung-pein-ne	***Artocarpus lakoocha***	Moraceae	T
170	Taung-poe-lu-lin	***Ehretia acuminata*** R.Br	Boraginaceae	T
171	Taung-tha-yet	***Mangifera sylvatica*** Roxb.	Anacardiaceae	T
172	Taw-gwe	***Spondias pinnata*** (L. f.) Kurz.	Anacardiaceae	T
173	Taw-ma-zeli	***Senna timoriensis*** (DC.) Irwin & Barneby	Caesalpiniaceae	T
174	Taw-pyin-taw-thein	***Clausena excavata*** var.***villosa*** Hook. f.	Rutaceae	S
175	Taw-shauk	***Atalantia monopyhlla*** A.DC.	Rutaceae	S
176	Taw-tha-na-kha	***Anacolosa griffithii*** Mast.	Olacaceae	ST
177	Ta-yoke-saga-ni	***Plumeria rubra*** L.	Apocynaceae	S
178	Ta-yoke-saga-phyu	***Plumeria obtusa*** L.	Apocynaceae	S
179	Ta-yoke-saga-wa	***Plumeria acutifolia*** Poir	Apocynaceae	S
180	Tha-but-gyi	***Uvaria cordata*** Schum. & Thonn.	Annonaceae	ST
181	Tha-but-kha	***Luffa aegyptiaca*** Mill.	Cucurbitaceae	Cl/Cr
182	Tha-bye	***Syzygium grande*** (Wight) Walp	Myrtaceae	ST
183	Tha-khut	***Dolichandrone spathacea*** (L. f.) K. Schum.	Bignoniaceae	T
184	Tha-ma-ga-nwee	***Congea tomentosa*** Roxb.	Verbenaceae	Cl/Cr
185	Than	***Terminalia oliveri*** Brandis	Combretaceae	T
186	Tha-net	***Cordia myxa*** L.	Boraginaceae	T
187	Tha-net-wa	***Thyrsostachys oliveri*** Gamble	Poaceae	B

188	Tha-phan	***Ficus racemosa***	Moraceae	T
189	Tha-yin-gyi	***Croton oblongifolius*** Roxb.	Euphorbiaceae	ST
190	Theik-wa	***Bambusa tulda*** Roxb.	Poaceae	B
191	Thet-ke	***Imperata cylindrica***	Poaceae	G
192	Thin-win	***Millettia ovalifolia*** Kurz	Fabaceae	T
193	Thit-ni/Hta-min-chauk	***Wendlandia tinctoria*** DC.	Rubiaceae	ST
194	Thit-pa-gan/Taung-tha-bye	***Tristaniopsis burmanica*** (Griff.) P.G. Wilson & J.T. Waterh.	Myrtaceae	T
195	Thit-pok	***Dalbergia kurzii*** Prain	Fabaceae	T
196	Thit-seik	***Terminalia bellirica*** (Gaertn) Roxb.	Combretaceae	T
197	Thit-tet-lin-nae	***Cymbidium aloifolium*** (L.)Sw.	Orchidaceae	E
198	Thit-ya	***Shorea obtusa*** Wall.	Dipterocarpaceae	T
199	Tin-wa	***Cephalostachyum pergracile*** Munro	Poaceae	B
200	Wa-da-let/Wa-gauk	***Oxytenanthera albociliata*** Munro	Poaceae	B
201	Wa-net	***Dendrocalamus longispathus*** (Kurz) Kurz	Poaceae	B
202	Wa-yaung-chin	***Cissus discolor*** Blume	Vitaceae	Cl/Cr
203	Wet-chi-pa-ne	***Urena lobata*** L.	Malvaceae	S
204	Win-u	***Millettia extensa*** Benth.	Fabaceae	Cl/Cr
205	Ye-ma-nae	***Gmelina arborea*** Roxb.	Verbenaceae	T
206	Ye-mo-ma-kha	***Homonoia riparia***	Euphorbiaceae	S
207	Yin-daik	***Dalbergia cultrata*** Grah**.**	Fabaceae	T
208	Yin-khat-gyi	***Gardenia coronaria*** Buch-Ham.	Rubiaceae	T
209	Yin-ku	***Quercus mespilifolia*** Wall.	Fagaceae	T
210	Yin-ma	***Chukrasia velutina*** Roem.	Meliaceae	T
211	Yon	***Anogeissus acuminata*** Wall.	Combretaceae	T
212	Zaung-pa-lae	***Lagerstroemia parviflora*** Roxb.	Lythraceae	T
213	Za-yit	***Lasia aculeata*** Lour.	Araceae	H
214	Zi	***Ziziphus jujuba*** Lam.	Rhamnaceae	ST
215	Zin-byun	***Dillenia pentagyna*** Roxb.	Dilleniaceae	T
216	Zi-phyu	***Phyllanthus emblica*** L.	Euphorbiaceae	ST

Aq=Aquatic, B=Bamboo, Cl/Cr=Climber/Creeper, E=Epiphyte, F=Fern, G=Grass, H=Herbs, S=Shrubs, ST=Small Tree, T=Tree

5.2.1 Endangered tree species in the catchment area according to IUCN list

No.	Scientific Name	Family Name	Vernacular Name	IUCN criteria
1	***Dalbergia cultrata*** Grah.	Fabaceae	Yin-daik	EN A 1cd
2	***Dalbergia oliveri*** Gamble	Fabaceae	Ta-ma-lan	EN A 1cd

EN =ENDANGERED

5.2.2 Ecological Analysis

5.2.2.1 Floristic composition

The total number of tree species collected in 8 representative sample plots in this area is 28 species belonging to 26 genera. The dominant tree species in this area are ***Dipterocarpus tuberculatus*** Roxb. (In) followed by ***Shorea obtusa*** Wall. (Thit-ya) and ***Shorea siamensis*** (Kurz) Miq., (In-gyin), ***Millettia ovalifolia*** Kurz (Thin-win).

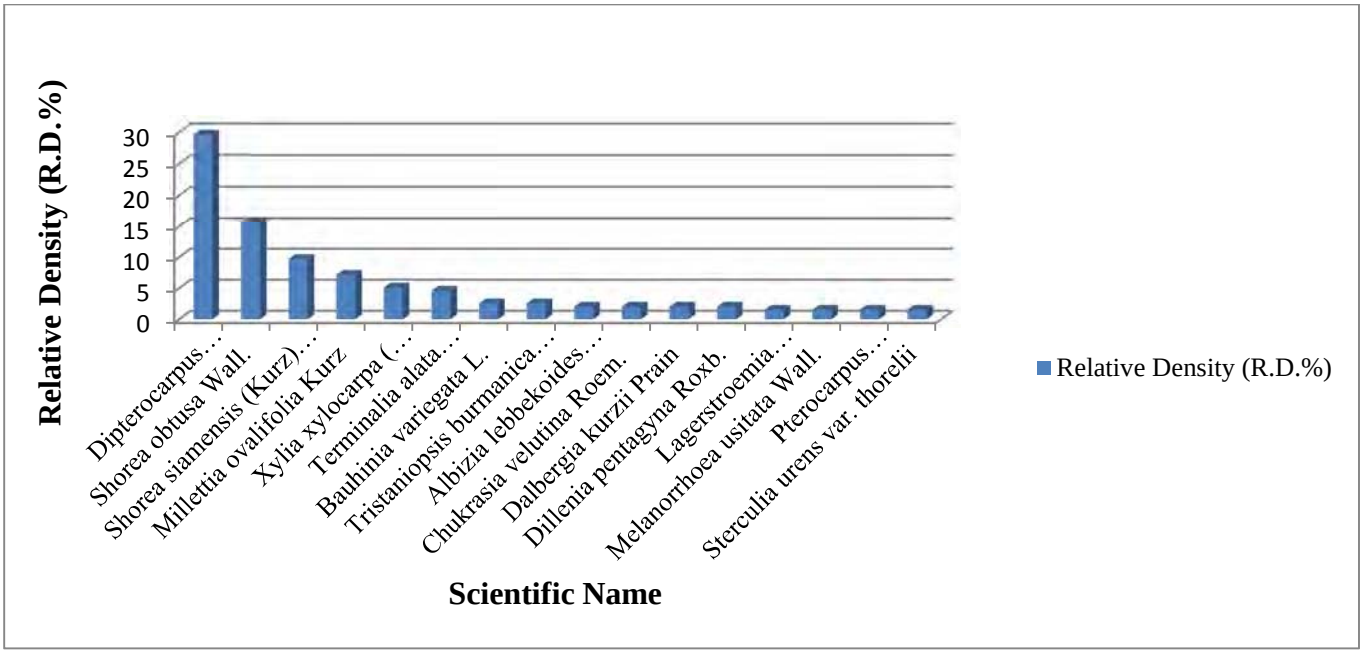
5.2.2.2 Tree Species Population

No.	Scientific Name	No. of individual	Total no. of individual/ha	Total no. of population/ha(%)
1	***Adina cordifolia*** Hook. f.	1	1.388888889	0.510204082
2	***Albizia lebbekoides*** (DC.) Benth.	4	5.555555556	2.040816327
3	***Anogeissus acuminata*** Wall.	1	1.388888889	0.510204082
4	***Bauhinia variegata*** L.	5	6.944444444	2.551020408
5	***Butea monosperma*** (Lam.) Kuntze	1	1.388888889	0.510204082
6	***Cassia fistula*** L.	1	1.388888889	0.510204082
7	***Chukrasia velutina*** Roem.	4	5.555555556	2.040816327
8	***Cratoxylum polyanthum***Korth.	1	1.388888889	0.510204082
9	***Dalbergia kurzii*** Prain	4	5.555555556	2.040816327
10	***Dalbergia oliveri*** Gamble	2	2.777777778	1.020408163
11	***Dillenia pentagyna*** Roxb.	4	5.555555556	2.040816327
12	***Dipterocarpus tuberculatus*** Roxb.	58	80.55555556	29.59183673
13	***Ficus altissima***	2	2.777777778	1.020408163
14	***Lagerstroemia tomentosa*** Presl	3	4.166666667	1.530612245
15	***Melanorrhoea usitata*** Wall.	3	4.166666667	1.530612245
16	***Millettia ovalifolia*** Kurz	14	19.44444444	7.142857143
17	***Phyllanthus emblica*** L.	2	2.777777778	1.020408163
18	***Pterocarpus macrocarpus*** Kurz	3	4.166666667	1.530612245
19	***Schleichera oleosa*** (Lour.) Oken	1	1.388888889	0.510204082
20	***Shorea obtusa*** Wall.	31	43.05555556	15.81632653
21	***Shorea siamensis*** (Kurz) Miq.	19	26.38888889	9.693877551
22	***Spondias pinnata*** (L. f.) Kurz.	1	1.388888889	0.510204082
23	***Sterculia urens*** var. ***thorelii***	3	4.166666667	1.530612245
24	***Tectona grandis*** L. f.	3	4.166666667	1.530612245
25	***Terminalia alata*** (Heyne) Roth	9	12.5	4.591836735
26	***Tristaniopsis burmanica*** (Griff.) P.G. Wilson & J.T. Waterh.	5	6.944444444	2.551020408
27	***Wrightia arborea*** (Dennst.) Mabb.	1	1.388888889	0.510204082
28	***Xylia xylocarpa*** (Roxb.)Taub.	10	13.88888889	5.102040816
	Total	**196**	**272.2222222**	**100**

5.2.2.3 Relative density

Among the sample plots species density per hectare varied and the highest density was observed ***Dipterocarpus tuberculatus*** Roxb., ***Shorea obtusa*** Wall., ***Shorea siamensis*** (Kurz) Miq. followed by ***Millettia ovalifolia*** Kurz, ***Xylia xylocarpa*** (Roxb.)Taub. and ***Terminalia alata*** (Heyne) Roth. This shows that these six species are abundant in this area.

No.	**Scientific Name**	**Density (D)**	**Relative Density (R.D.%)**
1	***Dipterocarpus tuberculatus*** Roxb.	7.25	29.59183673
2	***Shorea obtusa*** Wall.	3.875	15.81632653
3	***Shorea siamensis*** (Kurz) Miq.	2.375	9.693877551
4	***Millettia ovalifolia*** Kurz	1.75	7.142857143
5	***Xylia xylocarpa*** (Roxb.)Taub.	1.25	5.102040816
6	***Terminalia alata*** (Heyne) Roth	1.125	4.591836735
7	***Bauhinia variegata*** L.	0.625	2.551020408
8	***Tristaniopsis burmanica*** (Griff.) P.G. Wilson & J.T. Waterh.	0.625	2.551020408
9	***Albizia lebbekoides*** (DC.) Benth.	0.5	2.040816327
10	***Chukrasia velutina*** Roem.	0.5	2.040816327
11	***Dalbergia kurzii*** Prain	0.5	2.040816327
12	***Dillenia pentagyna*** Roxb.	0.5	2.040816327
13	***Lagerstroemia tomentosa*** Presl	0.375	1.530612245
14	***Melanorrhoea usitata*** Wall.	0.375	1.530612245
15	***Pterocarpus macrocarpus*** Kurz	0.375	1.530612245
16	***Sterculia urens*** var. ***thorelii***	0.375	1.530612245
17	***Tectona grandis*** L. f.	0.375	1.530612245
18	***Dalbergia oliveri*** Gamble	0.25	1.020408163
19	***Ficus altissima***	0.25	1.020408163
20	***Phyllanthus emblica*** L.	0.25	1.020408163
21	***Adina cordifolia*** Hook. f.	0.125	0.510204082
22	***Anogeissus acuminata*** Wall.	0.125	0.510204082
23	***Butea monosperma*** (Lam.) Kuntze	0.125	0.510204082
24	***Cassia fistula*** L.	0.125	0.510204082
25	***Cratoxylum polyanthum***Korth.	0.125	0.510204082
26	***Schleichera oleosa*** (Lour.) Oken	0.125	0.510204082
27	***Spondias pinnata*** (L. f.) Kurz.	0.125	0.510204082
28	***Wrightia arborea*** (Dennst.) Mabb.	0.125	0.510204082

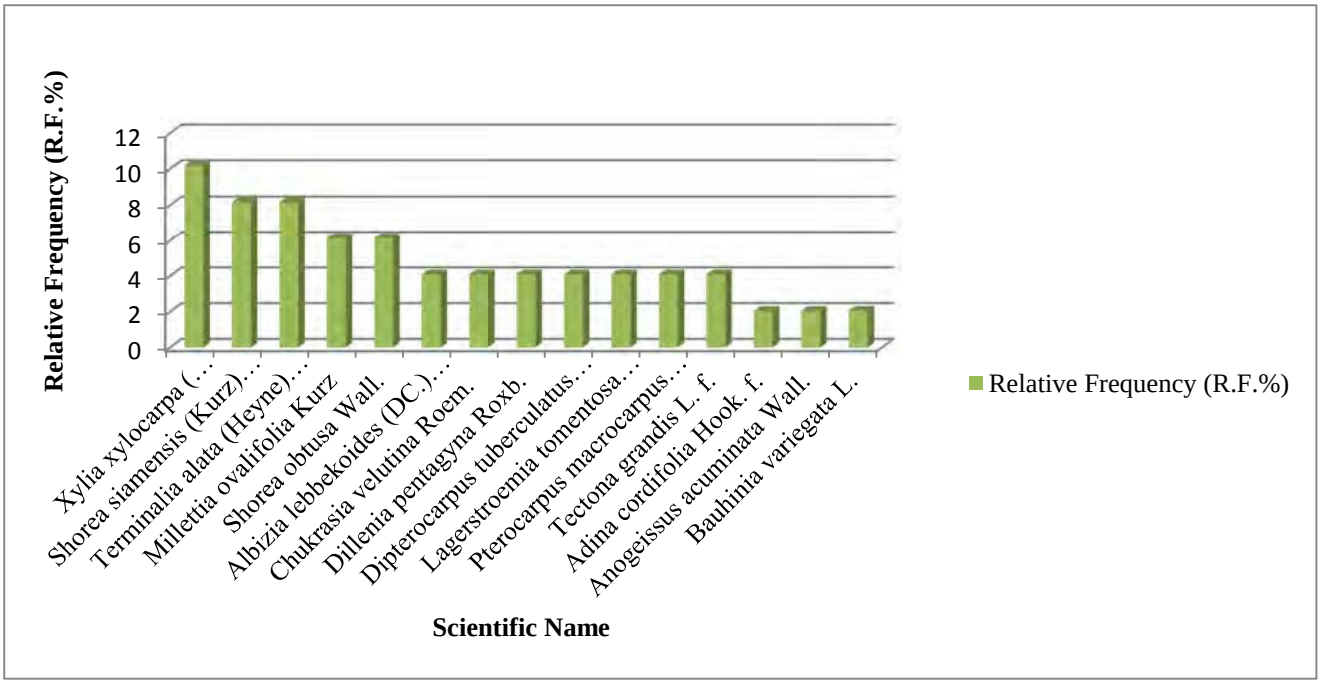


5.2.2.4 Relative frequency of Tree species

Relative frequency is the frequency of one species compared to the total frequency of all the species. According to the results**, *Xylia xylocarpa*** (Roxb.)Taub. high relative frequency value (10.204%) followed by ***Shorea siamensis*** (Kurz) Miq. and ***Terminalia alata*** (Heyne) Roth (8.163%) are equally, ***Millettia ovalifolia*** Kurz (6.122%), and ***Shorea obtusa*** Wall. (6.122%) respectively. Therefore these species occur everywhere in the study area. The lower frequency of some species, such as ***Adina cordifolia, Anogeissus acuminata*** and ***Bauhinia variegata*** are demarcated as rare species in the area.

No.	Scientific Name	Frequency (F)	Relative Frequency (R.F.%)
1	***Xylia xylocarpa*** (Roxb.)Taub.	0.625	10.20408163
2	***Shorea siamensis*** (Kurz) Miq.	0.5	8.163265306
3	***Terminalia alata*** (Heyne) Roth	0.5	8.163265306
4	***Millettia ovalifolia*** Kurz	0.375	6.12244898
5	***Shorea obtusa*** Wall.	0.375	6.12244898
6	***Albizia lebbekoides*** (DC.) Benth.	0.25	4.081632653
7	***Chukrasia velutina*** Roem.	0.25	4.081632653
8	***Dillenia pentagyna*** Roxb.	0.25	4.081632653
9	***Dipterocarpus tuberculatus*** Roxb.	0.25	4.081632653
10	***Lagerstroemia tomentosa*** Presl	0.25	4.081632653
11	***Pterocarpus macrocarpus*** Kurz	0.25	4.081632653
12	***Tectona grandis*** L. f.	0.25	4.081632653
13	***Adina cordifolia*** Hook. f.	0.125	2.040816327
14	***Anogeissus acuminata*** Wall.	0.125	2.040816327
15	***Bauhinia variegata*** L.	0.125	2.040816327
16	***Butea monosperma*** (Lam.) Kuntze	0.125	2.040816327
17	***Cassia fistula*** L.	0.125	2.040816327
18	***Cratoxylum polyanthum***Korth.	0.125	2.040816327

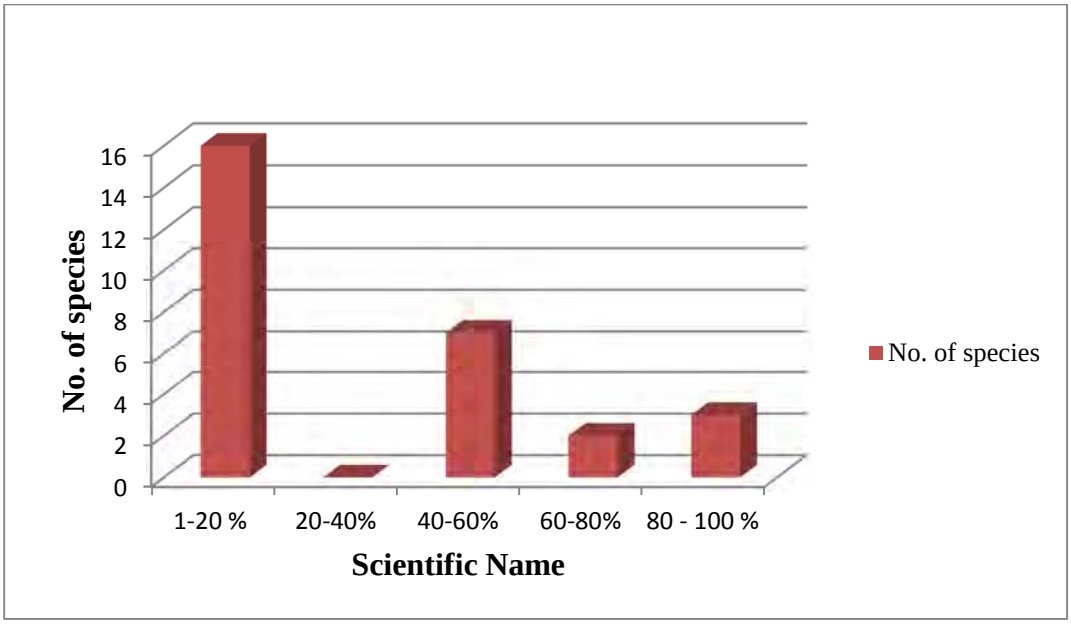
19	***Dalbergia kurzii*** Prain	0.125	2.040816327
20	***Dalbergia oliveri*** Gamble	0.125	2.040816327
21	***Ficus altissima***	0.125	2.040816327
22	***Melanorrhoea usitata*** Wall.	0.125	2.040816327
23	***Phyllanthus emblica*** L.	0.125	2.040816327
24	***Schleichera oleosa*** (Lour.) Oken	0.125	2.040816327
25	***Spondias pinnata*** (L. f.) Kurz.	0.125	2.040816327
26	***Sterculia urens*** var. ***thorelii***	0.125	2.040816327
27	***Tristaniopsis burmanica*** (Griff.) P.G. Wilson & J.T. Waterh.	0.125	2.040816327
28	***Wrightia arborea*** (Dennst.) Mabb.	0.125	2.040816327



5.2.2.5 Species distribution by frequency class

In order to clarify the homogeneity and heterogeneity of the floristic distribution in the area, the species distribution by frequency class was examined. According to the outcome of the frequency classes, only two species is in high frequency class and 23% of the species are in low frequency class. This shows that this area is floristically high degree of heterogeneity.

Frequency class	No. of species
1-20 %	16
20-40%	0
40-60%	7
60-80%	2
80 - 100 %	3



5.2.2.6 Tree species in GBH class interval

The distribution of GBH interval class reveals the dominant of small stem individuals in the area. 24.49 % of the tree species are less than 40cm GBH. Large stem individuals with GBH more than 80cm are of 51.02 %. Majority of the trees are less than 40cm in diameter, which indicates that the forests are degraded and secondary types.

GBH Class	No. of species	Total number of individual	% of total population
<40cm	48	66.66666667	24.48979592
41-60cm	48	66.66666667	24.48979592
61-80cm	26	36.11111111	13.26530612
81-100cm	34	47.22222222	17.34693878
>101cm	40	55.55555556	20.40816327
Total	**196**	**272.2222222**	**100**

5.2.2.7 Tree species in Height class interval

The distribution of Height shows that 176 individuals are less than 10 meter, comprising 64% and of the total population and 54 individuals are more than 15meter, comprising the 20%. Since most canopy height classes are not more than 10m, the forests in the area could be classified as lower secondary forests.

Height Class	No. of species	Total number of individual	% of total population
<10m	125	173.6111111	63.7755102
11-15m	39	54.16666667	19.89795918
16-20m	20	27.77777778	10.20408163
21-25m	7	9.722222222	3.571428571
>26m	5	6.944444444	2.551020408
Total	**196**	**272.2222222**	**100**

5.2.2.8 Vegetation Type in the Area

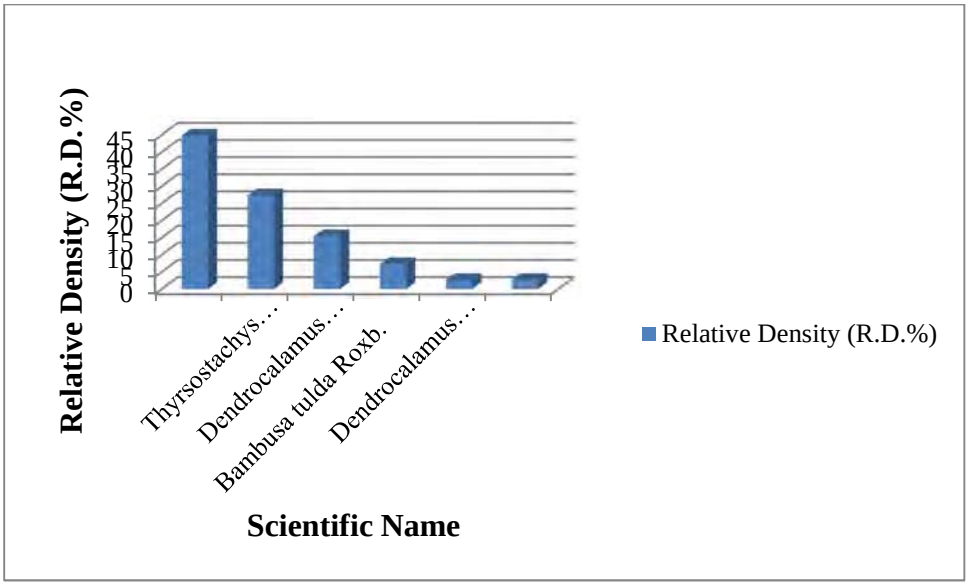
No.	Locality	Vegetation type	Latitude	Longitude	Altitude	Note
1	Q I	Dipterocarpus Forest	N 20º 52′ 26.9″	E 096º 24′ 32.0″	747m	***Shorea obtusa , Shorea siamensis,Dipterocarpus tuberculatus,Terminalia alata, Xylia xylocarpa, Albizia lebbekoides***
2	Q II	Dipterocarpus Forest	N 20º 52′ 25.6″	E 096º 24′ 29.4″	751m	
3	Q III	Dipterocarpus Forest	N 20º 52′ 17.4″	E 096º 24′ 15.4″	618m	
4	Q IV	Dipterocarpus Forest	N 20º 52′ 24.0″	E 096º 24′ 11.3″	587m	
5	Q V	Dipterocarpus Forest	N 20º 52′ 12.1″	E 096º 22′ 31.7″	495m	
6	Q VI	Dipterocarpus Forest	N 20º 52′ 14.9″	E 096º 22′ 29.1″	524m	
7	Q VII	Dipterocarpus Forest	N 20º 53′ 18.5″	E 096º 22′ 45.3″	318m	
8	Q VIII	Dipterocarpus Forest	N 20º 53′ 24.3″	E 096º 22′ 33.3″	314m	

5.2.2.9 Bamboo Species Population

No.	Scientific Name	No. of individual	Total no. of individual/ha	Total no. of population/ha(%)
1	***Bambusa polymorpha*** Munro	154	190.1234568	44.76744186
2	***Bambusa tulda*** Roxb.	25	30.86419753	7.26744186
3	***Dendrocalamus longispathus*** (Kurz) Kurz	9	11.11111111	2.61627907
4	***Dendrocalamus membranaceus*** Munro	53	65.43209877	15.40697674
5	***Dinochloa maclellandii*** Kurz	9	11.11111111	2.61627907
6	***Thyrsostachys oliveri*** Gamble	94	116.0493827	27.3255814
	Total	**344**	**424.691358**	**100**

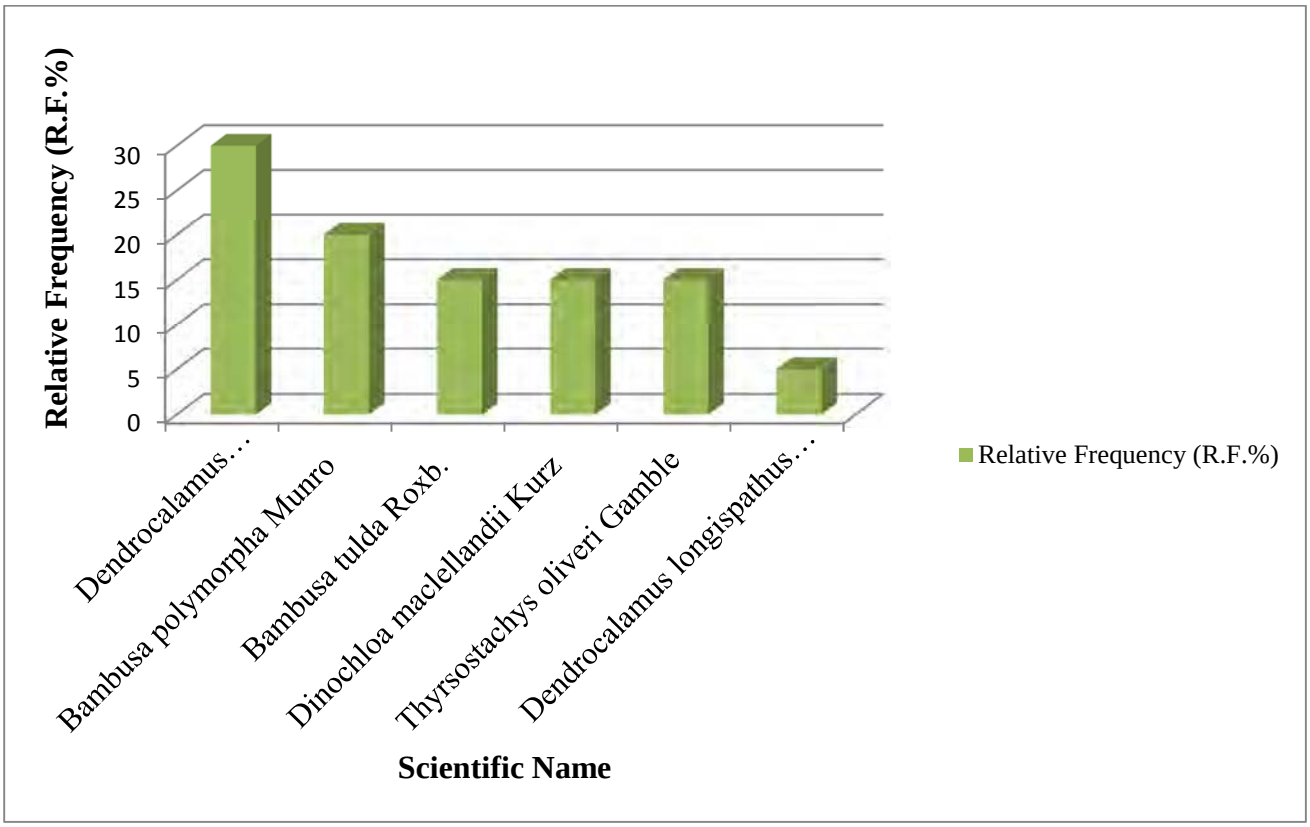
5.2.2.10 Relative Density

No.	Scientific Name	Density (D)	Relative Density (R.D.%)
1	***Bambusa polymorpha*** Munro	17.11111111	44.76744186
2	***Thyrsostachys oliveri*** Gamble	10.44444444	27.3255814
3	***Dendrocalamus membranaceus*** Munro	5.888888889	15.40697674
4	***Bambusa tulda*** Roxb.	2.777777778	7.26744186
5	***Dendrocalamus longispathus*** (Kurz) Kurz	1	2.61627907
6	***Dinochloa maclellandii*** Kurz	1	2.61627907



5.2.2.11 Species Distribution

No.	Scientific Name	Frequency (F)	Relative Frequency (R.F.%)
1	***Dendrocalamus membranaceus*** Munro	0.666666667	30
2	***Bambusa polymorpha*** Munro	0.444444444	20
3	***Bambusa tulda*** Roxb.	0.333333333	15
4	***Dinochloa maclellandii*** Kurz	0.333333333	15
5	***Thyrsostachys oliveri*** Gamble	0.333333333	15
6	***Dendrocalamus longispathus*** (Kurz) Kurz	0.111111111	5



5.2.2.12 Checklist of Species

No.	Scientific Name	Common Name	Family Name
1	***Acacia concinna*** (Willd.) DC.	Ka-mon-chin	Mimosaceae
2	***Acacia farnesiana*** (L.) Willd.	Nan-lon-kyaing	Mimosaceae
3	***Acacia intsia*** Willd.	Su-bok	Mimosaceae
4	***Acmella calva*** (DC.) R.K. Jansen	Pe-le-nyin	Asteraceae
5	***Adina cordifolia*** Hook. f.	Hnaw	Rubiaceae
6	***Aegle marmelos*** L.	Ok-shit	Rutaceae
7	***Ageratum conyzoides*** L.	Khwe-thay-pan	Asteraceae
8	***Albizia lebbekoides*** (DC.) Benth.	Taung-ma-gyi	Mimosaceae
9	***Albizia myriophylla*** Benth.	Nwee-cho	Mimosaceae
10	***Aloe vera*** L.	Sha-saung-la-pet	Aloaceae
11	***Alternanthera sessilis*** (L.) R.Br.	Pa-zun-sa-yaing	Amaranthaceae
12	***Amaranthus gracilis*** Desf.	Hin-nu-nwe-yaing	Amaranthaceae
13	***Amaranthus spinosus*** L.	Hnin-nu-new-su-bauk	Amaranthaceae
14	***Amorphophallus paeoniifolius*** (Dennst.) Nicolson	Pyan-u	Araceae
15	***Anacolosa griffithii*** Mast.	Taw-tha-na-kha	Olacaceae
16	***Anogeissus acuminata*** Wall.	Yon	Combretaceae
17	***Anthocephalus morindaefolius*** Korth.	Ma-u-let-tan-shae	Rubiaceae
18	***Antidesma velutinum***Tul.	Kin-pa-lin	Euphorbiaceae
19	***Ardisia humilis*** Vahl	Kyet-ma-oke	Myrsinaceae
20	***Argyreia barbigera*** Choisy	Min-ko-ka	Convolvulaceae
21	***Argyreia nervosa***	Not known	Convolvulaceae
22	***Artocarpus lakoocha***	Taung-pein-ne	Moraceae
23	***Asparagus racemosus*** Willd.	Shin-ma-tet	Asparagaceae
24	***Atalantia monopyhlla*** A.DC.	Taw-shauk	Rutaceae
25	***Baccaurea sapida*** Muell. Arg.	Ka-na-soe	Euphorbiaceae
26	***Bambusa polymorpha*** Munro	Kya-thaung-wa	Poaceae
27	***Bambusa tulda*** Roxb.	Theik-wa	Poaceae
28	***Bauhinia acuminata*** L.	Swe-daw-phyu	Caesalpiniaceae
29	***Bauhinia ornata*** Kurz	Myauk-hle-kha	Caesalpiniaceae
30	***Bauhinia variegata*** L.	Swe-daw	Caesalpiniaceae
31	***Blume balsamifera*** DC..	Phon-ma-thein	Asteraceae
32	***Boesenbergia rotunda*** (L.) Mansf.	Seik-phu	Zingiberaceae
33	***Bombax anceps*** Pierre	Ko-khe	Bombacaceae
34	***Bombax ceiba*** L.	Let-pan	Bombacaceae
35	***Bombax insigne*** Wall.	De-du	Bombacaceae
36	***Butea monosperma*** (Lam.) Kuntze	Pauk	Fabaceae
37	***Butea superba*** Roxb.	Pauk-nwee	Fabaceae
38	***Caesalpinia crista*** L.	Ka-lein	Caesalpiniaceae
39	***Calotropis gigantea*** (L.) Dryand. ex W.T. Aiton	Ma-yoe	Asclepiadaceae
40	***Calycopteris floribunda*** Lam.	Gyut-nwe	Combretaceae

41	***Canscora diffusa*** (Vahl) R.Br.	Kyauk-pan	Gentianaceae
42	***Careya arborea*** Roxb.	Ban-bwe	Lecythidaceae
43	***Cassia fistula*** L.	Ngu	Caesalpiniaceae
44	***Cephalostachyum pergracile*** Munro	Tin-wa	Poaceae
45	***Chromolaena odorata*** (L.) R.M. King & H Robinson	Bi-zet	Asteraceae
46	***Chukrasia velutina*** Roem.	Yin-ma	Meliaceae
47	***Cibotium barometz*** (Linn.) J. Sm.	Da-yin-kauk	Dicksoniaceae
48	***Cissus discolor*** Blume	Wa-yaung-chin	Vitaceae
49	***Clausena excavata*** var.***villosa*** Hook. f.	Taw-pyin-taw-thein	Rutaceae
50	***Clerodendrum siphonanthus*** R.Br	Nga-yan-padu	Verbenaceae
51	***Colocasia esculenta***	Pein-yaing	Araceae
52	***Combretum alfredii*** Hance	Not known	Combretaceae
53	***Combretum pilosum*** Roxb.	Kyet-tet-nwee	Combretaceae
54	***Congea tomentosa*** Roxb.	Tha-ma-ga-nwee	Verbenaceae
55	***Connarus paniculatus*** Roxb.	Hle-sa-nwee	Connaraceae
56	***Corchorus aestuans*** L.	Byauk-o	Tiliaceae
57	***Corchorus capsularis*** L.	Gon-shaw-yine	Tiliaceae
58	***Cordia myxa*** L.	Tha-net	Boraginaceae
59	***Costus speciosus*** Sm.	Pha-lan-taung-hmwe	Costaceae
60	***Crassocephalum crepidioides*** (Benth.) S. Moor.	Pan-zauk-htoe	Asteraceae
61	***Crateva magna*** (Lour.) DC.	Ka-det	Capparaceae
62	***Cratoxylum neriifolium*** Kurz.	Be-bya	Hypericaceae
63	***Cratoxylum polyanthum***Korth.	Be-bya	Hypericaceae
64	***Croton oblongifolius*** Roxb.	Tha-yin-gyi	Euphorbiaceae
65	***Cryptolepis buchanani*** Rome.& Schult	Na-sha-gyi	Asclepiadaceae
66	***Cyanotis barbada D.Don.***	Myet-cho	Commelinaceae
67	***Cyanthillium cinereum*** (L.) H. Robinson	Ka-du-byan	Asteraceae
68	***Cymbidium aloifolium*** (L.)Sw.	Thit-tet-lin-nae	Orchidaceae
69	***Cynodon dactylon*** (L.) Pers.	Myay-sa	Poaceae
70	***Dalbergia cultrata*** Grah**.**	Yin-daik	Fabaceae
71	***Dalbergia kurzii*** Prain	Thit-pok	Fabaceae
72	***Dalbergia oliveri*** Gamble	Ta-ma-lan	Fabaceae
73	***Dalbergia rimosa*** Roxb.	Daung-ta-laung	Fabaceae
74	***Dalbergia volubilis*** Roxb.	Daung-ta-laung	Fabaceae
75	***Delonix regia*** (Bojer ex Hook) Rafin.	Sein-pan-gyi	Caesalpiniaceae
76	***Dendrocalamus longispathus*** (Kurz) Kurz	Wa-net	Poaceae
77	***Dendrocalamus membranaceus*** Munro	Hmyin-wa	Poaceae
78	***Dillenia pentagyna*** Roxb.	Zin-byun	Dilleniaceae
79	***Dinochloa maclellandii*** Kurz	Ba-du-ma-wa/Wa-nwee	Poaceae
80	***Dioscorea bulbifera*** L.	Khat-cho	Dioscoreaceae
81	***Dipterocarpus tuberculatus*** Roxb.	In	Dipterocarpaceae
82	***Dolichandrone spathacea*** (L. f.) K. Schum.	Tha-khut	Bignoniaceae

83	***Drynaria quercifolia***	Not known	Polypodiaceae
84	***Duabanga grandiflora***	Myauk-ngo	Lythraceae
85	***Ehretia acuminata*** R.Br	Taung-poe-lu-lin	Boraginaceae
86	***Entada scandens*** Benth.	Doe-nwee	Mimosaceae
87	***Erythrina stricta*** Roxb.	Ka-thit	Fabaceae
88	***Euphorbia hypericifolia*** L.	Kywe-kyaung-hmin-se	Euphorbiaceae
89	***Ficus benghalensis***	Nyaung	Moraceae
90	***Ficus hispida*** L.	Kha-aung	Moraceae
91	***Ficus obtusifolia*** Roxb.	Nyaung-gyat	Moraceae
92	***Ficus racemosa***	Tha-phan	Moraceae
93	***Ficus virens*** Aiton	Nyaung-chin-phu	Moraceae
94	***Firmiana kerrii***	Not known	Sterculiaceae
95	***Flacourtia cataphracta*** Roxb.	Na-ywe	Flacourtiaceae
96	***Flemingia congesta*** Roxb.	Kye-hmi	Fabaceae
97	***Gardenia coronaria*** Buch-Ham.	Yin-khat-gyi	Rubiaceae
98	***Getonia floribunda*** Roxb.	Kywet-nwee	Combretaceae
99	***Gmelina arborea*** Roxb.	Ye-ma-nae	Verbenaceae
100	***Harrisonia perforata*** Merr.	Su-gyin	Simaroubaceae
101	***Heterophragma adenophyllum*** Seem.	Phet-than	Bignoniaceae
102	***Hiptage benghalensis*** (L.) Kurz	Bein-new	Malpighiaceae
103	***Holoptelea integrifolia*** Planch.	Pyauk-seik	Ulmaceae
104	***Homalium tomentosum*** Benth	Myauk-chaw	Flacourtiaceae
105	***Homonoia riparia***	Ye-mo-ma-kha	Euphorbiaceae
106	***Hydrocotyle sibthorpioides*** Thunb	Myin-khwa	Apiaceae
107	***Hydrolea zeylanica*** (L.) Vahl	Not known	Hydrophyllaceae
108	***Hymenodictyon orixense*** (Roxb.) Mabb.	Khu-san	Rubiaceae
109	***Imperata cylindrica***	Thet-ke	Poaceae
110	***Justicia procumbens***L.	Not known	Acanthaceae
111	***Kaempferia candida*** Wall.	Pa-det-sa	Zingiberaceae
112	***Lagerstroemia parviflora*** Roxb.	Zaung-pa-lae	Lythraceae
113	***Lagerstroemia speciosa*** (L.) Pers.	Pyin-ma	Lythraceae
114	***Lagerstroemia tomentosa*** Presl.	Lae-sa	Lythraceae
115	***Lannea coromandelica*** (Houtt.) Merrr.	Na-be	Anacardiaceae
116	***Lasia aculeata*** Lour.	Za-yit	Araceae
117	***Lepidagathis semiherbacea*** (Clarke) Nees	Not known	Acanthaceae
118	***Leptadenia reticulata*** Wight & Arn.	Gon-kha	Asclepiadaceae
119	***Leucaena leucocephala*** (Lam.) De.Wit	Baw-za-gaing	Mimosaceae
120	***Litsea monopetala*** (Roxb.) Pers	On-don	Lauraceae
121	***Livistona*** sp.	Taung-htan	Arecaceae
122	***Loranthus pulverulentus*** Wall.	Kyi-paung	Loranthaceae
123	***Ludwigia hyssopifolia***	Lay-nyin-thay	Onagraceae
124	***Ludwigia octovalvis***	Lay-nyin-gyi	Onagraceae

125	***Luffa aegyptiaca*** Mill.	Tha-but-kha	Cucurbitaceae
126	***Lycopersicon esculentum*** Mill.	Kha-yan-gyin	Solanaceae
127	***Lygodium japonicum*** (Thunb.) Sw.	Not known	Lygodiaceae
128	***Madhuca longifolia*** (Koen.) Macbride	Mae-zae	Sapotaceae
129	***Mangifera sylvatica*** Roxb.	Taung-tha-yet	Anacardiaceae
130	***Markhamia stipulata*** (Wall.) Seem.ex K.Schum.	Ma-hlwa	Bignoniaceae
131	***Mazus pumilus*** (Burm.f.)Steenis	Not known	Scrophulariaceae
132	***Melanorrhoea usitata*** Wall.	Sit-se	Anacardiaceae
133	***Melochia corchorifolia*** L.	Pilaw-agyi	Sterculiaceae
134	***Merremia hirta***	Nwee-chin	Convolvulaceae
135	***Mesua ferrea*** L.	Gan-gaw	Hypericaceae
136	***Millettia extensa*** Benth.	Win-u	Fabaceae
137	***Millettia ovalifolia*** Kurz	Thin-win	Fabaceae
138	***Mimusops elengi*** L.	Kha-yae	Sapotaceae
139	***Mitragyna rotundifolia*** (Roxb.) Kuntze	Bin-ga	Rubiaceae
140	***Morinda tinctoria*** Roxb.	Ni-ba-sae	Rubiaceae
141	***Mucuna pruriens*** (L.)DC.	Khwe-lae-ya	Fabaceae
142	***Muntingia calabura*** L.	Ja-pan-zi	Tiliaceae
143	***Myriopteron extensum*** (Wight) K. Schum.	Not known	Asclepiadaceae
144	***Nauclea orientalis*** L.	Ma-u	Rubiaceae
145	***Operculina turpethum*** (L.) Silva Mansa	Kyar-hin-nwe	Convolvulaceae
146	***Oroxylum indicum*** (L.) Kurz.	Kyaung-sha	Bignoniaceae
147	***Oryza rufipogon*** Griff.	Kyauk-nyin-saba/Ye-paw-thay	Poaceae
148	***Oryza sativa*** L.	Sa-ba-wa/Myo-pwar-saba/Lon-pu-saba	Poaceae
149	***Oxalis corniculata*** L.	Hmo-chin	Oxalidaceae
150	***Oxytenanthera albociliata*** Munro	Wa-da-let/Wa-gauk	Poaceae
151	***Paederia scandens*** Lour.	Khwe-ei-pok-nwee	Rubiaceae
152	***Pajanelia longifolia*** (Willd.) K. Schum.	Kyaug-dauk	Bignoniaceae
153	***Phyllanthus emblica*** L.	Zi-phyu	Euphorbiaceae
154	***Phyllanthus niruri*** L.	Kyet-tha-hin	Euphorbiaceae
155	***Phyllanthus urinaria*** L.	Myay-zi-phyu	Euphorbiaceae
156	***Plumeria acutifolia*** Poir	Ta-yoke-saga-wa	Apocynaceae
157	***Plumeria obtusa*** L.	Ta-yoke-saga-phyu	Apocynaceae
158	***Plumeria rubra*** L.	Ta-yoke-saga-ni	Apocynaceae
159	***Polygonum*** sp.	Not known	Polygonaceae
160	***Potamogeton natans*** L.	Floating-leaf Pondweed	Potamogetonaceae
161	***Pterocarpus macrocarpus*** Kurz	Pa-dauk	Fabaceae
162	***Quercus mespilifolia*** Wall.	Yin-ku	Fagaceae
163	***Rauvolfia serpentina*** (L.) Benth.	Bon-ma-ya-sa	Apocynaceae
164	***Samadera indica*** Gaertn.	Ka-di	Simaroubaceae
165	***Scadoxus multiflorus***	Baw-lon-pan	Amaryllidaceae
166	***Schleichera oleosa*** (Lour.) Oken	Gyo	Sapindaceae

167	***Scoparia dulcis*** L.	Dana-thu-kha	Scrophulariaceae
168	***Senna alata*** L.	Pwe-gaing	Caesalpiniaceae
169	***Senna hirsuta*** (L.) Irwin & Barneby	Ka-thaw-hmwe-htu	Caesalpiniaceae
170	***Senna timoriensis*** (DC.) Irwin & Barneby	Taw-ma-zeli	Caesalpiniaceae
171	***Senna tora*** (L.***)*** Roxb	Dan-gwe	Caesalpiniaceae
172	***Shorea obtusa*** Wall.	Thit-ya	Dipterocarpaceae
173	***Shorea siamensis*** (Kurz) Miq.	In-gyin	Dipterocarpaceae
174	***Sida acuta*** Burm f.	Ta-byet-si	Malvaceae
175	***Solanum torvum*** Swartz	Kha-yan-ka-zawt	Solanaceae
176	***Solanum verbascifolium*** L.	Not known	Solanaceae
177	***Spermacoce mauritiana***	Not known	Rubiaceae
178	***Spondias pinnata*** (L. f.) Kurz.	Taw-gwe	Anacardiaceae
179	***Stephania venosa*** (Blume) Spreng.	Taung-kya	Menispermaceae
180	***Sterculia foetida*** L.	Let-khok	Sterculiaceae
181	***Sterculia oblongata***	Not known	Sterculiaceae
182	***Sterculia ornata*** Wall. ex Kurz	Done-shaw	Sterculiaceae
183	***Sterculia urens*** var. ***thorelii***	Shaw	Sterculiaceae
184	***Sterculia versicolor*** Wall.	Shaw-phyu	Sterculiaceae
185	***Strychnos nux-blanda*** A.W. Hill	Ka-baung-ye-kyi	Loganiaceae
186	***Syzygium grande*** (Wight) Walp	Tha-bye	Myrtaceae
187	***Tadehagi triquetrum*** (L.)H. Ohashi	Lauk-thay	Fabaceae
188	***Tamarindus indica*** L.	Ma-gyi	Caesalpiniaceae
189	***Tectona grandis*** L. f.	Kyun	Verbenaceae
190	***Telosma minor*** (Andrews) Craib	Dauk-salat	Asclepiadaceae
191	***Terminalia alata*** (Heyne) Roth	Htauk-kyant	Combretaceae
192	***Terminalia bellirica*** (Gaertn) Roxb.	Thit-seik	Combretaceae
193	***Terminalia chebula*** Retz.	Phan-kha	Combretaceae
194	***Terminalia oliveri*** Brandis	Than	Combretaceae
195	***Terminalia pyrifolia*** Kurz	Lein-pin	Combretaceae
196	***Tetrameles nudiflora*** R. Br.	Baing	Datiscaceae
197	***Thunbergia grandiflora*** (Roxb. ex Rottl.) Roxb.	Kyi-hnok-thi-phyu	Acanthaceae
198	***Thunbergia laurifolia*** Lindl.	Kyi-hnok-thi-khayan	Acanthaceae
199	***Thyrsostachys oliveri*** Gamble	Tha-net-wa	Poaceae
200	***Thyrsostachys siamensis*** (Kurz ex Munro) Gamble	Hti-ka-yone	Poaceae
201	***Tinospora nudiflora*** Kurz	Sin-don-ma-nwee	Menispermaceae
202	***Trema orientalis***	Khwe-sha	Ulmaceae
203	***Tristaniopsis burmanica*** (Griff.) P.G. Wilson & J.T. Waterh.	Thit-pa-gan/Taung-tha-bye	Myrtaceae
204	***Typha angustifolia*** Chaub. & Bory	Peik-swe	Typhaceae
205	***Urena lobata*** L.	Wet-chi-pa-ne	Malvaceae
206	***Utricularia*** sp.	Bladderwort	Lentibulariaceae
207	***Uvaria cordata*** Schum. & Thonn.	Tha-but-gyi	Annonaceae
208	***Vangueria spinosa*** Roxb.	Magyi-bauk	Rubiaceae

209	***Vitex pubescens*** Vahl	Kyet-yoe	Verbenaceae
210	***Vitis discolour***	Ta-bin-taing-mya-naing	Vitaceae
211	***Wattakaka volubilis*** (L. f.) Stapf.	Gwe-dauk	Asclepiadaceae
212	***Wendlandia tinctoria*** DC.	Thit-ni/Hta-min-chauk	Rubiaceae
213	***Wrightia arborea*** (Dennst.) Mabb.	Let-htok-thein	Apocynaceae
214	***Xylia xylocarpa*** (Roxb.)Taub.	Pyin-ka-doe	Mimosaceae
215	***Zanthoxylum budrunga*** Wall.	Ma-yanin-kyet-su	Rutaceae
216	***Ziziphus jujuba*** Lam.	Zi	Rhamnaceae

VI. POTENTIAL IMPACT ON FLORA

The project area is located within the Kupyin Reserved Forest. Total impacted area comprises 11800 hectare (29158 Acre). There is the vegetation clearing of almost all area. So the natural forest and natural landscape will totally change. The open pit or open flat will replace the hilly landscape. The endangered tree species such as ***Dipterocarpus tuberculatus***, ***Dalbergia cultrata*** will loss in this area in future.

According to global study (by Costanzia et al. 1997) there are 17 different ecosystem services of the forest, including, food production, water supply, climate regulation. The combined value is between US$ 16 and 54 trillion per year. The ecosystem services of Kupyin Reserved Forest will be disrupted or lost due to fragmentation of the forest.

The wild animals are also disturbed due to their loss of habitat, polluted drinking water (waste water from factory and run off rain water from waste dump of mining), noise from drilling and blasting of mining process and increase bush meat consumption (due to increase population by migration of mining workers and cement factory workers). In the future the sociology of flora and fauna species will be disrupted.

VII. GENERAL DISCUSSION AND CONCLUSION

Throughout the world, market prices tend to reflect the direct use value of natural resources, ignoring indirect use and existence value. In general the natural resources tend to be severely undervalued. As an example, it was already mentioned in the introduction, the value of limestone habitat and sociology of limestone cave system. Most of people know only the market value of the limestone for cement production. In reality, the value of limestone habitat and ecosystem services is much more in terms of existence value. So also the forests are devalued due to the lack of market-valued timber tree. But most of people did not know the ecosystem services of forest which is existence value. It was learnt that clearance of forest cover for limestone mining had to pay 5000 kyat per acre per year. These show that the forests are undervalued by the Ministry of Environmental Conservation and Forestry. Even the Ministry of Forestry ignored the existence value or ecosystem value of the forest.

The forest in the project area is the Dipterocarpus Forest. The sociology of Dipterocarpus Forest especially ***Dipterocarpus tuberculatus*** and the edible globular fungi (locally called In-u) which grow under the falling leaves, is the unique characteristic of Dipterocarpus Forest. This edible fungi supply food for local people. The market prize of this edible fungus may be more than 5000 kyat per year. This example shows how forests are undervalued.

7.1 Recommendation and Mitigation measure

1. To grow the quick growing tree species around the cement factory as a wind break as well as buffer vegetation at least 100 meter in thickness. The quick growing tree species may be ***Leucaena leucocephala*** (Lam.) De.Wit (Baw-za-gaing), ***Acacia auriculiformis*** A.Cunn (Ma-lay-sia-pa-dauk) and ***Eucalyptus camaldulensis*** Dehnh. (Eu-ka-lit).
2. To establish the exact plan and fund for reforestation and soil conservation in mining area as a mine closure plan in accordance with the MOA.
3. To establish a plan to remove the endangered tree species as in living form to the other area and re-cultivate.
4. To restore the timber extraction according to MSS in Kupyin Reserve Forest.
5. To establish compensation fund to restore ecosystem services in other protected parts (blocks) of Kupyin Reserve forest.

7.2 Immediate Compensatory Measure

The investors of corporations who utilize the resources of the region have responsibility in term of Corporate Social Responsibility (CSR). Accordingly, the investor has to raise the fund to aid the environmental and social development of the project impacted region. The following prioritized action should be carried out in accordance with the environmental management plan (EMP).

Prioritized Action I

To develop the financial mechanism (Funding and management plan) that enable the beneficiaries of dispersed ecosystem services provided by Kupyin Reserved Forests ecosystems to contribute their conservation such as carbon offset payments and payment for ecosystem services (PES). The Ministry of Environmental Conservation and Forestry should develop a team to calculate the amount of payments and to monitor and manage the conservation plan.

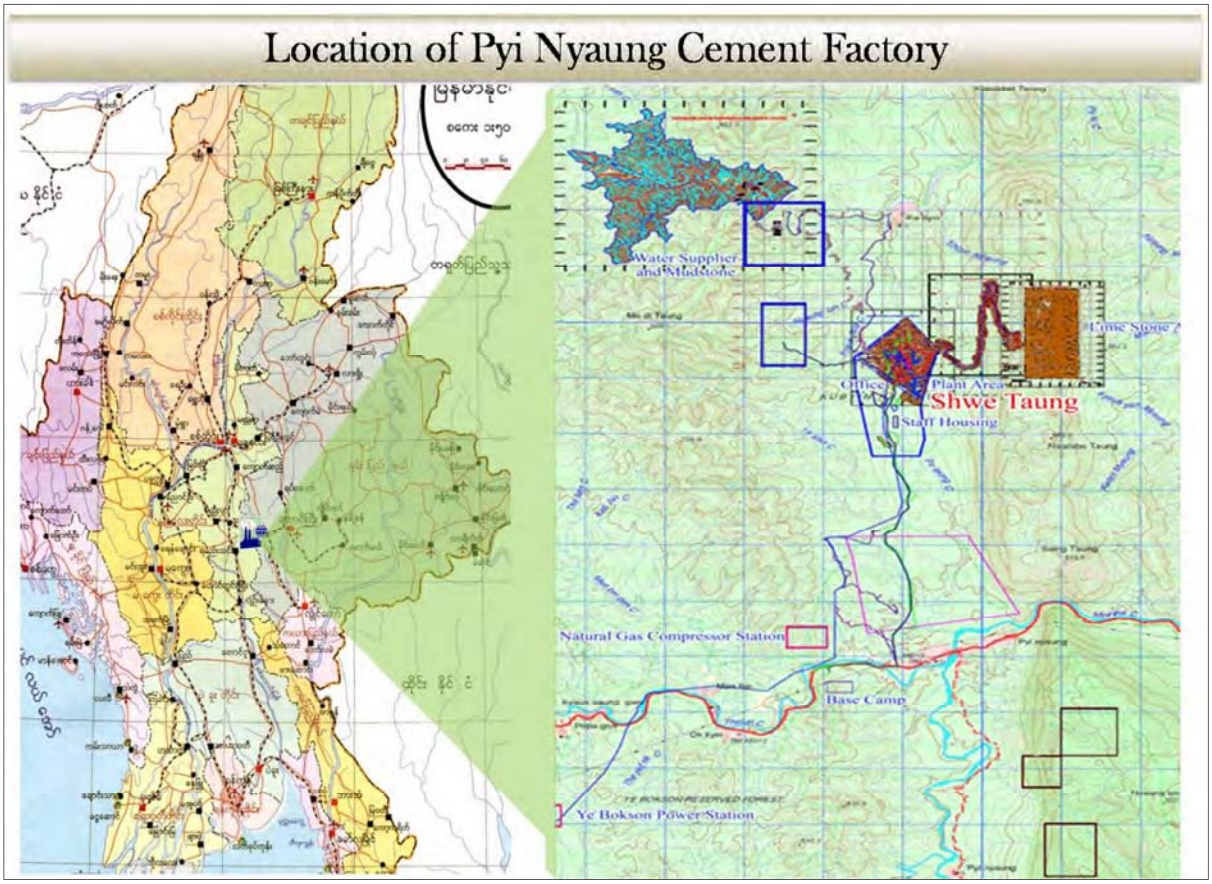
Prioritized Action II

Create and implement the socio-economic development of the local people. Approximately 0.5% of annual proceeds form the sale of cement will raise the socio-economic development fund. This fund will be managed by the representative of the company, local government officials, Kupyin Reserved Forest officials and local representative.

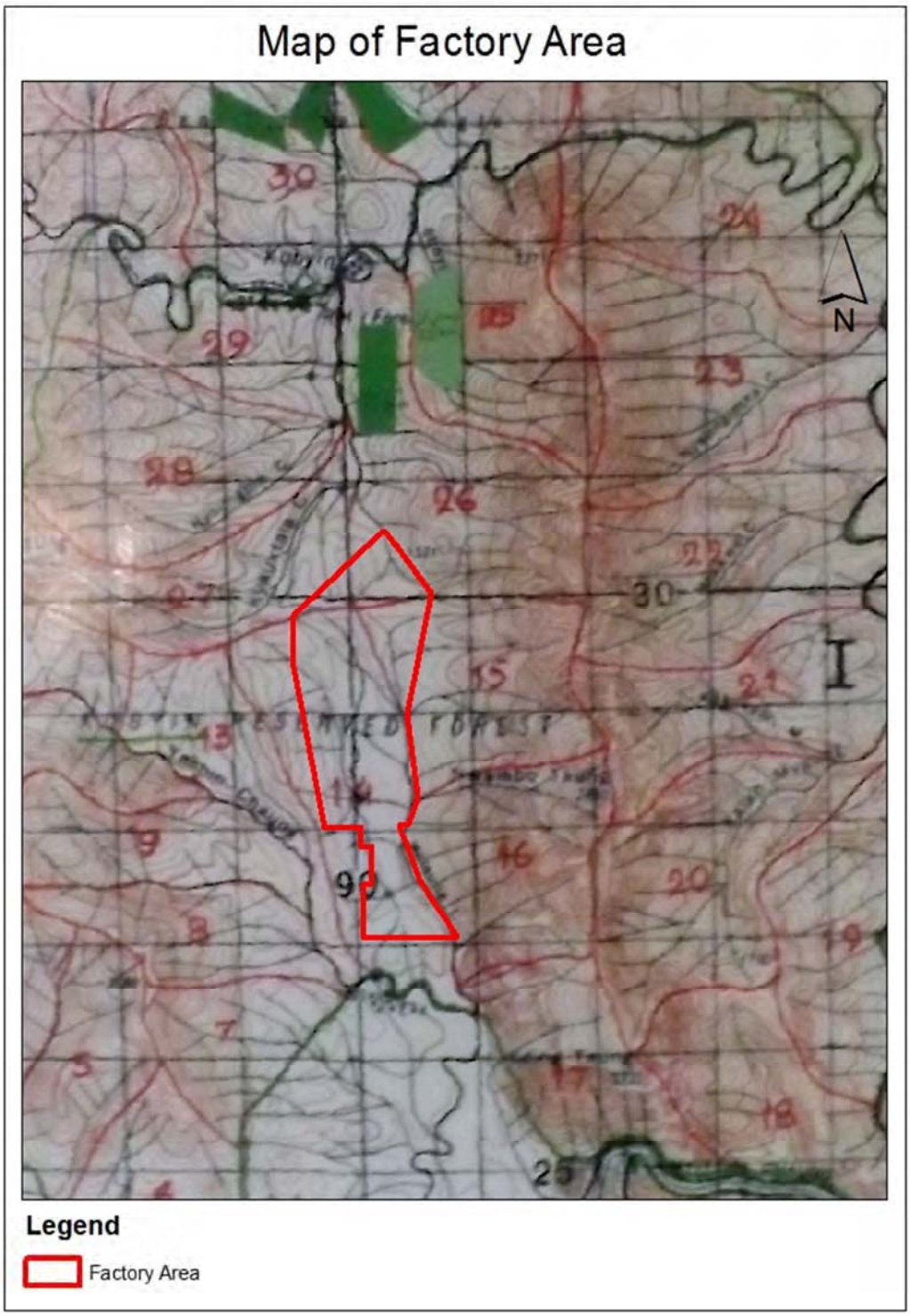
Prioritized Action III

Create and implement a new protected area in Kupyin Reserved Forest. Approximately 0.5% of the annual proceeds from the sale of cement will raise the conservation Fund. This fund should be managed by the representative of the company, local forestry department officer and local government representatives.

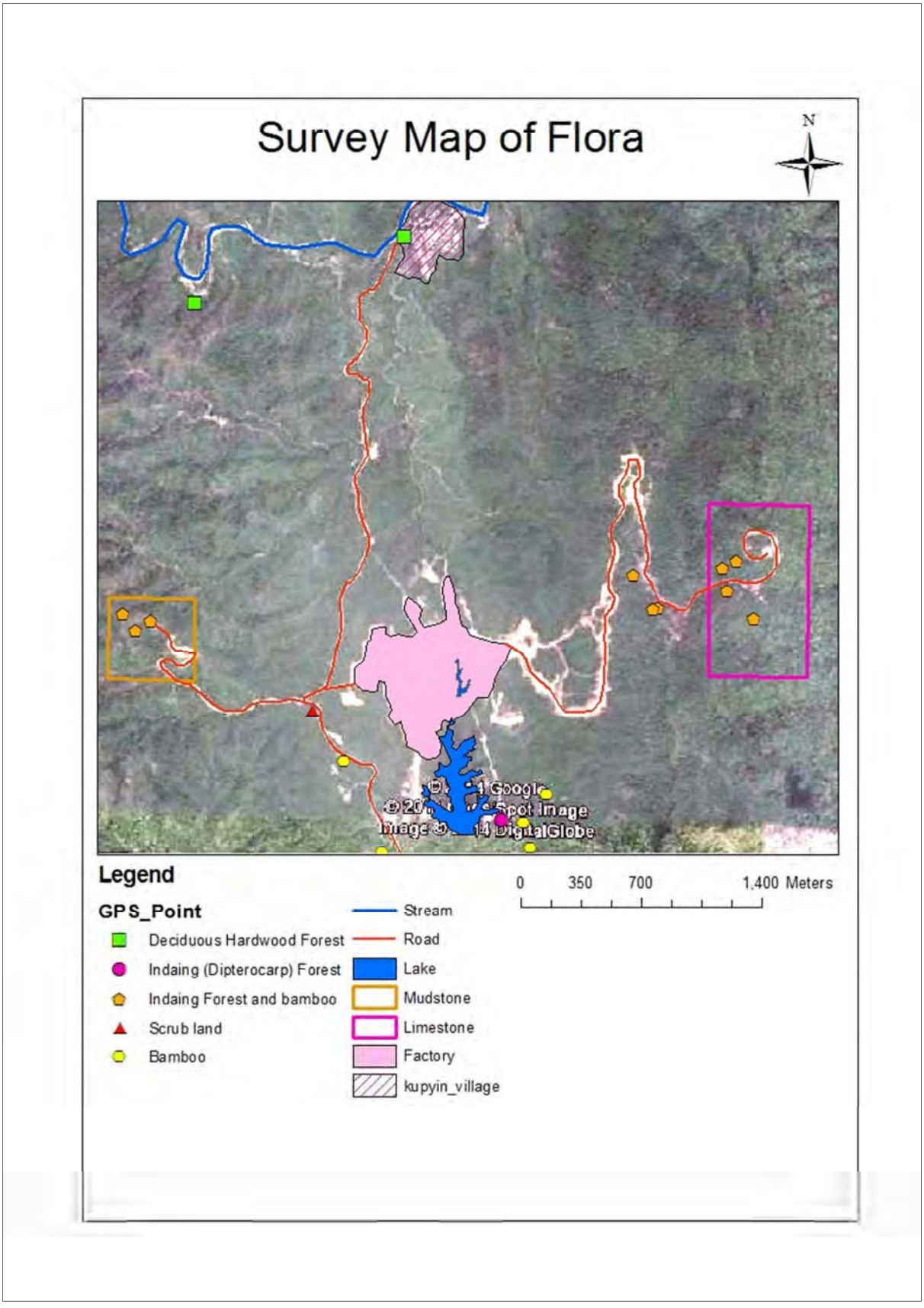
Map I.


Location of Pyi Nyaung Cement Factory
Water Supplier and Mudstone
Office
Plant Area
Shwe Taung
Staff Housing
Natural Gas Compressor Station
Base Camp
Ye Bokson Power Station

Map II.



Map III.


Survey Map of Flora
N
0 350 700 1,400 Meters
Legend
GPS_Point
Deciduous Hardwood Forest
Indaing (Dipterocarp) Forest
Indaing Forest and bamboo
Scrub land
Bamboo
Stream
Road
Lake
Mudstone
Limestone
Factory
kupyin_village

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APPENDIX - D

Project Report

Impact Assessment of Apache Cement Factory

Project on

the Fauna of Pyi Nyaung Village, Tharsi Township, Meikhtila District, Mandalay Region

23-3-2014 to 27-3-2014

23-4-2014

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Chapter 1

Executive summery

Construction of cement factory in Pyi Nyaung area, Kalaw District, Southern Shan state, one of the projects was permitted by the government of the Union of Myanmar to fulfill the requirement of cements to the constructions for the development of the country with the positive image.

However, changes in land cover and geomorphology affect on the flora and fauna on the particular area of the project area. All living species from very tiny microbes from the soil to large animals and trees on the ground of project area are totally destroyed due to digging the ground, taking the soil, and making it into the cement. This is direct affect on the fauna species. When the cement factories start running, long term affect will be on the species near the factory zone. Habitat changes and several disturbances such as spread of the dusts and aerosols and noise sound pollution will affect on the survival and reproduction of the fauna. Anyway, we can expect the project is started definitely; species diversity and impacts on the fauna and flora should be conducted and proposed the possible mitigation measure.

Chapter 2

Introduction

Extinction is a fact of life, as normal and necessary as species formation is to be a stable world ecosystem. Most species, probable all, go extinct eventually. More than 99% of species known to science (most from the fossil record) are now extinct. However, current rates are alarming high. Taking into account the rapid and accelerating loss of habitat that is occurring at present, especially in the tropics, it has been calculated that as much as 20% of the world's biodiversity may be loss during the next 30 years. In addition, many of these species may be lost before we are even aware of their extinction.

These losses will not just affect poorly known groups.

1. As many as 50,000 species of the world's total of 250,000 species of plants
2. 4,000 species of the world's total of 20,000 butterfly species
3. Nearly 2,000 species of the world's total of 9,700 bird species could be lost during this short period of time (Johnson, 2010).

Diversity is great important and modulate the environments and weather condition for the human beings. In addition, it has great values in three aspects.

1. Direct economic value
2. Indirect economic value and
3. Ethical and Aesthetic value.

One of the areas of the loss of biodiversity is limestone area, in which the area is porous and tunnels in the ground, and limestone caves, sinkholes; that can maintain the ground water enough to the growing plants above the ground as deciduous forest, biodiversity depend mainly on habitat in the limestone area. Population size of all fauna species in limestone area is low and existing species is also very fragile and vulnerable to disappear. A long eastern mountain range is a belt of limestone areas running from the Mokok are through the Hpa-an area to the Mawlamyaing area including the project area, Pyi Nyaung is located in the limestone area.

Loss of biodiversity and environmental impacts are mostly due to human activities. It is needed to know the biodiversity before human act on the earth surface. EIA is practiced for the reason of awareness of it in any project implementation. Minimizing the human activity on the environment is the best way to least affect on the biodiversity and environment.

Chapter 3

Project Framework and Methods

On the assessment on the animal fauna, birds, fishes, insects and herpets fauna are investigated. Specimen collection for insects, fishes, interview survey for mammals, visual observation for the birds were conducted. Habitat preferences, relative abundances and diversity assessment were examined. Diversity of fauna species were presented in tabulated forms. Possible impacts were investigated and mitigation measures were proposed. Collected specimens were checked with the IUCN Redlist and CITE appendices.

Chapter 4

Fauna diversity, Status and the Impacts

4.1 Diversity and status of Fauna

There are total of 80 fauna species recorded from the Apache Cement factory Project area. The list of fauna is mentioned as follow:

1.	Fish	16 species
2.	Herpets	13 species
3.	Birds	26 species
4.	Mammals	9 species
5.	Insects	18 species.
	Total	**82 species**

Fish fauna species

There were 16 fish species under nine families, three orders of the class Osteichthyes were collected from the markets and near water sources. Asian snake head fish ***Channa punctatus*** is locally rare species

Herpet species

A total of 13 species under 8 families of 3 orders of amphibian and reptiles were observed in this area. Among them, the following two species are important species for the conservation;

1. King cobra ***Ophiophagus hannah***
2. Burmese python ***¸Python reticulatus***

Bird species

A total of 15 bird species under 10 families, 5 orders were observed, among them, the following three species, are very rear species.

1. Black kite ***Milvus migrans***
3. Eagle ***Spilornis cheela***
4. Peregine Falcon ***Falcon peregrines***

   However, the species are high fliers, and they can fly to very far places, if this area is threat to them, they migrate into another habitats.

Mammal species

Total of 9 species were surveyed by interview and animal body parts.

One endangered species, ***Bos guar*** was found. Another four species are under CITES list Appendix I and II (Table 7). They are a kind of large mammals, might already be extinct due to hunting impacts.

Insect species

In the survey site, 16 insect species and 2 Arachnida (spider and scorpion) species were collected. Most are common species. Present of scorpion is the sign of the good condition of environment.

4.2 Impacts on the fauna species

There is no local hunters who totally rely on the hunting for their livelihood. There is definitely habitat fragmentation and habitat destruction for all kinds of species, fishes, herpets, birds, mammals, and insects and Arachnida. Erosion can decrease the quality of waters in the streams and lakes that affect on the fish. Sweeping all plants in the project area is driving out all amphibians, reptiles, birds, mammals, and insects away and killed all terrestrial, arboreal and fossoreal species. The species breathing air living outside the project area can face with breathing problem due to the spread of dusts and other aerosols in the air. Conclusively, the possible impacts,

1. Nor hunting impacts
2. Habitat loss and habitat destruction
3. Air and water pollution
4. Physiological impacts (breathing problems) due to air pollution fro the animals living outside the project area.

5. Mitigation measures

1. Growing the plants around the project area that can reduce the soil erosion and air pollution
2. Control the spread of the dusts from the cement factory

6. Discussion

The project area is assumed to be high diversity area in the past. Now, species status is low, it was happened in the past. Plants are important source for food and shelters directly and indirectly for all animals. Plantation is the best way for survival of animals.

APPENDICES

Table 1. Species lists of fish recorded from Pyi Nyaung village, Tharsi Township

No.	Order	Family	Scientific name	Common name	Local name
I	Cypriniformes	**1**.Cyprinidae	***1.Puntius sophors***	Sportfin Swamp barb	Nga Khone Ma
			2.Barilius barila		Nga La war
		2.Cobitidae	***3.Lepidocephalus berdmorei***	Burmese loach	Nga-tha-le-htoe
			4.L. guntea	Guntea loach	
			5.L. micrpogon	Loach	
			6.L. thermalis	Lesser loach	
		3.Balitoridae	***7.Homaloptera Rupicola***		Nga-tha-le-htoe
II	Siluridae	**4**.Bagridae	***8.Mystus pulcher***	***Pulcher mystus***	Nga zin yaing
III	Percifomes	**5**.Ambassidae	***9.Parambassis Notatus***	Glass fish	Nga zin zat
		6.Cichlidae	***10.Oreochromis niloticus***	Tilapia	Tilapia
		7.Gobiidae	***11.Glossogobius giurius***	Tank goby	Nga Lone
		8.Belontidae	***12.Colisa labiosus***	Thick-lip-goramy	Japan-nga
			13.Colisa colisa	Snake-skin-goramy	Japan-nga
		9.Channidae	***14.Channa striatus***	Striped-snake-head	Nga Yant
			15.Channa panctatus	Asiatic- snake-head	Nga pa Naw

Table 2. Species lists of Herpet in Pyi Nyaung village, Tharsi Township.

No.	Order	Family	Scientific name	Common name	Local name
I	Anura	Bufonidae	1***.Bufo melanostictus***	Common toat	Phar-pyok
		Ranidae	2***.Rana tigrina***		Sar-phar
II	Sqauamata	Agamidae	3***.Calotes versicolor***	Garden Fence Lizard	Tat-Too
		Scincidae	4***.Mabuya macularia***	Speckled Forest Skink	Din shaw
		Gekkonidae	5***.Gekko smithi***	Forest Gecko	Tauk tae
			6***.Hemidactylus Frenatus***	Spiny-tailed House Gecko	Ein-Myaung
		Colubridae	7***.Ptyas mucosus***	Rat snake	Lin Mwe
			8***.Amphasima stolata***	Striped Keelback	Myat Shaw
			9***.Xoenochro piscata***	Chequered Keelback	Ye Mwe - pyauk Ma
		Elapidae	10***.Naja kaouthia***	Cobra	Mwe Hout
			11***.Naja Hannah***	King Cobra	Taw Kyi-Mwe Hout
			12***.Bungarus fasciatus***	Banded Krait	Ngan Taw-Kyar
		Boidae	13.***Python reticulates***	Python	Sa-ba-gyi

Table 3. Herpet fauna recorded from different habitat types of Pyi Nyaung village, Tharsi Township.

Species	Number	Habitat				Data source
		Tree	Pond	Grass Land	Forest	
1.***Bufo melanostictus***	-	-	-	√	-	IS
2.***Rana tigrina***	-	-	√	-	-	IS
3.***Calotes versicolor***	3	√	-	-	-	Voucher
4.***Mabuya macularia***	4	-	-	√	-	Voucher
5.***Gekko smithi***	1	√	-	-	-	Watching
6.***Hemidactylus Frenatus***	3	-	-	-	√	Voucher
7.***Ptyas mucosus***	-	√	-	-	-	IS
8.***Amphasima stolata***	-	-	-	√	-	IS
9.***Xoenochro piscata***	-	-	√	-	-	IS
10.***Naja kaouthia***	-	-	-	-	√	IS
11.***Naja Hannah***	-	-	-	-	√	IS
12.***Bungarus fasciatus***	-	-	-	-	√	IS
13.***Python reticulates***	-	-	-	-	√	IS

IS=Interview Survey; V=Voucher; W= Watching

Table 4. Bird species collected from Pyi Nyaung village, Tharsi Township.

No.	Order	Family	Scientific name	Common name	Local name
I	Flaconiformes	Dendrocygridae	***1.Milvus migrans***	Black Kite	Son
		Accipitridae	***2.Spilornis cheela***	Eagle	Lin-yon
			3.Falcon peregrines	Peregrine Falcom	Thein Hnget
II	Columbiformes	Columbidae	***4.Streptopelia chinensis***	Spotted Dove	JoeLe—Pyauk
			5.Columbia livia	Rock Pigeon	Kho
III	Galliformes		***6.Gallus gallus***	Jungle fowl	Taw Kyet
			7.Merops orientalis	Green Bee Eater	Pa-Zin- Htoe
IV	Passeriformes	Sturnidae	***8.Passer flaveolus***	Plain Back Sparrow	Sar-War
			9.Acridotheres fuscus	Jungle Myna	Za-Yet
		Hirundinidae	***10.Cypsiurus balasiensis***	Asian Palm Swift	Moe- Sar
		Passeridae	***11.Passser domesticus***	House Sparrow	Sarkalay
			12.Ploceus philippinus	Baya weaver	Sar-wa-tee
V	Ciconiformes	Ardeidae	***13.Egrotta garzettar***	Little Egret	Byine
		Sylviidae	***14.Nectarinia asiatica***	Common Taior Bird	Hnan- pyi-soak
		Nectariritidae	***15.Nectarinia jugularis***	Olive-backed-Sunbird	Pan-Ye-Soak

Table 4. (Contd.) Bird species collected from Pyin Nyaung village, Tharsi Township

No.	Order	Family	*SCIENTIFIC NAME*	Common name	Local name
	Ciconiformes	Pycnonotidae	***16.Pycnonotus cafer***	Red Vented Bulbul	But Fin Ni
			17.Pycnonotus blanfordi	Streak Ear Bulbul	But-Chwe
			18.Pycnonotus jacosus	Red-whiskered-bulbul	But-ka-lon
		Corvidae	***19.Urocissa erythorhyncha***	Red BiIlled Blue Mag pine	Hnget-Taw-Pyar
		Muscicapidae	***20.Copsychs saularis***	Oriental Magpierobin	Tha-Paik-Lwe
			21.Dicrurus macrocercus	Black Drongo	Hnget Taw
			22.Coracias benghalensis	Indian Roller	Hnget- Kha
VI	Piciformes	Picidae	***23.Picummus innorminatus***	Speckled Piculet	Tit-Taut-Hnget
			24.Turdoides gularis	White-Throted babbler	Swate
VII	Apodiformes	Hemiprocnidae	***25.Hemiprocne coronate***	Crested Tree Swift	Pyan-hlwar
VIII	Caprimulgiformes	Caprimulgidae	***26.Caprimulgus asiaticus***	Indian Nightjar	Myay- Waut

Table 5. Different habitat types of Bird species of collected from Pyi Nyaung village, Tharsi Township

No.	Scientific name	T	S&B	O	M	W	Total
1.	***Milvus migrans***	2	-	-	-	-	2
2.	***Spilornis cheela***	1	-	-	-	-	1
3.	***Falcon peregrines***	1	-	-	-	-	1
4.	***Streptopelia chinensis***	2	-	-	-	-	2
5.	***Columbia livia***	9	-	-	-	-	9
6.	***Gallus gallus***	-	8	-	-	-	8
7.	***Merops orientalis***	-	-	3	-	-	3
8.	***Passer flaveolus***	5	-	-	-	-	5
9.	***Acridotheres fuscus***	10	-	-	-	-	10
10.	***Cypsiurus balasiensis***	5	-	-	-	-	5
11.	***Passser domesticus***	20	-	-	-	-	20
12.	***Ploceus philippinus***	15	-	-	-	-	15
13.	***Egrotta garzettar***	-	-	-	-	4	4
14..	***Nectarinia asiatica***	-	6	-	-	-	6
15.	***Nectarinia jugularis***	3	-	-	-	-	3
16.	***Pycnonotus cafer***	4	-	-	-	-	4
17.	***Pycnonotus blanfordi***	3	-	-	-	-	3
18.	***Pycnonotus jacosus***	3	-	-	-	-	3
19.	***Urocissa erythorhyncha***	2	-	-	-	-	2
20.	***Copsychs saularis***	2	-	-	-	-	2

Table 5. (Contd.) Different habitat types of Bird species of collected from Pyi Nyaung village, Tharsi Township

No.	Scientific name	T	S&B	O	M	W	Total
21.	***Dicrurus macrocercus***	3	-	-	-	-	3
22.	***Coracias benghalensis***	1	-	-	-	-	1
23.	***Picummus innorminatus***	2	-	-	-	-	2
24.	***Turdoides gularis***	-	5	-	-	-	5
25.	***Hemiprocne coronate***	-	-	6	-	-	6
26.	***Caprimulgus asiaticus***	3	-	-	-	-	3
Total		96	19	9	0	4	128

Note; T. Tree; S&B. Shrubs and Bushes; O. Open Country; M. Marshes; W. Water

Table 6. Activity patterns of recorded bird species from Pyi Nyaung village, Tharsi Township

No.	Scientific name	Activity Patterns			Observed Number
		FL	P	FE	
1.	***Milvus migrans***	-	√	-	2
2.	***Spilornis cheela***	-	√	-	1
3.	***Falcon peregrines***	√	-	-	1
4.	***Streptopelia chinensis***	-	√	-	2
5.	***Columbia livia***	-	-	√	9
6.	***Gallus gallus***	-	-	√	8
7.	***Merops orientalis***	√	-	-	3
8.	***Passer flaveolus***	-	√	-	5
9.	***Acridotheres fuscus***	-	√	-	10
10.	***Cypsiurus balasiensis***	-	√	-	5
11.	***Passser domesticus***	-	-	√	20
12.	***Ploceus philippinus***	√	-	-	15
13.	***Egrotta garzettar***	-	√	-	4
14..	***Nectarinia asiatica***	√	-	-	6

Table 6.(Contd.) Activity patterns of recorded bird species from Pyi Nyaung village, Tharsi Township

No.	Scientific name	Activity Patterns			Observed Number
		FL	P	FE	
15.	***Nectarinia jugularis***	√	-	-	3
16.	***Pycnonotus cafer***	-	√	-	4
17.	***Pycnonotus blanfordi***	-	√	-	3
18.	***Pycnonotus jacosus***	-	√	-	3
19.	***Urocissa erythorhyncha***	√	-	-	2
20.	***Copsychs saularis***	-	√	-	2
21.	***Dicrurus macrocercus***	√	-	-	3
22.	***Coracias benghalensis***	√	-	-	1
23.	***Picummus innorminatus***	√	-	-	2
24.	***Turdoides gularis***	-	√	-	5
25.	***Hemiprocne coronata***	√	-	-	6
26.	***Caprimulgus asiaticus***	√	-	-	3

Note; FL. Flying; P. Perching; FE. Feeding

Table 7. Mammal species collected from Pyi Nyaung village, Tharsi Township

No.	Order	Scientific name	Common name	Local name	Data Source	IUCN Redlist CITES
1.	Artiodactypus	***Bos gaurus***	Guar	Pyaung	IS	EN, Appendix I
2.	Artiodactypus	***Naemorhedus baileyi***	Red Goral	Taung Sate	IS	Vul, Appendix I
3.	Rodentia	***Echinosorex gymnurus***	Moonrat	Le-Kywet	IS	
4.	Rodentia	***Talpa micrura***	Eastern Mole	Pwae	IS	
5	Rodentia	***Callosciurus erythraeus***	Pallas' s Squirrel	Shint-Nga-Paw	IS	
6.	Carnivora	***Felis chaus***	Jungle Cat	Taw Kyaung	IS	Appendix II
7.	Rodentia	***Rhizomys sumatrensis***	Large Bamboo Rat	War-Poe-Kywat-Gyi	IS	
8.	Rodentia Histricidae	***Hystrix brachyuran***	East Asian Porcupine	Phyu kaung gyi	IS	Vul
9.	Primates Cercopithicus	***Presbytis femoralis***	Banded Langur	Myauk-Myee-Shae	IS	Low risk Near Threatened Appendix II

Table 8. Insect species collected from Pyi Nyaung village, Tharsi Township

No.	Order	Family	Scientific name	Common name	Local name
I	Lepidoptera	1.Papilionidae	1. ***Papilio demoneus***	Butterfly	Laik Pyar
		2.Danaidae	2. ***Danaus chrysippus***	Butterfly	
		3.Nymphilidae	3. ***Junonia lemonias***	Butterfly	
		4.Pieridae	4. ***Eurema hecabe***	Butterfly	
		5.Acaridae	5. species 1	Butterfly	
		6. Satyridae	6. species 1	Butterfly	
II.	Odonnata	7.Libellulidae	7.***Diplacodes trivialis***	Dragonfly	
			8.***Brachydiplax sobrina***	Dragonfly	
			9.***Trithemis kirbyi***	Dragonfly	
			10. ***Sympetrum fonscolombei***	Dragonfly	
			11.***Orthetrum sabina***	Dragonfly	
		8.Zygoptera	12. Damselfly	Damselfly	
III.	Hymenoptera	-	13.***Eumenes petiolata***	Wasps	
		-	14. ***Apis mellifica***	Bees	
IV.	Coleoptera	9.Silphidae	15. ***Silpha***	Beetles	Carrion beetle
V.	Araneae	-	16.***Chilades spp***	Spiders	
	Scopionidea	-	17. ***Buthus tamulua***	Scorpion	
VI.	Lepidoptera	10. Lasiocamtidae	18.***Trubala vishnu***	Moth	

Parambassis notatus

Oreochromis niloticus

Glossogobius giurius

Colisa labiosus

COLISA COLISA

CHANNA STRIATUS

Plate 1. Collected fish species from pyi Nyaung Apache Cement Factory Project Area

CHANNA PUNCTATUS

MYSTUS PULCHER

PUNTIUS SOPHORE

BARILIUS BARILA

LEPIDOCEPHALUS THERMALIS

LEPIDOCEPHALUS GUNTEA

Plate 2. Collected fish species from Pyi Nyaung Cement Factory Project Area

MABUYMA MULTIFASCIATA **skink**

CALOTES VERSICOLA

HEMIDACTYLUS **catching the insect prey**

CALOTES VERSICOLA

MABUYA MULTIFASCIATA

Tadpole of frog species

Plate 3. Collected Herpet species from Pyi Nyaung Cement Factory Project Area

SPILORNIS CHEELA

MYLVUS MIGRANS

STREPTOPELIA CHINENSIS

UROCISSA ERYTHORHYNCHA

Columba livia

MEROPS ORIENTALIS

Plate 4. Collected Bird species from Pyi Nyaung Cement Factory Project Area

PAPLIO DMOLEUSE

EUREMA HECABE

DANOUS CHRYSIPPUS

JUNONIA LEMONIAS

Plate 5. Collected Insect species from Pyi Nyaung Cement Factory Project Area

DIPLACODES TRIVIALIS

SYMPETRUM FONSCOLOMBEI

BRACHYDIPLAX SOBRINA

Damselfly

TRITHEMIS KIRBYI

ORTHETRUM SABINA

Plate 6. Collected Insect species from Pyi Nyaung Cement Factory Project Area

TAXOPHRA GRAMINUM

***SILPHA* sp.**

EUMENES PETIOLATA

BUTHUS TAMULUA

APIS MELLIFICA

TRUBALA VISHNU

Plate 7. Collected Insect species from Pyi Nyaung Cement Factory Project Area

Horn of *BOS GAURUS*

Horn of *NAEMORHEDUS BAILEYI*

Plate 8. Collected horns of mammal species from Pyi Nyaung Cement Factory Project Area

Annexes

Survey Team of Fauna in the Apache Cement Factory Project

U Aung Pe Lwin, Zoologist

Daw Ei Thiri Khine, Zoologist

Daw Chan Mye Thu, Zoologist

Itinerary

23-3-2014	6:00pm to 2:00am	Yangon to Pyin Nyaung
24-3-2014	9:00am to 11:30am	Meeting Hall, cement factory
	11:30 am to 2:00am	Interview, Ku Pyin village
	4:00 pm to 6:00 pm	Interview, No.(2)Ward, Pyin Nyaung village
25-3-2014	9:00am to 11:30am	Lime-stone area, Fauna Survey
	3:30 pm to 6:00am	Fauna Survey, East part of cement factory
	4:00 pm to 6:00 pm	Interview, No. (2) Ward, Kyu Pyin village

26-3-2014	8:30am to 13:00am	Water supply area, Fauna survey
	3:00pm to 6:00pm	Mud-stone area, Fauna survey
27-3-2014	8:30am to 12:00am	Yin Mar Pin village, Fauna survey
	6:00pm to 5:00am	Pyin Nyaung to Yangon

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APPENDIX - E

Appendix - E

Analysis result of surface water of APACHE CEMENT PLANT, Thazi Township

Characteristics	World Health Organiztion (WHO)		Sample No.1	Sample No.2	Sample No.3
	Highest desirable	Maximum permissible			
Physico -chemical	Level	Level			
Turbidity (J.T.U)	5	25.0	95	120	130
pH	7- 8.5	6.5 - 9.2	7.35	6.99	735
Total solids	500	1500	87.68	214.4	113.76
Total hardness	100	500	92	160	72
Chlorides	200	600	44.11	10.69	103.51
Sulphates (as So_4)	200	400	1.92	24.02	N.D
Calcium (as Ca)	75	200	2.56	54.51	24.05
Magnesium	30	150	14.64	5.86	2.93
Iron (as Fe)	0.1	1	0.04	0.01	0.03
Arsenic	0.05	0.05	0	0	0
Lead	-	0.1	0	0	0
Mercury	-	0.001	0	0	0
EC			137µ mhos /cm	335µ mhos /cm	184µ mhos /cm

P.K , Goel , Water Pollution , Causes, Effects and Controls

Note : all the values are in mg/ L except pH , otherwise stated.

NTU is a measure of light scattered by a formazin polymer.

Approximately, 1 NTU is equal to 1 JTU.

Sample No 1. Surface water at wei

Sample No 2. Surface water at dam site

Sample No 3. Surface water at up stream of dam site

Finding : At present the analysed data shows that these are chemically potable water except turbidity

APPENDIX - F

Appendix - F

Monitoring of Ambient Air Quality

Monitoring is limited to some key pollutants such as suspended particulate matter (SPM), a good air quality management system usually review the probable emission sources and environmental receptor in the area concerned and then selects the pollutants to be monitored. One such pollutant is particulate matter of less than 10 microns in aerodynamic diameter (PM_{10}). Other pollutants monitored included sulphur dioxide (SO_2) and Nitrogen Dioxide (NO_2).

The air pollutants have harmful effect on human beings, animals, plants and even on the buildings. The air pollutants may have their origin from vehicular emissions or by other industrial or other human or natural activity.

The world health organization (WHO) guide line values

	24 hr. mean
1. Total Suspended Particulate Matter(TSPM)	200μgm/m^3
2. Respiratory Particulate Matter(PM_{10})	50 μgm/m^3
3. Sulphur Dioxide (SO_2)	20 μgm/m^3
4. Nitrogen Dioxide (NO_2)	40 μgm/m^3

Effect on health

The air pollution can have deleterious effect not only on human health but also on vegetation and animals, materials and structure of atmosphere, soil and water bodies with long-term adverse effects. Air pollutants have many acute as well as chronic effects on human health, such as irritation of the respiratory tract, eye, nose and throat.

For the batter applicability continued monitoring is essential throughout the operation period by a special team organized for this particular purpose so that remedial measures can be taken as necessary. Furthermore, during the operation period, continuous monitoring will be needed to complete the environmental impact assessment of development cement plant.

Follow up monitoring works should be planned

APPENDIX - G

Monitoring of Acoustic Environment

Noise abatement measures should achieve other the levels given below or a maximum increase in background levels of 3 decibels {Measured on the A scale (dB(A)}

Receptor	Maximum allowable log Equivalent (hourly measurement), in dB(A)	
	Day (07.00 – 22.00)	Night (22.00 – 07.00)
Residential ,		
Institutional, educational.	55	55
Industrial, commercial	70	70

According to the WHO acoustic standard for cement plant, the maximum allowable log equivalent are mentioned above figure, the industrial and commercial limit is 70 dB(A) in both day and night.

The noise is has several adverse effects on heath, much worse than those caused by vibrations. They include cardiovascular problems or pulmonary disorders or skin problems, or faulty blood vascular system. The common pollutants show deleterious effect on heath immediately while the noise pollution shows effect only after prolonged exposure. Therefore noise is called silent killer amongst several environmental hazards. In the long run of exposure to noise the person will have deafness, high blood pressure and hypertension headache, dry skin, weak eye sight, abnormal conscience state of mind.

The noise causes severe heath hazards. Such effects may be physical or mental, which would have long-tern consequences on communications working efficiency personal comfort and can lead to industrial accidents. The physical health problems may be acute and chronic.

To mitigate all the health problems it is necessary to measure the noise by instruments in terms of some units. Acoustic environment monitoring will be performed in accordance with standard procedures adopted by American Conference of Governmental Industrial Hygienist (ACGIH) which is currently used in Myanmar.

For the better applicability, it needs to assess for different variation. Further more, during the operation period, continuous monitoring must be needed to complete the environmental impact assessment of a sustainable development cement plant.

APPENDIX - H

Appendix - H

Final Products of APACHE Cement Plant

Photo-1 : 2000 kg APACHE Cement Bag (Jumbo Bag)

Photo-2 : 2000 kg APACHE Cement Bag (Jumbo Bag)

Photo-3 : 50 kg APACHE Cement Bag (Front View)

Photo-4 : 50 kg APACHE Cement Bag (Back View)

Photo – 5 : Bulk Cement Truck

APPENDIX - I

Appendix - I

APACHE Cement Production Process Photos

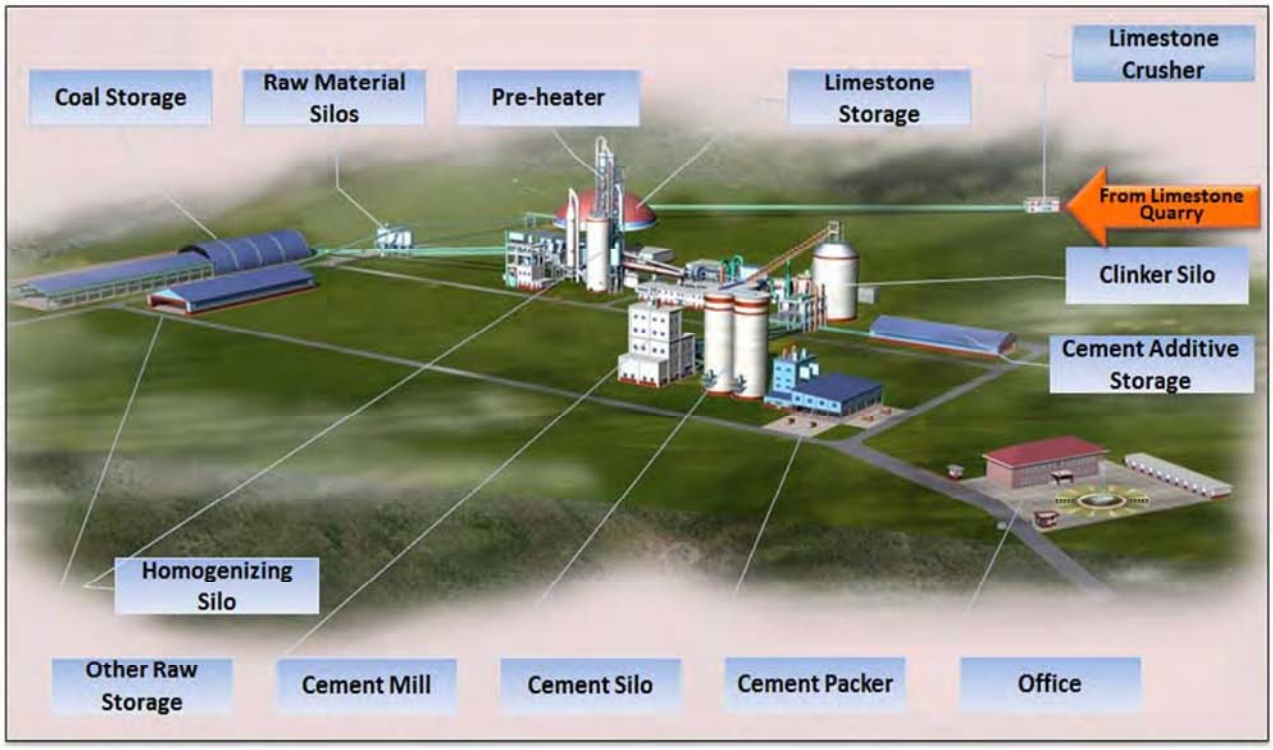


Photo-1 : All APACHE Cement Production Processes

Photo-2: APACHE Cement Plant

Photo-3 : Lime Stone Crusher Building

Photo-4 : Crusher machine

Photo-5 : Crusher machine

Photo-6 : Crusher to lime pre-homogenizing shed transporting

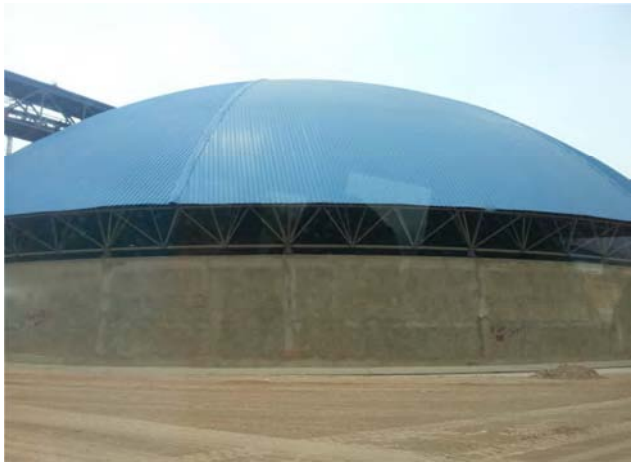


Photo-7 : Lime Pre-Homogenizing Shed(outside)

Photo-8 : Lime Pre-Homogenizing Shed(inside)

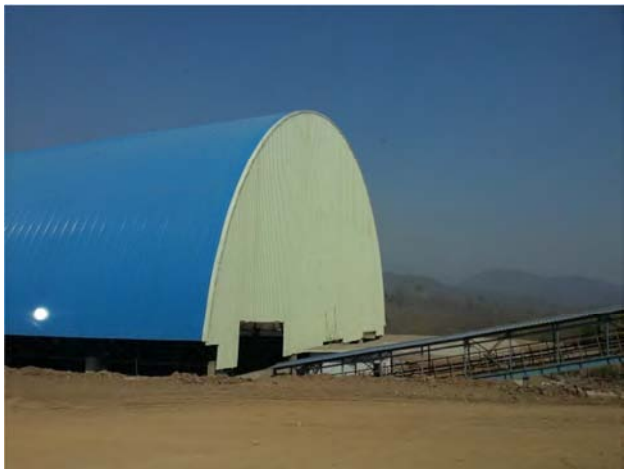


Photo-9 : Coal crushing store and conveying

Photo-10 : Auxiliary Material Crushing Store

Photo-11 : Raw Meal Blending Station

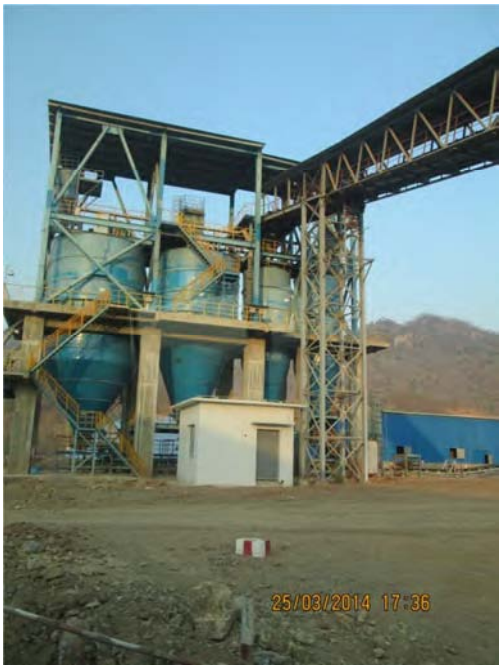


Photo-12 : Raw Material Blending

Photo-13 : Transporting Station

Photo-14 : Grinding Station

Photo-15 : Kiln Inlet Pre-heater

Photo-16 :Homo Silo

Photo-17 : Kiln

Photo-18 : Cement Silos and Cement bulk

Photo-19: Clinker and Unburnt clinker silo

Phto-20:Compressor station, water pump house, and water Purifying station

Photo-21 : Packing Station

Photo-22 : 50kg bag carrying roller

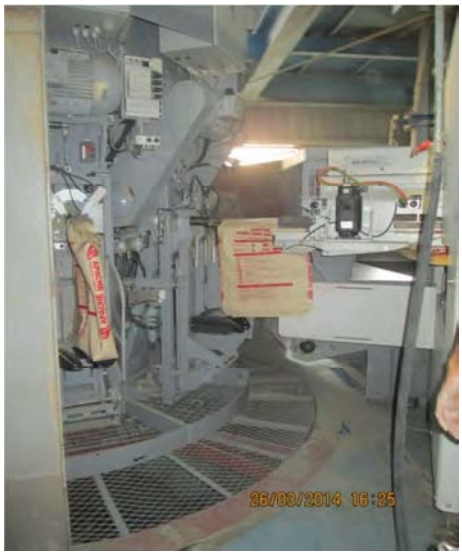


Photo-23 : Packing machine of 50kg bag

Photo-24 : Bag Carry Roller of 50kg bag

Photo-25 : Packing of 2000kg bag

Photo-26 : Instrument of Lab and Master Control Room

APPENDIX – J

Appendix - J

Buildings of APACHE Cement Plant Photos

Photo-1 : Guest house, Messing, Base Camp Office, Brief Hall, Executive at the Base Camp of Shwe Taung Cement Company Limited

Photo-2 : Clinic, E-Type Building, 3- Storey Buildings

Photo-3 : 3- Storey Buildings

Photo-4 : E-Type Building

Photo-5 : F-Type Building

Appendix - J

Staff Housing of APACHE Cement Plant Photos

Photo-6 : Chinese Expatriates Base Camp

Photo-7 : Labor Camp

Photo-8 : Labor Camp

Photo-9 : Labor Camp

Photo-10 : Labor Camp

Photo-11 : : Labor Camp

Buildings of APACHE Cement Plant Photos

Photo-12 : Messing

Photo-13 : Messing Room

Photo-14 : Clinic Building

Photo-15 : Patient beds at the clinic room

Photo-16 : Main Office of Shwe Taung Cement Company Limited

Appendix - J

General Workers Housing of APACHE Cement Plant Photos

Photo-17 : The general workers housing

Photo-18 : The general workers housing

Photo-19 : The general workers housing

Photo-20 : The general workers housing

Photo-21 : The general workers housing

Photo-22 : The general workers housing

General Workers Housing of APACHE Cement Plant Photos

Photo-23 : Water Tank at the general workers housing area

Photo-24 : Latrine at the general workers housing area

Photo-25 : The general workers housing

Photo-26 : The general workers housing

Photo-27 : The general workers housing

Photo-28 : The general workers housing

APPENDIX – K

Raw Materials

Photo-1 : Laterite from Htilon

Photo-2 : Laterite from Htilon

Photo-3 : Red Clay from Myin Ma Hti

Photo-4 : Red Clay

Photo-5 : Bauxite from Inya village, Pyi Oo Lwin Township

Photo-6 : Bauxite from Inya village, Pyi Oo Lwin Township

Mud Stone Quarry Site Photos

Photo-7 : The hill from where the mud stone were mined

Photo-8 : The access road connected with the APACHE Cement Plan to carry the mud stones

Photo-9 : Mud stone quarry site

Photo-10 : Mud stone quarry site

Photo-11 : Mud stone quarry site area

Photo-12 : The view of the APACHE Cement Plant from the quarry site

Mud Stone Quarry Site Photos

Photo-13 : The raw materials for the APACHE Cement Plant

Photo-14 : The raw materials for the APACHE Cement Plant

Photo-15 : The raw materials for the APACHE Cement Plant

Photo-16 : The raw materials for the APACHE Cement Plant

Photo-17 : The raw materials for the APACHE Cement Plant

Photo-18 : The raw materials for the APACHE Cement Plant

Lime Stone Quarry Site Photos

Photo-19 : The Pyae Mountain where the lime stones were mined

Photo-20 : Excavator at the lime stone quarry site

Photo-21 : Dump truck carrying the lime stone to the APACHE Cement Plant

Photo-22 : The Pyae Mountain where the lime stones were mined

Photo-23 : Bulldozer at the lime stone quarry site

Photo-24 : Bulldozer with drilling machine mined at the lime stone quarry site

Lime Stone Quarry Site Photos

Photo-25 : The access road connected with quarry site and lime stone crusher

Photo-26 : Lime stone quarry site area

Photo-27 : The natural trees at the quarry site area

Photo-28 : The raw materials for the APACHE Cement Plant

Photo-29 : The raw materials for the APACHE Cement Plant

Photo-30 : The raw materials for the APACHE Cement Plant

Appendix - K

Explosive Magazines

Photo-31 : Location of Magazine

Photo-32 : Explosive Magazine Fence Gate and

Photo-33 : Magazine 1

Photo-34 : Magazine 2

Photo-35 : Magazine 3

Photo-36 : Magazine

APPENDIX – L

Appendix - L

Photo-1 : Yae Paung Son Sub Power Station

Photo-2 : four power line feeders 15 MVA feeder

Photo-3 : Overhead Power line from Yae Paung Son Sub Station

Photo-4 : Overhead Power line from Yae Paung Son Sub Station

Photo-5 : Overhead Power line to APACHE Cement Plant

Photo-6 : Power line to Employee Housing

Photo-7 : lamp post at the project area

Photo-8 : Name Plate of the transformer at the project area

Photo-9 : Main transformer 16 MVA for APACHE Cement Plant

Photo-10 : 33KV Power Supply Panels

Photo-11 : 6 KV Power Supply Panels for the project area

Photo-12 : Main Transformer for the APACHE Cement Plant project

APPENDIX – M

Appendix - M

Photo-1 : Stream at the Weir Site Area

Photo-2 : Weir Site

Photo-3 : Spillway of the weir site

Photo-4 : Power House near the weir site

Photo-5 : Drainage System

Photo-6 : Water Storage Tank

Photo-7 : Weir Site Area

Photo-8 : Pipe line from the weir site

Photo-9 : Lower Dam (45 million Gallons)

Photo-10 : Water at the lower dam

Photo-11 : Drainage System at the lower dam

Photo-12 : Upper Dam (6 million gallons)

APPENDIX – N

Photo-1 : crana ccessor ies at limestone crusher room

Photo-2 : AJ Power for water supply to cement plant

Photo-3 : machine supporting for limestone crusher

Photo-4 : machine supporting for limestone crusher

Photo-5 : computers at control room

Photo-6 : Packing machine

APPENDIX – O

Appendix - O

101 Outsite - Bag Filter

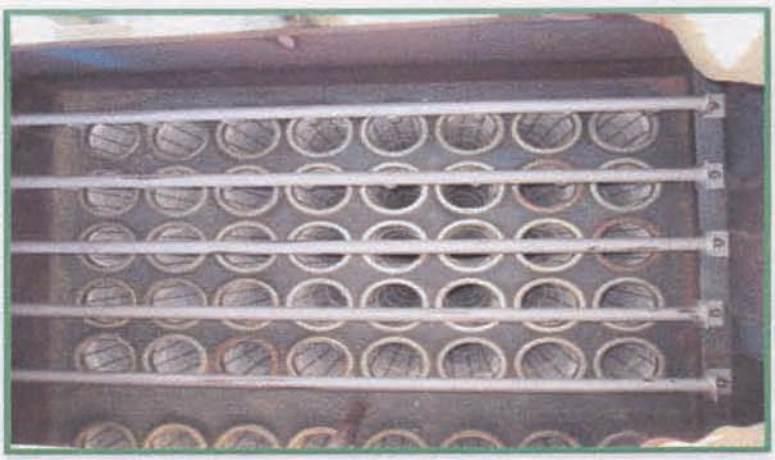
101 Insite - Bag Filter

201 Outsite - Bag Filter

201 Insite - Bag Filter

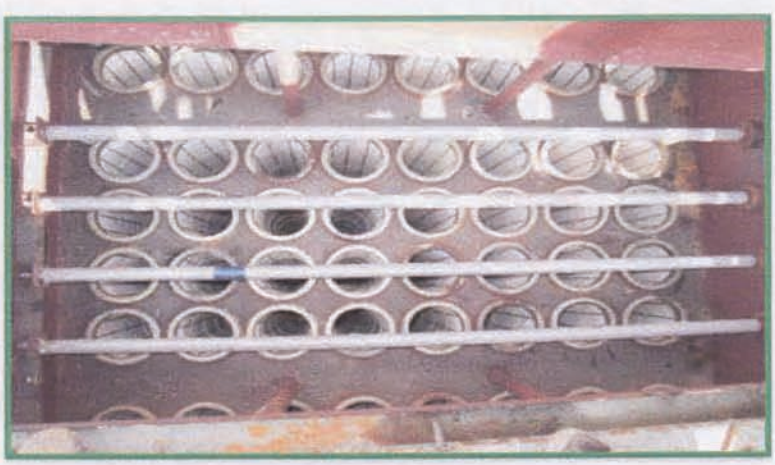
Appendix - O

202 Outsite - Bag Filter



202 Outsite - Bag Filter

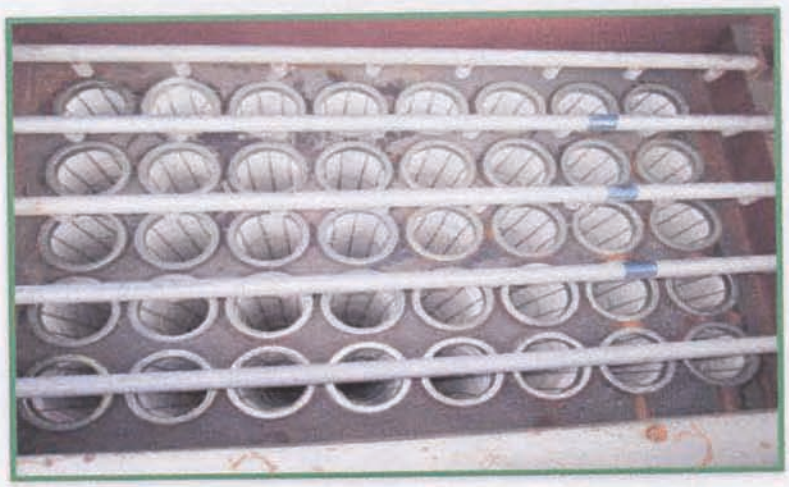
203 Insite - Bag Filter



203 Insite - Bag Filter

Appendix - O

304 Outsite - Bag Filter



304 Insite - Bag Filter

403 Outsite - Bag Filter

403 Insite - Bag Filter

Appendix - O

405 Outsite - Bag Filter

405 Insite - Bag Filter

501 Outsite - (Bag Filter)

502 Insite - (Bag Filter)

APPENDIX – P

Construction Process Safety Signs

Photo-1 : The safety sign at the construction site

Photo-2 : The safety sign at the construction site

Photo-3 : The safety sign at the plant building

Photo-4 : The safety sign at the plant building

Photo-5 : The safety sign at the Cement Plant

Photo-6 : The safety sign at the Cement Plant

Appendix - P

Road Safety Signs Photos

Photo-7 : Road Safety Sign

Photo-8 : Road Safety Sign

Photo-9 : Road Safety Sign

Photo-10 : Road Safety Sign

Photo-11 : Road Safety Sign

Photo-12 : Road Safety Sign

Mine Operation Signs Photos

Photo-13 : Mine Operation Sign

Photo-14 : Mine Operation Sign

Photo-15 : Mine Operation Sign

Photo-16 : Mine Operation Sign

Photo-17 : Mine Operation Sign

Photo-18 : Mine Operation Sign beside the road of the mining site

Personal Protective Equipment (PPE)

Photo-19 : Full safety suits

Photo-20 : Notice Board to wear PPE and Safety Suit for visitors

Photo-21 : The safety hard hats at the gate

Photo-22 : PPE Box

Photo-23 : Safety Hardhat,Safety Glasses, Safety Shoes, Socks, Safety Vest, Gloves, Dust mask, Goggles, Face shield, Ear-plug, Ear-muffs, Apron, Rubber Suit, Respirator

Photo-24 : Safety Hardhat, Safety Glasses, Safety Shoes, Safety Clothing (Long Sleeve Shirts and Trousers), Dust mask

Safety Awareness Training

Photo-25 : Safety Awareness Training

Photo-26 : Safety Orientation Training

Photo-27 : Discussion for safety works

Photo-28 : Deliver a speech for safety

APPENDIX - Q

Health Care Photos

Photo-1 : Clinic at APACHE Cement Plant

Photo-2 : Preparing patients beds at clinic

Photo-3 : Doctor take care the patient

Photo-4 : Nurse does medical checkup to employees

Photo-5 : Preparation medicine box for employee

Photo-6 : Preparation medicine box for employee

Occupational First Aid

Photo-7 : Basic first aid training closing ceremony

Photo-8 : Occupational first aid training at Shwe Taung Cement Plant

Photo-9 : Teaching basic first aid from the red cross association

Photo-10 : Basic first aid training at Shwe Taung Cement Plant

APPENDIX – R

Photo-1 : Fire Safety training to messing team

Photo-2 : Messing Team at Fire Safety Team

Photo-3 : Fire Extinguisher Practical Training

Photo-4 : Fire Extinguisher Practical Training

Photo-5 : Fire Extinguisher Practical Training

Photo-6 : Fire Extinguisher Practical Training

Fire Emergency Plan

Photo-7 : The assembly point area at 403,501,301 for fire emergency

Photo-8 : Prepare the assembly points for fire emergency

Photo-9 : Water tank to extinguish a fire

Photo-10 : Preparation the fire extinguishers

APPENDIX – S

APACHE CEMENT FACTORY

CORPORATE SOCIAL RESPONSIBILITY

a'owi; vrzl;a&; twu wm0e,aom p;ym;a&; vyaqmir

CSR Program

Appendix S

rmwum

၁။ ရည်ရွယ်ချက်

၂။ Global Compact

၃။ 10 Principle

၄။ Millennium Development Goals (MDGs)

၅။ ဒေသခံလူမှုအဖွဲ့အစည်းသို့ ပံ့ပိုးအကျိုးပြုသွားမည့် (Corporate Social Responsibility) အစီအစဉ်များ နှင့် စီမံချက်

၆။ ပြည်ညောင်ဒေသဖွံ့ဖြိုးမှုဆိုင်ရာဆောင်ရွက်မှုများ

၇။ ESIA and EMP

၈။ မှန်လုံအိမ် ဓါတ်ငွေ့လျှော့ချရေး ဆောင်ရွက်ချက်များ

1/ &n& , cu

ရွှေတောင်ဖွဲ့ဖြိုးတိုးတက်မှုကုမ္ပဏီအုပ်စုတွင် တစ်ခုအပါအဝင်ဖြစ်သည့် Shwe Taung Cement Co., Ltd. (Pyi Nyaung) သည် ပြည်ညောင်ဒေသအတွင်း စီးပွားရေးလုပ်ငန်းများ ဆောင်ရွက်လျက်ရှိရာတွင် မိမိတို့ကိုယ်မိမိတို့ ထိန်းချုပ်သည့်ပုံစံအဖြစ် သတ်မှတ်ထားသည့် ဥပဒေများအား လိုက်နာဆောင်ရွက်စေခြင်း၊ လူကျင့်ဝတ်နှင့် ညီညွတ်သော ထိန်းသိမ်းစောင့်ရှောက်ခြင်းရှိသည့် စံသတ်မှတ်ချက်ဘောင်အတွင်း လှုပ်ရှားမှုများဆောင်ရွက်ခြင်း စသည့် CSR (Corporate Social Responsibility) လုပ်ငန်းစီမံချက်တစ်ရပ်ကို ရေးဆွဲအကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိပါသည်။ မိမိတို့ကုမ္ပဏီသည် Global Compact ၏ ဦးတည်ချက် နှစ်ရပ်ဖြစ်သည့် အခြေခံမူ (၁၀)ရပ်ကို စီးပွားရေးလုပ်ငန်းများအနေဖြင့် လိုက်နာကျင့်သုံးနိုင်ရန်နှင့် ထိုသို့စီးပွားရေးလုပ်ငန်းများ ဆောင်ရွက်ရာတွင် ကမ္ဘာ့ကုလသမဂ္ဂအဖွဲ့အစည်း၏ ထောင်စုနှစ် ရည်မှန်းချက်များ ဖြစ်သည့် Millennium Development Goals (MDGs) ပြည့်မီရေးအတွက် ရည်ရွယ်ဆောင်ရွက်ခြင်းဖြစ်ပါသည်။ မိမိတို့လုပ်ငန်း ဆောင်ရွက်မှုများကြောင့် ပတ်ဝန်းကျင်နှင့် စားသုံးသူ၊ ဝန်ထမ်းများအပါအဝင်၊ ပြည်သူပြည်သားများ အားလုံးအတွက် ပြောင်းလဲတိုးတက်မှုများဖြစ်စေရန် ရည်ရွယ်ချက်ထားရှိဆောင်ရွက်လျက် ရှိပါသည်။ ထိုသို့ဆောင်ရွက်ရာတွင် မိမိတို့ကုမ္ပဏီအနေဖြင့် သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာနှင့် ပတ်ဝန်းကျင်ကျေးရွာများရှိ ဒေသခံပြည်သူတို့၏ ပညာရေး၊ ကျန်းမာရေး ဖွံ့ဖြိုးတိုးတက်လာစေရန်၊ သဘာဝပတ်ဝန်းကျင် ထိခိုက်ပျက်စီးမှု မရှိစေရေးအတွက် ထိန်းသိမ်း စောင့်ရှောက်ခြင်း လုပ်ငန်းများဆောင်ရွက်ရန်စသည့် ရည်ရွယ်ချက်များထားရှိ၍ CSR လုပ်ငန်းများအား အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိပါသည်။

၂။ Global Compact

CSR အစီအစဉ်ကို ကမ္ဘာ့ကုလသမဂ္ဂအဖွဲ့အစည်းမှ တစ်ကမ္ဘာလုံးရှိ လုပ်ငန်းအဖွဲ့အစည်းများ၊ လူမှုရေးတာဝန်ကျေစေရေးဦးတည်ချက်ဖြင့် တိုက်တွန်းဆောင်ရွက်ခြင်းဖြစ်ပါသည်။ ထိုသို့ဆောင်ရွက်ရာတွင် ကုလသမဂ္ဂအဖွဲ့အစည်းများ၊ စီးပွားရေးလုပ်ငန်းများ၊ အလုပ်သမားအစည်းအရုံးများနှင့် လူမှုရေးအဖွဲ့အစည်းများ ပူးပေါင်းဆောင်ရွက်နိုင်ရန် တိုက်တွန်းအားပေးခြင်းသာဖြစ်ပါသည်။ Global Compact တွင် အဓိကဦးတည်ချက် (၂) ရပ် ရှိပါသည်။ ပထမအချက်မှာ အခြေခံမူ (၁၀) ရပ် ဖြစ်ပြီး ဒုတိယရည်ရွယ်ချက်မှာ ကမ္ဘာ့ကုလသမဂ္ဂ၏ ထောင်စုနှစ် ရည်မှန်းချက်များ (Millennium Development Goals - MDGs) ပြည့်မီအောင် ဆောင်ရွက်ရေးပင် ဖြစ်ပါသည်။ Global Compact ကို ၂၀၀၀ ပြည့်နှစ်တွင် ကမ္ဘာ့ကုလသမဂ္ဂအဖွဲ့အစည်းများ ဖြစ်သည့် UNOHCHR, UNEP, ILO, UNDP, UNIDO နှင့် ODC စသည့် အဖွဲ့အစည်း(၆)ခုဖြင့် စတင်အကောင်အထည်ဖော်ဆောင်ရွက်ခဲ့ပါသည်။ Global Compact သည် ကြီးကြပ်နိုင်သည့် အာဏာအသုံးပြုဆောင်ရွက်စေခြင်းမဟုတ်ဘဲ ညှိနှိုင်းဆွေးနွေးမှုများကို ဖန်တီးပေးခြင်းသာဖြစ်ပါသည်။ တခြားတဖက်မှလည်း ကွန်ရက်တစ်ခုအား ဖော်ထုတ်ပေးခဲ့ခြင်း ဖြစ်ပါသည်။

၃။ 10 Principle

1) Human Rights

Principle 1: Businesses support and respect protection of internationally proclaimed human rights.

လုပ်ငန်းများသည် နိုင်ငံတကာမှ အသိအမှတ်ပြုထားသည့် လူ့အခွင့်အရေးများကို ကာကွယ်ခြင်း၊ ထောက်ခံလေးစားခြင်းတို့ ပြုလုပ်ရမည်။

Principle 2: Make sure they are not complicit in human rights abuses.

မိမိတို့သည် လူ့အခွင့်အရေး ချိုးဖောက်မှုများကို အားပေးအားမြောက် မပြုလုပ်ရ။

2) Labour

Principle 3: Businesses uphold freedom of association and effective recognition of right to collective bargaining.

အသင်းအဖွဲ့များ ဖွဲ့စည်းခွင့်ကို လွတ်လွတ်လပ်လပ် ဆောင်ရွက်ခွင့်ပြုရမည်။ စုပေါင်းအရေးဆိုခွင့်ကို အသိအမှတ်ပြု ဆောင်ရွက်ပေးရမည်။

Principle 4: Elimination of all forms of forced and compulsory labour.

အဓမ္မစေခိုင်းခြင်း ၊ မလုပ်မနေရစေခိုင်းခြင်း မပြုလုပ်ရ။

Principle 5: Effective abolition of child labour.

လုပ်ငန်းခွင်တွင် ကလေးလုပ်သား အသုံးပြုခြင်းကို ထိထိရောက်ရောက် ဖျက်သိမ်းရမည်။

3) Environment

Principle 6: Elimination of discrimination respect of employment and occupation.

အလုပ်အကိုင်၊ အခွင့်အလမ်းနှင့်ပတ်သက်၍ (ဘာသာရေး၊ ကျန်းမာရေး၊ ကျား/မ အစရှိသည့်) ခွဲခြားမှုကို ပယ်ဖျက်ရမည်။

Principle 7: Businesses Support Precautionary approach greater environmental responsibility.
လုပ်ငန်းများသည် သဘာဝပတ်ဝန်းကျင်ကို အနှောက်အယှက်ဖြစ်စေမည့်ကိစ္စများ၊ ပျက်စီးဆုံးရှုံးမှုဖြစ်ပေါ်စေမည့် ကိစ္စရပ်များကို သတိထားချည်းကပ်၍ ကြိုတင်ကာကွယ်ထိမ်းသိမ်းရန် ဆောင်ရွက်ရမည်။

Principle 8: Undertake initiatives to promote greater environmental responsibility.

သဘာဝပတ်ဝန်းကျင်ရေးရာ တိုးတက်ရေးအတွက် တာဝန်ယူဦးစီးဆောင်ရွက်ရမည်။

Principle 9: Encourage development and diffusion of environmentally friendly technologies.
ပတ်ဝန်းကျင်အားအကျိုးပြုသည့် နည်းပညာများဖွံ့ဖြိုးရေးနှင့်အသုံးချရေးကို အားပေးဆောင်ရွက် ရမည်။

4) Anti - Corruption

Principle 10: Businesses work against corruption in all its forms including extortion and bribery.

ငွေညှစ်ခြင်း ၊ မိုက်ကြေးခွဲခြင်း၊ လာဘ်ပေးလာဘ်ယူခြင်းအပါအဝင် သဏ္ဌာန်အမျိုးမျိုးနှင့် အကျင့်ပျက်ပြားမှုကို တိုက်ဖျက်ရေးလုပ်ရမည်။

၄။ Millennium Development Goals (MDGs)

MDG (1) – Eradicate extreme poverty and hunger (ဆင်းရဲမှုပပျောက်ရေးနှင့် ငတ်မွတ်မှု)

MDG (2) – Achieve universal primary education (မသင်မနေရပညာရေးစနစ်)

MDG (3) – Promote gender equality and empower women (ကျား/မ မခွဲခြားရေး)

MDG (4) – Reduce child mortality (ကလေးသူငယ်သေဆုံးမှု လျှော့ချရေး)

MDG (5) – Improve maternal health (ကိုယ်ဝန်ဆောင် မိခင်ကျန်းမာရေးစောင့်ရှောက်မှု)

MDG (6) – Combat HIV/AIDS Malaria and other diseases (HIV, Malaria နှင့်

အခြားရောဂါတိုက်ဖျက်ရေး)

MDG (7) – Ensure environmental sustainability (သဘာဝပတ်ဝန်းကျင် ထိမ်းသိမ်း စောင့်ရှောက်ရေး)

MDG (8) – Global partnership for development (ဆင်းရဲ/ချမ်းသာနိုင်ငံများ ပူးပေါင်း ဆောင်ရွက်ရေး)

၅။ ဒေသခံလူမှုအဖွဲ့အစည်းသို့ အကျိုးပြုပံ့ပိုးသွားမည့် (Corporate Social Responsibility) အစီအစဉ်များနှင့် စီမံချက်

ရှွေတောင်ဖွဲ့ဖြိုးတိုးတက်မှု ကုမ္ပဏီအုပ်စု တစ်ခုဖြစ်သည့် Shwe Taung Cement Co., Ltd. သည် မန္တလေးတိုင်း၊ သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာ ဒေသဖွံ့ဖြိုးတိုးတက်မှုအတွက် ကဏ္ဍများအလိုက် ခွဲခြားပြီး အကျိုးပြု ပံ့ပိုးမှုများ ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

(၅. ၁) ကျန်းမာရေးအတွက် အကျိုးပြုပံ့ပိုးနိုင်မည့်အစီအစဉ်

(၁) လူထုကျန်းမာရေးပညာပေးဟောပြောပွဲများ ကျင်းပပေးခြင်းဖြင့် ပံ့ပိုးပေးခြင်း။
(၂) ရာသီအလိုက်ဖြစ်ပွားတတ်သော ကူးစက်ရောဂါကာကွယ်ဆေးများ ပံ့ပိုးပေးခြင်း။
(၃) ဌက်ဖျားရောဂါနှိမ်နှင်းရေးနှင့် စီမံချက်အလိုက် ကာကွယ်ဆေးထိုးပေးခြင်းဖြင့် ပံ့ပိုးပေးခြင်း။
(၄) ရေမရနိုင်ပါက အဝီစိတွင်းတူး၍ ရေကောင်းရှာဖွေပေးခြင်းနှင့် ရေသန့်များ လှူဒါန်းပေးခြင်းဖြင့် ပံ့ပိုးပေးခြင်း။
(၅) ဒေသခံလူနာများအား ရှွေတောင်ဆေးပေးခန်းတွင် ကုသပေးခြင်းဖြင့် ပံ့ပိုးပေးခြင်း။
(၆) မိမိတို့ကုမ္ပဏီတွင်ခန့်ထားသော ဝန်ထမ်းများအား ကျန်းမာရေး စစ်ဆေးမှုများဖြစ်သည့် B ပိုးC ပိုး၊ HIV ၊ ECG များ စစ်ဆေးပေးခြင်းဖြင့် ထောက်ပံ့ပေးခြင်း။

(၅. ၂) ပညာရေးအတွက် အကျိုးပြုပံ့ပိုးပြီးစီးသည့် အစီအစဉ်နှင့် ဆက်လက်ပံ့ပိုးမည့် အစီအစဉ်များ

(၁) သာစည်မြို့နယ် ပြည်ညောင်ကျေးရွာ အလယ်တန်းကျောင်း(ခွဲ)နှစ်ထပ်ကျောင်းဆောင်သစ်ကြီး ဆောက်လုပ်လှူဒါန်းခြင်း။
(၂) ပြည်ညောင်စာသင်ကျောင်းတွင် စာသင်ခုံများ လှူဒါန်းပေးခြင်း။

(၃) စာသင်ကျောင်းအဆောက်အဦများအား ကျောင်းအင်္ဂါရုပ်နှင့် ညီညွတ်အောင် ပြုပြင်မွမ်းမံတည်ဆောက်ရာတွင် လိုအပ်ချက်များ ဖြည့်ဆည်းပေးနိုင်ရန်အတွက် ရန်ပုံငွေ ကျပ်သိန်း(၅၀) မတည် လှူဒါန်းပေးထားခြင်း။

(၄) ကွန်ပြူတာများ၊ စာရေးကိရိယာများ နှစ်စဉ် လှူဒါန်းပေးခြင်း။

(၅) မိဘဆရာအသင်းခန့်ဆရာ/ဆရာမများအား လစာငွေ ပံ့ပိုးပေးခြင်း။

(၆) ဒေသခံဘွဲ့ရလူငယ်များအား အလုပ်အကိုင်အခွင့်အလမ်းဖွင့်ပေးခြင်း။

(၇) ပညာရေးငွေပဒေသာပင်များ စိုက်ထူပေးထားခြင်း။

(၈) ပညာထူးချွန်ကျောင်းသား၊ကျောင်းသူများအား ပညာသင်စရိတ်ထောက်ပံ့ပေးခြင်း။ (၂၀၁၄-ခုနှစ်၊ ဇွန်လမှ စတင်အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။)

(၉) ထောက်ပံ့ပေးသည့် ကျောင်းသားများဘွဲ့ရလာသည့်အခါ မိမိတို့ကုမ္ပဏီတွင် အလုပ်အကိုင်အခွင့်အလမ်းဖွင့်ပေးခြင်း။

(၅. ၃) အထွေထွေဖွံ့ဖြိုးရေးအတွက် အကျိုးပြုပံ့ပိုးမည့် အစီအစဉ်

(၁) ကူပြင်ရွာနှင့် ပြည်ညောင်ကျေးရွာရှိ ရွာသူရွာသားများ သွားလာရေး လွယ်ကူစေရန် လမ်းများ ဖောက်လုပ်ပေးခဲ့ခြင်း ။

(၂) ဘေးကင်းလုံခြုံစွာ သွားလာနေထိုင်တတ်စေရန် ဟောပြောခြင်း၊ စောင့်ကြည့် ကြပ်မတ်ခြင်း၊ သတိပေးတားမြစ်ခြင်း။

(၃) သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာအသိအမြင်များ တိုးတက်လာစေရန် ဟောပြောပွဲများ ကျင်းပပေးခြင်း။

(၄) လျှပ်စစ်မီးများ ရရှိရေးအတွက် ပံ့ပိုးဆောင်ရွက်ပေးခြင်း။

(၅. ၄) ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုဆောင်ရွက်မည့် အစီအစဉ်များ

(က) တူးဖော်ပြီးလုပ်ကွက်ဟောင်းများအား ပြန်လည်ပြုပြင်ထိန်သိမ်းမည့်အစီအစဉ်

ထုံးကျောက်တူးဖော်ပြီးသော လုပ်ကွက်ဧရိယာများကို ကျင်းချို့များ၊ ရေအိုင်ခြင်းများ မရှိရေးအတွက် မြေသားဖြင့် ပြန်လည်ဖို့ညီပေးခြင်းများကို ဆောင်ရွက်ပေးခဲ့ပြီး အပင်များစိုက်ပျိုးနိုင်ရန် မြေဆီလွှာဖြန့်ခင်းပြီး မြေပြုပြင်ထားပါသည်။

(ခ) အစားထိုးသစ်ပင်စိုက်ပျိုးမည့်အစီအစဉ်

ထုံးကျောက်ထုတ်လုပ်ပြီးသွားသည့်နေရာများတွင် မြေမျက်နှာပြင် ပြန်လည်ပြုပြင်ခြင်းလုပ်ငန်းများ ဆောင်ရွက်ပြီးစီးပြီးသည်နှင့် တပြိုင်နက်တည်း ထုံးကျောက်တောင်သဘာဝပတ်ဝန်းကျင် ပြန်လည်ပြုစုပျိုးထောင်ရေးအတွက် မန္တလေးတိုင်း၊ သာစည်မြို့နယ်သစ်တောဦးစီးဌာန၏ လမ်းညွှန်မှုဖြင့် မူလသဘာဝပတ်ဝန်းကျင် ပေါက်ပင်များ နှင့် ဒေသနှင့်သင့်တော်သည့် အခြားသစ်အမျိုးမျိုးတို့ကို ပြန်လည်စိုက်ပျိုးနိုင်ရန် သစ်တောဝန်ထမ်းများနှင့် ပူးပေါင်း၍ သစ်ပျိုးပင်များကို ရာသီအခါနှင်အမီ ပျိုးထောင်စိုက်ပျိုးထားပါသည်။ သစ်တောဦးစီးဌာန၏ စီမံခန့်ခွဲပိုင်ခွင့်ရှိသော ဧရိယာများတွင်လည်း ဒေသနှင့် သင့်တော်သည့်စိုက်ခင်းများ တည်ထောင်ကာ အစားထိုးစိုက်ပျိုးသွားမည်ဖြစ်ပါသည်။

၆။ ပြည်ညောင်ဒေသဖွံ့ဖြိုးမှုဆိုင်ရာဆောင်ရွက်မှုများ

(၆. ၁) ပြည်ညောင်ဒေသ တည်ရှိရာ နှင့် ဖွံ့ဖြိုးမှုဆိုင်ရာလုပ်ဆောင်ချက်များ

မိမိတို့ရွှေတောင်ဘိလပ်မြေကုမ္ပဏီလီမိတက်သည် မန္တလေးတိုင်းဒေသကြီး၊ သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာတွင် တစ်နေ့လျှင် တန်ချိန် (၁၅၀၀) ထုတ်လုပ်နိုင်သည့် ဘိလပ်မြေစက်ရုံကို တည်ဆောက်ပြီးစီးသွားပြီဖြစ်ပါသည်။ ပြည်ညောင်ကျေးရွာသည် ရန်ကုန်မှ (၃၃၀) မိုင်၊ မန္တလေးမှ (၁၂၄) မိုင်၊ ကလောမှ (၃၀)မိုင်၊ သာစည်မှ ၂၅ မိုင်ခန့် ကွာဝေးသောကြောင့် မြို့နှင့်အလမ်းဝေးကွာသည့် ကျေးရွာကလေးတစ်ရွာဖြစ်ပါသည်။ မိမိတို့ကုမ္ပဏီသည် ပြည်ညောင်ကျေးရွာနှင့် ပတ်ဝန်းကျင်ဒေသရှိ ကျေးရွာများ၏ လူသားအရင်းအမြစ်ဖွံ့ဖြိုးတိုးတက်မှုဆိုင်ရာလုပ်ငန်းများကို လုပ်ကိုင်ဆောင်ရွက်ခဲ့ပါသည်။

ကျန်းမာရေးစောင့်ရှောက်မှုများ

၁။ ကျန်းမာရေးစောင့်ရှောက်မှုအပိုင်းတွင် ဝန်ထမ်းများအားလုံးအား ရောဂါစစ်ဆေးမှုများဖြစ်သည့် HIV, B ပိုး၊ C ပိုး၊ ECG TEST များ စစ်ဆေးပေးပြီးဖြစ်ပါသည်။

၂။ ပြည်ညောင်ဒေသတွင် အဖြစ်များဆုံးဖြစ်သည့် ငှက်ဖျားရောဂါများစစ်ဆေးပေးခြင်းကိုလည်း UNICIEF နှင့် ပူးပေါင်းဆောင်ရွက်ပေးခဲ့ပါသည်။

၃။ မြွေဆိုးအန္တရာယ်မှ ကာကွယ်ရန်အတွက် မြွေဆိပ်ဖြေဆေးများကိုလည်း ထားရှိပေးထားပါသည်။

၄။ မြို့နယ်ဆေးရုံများတွင် သွေးများလိုအပ်ပါက သွားရောက်လှူဒါန်းနိုင်ရန်အတွက် သွေးလှူအသင်းများကိုလည်း ဖွဲ့စည်းထားရှိပေးပါသည်။

၄။ (၂၆-၁-၂၀၁၄) ရက်နေ့တွင် UNICIEF နှင့် ပူးပေါင်းဆောင်ရွက်မှုအစီအစဉ်အရ အသက်(၁၅)နှစ်မှ (၄၅) နှစ်အတွင်း အမျိုးသမီးများအား မေးခိုင်ကာကွယ်ဆေးများထိုးပေးခဲ့ပြီး ဆေးထိုးရန် ကျန်ရှိနေသည့် နောက်ထပ်(၂)ကြိမ်အတွက် ဖေဖော်ဝါရီလနှင့် ဩဂုတ်လများတွင် ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

၅။ ဆေးပေးခန်းတွင် အသက်ရှူကြပ်သည့်ရောဂါရှိ လူနာများအတွက် ဆေးခန်းတွင် Oxygen Concentrator ထားရှိရန် စီစဉ်လျက်ရှိပါသည်။

၆။ ပြည်ညောင်ကျေးရွာနှင့် အနီးပတ်ဝန်းကျင်ကျေးရွာမှ လူနာများအတွက်လည်း စရိတ်မျှပေးကျန်းမာရေးစနစ်ဖြင့် ဆေးကုသစရိတ်ချိုသာစွာ ကုသပေးလျက်ရှိပါသည်။

၇။ ဆေးခန်းတွင် လူနာများသက်တောင့်သက်သာဖြင့် ဆေးကုသမှုခံယူနိုင်ရေးအတွက် ကူရှင်များဖြင့်ပြုလုပ်ထားသည့် ဘီးတပ်ကုတင်များကိုလည်း ဝယ်ယူပေးထားပြီး အမျိုးသမီးများအတွက် (၃)လုံး၊ အမျိုးသားအတွက် (၃)လုံး၊ စုစုပေါင်း (၆)လုံး ထားရှိပေးပါသည်။

၈။ ကျန်းမာရေးနှင့်အညီ ဆောင်ရွက်မှုအနေဖြင့် လူနာများဆေးခန်းလာပြသည့်အခါ သန့်ရှင်းမှုရှိစေရန် လူနာများ၏ ခေါင်းအုံးပေါ်တွင် Towel များထားရှိပြီး အသုံးပြုရန် စီစဉ်ထားပါသည်။

ဝန်ထမ်းများနှင့် အိမ်ထောင်သည်လိုင်းမှ အမျိုးသမီးများအား ကာကွယ်ဆေးထိုးရန်ကားဖြင့် အကြိုအပို့လုပ်ပေးစဉ်

စားဆောင်မှ အမျိုးသမီးဝန်ထမ်းများအား ကျေးရွာ သူနာပြုဆရာမမှ ကာကွယ်ဆေးထိုးပေးစဉ်

&up	talumi;t&m	vl'ge;ai
၁၇. ၀၃. ၂၀၁၀	ကူပြင်ကျေးရွာမူလတန်းလွန်စာသင်ကျောင်းဆောက်လုပ်ရန်အတွက် ထောက်ပံ့ငွေများလျှုဒါန်းခဲ့ပါသည်။	၅၀၀,၀၀၀ ကျပ်
၂၁. ၀၈. ၂၀၁၀	သာစည်မြို့နယ်ကူပြင်ကျေးရွာ မူလတန်းကျောင်းအတွက် ဆရာမများ၏ လစာငွေအတွက် (၁. ၆. ၂၀၁၀ မှ ၃၁. ၃. ၂၀၁၁ ထိ) ထောက်ပံ့လစာ အလျှုငွေ ကိုထောက်ပံ့ ပေးခဲ့ပါသည်။	၄၀၀,၀၀၀ ကျပ်
၁၀. ၀၄. ၂၀၁၁	ကူပြင်ကျေးရွာရှိဒေသနေပြည်သူများသွားလာရေးလွယ်ကူစေရန် လမ်းဖောက်လုပ် ပေးခြင်းများ ပြုလုပ်ခဲ့ပါသည်။	
၂၃. ၈. ၂၀၁၂	ပြည်ညောင်ကျေးရွာရှိ မူလတန်းလွန်ကျောင်း တည်ဆောက်ရန်အတွက် စာသင်ခုံ အလုံး (၈၀) လျှုဒါန်းခဲ့ပါသည်။	၁,၂၈၀,၀၀၀ ကျပ်
လစဉ်ပံ့ပိုး လုပ်ဆောင်ချက်များ	ပြည်ညောင် မူလတန်းလွန်ကျောင်းရှိ ဆရာ၊ ဆရာမများနှင့် ကျောင်းသား ကျောင်းသူများ သောက်သုံးရန်အတွက် ၂၀ လီတာဆန့် ရေသန့်ဗူးများကို နေ့စဉ်လျှုဒါန်းလျက်ရှိပါသည်။ ရေသန့်ဗူးခွံ ၂၀ လျှုဒါန်း ပေးထားပါသည်။ ကျောင်းတွင် လစဉ်သုံးရေအတွက် ရေဂါလံ (၁၆၀၀)ဆန့် ရေကား (၃)စီးကိုလည်း ၃ရက်တစ်ကြိမ် နှင့် လိုအပ်၍ ထပ်မံ တောင်းဆိုပါကလည်း သွားရောက် လျှုဒါန်း ပေးလျက်ရှိပါသည်။	
၂၇. ၀၁. ၂၀၁၃	၈ ပေ × ၅ ပေ × ၅ ပေ အုတ်ရေကန် ဆောက်လုပ်လျှုဒါန်းခဲ့ပါ သည်။	
၃၀. ၁၂. ၂၀၁၄	၁၂၀ ပေ × ၃၀ပေ အလယ်တန်းကျောင်း (၂) ထပ်ကျောင်းဆောင်ကြီး ကိုလည်း ဆောက်လုပ်လျှုဒါန်းခဲ့ပါသည်။	သိန်း (၉၀၀)
၃၀. ၁၂. ၂၀၁၄	အလယ်တန်းကျောင်း (ခွဲ) ပြည်ညောင်ကျောင်း၏ လွဲပြောင်းပေးအပ်ပွဲတွင် လျှုဒါန်းမှုများမှာ ကွန်ပြူတာ (၄)လုံး၊ ဗလာစာအုပ် ဒါဇင် (၃၅၀) ၊ ခဲတံ (၃၅၀) ဒါဇင် ၊ လွယ်အိတ် အလုံး (၇၅၀) ၊ ပညာရေးငွေပဒေသာပင် မတည်ငွေ သိန်း (၅၀)အားလျှုဒါန်းခဲ့ပါသည်။	သိန်း (၉၆၅. ၅)

ယခင်မူလ တန်းလွန်၊ယခု အလယ်တန်းကျောင်း (၃) ပြည်ညောင် ပန္နက်တော်တင် မင်္ဂလာအခမ်းအနားကျင်းပစဉ်

သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာ အလယ်တန်းကျောင်း (၃) နှစ်ထပ်ကျောင်းဆောင်သစ် ပန္နက်တော်တင် မင်္ဂလာ အခမ်းအနား တွင် ထောက်ပံ့ငွေ (၁၀)သိန်း၊ ကျောင်းသုံး ဗလာစာအုပ် (၆၀၀) နှင့် လွယ်အိတ် အလုံး(၆၀၀)လှူဒါန်းခြင်း

(၂၀၁၃-၂၀၁၄) ပညာသင်နှစ်အတွက် စက်ရုံတည်ရှိရာဒေသပတ်ဝန်းကျင်ရှိစာသင်ကျောင်းများသို့ စာရေးကိရိယာများ လှူဒါန်းပေးအပ်ခြင်း အခမ်းအနား

သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာ တွဲဖက်အလယ်တန်းကျောင်းအတွက် စာသင်ခုံအလုံး (၈၀) လှူဒါန်းခြင်း

၂၀၁၃ - ၂၀၁၄ ခုနှစ် စာရေးကိရိယာလှူဒါန်းခြင်း


(၂၀၁၃-၂၀၁၄) ပညာသင်နှစ်အတွက် ပတ်ဝန်းကျင်ကျေးရွာကျောင်းများသို့ စာရေးကိရိယာများ ထောက်ပံ့ပေးသည့်လုပ်ရှားမှုများ



ကူပြင်ကျောင်းဆောက်လုပ်ရန် ထောက်ပံ့ငွေ (၅)သိန်း လှူဒါန်းစဉ်

ကူပြင်ကျောင်းတွင် လှူဒါန်းစဉ်အမှတ်တရ



တောင်ပြည်ညောင် မူလတန်းကျောင်းတွင် လှူဒါန်းစဉ်

မုံပင်ကျောင်းတွင် လှူဒါန်းစဉ်အမှတ်တရ


သာစည်မြို့နယ၊ ပြည်ညောင်ကျေးရွာ အလယ်တန်းကျောင်း (ခွဲ) အတွက်
နှစ်ထပ်စာသင်ကျောင်းဆောင် (၁)ဆောင်

ဆောက်လုပ်လှူဒါန်းခြင်းနှင့် ကျောင်းဆောင်သစ်လွှဲပြောင်းအပ်နှံခြင်း






ထိုင်ခုံများ မလှူဒါန်းခင် အခြေအနေ


ထိုင်ခုံများ လှူဒါန်းပြီး အခြေအနေ


မလှူဒါန်းခင် (Toilet) အခြေအနေ


လှူဒါန်းပြီး (Toilet) အခြေအနေ

နှစ်ထပ်ကျောင်းဆောင်သစ်လွှဲပြောင်းပေးအပ်ပွဲ

ဥက္ကဋ္ဌကြီးအား ကျောင်းအုပ်ဆရာကြီးမှ ဂုဏ်ပြုလွှာ ပြန်လည်ပေးအပ်စဉ်

ကုမ္ပဏီအတွက် အမှတ်တရ ကဗျာသီကုံး ဂုဏ်ပြုလွှာ ပေးအပ်စဉ်

ဥက္ကဋ္ဌနှင့် ရှယ်ယာရှင်များမှ ပြည်ညောင်ကျောင်းသို့ ကွန်ပြူတာ (၄)လုံး၊ စာအုပ်၊ ခဲတံ၊ လွယ်အိတ်များ လှူဒါန်းစဉ်

ပညာရေးငွေပဒေသာပင်

စဉ်	လ /ဒုနှစ်	အလှူငွေ (ကျပ်)	လက်မှတ်
၁	ကိန်ဝါရီ		
၂	ဖေဖော်ဝါရီ		
၃	မတ်		
၄	ဧပြီ		
၅	မေ		
၆	ဇွန်		

စဉ်	လ /ဒုနှစ်	အလှူငွေ (ကျပ်)	လက်မှတ်
၇	ဇူလိုင်		
၈	ဩဂုတ်		
၉	စက်တင်ဘာ		
၁၀	အောက်တိုဘာ		
၁၁	နိုဝင်ဘာ		
၁၂	ဒီဇင်ဘာ		

(၁၄. ၄. ၂၀၁၃) မှ စတင်အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိရှိရာ (၃၁. ၁၂. ၂၀၁၃) အထိ ပညာရေးငွေပဒေသာပင် ထည့်ဝင်လှူဒါန်းငွေ စုစုပေါင်းမှာ (၅၃၆၀၀၀) ကျပ် ရရှိပြီဖြစ်ပါသည်။ ပညာရေးငွေပဒေသာပင် စိုက်ထူခြင်းမှ ရရှိလာသည့် အလှူငွေများအား မိတ္ထီလာ CB Bank တွင် အပ်နှံထားပါသည်။

APACHE Scholarship Examination

APACHE Cement Factory မှ ထောက်ပံ့ခြင်း

rrw Company tae|zi ompnlrTe,r ausmi;om;^o (5)0;? |ynanmiaus;&mr ausmi;om;^o (5)0; ppay;gi; (10)0;u axmuyay;om;rn|zpy;gon/ uav; wp0;v|i (30,000)u;yEe;|zivp0 ynmoi axmuyalu; tm;ay;om;rn|zpy;gon/

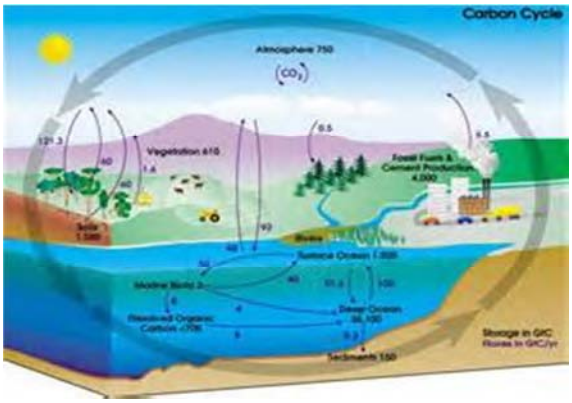
p0	cpm;ci (twe;)	0;a&	wpvay;Ele;	Total Month	10 Month Budget	Total Budget
1/	9 we;	10	30,000	10 Month	300,000	3,000,000
2/	10 we;	10	30,000	10 Month	300,000	3,000,000
ppay;gi; (2 Ep)						9,000,000

jynanmi t v , we; (c)ausmi;r uav;rsm;ajzqjci;Ei rwwr;wi"gwy &u u;jci;

ompnrTe , r uav;rsm;ajzqjci;Ei rwwr;wi"gwy&u u;p0

ဘုန်းတော်ကြီးများအား ဝါဆိုသင်္ကန်းကပ်လှူခြင်းနှင့် စုပေါင်းမဟာဘုံထိန်ပွဲ

မှန်လုံအိမ် ဓါတ်ငွေ့လျော့ချရေး ဆောက်ရွက်ခြင်း



မိမိတို့ကုမ္ပဏီသည် မှန်လုံအိမ်ဓါတ်ငွေ့များ လျော့ချရေးအတွက် နည်းပညာများကို မျှဝေသုံးစွဲသည့်အနေဖြင့် မိမိတိုစက်ရုံကို နိုင်ငံတကာစံချိန်မီ နည်းပညာဖြင့်လည်းကောင်း၊ စက်ပစည်းများဖြင့်လည်းကောင်း တည်ဆောက်ထားပါသည်။ မိမိတို့သည် စီးပွားရေးသက်သက်ကိုသာမကြည့်ဘဲ ရာသီဥတုပြောင်းလဲမှု အပါအဝင် ပတ်ဝန်းကျင် လေထုညစ်ညမ်းမည့်ပြဿနာများကို ထည့်သွင်းစဉ်းစား၍ လုပ်ငန်းဆောင်ရွက်လျက် ရှိပါသည်။ သဘာဝပတ်ဝန်းကျင်ကို ထိန်းသိမ်းရင်း ရေရှည်မျှော်မှန်းဆောင်ရွက်မှုအနေဖြင့် သစ်ပင်များ အစားထိုး စိုက်ပျိုးသွားမည်ဖြစ်ပြီး မိမိတို့ စက်ရုံပတ်ဝန်းကျင်တွင် စိမ်းစိုသောသစ်တောများဖြင့် ဖုံးလွှမ်းသွားစေရန် စီမံကိန်းများ ချမှတ်ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

- သစ်ပင်နည်းလာ တို့ကမ္ဘာ၊ လွန်စွာပူအေး ဥတုဘေး။
- ရတနာသစ်တော၊ ပြည်သွေးကြော၊ သစ်တောရတနာ ထိန်းသိမ်းပါ။
- သစ်ပင်စိုက်မှ အရိပ်ရ၏။ ရိပ်ခိုနားနေ အပန်းဖြေ၏။
- သစ်ပင်စိုက်လျှင် တို့ဝန်းကျင် စိမ်းစိုလှပ ကြည်နူးရ၏။
- ပူနွေးသောကမ္ဘာကြီး မဖြစ်စေရန် သစ်ပင်များ အစားထိုးစိုက်ပျိုးကြပါစို့။

အထက်ပါဆောင်ပုဒ်များကိုလည်း မိမိတို့ပတ်ဝန်းကျင်ရှိ သစ်တောစိုက်ခင်းများတွင် ထားရှိပေးပါမည်။

ကာဗွန်ဒိုင်အောက်ဆိုဒ်ကို စုပ်ယူဖယ်ရှားပေးသည့် အပင်များ

သစ်ပင်တို့သည် အစာချက်လုပ်ရာတွင် လေထုထဲမှ ကာဗွန်ဒိုင်အောက်ဆိုဒ်ကို စုပ်ယူသုံးစွဲကြပါသည်။ အစာချက်ပြီးနောက် ကာဗွန်ဒိုင်အောက်ဆိုဒ်တို့သည် ကာဗွန်အဖြစ်သို့ ပြောင်းလဲကာ ပင်စည်၊ အရွက် စသည်တို့ထဲသို့ရောက်ရှိပါသည်။ သစ်ပင်၏ ကာဗွန်ဒိုင်အောက်ဆိုဒ် စုပ်ယူမှုစွမ်းရည်သည် ကမ္ဘာ့အပူချိန်ကို မြင့်တက်မလာအောင် ထိန်းချုပ်ရာတွင်အရေးပါသည့် ကဏ္ဍာတစ်ရပ် ဖြစ်ပါသည်။ အရွယ်ရောက်ပြီးသော သစ်ပင်တစ်ပင်သည် ၁ နှစ် လျှင် ကာဗွန်ဒိုင်အောက်ဆိုဒ် ၄၈ ပေါင်ကို စုပ်ယူပါသည်။ ၁ ဧက အကျယ်မြေကွက်ရှိသစ်ပင်တို့သည် ၁ နှစ်လျှင် ကာဗွန်ဒိုင်အောက်ဆိုဒ် (၂. ၆)တန်ကို စုပ်ယူနိုင်သည်ဟု လေ့လာသိရှိရပါသည်။ မိမိတို့ကုမ္ပဏီသည် ယခုလက်ရှိတွင်

သာစည်မြို့နယ် သစ်တောဦးစီးဌာနနှင့် ပူးပေါင်း၍ (၂၈)ကေတွင် အစားထိုးသစ်ပင်များ စိုက်ပျိုးနိုင်ရန် သစ်ပျိုးပင်များကို စိုက်ပျိုးပြီးဖြစ်ပါသည်။ ၁ ကေ အကျယ်မြေကွက်ရှိ သစ်ပင်တို့သည် ၁ နှစ်လျှင် ကာဗွန်ဒိုင်အောက်ဆိုဒ် (၂. ၆)တန်ကို စုပ်ယူနိုင်သဖြင့် မိမိတို့ကုမ္ပဏီမှ အစားထိုးစိုက်ပျိုးမြေ (၂၈) ကေအတွက် (၁)နှစ်လျှင် ကာဗွန်ဒိုင်အောက်ဆိုဒ် (၇၂. ၈)တန်ကို စုပ်ယူနိုင်မည်ဖြစ်ပါသည်။ မိမိတို့သည် စက်ရုံမဆောက်မီကပင် သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုများအား ထည့်သွင်းစဉ်းစားပြီး ခေတ်မှီစက်ကြီးများနှင့် ခေတ်မှီနည်းစနစ်များကို အသုံးပြုတည်ဆောက်ထားသဖြင့် စက်ရုံမှ ကာဗွန်ဒိုင်အောက်ဆိုဒ် ထွက်ရှိမှုပမာဏမှာ အနည်းငယ်သာရှိပါသည်။ ထို့ပြင် မိမိတို့စက်ရုံအနေဖြင့် သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုမရှိစေရန်အတွက် စက်ရုံမှထွက်ရှိသော ဓါတ်ငွေ့ပမာဏအား ကြိုတင်တွက်ချက်၍ ရေရှည်စီမံကိန်းများချမှတ်ရေးဆွဲကာ အစားထိုးသစ်ပင်များ တိုးချဲ့စိုက်ပျိုးသွားမည်ဖြစ်ပါသည်။

မိမိတို့ကုမ္ပဏီသည် ယခုလက်ရှိထုံးကျောက်တောင် သဘာဝပတ်ဝန်းကျင် ပြန်လည်ပြုစုပျိုးထောင်နိုင်ရေးအတွက် မန္တလေးတိုင်း၊ သာစည်မြို့နယ် သစ်တောဦးစီးဌာန၊ သစ်တောဝန်ထမ်းများနှင့် ပူးပေါင်း၍ မူလသဘာဝပတ်ဝန်းကျင်တွင် ပေါက်ရောက်လျက်ရှိသော သစ်မာပင်များ၊ ယူကလစ်၊ လျှော်ဖြူ။ ပိတောက်စသည့် သစ်ပင်အမျိုးမျိုးတို့ကို အစားထိုးစိုက်ပျိုးနိုင်ရန် သစ်တောဦးစီးဌာန၏ စီမံခန့်ခွဲပိုင်ခွင့်ရှိ ဧရိယာများတွင် သစ်ပျိုးပင်များကို ရာသီအချိန်အမီ ပျိုးထောင်၍ ပြန်လည်စိုက်ပျိုးထားပါသည်။ ဆက်လက်ပြီး အထက်ဖော်ပြပါ ဓါတ်ငွေ့တွက်ချက်မှုအရ ထွက်ရှိလာနိုင်သည့် ကာဗွန်ဒိုင်အောက်ဆိုဒ်ပမာဏအပေါ် မူတည်၍ အစားထိုးစိုက်ပျိုးသွားနိုင်ရန် သစ်တောဦးစီးဌာနနှင့် ပူးပေါင်းဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

Shwe Taung Cement Co., Ltd.
tvlai vL'ge;xm;&rl pm&i; (2010cEpir 2014 cEp)

p0	vL'ge;on&uip	taumi;t&m	10 Principles (OR) MDGs	uieuaii	tuf;jyic&oO;a&	tut;ouia&nuir	yp0iaqmi&uioirm;
1	17-Mar-10	ompnirlie , ? ujyiau;&mrvwe;vepmoiausmi; aqmuvy&etwu axmuyairsm; vL'ge; cyg on/	Achieve Universal Primary Education	500,000	ausmi;om; (45) 0;	at;csr;pmynmoilum;Eijci;	Shwe Taung Cement Co., Ltd. r tycgyrt&m&lu;rsm; 0exr;rsm;
2	10-Apr-11	ujyiau;&m&? a'ocjynorsm; om;vma&;v , uap&e vr;azmuvyay;jci;rsm; jyfvycyg on/	Enviroment		a'oc jynorsm;	vr;ye;quo , a&; tqiajyacmarap&e	
3	21-Aug-12	ujyiau;&mrvwe;ausmi; q&mrrsm;twu axmuyvpmai (1.6.2010 r 31.3.2011 x)	Achieve Universal Primary Education	400,000	q&mr (2)0;	uav;rsm;\ rvwe; ynmoilum;rtwu	
4	23-Aug-12	ompnirlie , ? jynanmiau;&m& rvwe;ausmi;twu pmoictv; (80) vL'ge;cyg on/ (yxr tlur)	Achieve Universal Primary Education	1,280,000	ausmi;om;0;a& (400)0;	pmoilum;rwi tqiajyacmarap&e	
5	vp0 yjy; vyaqmicursm;	jynanmitv , we; (c) ausmi;& ausmi;q&m? q&mrrsm; Eiausmi;om;? ausmi;orsm; aomu o;&etwu a&oe u (20) vwmqe a&oeA; (20)jzi aep0vL'ge;vu &yg on/	Combat HIV/AIDS Malaria and other diseases	40,000	ausmi;om;0;a&(782)0;	use;rma&;Ei nnwon aomuo;a&oe&& apjci;	
6		ausmi;wivtyaom vp0o;a&twu wpvvji a&*gvayg i; (1600)qe a&umjzi (3)acju Eejzi vp0 yjy;vL'ge; ay;vu&yg on/					
7	1-Apr-13	jynanmiwi 120 ay × 30 ay& tajccynmtv , we; (c) ausmi; (2)xyausmi;aqmi aqmu vyvL'ge; jci; twjrpc yEawmwir*vm tcr;tem;u 30.4.2013 &uaewi usi;y cyg on/	Achieve Universal Primary Education	65,000,000	ausmi;om;0;a&(782)0;	a'ozlzi;rtwu taxmutujyjci; at;csr;pm ynmoilum;Eijci;	Shwe Taung Cement Co., Ltd. r tycgyrt&m&lu;rsm; 0exr;rsm;
8	1-Apr-13	ausmi;aqmujci;Eitw use;rma&;Ei nnwaom , ivtromrsm;aqmuvy vL'ge;xm; yg on/					
9		ausmi;twwwi;rsm;cwjci;?ausmi;a&& qi;bwrsm; jyfvyay;jci;rsm;uvn; aqmi&uvsu &yg on/					
10	1-Apr-13	STC\Business Partner jzpaom SINOMA WUHAN Company rtvlai (10) oe; vL'ge;jci;/	Achieve Universal Primary Education	1,000,000	ausmi;om;0;a& (1318)0;		Shwe Taung Cement Co., Ltd. r tycgyrt&m&lu;rsm; 0exr;rsm;
11		&, ,m&irsm;jzpluaom 0;usixe;? 0;at;aomi;? 0;wivw? 0;rs;oewr ausmi;o;Ampmty 'gZi (800) vL'ge;jci;	Achieve Universal Primary Education	2,400,000	ausmi;om;0;a& (1318)0;		
12		&, ,m&irsm;jzpluaom 0;avmum pyg;Ewm , mpu&? 0;tuarmi pu&wrv , twtv;(600) vL'ge;jci;/	Achieve Universal Primary Education		ausmi;om;0;a& (600)0;	at;csr;pm ynmoilum;Ei&etwu axmuyay;tyjci;	
13	1-Jun-13	jynanmiau;&m tv , we; (c)ausmi; (um;jynanmi)Ei rvwe;ausmi; (awmijynanmi)? luupce; tajccynm rv we;ausmi;? ryi tajccynm rvwe;ausmi;? ujyi tajccynmrvwe; ausmi;rsm;ol (2013-2014) ynmoiEp twu ausmi;zicepma&; u& , mrsm; vL'ge; ay;tyjci;/	Achieve Universal Primary Education	6,692,418	ausmi;om;0;a& (1318)0;	a'ozlzi;rtwu taxmutujyjci; at;csr;pmynmoilum;Eijci;	
14	8-Aug-13	0exr;rsm;tm; ton;a&mitom;0g by;? py; Ei HIV y;&? r& use;rma&;ppaq;rjyfvyay;jci;/	Combat HIV/AIDS Malaria and other diseases	3,384,000	0exr; (129)0;		Shwe Taung Cement Co., Ltd. r tycgyrt&m&lu;rsm; 0exr;rsm;
15	1-Jun-13	Epxyausmi;aqmitoptwu pmoic tv; (240) vL'ge;jci;/ ('w , tlur)	Achieve Universal Primary Education	10,560,000	ausmi;om; (782)0;	at;csr;pm ynmoilum;Ei&etwu xmuyay;tyjci;	
16	1-Jun-13	pmoiausmi;yw0e;usipr;vr;pajyap&e opyipuy?;jci;rsm;uvn; aqmi&uay;vsu &yg on/	Enviroment	600,000	ausmi;om; (782)0;Ei q&m?q&mrrsm;	yw0e;usipr;vr;pajya&;	
17	27-Jun-13	be;awmiu;ausmi;rsm; jynanmi? ujyi? luupce;? 7 ri? opyav? 0ujzLa&?rau? eiyewu? a&a , mi;r? a& , m; pon be;awmiu; ausmi;rsm;o payi;í qr;cz , ?abmZ0rsm;? vlz , ypn;rsm;? 0wlairsm;?0;qoue; 'prsm; quuyvL'ge;jci;/		1,006,230	q&mawmrsm;Ei pmoioCmawmrsm;	pmoioCmawmrsm; x;?zeyfoCe;jynp apa&;	
18	15-Jun-13 to 19-Jun-13	ompnirlie , luuajce toi;r q&m? q&mrrsm;Ei y;ayg i;í (5) &u a&;0;oemjyfpen;oiwe; ay;jci; (First Aid Training)	Combat HIB/AIDS Malaria other diseases	528,400	0exr;rsm;Ei ywOe;usi au;&m jynorsm; tx	0exr;rsm;tm; a&;0; vemjyfpay;Ei&e Eiau;&mae jynowtm; use;rma&;toynmay; Ei&e	0exr;rsm;Ei ompnjrie , luuajcetoi;
19		urPtwi; arqyajzaq;xm;&ay;jci;/ (jynanmiEi ujyiau;&maejynorsm; tqy&aruu ygu vL'ge;&e&n& , yg on/)	Combat HIV/AIDS Malaria other diseases	26,000	0exr;rsm;Eiau;&mae jynorsm;	0exr;rsm;Eiau;&mae jynowtwu arq; tE&m , r umu , ay;Eijci;	Shwe Taung Cement Co., Ltd. r tycgyrt&m&lu;rsm; 0exr;rsm;
20	Epp0 vyaqmicursm;	Epp0 jynanmiEiujyiau;&mbe;awmiu;ausmi;o uxeoCe;rsm; Ei vlz , 0wltr?;rs; payg i; vL'ge;jci;/			pmoioCmrsm;	at;csr;pm omoemjyfEi&e vL'ge;jci;	
	26.01.2014 (1st) 22.02.2014(2st) 23.08.2014 (3rd)	15 Ei 45 x tr?;or;rsm;u ar;ciumu , aq; x;ay;jci;/ (yxr Ei 'w , tlur;tm;x;ay;cjy;/)	Improve Maternal Health		0exr;rsm;Ei 0exr;rsm;\ tr?; or;rsm;au;&m& tvyorm;rsm;	u , 0eaqmi aoq;ravfmc&e	a&awmi bvyajr0exr;rsm; jyiyavbmrsm;
22	30.12.2013	jynanmiausmi;aqmiop vajymi;ay;tyytcr;tem; wi vL'ge;con ypn;rsm; 1) uejyLvwm (4)v;? 2) Avmpmty (350)'gZi? 3) cw (350) 'gZi 4) v , tw (750)v; 5) ynma&;aiya'omyi oe; (50)	Achieve Universal Primary Education	9,655,000	ausmi;om; (782)0;	at;csr;pmynmoilum;Ei&etwu axmuyay;tyjci;	
23	23.04.2013	jynanmitajccynmtv , we; (c)ausmi; rausmi;om;^oav;rsm;Ei ompnirlie , tv , we; ausmi;rtxuwe;tqi ausmi;om; ausmi;oav; rsm;tm; ynmoiq tjzp 1 v vji (30000) uy cs;rijci;/ jrlie , tqi (5)0;? jynanmiau;&mr (5)0;/ (1Epvji 10vpm)	Achieve Universal Primary Education	300,000	ausmi;om; (10)0;	x;cleuav;rsm;ay:xe;vmap&eEi qi;& Er;yg;on uav;rsm; at;csr;pm ynmoilum;Ei&e	
				100,372,048			

Appendix - S

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-1 : Ground-breaking ceremony of basic education post primary school building donated by Shwe Taung Cement Co.,Ltd

Photo-2 : Foundation stone laying ceremony of basic education post primary school building donated by Shwe Taung Cement Co.,Ltd

Photo-3 : Foundation stone laying ceremony of basic education post primary school building donated by Shwe Taung Cement Co.,Ltd

Photo-4 : 10 lakh Donation of Shwe Taung Cement Co.,Ltd

Photo-5 : Donation of Shwe Taung Cement Co.,Ltd in Pyi Nyaung village

Photo-6 : Donation of Shwe Taung Cement Co., Ltd in Pyi Nyaung village

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-7 : Desks and chairs were donated by Shwe Taung Cement Co.,Ltd

Photo-8 : Desks and chairs were donated by Shwe Taung Cement Co.,Ltd

Photo-9 : Desks and chairs were donated by Shwe Taung Cement Co.,Ltd

Photo-10 : Umbrellas were donated by Shwe Taung Cement Co.,Ltd

Photo-11 : Students with umbrellas, stationery and bags which were donated by Shwe Taung Cement Co., Ltd

Photo-12 : Shwe Taung Cement Company Employees donated umbrellas, stationery and bags to students in Pyi Nyaung village

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-13 : Donation of Shwe Taung Cement Co., Ltd in Ku Byin village

Photo-14 : Basic Education Primary School Building was donated by Shwe Taung Cement Co., Ltd

Photo-15 : Students were happy with stationery and bags donated by Shwe Taung Cement Co., Ltd

Photo-16 : Students were happy with stationery and bags donated by Shwe Taung Cement Co., Ltd

Photo-17 : Shwe Taung Cement Co., Ltd donated to student s in Ku Byin village

Photo-18 : Record of group photo of students and donor after donation ceremony

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-19 : Classroom of basic education primary school in Ku Byin village

Photo-20 : Shwe Taung Cement employees cross the creek to do the CSR activities

Photo-21 : Basic education high school building donated by Shwe Taung Cement Co.,Ltd

Photo-22 : Basic education high school compound side view

Photo-23 : Open ceremony of two storey building donated by Apache Cement Co., Ltd

Photo-24 : Open ceremony of two storey building donated by Apache Cement Co., Ltd

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-25 : Group photo at open ceremony of two storey building donation

Photo-26 : Donor of tow storey building, students, teachers and other related gentle men

Photo-27 : Before donation of desks and chairs, students learning use with old desks

Photo-28 : Students learning use with desks and chairs after donation of Shwe Taung Cement Co., Ltd

Photo-29 : Old toilets before donation of new toilets

Photo-30 : New toilets donated by Apache Cement Co., Ltd

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-31 : Open ceremony of basic education middle school (two storey building) donated by Apache Cement Plant in Pyi Nyaung village

Photo-32 : Open ceremony of basic education middle school (two storey building) donated by Apache Cement Plant in Pyi Nyaung village

Photo-33 : Open ceremony of basic education middle school (two storey building) donated by Apache Cement Plant

Photo-34 : Donation computers at open ceremony of basic education middle school (two storey building) donated by Apache Cement Plant

Photo-35 : Shwe Taung Cement Co., Ltd prepared for education fund

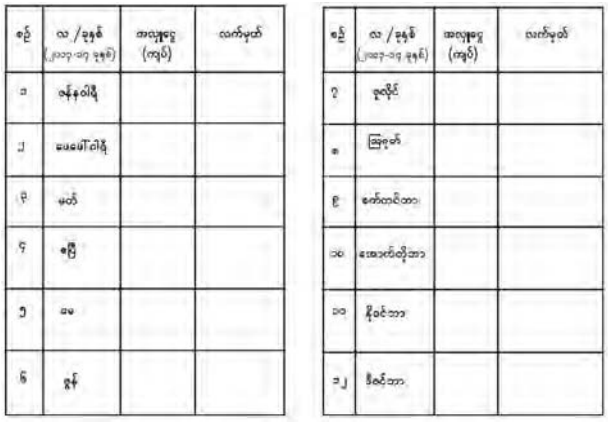


Photo-36 : Education fund form of Shwe Taung Cement Co., Ltd

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-37 : Shwe Taung Cement Scholarship exam

Photo-38 : Shwe Taung Cement Scholars at Thazi

Photo-39 : Shwe Taung Cement Scholarship exam

Photo-40 : Shwe Taung Cement Scholars at Thazi

Photo-41 : Warso robe donation ceremony of Shwe Taung Cement Co., Ltd

Photo-42 : Warso robe donation ceremony of Shwe Taung Cement Co., Ltd

Corporate Social Responsibility (CSR) Activities of Shwe Taung Cement Co., Ltd.

Photo-43 : Warso robe donation ceremony of Shwe Taung Cement Co., Ltd

Photo-44 : Warso robe donation ceremony of Shwe Taung Cement Co., Ltd

Photo-45 : Kahtein trees (badaytha bin) donated by Shwe Taung Cement Co., Ltd

Photo-46 : Employees of Shwe Taung Cement Co., Ltd with Kahtein trees (badaytha bin)

Photo-47 : Carrying Kahtein trees (badaytha bin) to the monastery

Photo-48 : Kahtein trees (badaytha bin) donated by Shwe Taung Cement Co., Ltd

APPENDIX – T

Appendix - T: List of Report Preparers, Environmental and Social Impact Assessment of APACHE Cement Plant

Consultant Team Leaders (NEPS)

1. U Win Swe — Project Manager and Head of SIA Works

I. Physical Environmental Survey Team

1. U Aye Ko — Senior Geologist
2. U Myint Sann — Senior Geomatic Surveyor
3. Daw Khin Khin Cho — Senior Water Resources Engineer (Hydrology)
4. Daw Darle The Oo — Environmentalist
5. U Than Win — Quantity Surveyor
6. Daw Aye Thet Wai — GIS Analyst

II. Social Environmental and Economic Survey Team

1. U Than Shwe — Specialist, Socio-Economic and Water Quality Survey
2. U Nyo — Team Leader, Socio Economic and Water Quality Survey
3. U Thike Tun — Senior Socio Economic Surveyor
4. Daw Haymar Hninn — Civil Engineer, Socio Economic Surveyor
5. U Kyaw Zin Htun — Socio Economic Surveyor
6. U Kyaw Min Aung — Socio Economic Surveyor
7. Daw Tin Nwe Nwe Oo — Socio Economic Surveyor

III. Biological Environmental Survey Team

III A. Flora team

1. U Nyo Maung — Retired Professor, Taxonomist
2. Dr. Win Myint — Associated Professor, ex. Ecologist
3. Dr. Ei Ei Phoe — Taxonomist
4. U Tun Thura — Botanist & GIS / RS

III B. Fuana Team

1. Dr. Khin Maung Swe — Fauna Leader, Bat Specialist
2. U Auang Pe Lwin — Zoologist
3. Daw Ei Thiri Khine — Zoologist
4. Daw Chan Mye Thu — Zoologist

APPENDIX - U

Appendix - U

NEPS Company Profile

About NEPS

National Engineering & Planning Services is a company incorporated in Myanmar in 1998 specializing in Planning, Design, Construction and Engineering Consultancy Services related to civil engineering works. It has the resources and experience essential for the successful completion of the tasks.

NEPS has more than 40 engineers and specialists of various disciplines including geology, geotechnology, agronomy, hydraulics, hydrology, geomatic engineering, social economics and remote sensing subjects. Among the above specialists, 15 key personals of NEPS have work- experience of more than 30 years and had proven expertise having post graduate trainings in overseas institutes.

For flora, terrestrial fauna and aquatic fauna study, some specialists (Retired Professors and Lecturers from the Universities) are affiliated with NEPS to cope with the diversified nature of EIA works.

Among other works, NEPS had involved in the following EIA related works:

- Worked as a local counterpart team to COLENCO Power Engineering of Switzerland in 2006-07 in SIA (Social Impact Assessment) study for Tamanthi Dam Hydropower and Multipurpose Project.
- In year 2008-09, NEPS had carried out environmental baseline study in Hydropower Development of Ayeyawady River Basin, Myitkyina Project.
- NEPS had completed EIA and SIA works in 2012 for Baluchaung 3 Hydropower Project of High Tech Concrete Company Ltd. in which AF-Colenco of Switzerland was the main consultant.
- In year 2012-13 NEPS had worked for JPOWER of Japan in Environmental and Local Community Survey for Feasibility Study on Small Scale Hydropower Development with Existing Irrigation Dams in Myanmar.
- In year 2012-13, NEPS also worked for SANYU Consultants Inc. of Japan for Inventory Survey of existing wells on data collection survey on water resource potential for Thilawa Special Economic Zone and Adjoining Areas.

Appendix - U

NEPS Company Profile

- NEPS is associated with an International Consultancy firm, Norconsult of Norway (www.norconsult.com) and has completed the ESIA (Environmental and Social Impact Assessment) for the POL Storage and Port Facilities Project for Thilawa, Thanlyin and Kyauktan Townships for eleven-group of companies in 2013.
- In association with Norconsult of Norway, NEPS has worked as a local counterpart consultant team and had completed the ESIA (Environmental and Social Impact Assessment) for the World Bank Project of Upgrading Thaton Gas Turbine Project, Mon State in 2013.
- NEPS is currently working on EIA and SIA works for different development projects in Thanlyin, Kyauktan, Kyaukse, Dawei, Tharketa, Kyimyindaing, Dagon Seikkan Townships and also at Mya Sein Yaung Industrial Zone in Htan Tabin Township.

Along its services, NEPS had undertaken the works of Irrigation Department, Water Resources Utilization Department of Ministry of Agriculture and Irrigation, Department of Hydropower, Implementation of Ministry of Electric Power No. (1), Ministry of Industry (1), International Non-governmental Organizations, UNDP, Japan International Cooperation Agency (JICA), Japan Electric Power Development Co., Ltd. (JPOWER), World Bank (WB) and Local Private Companies as well.

More information about NEPS could be seen on the website **www.neps-myanmarengineering.com**

ANNEX - 1

Annex - 1

The Republic of the Union of Myanmar

The Environmental Conservation Law

July, 2012

The Pyidaungsu Hluttaw Law No. 9 / 2012

The 8th Waxing Day of Tagu, 1373 M. E.

(30th March, 2012)

The Pyidaungsu Hluttaw hereby enacts this Law:

Chapter I

Title and Definition

1. This Law shall be called **the Environmental Conservation Law.**

2. The following expressions contained in this Law shall have the meanings given hereunder:

   (a) **Environment** means the physical factors in the human environment, including land, water, atmosphere, climate, sound, odour, taste, the biological factors of various animals and plants and historical, cultural, social and aesthetic factors;

   (b) **Environmental Quality** means the balance of nature including man made objects and also animals, plants, natural resources for the benefit of sustainability of nature and human beings;

   (c) **Environmental Quality Standard** means the parameters of general quality for enhancement and conservation of environmental quality for environmental situations;

   (d) **Environmental Audit** means periodic, systematically documented and objective evaluation to determine the followings:

      (i) correspond with regulatory requirements on environmental conservation;

      (ii) environmental management system;

      (iii) various possible environmental risks to the buildings, plots and premises.

   (e) **Pollution** means any direct or indirect alteration, effect of the physical, thermal, chemical or biological properties of any part of the environment

including land, water and atmosphere by discharging, emitting or depositing environmental hazardous substances, pollutants or wastes so as to affect beneficial use of environment, or to affect public health, safety or welfare, or animals and plants or to contravene any condition, limitation or prohibition contained in the prior permission issued under this Law;

(f) **Noise Pollution** means the occurrence of sound unit which causes annoyance, fatigue, loss of hearing or interference with the perception of other sounds;

(g) **Pollutant** means solid, liquid, or vapour which directly or indirectly alters the quality so as to affect beneficial use of any segment or element of the environment or is hazardous or potentially hazardous to health or causes pollution;

(h) **Waste** includes solid, liquid, or vapour and also includes anything which is classified as waste in accord with this Law including radioactive substance which is discharged, emitted or deposited in the environment in such volume, constituency or any manner which causes environmental pollution;

(i) **Hazardous Substance** means a substance or object which may affect health including explosive substance, substance which may be created and used as a biological weapon, substance which may be used as a nuclear weapon, inflammable substance, oxidizing and peroxidizing substance, toxic substance, pathogenic substance, radioactive substance, genetic transforming substance, corrosive substance, irritating objects, whether chemical or not, which can be harmful to human being, animal, plant, property or environment;

(j) **Beneficial Use** means the use of the environment or any element or segment of the environment after making required protections from the adverse effects of wastes, discharges, emissions and deposits so as to cause public health, safety or welfare;

(k) **Cleaner Production** means the continuous application of multi-strategy on environmental conservation to processes, products and services to improve the use of resource efficiently, minimize waste, polluted water and emissions and conserve the healthy nature and human environment;

(l) **Control Equipment** includes the followings:

(i) any apparatus for collecting waste;

(ii) any automatic device which can be used for more effective operation of any equipment;

(iii) any device for indicating or recording pollution or warning of excessive pollution;

(iv) any other device or facility used for the purpose of limitation of pollution;

(m) **Ecosystem** means the natural system existing living, non-living substances and plants in compatibility and the natural environment which have been evolving due to such system;

(n) **Owner** means owner, proprietor, operator in charge, lessor or receiver of any building, plots, or vehicle, or heir, trustee or representative of such person;

(o) **Occupier** means any person in occupation or control of any building, plot or any part of it, or any vehicle;

(p) **Environmental Emergency** means the situation which may affect the safety and health of the public or the environment and ecosystem if natural or man-made disaster or pollution is not taken action immediately;

(q) **Committee** means the Environmental Conservation Committee formed under this Law;

(r) **Ministry** means the Union Ministry assigned by the Union Government to perform the matters of environment;

(s) **Department** means the relevant Department formed under this Law.

Chapter II

Objectives

3. The objectives of this Law are as follows:

(a) to enable to implement the Myanmar National Environmental Policy;

(b) to enable to lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process;

(c) to enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations;

(d) to reclaim ecosystems as may be possible which are starting to degenerate and disappear;

(e) to enable to manage and implement for decrease and loss of natural resources and for enabling the sustainable use beneficially;

(f) to enable to implement for promoting public awareness and cooperation in educational programmes for dissemination of environmental perception;

(g) to enable to promote international, regional and bilateral cooperation in the matters of environmental conservation;

(h) to enable to cooperate with Government departments, Government organizations, international organizations, non-government organizations and individuals in matters of environmental conservation.

Chapter III

Formation of the Environmental Conservation Committee

4. (a) The Union Government shall form the Environmental Conservation Committee with the Union Minister for the Union Ministry assigned by the Union Government as the Chairman and with suitable members to conserve the environment of the Republic of the Union of Myanmar;

(b) In forming the Committee, the Vice Chairman, Secretary and Joint Secretary shall be assigned among the members of the Committee;

(c) The Union Government may re-form the Committee.

5. The Union Government shall stipulate functions and duties of the Committee to enable to implement the objectives contained in this Law.

6. The powers of the Committee are as follows:

(a) carrying out organizational education and activities relating to environmental conservation;

(b) suggesting to enable to amend and insert, as may be necessary, the lessons on environmental conservation contained in school lessons after coordinating with the relevant departments;

(c) accepting donations, grants, materials and technological aids from local and foreign and managing and using such money, materials and technologies as may be necessary in environmental conservation works;

(d) sending suitable suggestions and encouragements relating to environmental conservation to the relevant Government departments and organizations;

(e) asking necessary proposals and suggestions from the relevant Government departments and organizations for conservation and enhancement of environment;

(f) prohibiting the relevant Government departments and organizations if the environmental damages arise or situations for damage arise and, if necessary, asking policy to the Union Government;

(g) laying down and carrying out the Myanmar national environmental policies and other environmental policies for conservation and enhancement of environment with the approval of the Union Government.

Chapter IV

Duties and Powers relating to the Environmental Consenvation of the Ministry

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

(a) implementing the environmental conservation policies;

(b) planning and laying down national or regional work plans relating to environmental management;

(c) laying down, carrying out and monitoring programmes for conservation and enhancement of the environment, and for conservation, control and abatement not to cause environmental pollution;

(d) prescribing environmental quality standards including standards on emissions, effluents, solid wastes, production procedures, processes and products for conservation and enhancement of environmental quality;

(e) submitting proposals to the Committee for economic incentive mechanisms and terms and conditions which may not affect the environment or cause least environmental affect for sustainable development in addition to legal affairs and guidelines relating to environment;

(f) facilitating for the settlement of environmental disputes and, if necessary, forming bodies to negotiate such disputes;

(g) specifying categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities;

(h) prescribing categories of hazardous substances that may affect significantly at present or in the long run on the environment;

(i) promoting and carrying out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances;

(j) prescribing the terms and conditions relating to effluent treatment in industrial estates and other necessary places and buildings and emissions of machines, vehicles and mechanisms;

(k) negotiating, cooperating and implementing in respect of international, regional and bilateral agreements, instruments and programmes relating to matters of environment;

(l) implementing the international, regional and bilateral agreements accepted by Myanmar for environmental conservation and enhancement of environmental quality in accord with the guidance adopted by the Union Government or the Committee;

(m) causing to lay down and carry out a system of environmental impact assessment and social impact assessment as to whether or not a project or activity to be undertaken by any Government department, organization or person may cause a significant impact on the environment;

(n) laying down guidances relating to the management, conservation and enhancement of environment for the matters of protection of ozone layer, conservation of biologial diversity, conservation of coastal environment, mitigation and adaptation of global warming and climate change, combating desertification and management of non-depleting substances and management of other environmental matters;

(o) managing to cause the polluter to compensate for environmental impact, cause to contribute fund by the organizations which obtain benefit from the natural environmental service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works;

(p) carrying out other functions and duties assigned by the Union Government relating to environmental conservation.

8. The Ministry shall establish an Environmental Management Fund in the Union Budget in accord with the financial regulations and by-laws of the Union for effective implementation of environmental conservation works in addition to the receipt from the Union Consolidated Fund.

Chapter V
Environmental Emergency

9. (a) If the Committee is aware that an event of environmental emergency has occurred or may occur in the entire Myanmar or any Region or State or any area, it shall immediately report to the Union Government so as to declare the occurrence of such event;

(b) The Committee, Ministry and Department shall carry out necessary measures relating to the environmental emergency.

Chapter VI

Environmental Quality Standards

10. The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:

(a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;

(b) water quality standards for coastal and estuarine areas;

(c) underground water quality standards;

(d) atmospheric quality standards;

(e) noise and vibration standards;

(f) emissions standards;

(g) effluent standards;

(h) solid wastes standards;

(i) other environmental quality standards stipulated by the Union Government.

11. The Ministry may, with the approval of the Union Government and the Committee, insert, modify and stipulate the environmental quality standards for the interests of the public in accord with the scientific and technological advances or requirement of work according to time and area.

12. If any environmental quality standard stipulated by any Government department, Government organization under any existing law is more than the quality standard stipulated by the Ministry, it shall remain in force; however if it is less than such standard, only the standard stipulated by the Ministry shall be in force.

Chapter VII

Environmental Conservation

13. The Ministry shall, under the guidance of the Committee, maintain a comprehensive monitoring system and implement by itself or in co-ordination with relevant Government departments and organizations in the following matters:

(a) the use of agro-chemicals which cause to impact on the environment significantly;

(b) transport, storage, use, treatment and disposal of pollutants and hazardou substances in industries;

(c) disposal of wastes come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;

(d) carrying out waste disposal and sanitation works;

(e) carrying out development and constructions;

(f) carrying out other necessary matters relating to environmental pollution.

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

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

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

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

(b) shall contribute the stipulated users charges or management fees for the environmental conservation according to the relevant industrial estate, special economic zone and business organization;

(c) shall comply with the directives issued for environnmental conservation according to the relevant industrial estate, special economic zone or business.

Chapter VIII
Management of Urban Environment

17. The Ministry shall, for the management of urban environment, advise as may be necessary to the relevant Government departments and Government organizations, private organizations and individuals in carrying out the following matters in accord with the guidances laid down by the Committee:

(a) land use planning and management including zoning;

(b) management of the construction industry in pivotal urban centres;

(c) management of housing settlements;

(d) management of wastes;

(e) pollution control including land, water, air and noise pollution;

(f) other necessary environmental management.

Chapter IX
Conservation of Natural Resources and Cultural Heritages

18. The relevant Government departments and Government organizations shall, in accord with the guidance of the Union Government and the Committee, carry out the conservation, management, beneficial use, sustainable use and enhancement of regional cooperation of the following environmental natural resources:

(a) forest resources;

(b) land resources;

(c) fresh water resources including underground water;

(d) mineral resources;

(e) agricultural resources;

(f) fisheries resources;

(g) marine resources;

(h) natural ecosystems;

(i) natural areas, wildlife, natural plants and biological diversity;

(j) other natural resources stipulated by the Union Government.

19. The Ministry shall cooperate with the relevant Government departments and Government organizations in the matters of environmental conservation for perpetual existence of cultural heritage sites and natural heritage sites, cultural monuments and natural areas stipulated under any existing law.

20. The Ministry shall provide necessary technologies to the relevant Government departments and Government organizations in implementing the matters contained in sections 18 and 19.

Chapter X
Prior Permission

21. The Ministry may, with the approval of the Union Government, stipulate the categories of business, work-site or factory, work-shop which may cause impact on the environmental quality that requires to obtain the prior permission.

22. The owner or occupier of the category of business, work- site or factory, workshop stipulated by the Ministry under section 21 shall apply for the prior permission to the Ministry in accord with the stipulations.

23. The Ministry may, after scrutinizing whether or not the application made under section 22 is in conformity with the stipulations, grant or refuse to issue the prior permission by stipulating terms and conditions.

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

25. The Ministry may, if it is found that a holder of the prior permission fails to comply with any of the terms and conditions relating to environmental conservation contained in the prior permission, pass any of the following administrative penalties:

(a) causing to comply with in accord with the terms and conditions after warning, causing to sign the bond;

(b) causing to comply with in accord with the terms and conditions after paying a fine.

Chapter XI
Insurance

26. The holder of the prior permission shall effect insurance according to the category of his business, work-site or factory, workshop for any accident that may cause impact on the environment, in accord with the existing law.

27. The Ministry shall give the remark if it is requested by the Myanmar Insurance on the extent and potential environmental impact in respect of the business, department or organization which carries out the business to be insured under section 26.

Chapter XII

Prohibitions

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

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

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

Chapter XIII

Offences and Penalties

31. Whoever, without the prior premission, operates business, work-site or factory, workshop which is required to obtain the prior permission under this Law shall, on conviction, be punished with imprisonment for a term not exceeding three years, or with fine from a minimum of one hundred thousand kyats to a maximum of one million kyats,or with both.

32. Whoever violates any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law shall, on conviction, be punished with imprisonment for a term not exceeding one year, or with fine, or with both.

33. Whoever shall:

(a) if convited under section 32, be passed an order to compensate for damage due to such act or omission;

(b) if ordered under sub-section (a), and fails to pay the compensation to be paid, be recovered in accord with the existing revenue laws.

34. Whoever imports, exports, produces, stores, carries or trades any material prohibited by the Ministry due to its impact on environment shall, on conviction, be punished with imprisonment for a term from a minimum of three years to a maximum of

five years, or with fine from a minimum of one hundred thousand kyats to a maximum of two million kyats, or with both. Moreover, he shall incur the expenditure for the treatment and disposal of such material until the process that has no impact on the environment.

Chapter XIV

Miscellaneous

35. In prosecuting an offender under this Law, prior sanction of the Ministry shall be obtained.

36. The Ministry may, with the approval of the Union Government, exempt or relieve any Government department, organization or private business from complying with any provision contained in this Law for the interests of the Union and its people.

37. If any Government department, organization or individual incurs the expenditures for any action due to the declaration of environmental emergency, such expenditures are entitled to claim from the environmental management fund.

38. The relevant Government department, Government organization authorized to issue licence, permit or register for enabling operation of category of business, work-site or factory, workshop which is required to obtain the prior permission shall issue such licence, permit, or register only to the business, work-site or factory, workshop which has obtained the prior permission under this Law.

39. (a) The Ministry shall, if the person obtained the prior permission who was imposed with administrative penalty under section 25 fails to comply with the terms and conditions, inform the relevant Government department, Government organization authorized to issue licence, permit or register for the relevant business, work-site or factory, workshop to enable to take action as may be necessary.

(b) The Government department, Government organization received information under sub-section (a) may, after making necessary inquiries if it is found that any terms and conditions of environmental conservation contained in the prior permission is not complied with, cancel the issued licence, permit or register or suspend it for a limited period.

40. The offence contained in section 32 is determined as the cognizable offence.

41. The provisions relating to environmental conservation contained in the laws, rules, orders, directives and procedures issued before the enactment of this Law shall remain in force unless it is contrary to the provisions contained in this Law.

42. In implementing the provisions contained in this Law:

(a) the Ministry may issue necessary rules, regulations and by-laws with the approval of the Union Government;

(b) the Committee and the Ministry may issue necessary notifications, orders, directives and procedures.

I hereby sign under the Constitution of the Republic of the Union of Myanmar.

(Sd.) Thein Sein

President of the Union

Republic of the Union of Myanmar

ANNEX - 2

Annex - 2

ကန်သတ်

ပြည်ထောင်စု မြန်မာနိုင်ငံတော် အစိုးရ

သစ်တောရေးရာ ဝန်ကြီးဌာန

ဝန်ကြီးဌာန

စာအမှတ်၊ ၂/၂၃၀(ခ)(၃)/(၃၄၈၈ /၂၀၁၁)

ရက်စွဲ၊ ၂၀၁၁ ခုနှစ်၊ဖေဖော်ဝါရီလ ၂၅ ရက်

အကြောင်းအရာ။ ဘီလပ်မြေစက်ရုံ တည်ဆောက်နိုင်ရန်အတွက် လိုအပ်သော စက်ရုံမြေနေရာ လျှောက်ထားခွင့်ပြုပါရန် တင်ပြခြင်း

ရည် ညွှန်း ချက်။ သစ်တောဦးစီးဌာန၏ ၃၀-၁-၂၀၁၁ ရက်စွဲပါစာအမှတ်၊ စီမံကိန်း/စ-၁၉(ခ)/ (၁၂၈၇-၈၉/၂၀၁၁)

၂၀၁၁ခုနှစ်၊ဖေဖော်ဝါရီလ ၁၃ ရက်နေ့၌ကျင်းပပြုလုပ်သောသစ်တောရေးရာဝန်ကြီးဌာန စီမံခန့်ခွဲမှုကော်မတီ၏(၃/၂၀၁၁)ကြိမ်မြောက် အစည်းအဝေး ဆုံးဖြတ်ချက်အရ ၊ ရွှေတောင်ဖွံ့ဖြိုးတိုးတက်မှုကုမ္ပဏီလီမိတက်သို့မန္တလေးတိုင်းဒေသကြီး၊မိတ္ထီလာခရိုင်၊သာစည်မြို့နယ်၊ ပြည်ညောင်ကျေးရွာအနီးရှိမြေဧရိယာဧက(၄၄၀)တွင် ဘီလပ်မြေစက်ရုံတည်ဆောက်ခွင့်ပြုကြောင်းနှင့် နှစ်စဉ်မြေဌားစာချုပ်၊ချုပ်ဆိုဆောင်ရွက်သည့်စနစ်ဖြင့် မြေဌားခွင့်ပြုကြောင်း အကြောင်းကြားအပ်ပါသည်။

ဝန်ကြီးဌာနဒုတိယအတွင်းရေးမှူး

(မျိုးဝင်း ၊ ဦး အဖွဲ့ မှူး)

ညွှန်ကြားရေးမှူးချုပ်
သစ်တောဦးစီးဌာန

ကန်သတ်

3D:\3,EC (3) 2011.doc

Annex - 2

သစ်တောမြေအတွင်း ရွှေ၊ သတ္တုတူးဖော်ခွင့်စာချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန၊ သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက် မှ ဤစာချုပ်ကို ၂၀၁၂ ခုနှစ်၊ နိုဝင်ဘာလ(၁၅)ရက်နေ့တွင် သာစည်မြို့နယ်ရှိ ကူပြင်ကြိုးဝိုင်းအတွင်း ဘိလပ်မြေစက်ရုံတည် ဆောက်ရန်မြေနေရာနှင့်စပ်လျဉ်း၍ ပူးတွဲပါ သစ်တောဦးစီးဌာနနှင့် အမှတ်(၁)လျှပ်စစ်စွမ်း အားဝန်ကြီးဌာနတို့၏ စည်းကမ်းချက်များအတိုင်း ဆောင်ရွက်ရန် အောက်ဖော်ပြပါအသိသက်သေများ ရှေ့မှောက်တွင် နှစ်ဦးနှစ်ဖက် သဘောတူ လက်မှတ်ရေးထိုးကြပါသည်-

(က) တိုင်းဒေသကြီး /ခရိုင် - မန္တလေးတိုင်းဒေသကြီး၊ မိတ္ထီလာခရိုင်

(ခ) သစ်တောမြေ - ကူပြင်ကြိုးဝိုင်း၊ အကွက်အမှတ်(၁၄၊ ၁၅၊၂၆၊၂၇)

(ဂ) ဧရိယာ(ဧက) - (၄၀၀)ဧက

(ဃ) နယ်နိမိတ် - ခန့်မှန်းမြေပုံညွှန်း ၉၃-ဒီ/၅ (၉၀၂၃၀၇, ၉၀၆၃၀၁, ၉၀၄၂၉၀, ၉၀၅၂၈၃, ၉၀၄၂၈၀, ၈၉၇၂၈၀, ၈၉၅၂၉၄, ၈၉၅၂၉၉)

(င) စာချုပ်သက်တမ်း - (၁၅.၁၁.၂၀၁၂) မှ (၁၄.၁၁.၂၀၁၃)အထိ

(စ) အဖွဲ့အစည်း/ပုဂ္ဂလိက - -

(သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်ရုံး၏ (၅.၃.၂၀၁၁)ရက်စွဲပါ စာအမှတ်၊ စီမံကိန်း/စ-၁၉(ခ)/ (၃၁၁၁-၁၃/၂၀၁၁)အရ ဘဏ်ချလံအမှတ် (၄၄)၊ နေ့စွဲ(၅.၄.၂၀၁၁)ဖြင့် မြေတူးခအခွန်ငွေ (၂၀၀၀၀၀၀/-) (ကျပ်သိန်းနှစ်ဆယ်တိတိ)နှင့် ဘဏ်ချလံအမှတ်(၁၇)၊ နေ့စွဲ(၁၃.၃.၂၀၁၂)ဖြင့် လုပ်ငန်းအာမခံကြေးငွေ (၈၀၀၀၀၀၀၀/-) (ကျပ်သိန်းရှစ်ရာတိတိ)ကို ပေးသွင်းပြီး။)

(ခွင့်ပြုသူ)

လက်မှတ် -
အမည် - (ဒေါက်တာညီညီကျော်)
ရာထူး - ညွှန်ကြားရေးမှူးချုပ်
ဌာန - သစ်တောဦးစီးဌာန

(လုပ်ကိုင်ခွင့်ရသူ)

လက်မှတ် -
အမည် - (မျိုးနောင်)
မှတ်ပုံတင်အမှတ် - ၁၃/တကန(နိုင်) ၁၂၅၀၉၂
ရာထူး - ဒါရိုက်တာ
နေရပ် - အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊ ရန်ကုန်မြို့။

(အသိသက်သေ)

လက်မှတ် -
အမည် - (ခင်မောင်ဦး)
ရာထူး - ညွှန်ကြားရေးမှူး(စီမံကိန်း)
ဌာန - သစ်တောဦးစီးဌာန

(အသိသက်သေ)

လက်မှတ် -
အမည် - (ထွန်းထွန်း)
မှတ်ပုံတင်အမှတ် - ၁၂/မဂတ (နိုင်) ၀၃၁၄၈၂
နေရပ် - Junction Center Office၊ ဟိုတယ်ဇုန်၊ နေပြည်တော်။

Annex - 2

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန

သစ်တောဦးစီးဌာန

ကြိုးဝိုင်း/ကြိုးပြင်ကာကွယ်တောအတွင်း ရွှေနှင့်သတ္တုအမျိုးမျိုးတူးဖော်ဆောင်ရွက်ခြင်းဆိုင်ရာ

စည်းကမ်းချက်များ

၁။ သတ္တုတူးဖော်ထုတ်လုပ်ရန်အတွက် မြေငှားရမ်းခြင်းကို သတ္တုတွင်းဝန်ကြီးဌာနမှ သတ်မှတ်ထားသော နှစ်အဝိုင်းအခြားပေါ်မူတည်၍ သတ်မှတ်ခွင့်ပြုပါသည်။

၂။ သစ်တောမြေအတွင်း သတ္တုတူးဖော်ခွင့်ရရှိသူသည် စာချုပ်ချုပ်ဆိုသည့်နေ့မှစ၍ လုပ်ကွက်မြေ တစ်ဧကအတွက် တစ်နှစ်လျှင် ၅၀၀၀/-နှုန်းဖြင့် သစ်တောဦးစီးဌာနသို့ နှစ်စဉ်မြေငှားရမ်းခ ပေးဆောင်ရမည်။

၃။ ပထမနှစ်အတွက် သတ်မှတ်ထားသောအခွန်တော်ငွေကို စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။ ဒုတိယနှစ်မှစ၍ နှစ်စဉ်နှစ်ကုန်ပြီး တစ်လအတွင်း ပေးသွင်းရမည်။

၄။ အခွန်တော်နှုန်းထားကို သစ်တောဦးစီးဌာနက အခါအားလျော်စွာ ပြင်ဆင်သတ်မှတ်နိုင်သည်။

၅။ ဘိလပ်မြေစက်ရုံတည်ဆောက်ရန် မြေနေရာအတွက် အာမခံကြေးငွေကို(၁)ဧကလျှင်(၂)သိန်းကျပ်နှုန်းဖြင့် နှစ်စဉ်ဆောင်ရွက်မည့် စီမံချက်ပါဧရိယာအတိုင်း သစ်တောဦးစီးဌာနမှ သတ်မှတ်သည့် မြန်မာ့စီးပွားရေးဘဏ်တွင် စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။

၆။ လုပ်ငန်းဆောင်ရွက်ပြီးစီး၍ သတ္တုတူးဖော်ခွင့်ရရှိသူမှ လုပ်ကွက်ပြန်လည်အပ်နှံသည့်အချိန်တွင် စာချုပ်ပါစည်းကမ်းချက်များနှင့်အညီ ဆောင်ရွက်ထားကြောင်းစိစစ်တွေ့ရှိရပါက အဆိုပါအာမခံငွေကြေးကို ပြန်လည်ထုတ်ယူခွင့်ရရှိပြီး စာချုပ်ပါစည်းမျဉ်းစည်းကမ်းများနှင့်အညီ လုပ်ကိုင်ဆောင်ရွက်ထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရပါကပေးသွင်းထားသော လုပ်ငန်းအာမခံငွေကို သိမ်းယူခြင်းခံရမည်။

၇။ ခွင့်ပြုချက်ရရှိပြီး သတ္တုတူးဖော်မည့်ဧရိယာကို ထင်ရှားသောနယ်နိမိတ်များ သတ်မှတ်ရမည်။ နယ်နိမိတ်များသတ်မှတ်ခြင်းအတွက် ကုန်ကျစရိတ်ကို လုပ်ကိုင်ခွင့်ရရှိသူမှ ကျခံရမည်။

၈။ လုပ်ကိုင်ခွင့်ရရှိသည့်ဧရိယာကို လွှဲပြောင်းခြင်း၊ ပေါင်နှံခြင်း၊ ရောင်းချခြင်းမပြုရ။ ခွင့်ပြုချက်ရရှိသူမှ ကိုယ်တိုင်လုပ်ကိုင်လိုခြင်း၊ ကိုယ်တိုင်လုပ်ကိုင်နိုင်ခြင်းမရှိလျှင် သစ်တောဦးစီးဌာနသို့ ပြန်လည်အပ်နှံရမည်။

၉။ သတ္တုတူးဖော်မှုကြောင့် ကျင်း၊ ချိုင့်များ ဖြစ်ပေါ်လာပါက ၎င်းနေရာတွင် ပြန်လည်၍ မြေဖို့ပေးရမည်။

၁၀။ သတ္တုတူးဖော်ခွင့် ပြုထားသည့်ဧရိယာတွင်ဖြစ်စေ၊ ဧရိယာပြင်ပတွင်ဖြစ်စေ သစ်ပင်ခုတ်လှဲခြင်းမပြုရ။ မလွဲမရှောင်သာ၍ ခုတ်လှဲရန်လိုအပ်ပါက သစ်တောဦးစီးဌာန၏ ကြိုတင်ခွင့်ပြုချက်ကိုရယူရမည်။ ခုတ်လှဲပြီးသည့် နေရာတွင် သစ်တောစိုက်ခင်းများ တည်ထောင်ပေးရမည်။ (သို့မဟုတ်) စိုက်ခင်းတည် ထောင်စရိတ်ကျခံပေး လျော်ရမည်။

၁၁။ သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ဖြင့် ခုတ်လှဲပြီးသောသစ်ပင်များကို သတ္တုတူးဖော်သော လုပ်ငန်းရှင်မှ အသုံးပြုလိုပါက သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ကိုတောင်းခံပြီး သစ်တောဦးစီးဌာနမှ သတ်မှတ်ထားသော ဈေးနှုန်းဖြင့် ဝယ်ယူသုံးစွဲရမည်။

၁၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် လေထု၊ ရေထု၊ မြေထုညစ်ညမ်းမှုမဖြစ်စေရန်လိုအပ်သည်များကို လုပ်ကိုင်ခွင့်ရသူက ဆောင်ရွက်ပေးရမည်။

၁၃။ သတ္တုတူးဖော်ခွင့်ရရှိသော ဧရိယာအတွင်း လုပ်ငန်းဆောင်ရွက်နေထိုင်ရန် ယာယီနေအိမ်၊ တဲများမှအပ အခြားအဆောက်အအုံများ အဆိုင်အမာ ဆောက်လုပ်ခြင်းမပြုရ။

၁၄။ လုပ်ကိုင်ခွင့်ရရှိသောမြေကို ခွင့်ပြုချက်ရရှိသည့် သတ္တုတူးဖော်မှုမှအပ အခြားစီးပွားရေး လုပ်ငန်းများအတွက် ဆောင်ရွက်ခြင်းမပြုရ။

၁၅။ ရွှေသတ္တုတူးဖော်မှုကြောင့် ထိခိုက်ပျက်စီးသည့် အပင်များအတွက် သစ်တောဦးစီးဌာနမှ သတ်မှတ်ထားသည့် လျော်ကြေးငွေကို ပေးချေရမည်။

၁၆။ ချုပ်ဆိုခဲ့သော ဤစာချုပ်သည် သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် လုပ်ကိုင်ခွင့်ရှိသည့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက် နှင့်သာ သက်ဆိုင်စေရမည်။

၁၇။ ဖော်ပြပါ စည်းကမ်းချက်တစ်ခုံတစ်ရာကို ချိုးဖောက်ပါက လုပ်ကိုင်ခွင့်ရုတ်သိမ်းခြင်း ခံရမည့်အပြင် တည်ဆဲဥပဒေများအရ ထိရောက်စွာအရေးယူခြင်းခံရမည်။

Annex - 2

အမှတ်(၁)လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ စည်းကမ်းချက်များအပေါ်
ဝန်ခံကတိလက်မှတ်ရေးထိုးခြင်း

သတ္တုတူးဖော်ရာတွင် အမှတ်(၁)လျှပ်စစ်ဝန်ကြီးဌာနမှ ဆောင်ရွက်သော ရေအားလျှပ်စစ်စီမံကိန်း တမံများ သက်တမ်းပြည့် တည်မြဲနေစေရေးအတွက် သတ္တုတူးဖော်သည့်နေရာများသည် တမံတည်နေရာ၊ ရေဝပ်ဧရိယာများနှင့် လွတ်ကင်းသော်လည်း တွက်ချက်တိုင်းတာ၍ မရနိုင်သော ရေဆင်းဧရိယာများအတွင်းတွင် ကျရောက်နိုင်သည်ဖြစ်ရာ အောက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များအတိုင်း ကုမ္ပဏီမှလိုက်နာ ဆောင်ရွက်ရမည်-

(၁) လုပ်ငန်းဆောင်ရွက်ရာတွင် (၄)ပေကျင်းလုံးစနစ်ဖြင့် ထွက်ရှိလာမည့် မြေစာ၊ ကျောက်စာများကို သဘာဝပတ်ဝန်းကျင် ပျက်စီးမှုမရှိစေရန် ချောင်း၊ မြောင်း၊ လျှိုများအတွင်း မစွန့်ပစ်ဘဲ စွန့်ပစ်ကန်တူး၍လည်းကောင်း၊ ကျင်းဟောင်းများတွင် မြေပြန်ဖို့ခြင်းဖြင့် လည်းကောင်း ဆောင်ရွက်ရန်၊

(၂) ရွှေ၊ သတ္တုထုတ်လုပ်ရာတွင် ဆိုင်ရာနိုင်ကဲ့သို့သော ဓါတုဓါတ်ဆေးများကို အသုံးမပြုဘဲ သမားရိုးကျနည်းများကိုသာ အသုံးပြုရန်၊

(၃) ထွက်ရှိလာမည့် မြေစာနည်းပါးစေရန်အတွက် ဟင်းလင်းပွင့် တူးဖော်နည်းစနစ် (Open Pit) အစား ဘဲစိုက်တွင်းတူးဖော်နည်း (Vertical Shaft)စနစ်ကိုသာ အသုံးပြုရန်၊

(၄) ရွှေ၊ သတ္တုတူးဖော်ခြင်းအတွက် လုပ်ကိုင်ခွင့်ကာလအား တိကျစွာသတ်မှတ်ခြင်းနှင့် လုပ်ငန်းရပ်ဆိုင်းရန် အကြောင်းတစ်စုံတစ်ရာပေါ်ပေါက်လာပါက(၁)လအတွင်းလုပ်ငန်းရပ်သိမ်းရန်၊

(၅) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် ရေထု၊ မြေထု၊ လေထု ညစ်ညမ်းမှု မဖြစ်စေရန် လိုအပ်သည်များကို သက်ဆိုင်ရာကုမ္ပဏီမှ တာဝန်ယူဆောင်ရွက်ရန်၊

(၆) သတ္တုတွင်းဝန်ကြီးဌာနနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနတို့မှထုတ်ပြန်ထားသော စည်းကမ်းသတ်မှတ်ချက်များအတိုင်းတိကျစွာလိုက်နာဆောင်ရွက်ရန်။

၂။ အထက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များကို တိကျစွာလိုက်နာဆောင်ရွက်ပါမည်ဟု ဝန်ခံကတိ လက်မှတ်ရေးထိုးပါသည်။

(မျိုးနောင်)
ဒါရိုက်တာ
ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက်
၁၃/တကန(နိုင်) ၁၂၅၀၉၂
အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊
ရန်ကုန်မြို့။

Annex - 2

သစ်တောမြေအတွင်း ရွှေ၊ သတ္တုတူးဖေါ်ခွင့်စာချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန၊ သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက် မှ ဤစာချုပ်ကို ၂၀၁၂ ခုနှစ်၊ နိုဝင်ဘာလ(၁၅)ရက်နေ့တွင် သာစည်မြို့နယ်ရှိ ကူပြင်ကြိုးဝိုင်းအတွင်း ရွှံကျောက် တူးဖော်လုပ်ကိုင်ခွင့်နှင့်စပ်လျဉ်း၍ ပူးတွဲပါ သစ်တောဦးစီးဌာနနှင့် အမှတ်(၁)လျှပ်စစ် စွမ်းအားဝန်ကြီးဌာနတို့၏ စည်းကမ်းချက်များအတိုင်း ဆောင်ရွက်ရန် အောက်ဖေါ်ပြပါ အသိသက်သေများ ရှေ့မှောက်တွင် နှစ်ဦးနှစ်ဖက် သဘောတူ လက်မှတ်ရေးထိုးကြပါသည်-

(က)	တိုင်းဒေသကြီး /ခရိုင်	- မန္တလေးတိုင်းဒေသကြီး၊ မိတ္ထီလာခရိုင်
(ခ)	သစ်တောမြေ	- ကူပြင်ကြိုးဝိုင်း၊ အကွက်အမှတ် (၂၉)
(ဂ)	ဧရိယာ(ဧက)	- (၇၁)ဧက
(ဃ)	နယ်နိမိတ်	- ခန့်မှန်းမြေပုံညွှန်း ၉၃-ဒီ/၅ (၈၈၂၃၂၇, ၈၈၉၃၂၇, ၈၈၈၃၂၃, ၈၈၂၃၂၃)
(င)	စာချုပ်သက်တမ်း	- (၁၅.၁၁.၂၀၁၂) မှ (၁၄.၁၁.၂၀၁၃)အထိ
(စ)	အဖွဲ့အစည်း/ပုဂ္ဂလိက	- -

(သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်ရုံး၏ (၂၃.၆.၂၀၁၁)ရက်စွဲပါ စာအမှတ်၊ စီမံကိန်း/သတ္တု/ (၆၈၃၇-၄၀/၂၀၁၁)အရ ဘဏ်ချေလံအမှတ် (၃၉)၊ နေ့စွဲ(၁၁.၆.၂၀၁၂)ဖြင့် မြေငှားခအခွန်ငွေ (၃၅၅၀၀၀၀/-) (ကျပ်သုံးသိန်းငါးသောင်းငါးထောင်တိတိ)နှင့် ဘဏ်ချေလံအမှတ်(၂၉)၊ နေ့စွဲ(၁၁.၆.၂၀၁၂)ဖြင့် လုပ်ငန်းအာမခံ ကြေးငွေ (၃၅၅၀၀၀၀/-) (ကျပ်သုံးဆယ့်ငါးသိန်းငါးသောင်းတိတိ)ကို ပေးသွင်းပြီး။)

(ခွင့်ပြုသူ)

လက်မှတ် -
အမည် - (ဒေါက်တာညီညီကျော်)
ရာထူး - ညွှန်ကြားရေးမှူးချုပ်
ဌာန - သစ်တောဦးစီးဌာန

(လုပ်ကိုင်ခွင့်ရသူ)

လက်မှတ် -
အမည် - (မျိုးနောင်)
မှတ်ပုံတင်အမှတ် - ၁၃/တကန(နိုင်) ၁၂၅၀၉၂
ရာထူး - ဒါရိုက်တာ
နေရပ် - အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊ ရန်ကုန်မြို့။

(အသိသက်သေ)

လက်မှတ် -
အမည် - (ခင်မောင်ဦး)
ရာထူး - ညွှန်ကြားရေးမှူး(စီမံကိန်း)
ဌာန - သစ်တောဦးစီးဌာန

(အသိသက်သေ)

လက်မှတ် -
အမည် - (ထွန်းထွန်း)
မှတ်ပုံတင်အမှတ် - ၁၂/မဂတ (နိုင်) ၀၃၁၄၈၂
နေရပ် - Junction Center Office၊ ဟိုတယ်ဓနု၊ နေပြည်တော်။

Annex - 2

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန
သစ်တောဦးစီးဌာန
ကြိုးဝိုင်း/ကြိုးပြင်ကာကွယ်တောအတွင်း ရွှေနှင့်သတ္တုအမျိုးမျိုးတူးဖော်ဆောင်ရွက်ခြင်းဆိုင်ရာ
စည်းကမ်းချက်များ

၁။ သတ္တုတူးဖော်ထုတ်လုပ်ရန်အတွက် မြေငှားရမ်းခြင်းကို သတ္တုတွင်းဝန်ကြီးဌာနမှ သတ်မှတ်ထားသော နှစ်အဝိုင်းအခြားပေါ်မူတည်၍ သတ်မှတ်ခွင့်ပြုပါသည်။

၂။ သစ်တောမြေအတွင်း သတ္တုတူးဖော်ခွင့်ရရှိသူသည် စာချုပ်ချုပ်ဆိုသည့်နေ့မှစ၍ လုပ်ကွက်မြေ တစ်ဧကအတွက် တစ်နှစ်လျှင် ၅၀၀၀/-နှုန်းဖြင့် သစ်တောဦးစီးဌာနသို့ နှစ်စဉ်မြေငှားရမ်းခ ပေးဆောင်ရမည်။

၃။ ပထမနှစ်အတွက် သတ်မှတ်ထားသောအခွန်တော်ငွေကို စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။ ဒုတိယနှစ်မှစ၍ နှစ်စဉ်နှစ်ကုန်ပြီး တစ်လအတွင်း ပေးသွင်းရမည်။

၄။ အခွန်တော်နှုန်းထားကို သစ်တောဦးစီးဌာနက အခါအားလျော်စွာ ပြင်ဆင်သတ်မှတ်နိုင်သည်။

၅။ ရုံးကျောက်တူးဖော်ခြင်း လုပ်ငန်းဆောင်ရွက်ခွင့်အတွက် အာမခံကြေးငွေကို(၁)ဧကလျှင် (၅)သောင်းကျပ် နှုန်းဖြင့် နှစ်စဉ်ဆောင်ရွက်မည့် စီမံချက်ပါဧရိယာအတိုင်း သစ်တောဦးစီးဌာနမှ သတ်မှတ်သည့် မြန်မာ့စီးပွားရေးဘဏ်တွင် စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။

၆။ လုပ်ငန်းဆောင်ရွက်ပြီးစီး၍ သတ္တုတူးဖော်ခွင့်ရရှိသူမှ လုပ်ကွက်ပြန်လည်အပ်နှံသည့်အချိန်တွင် စာချုပ်ပါစည်းကမ်းချက်များနှင့်အညီ ဆောင်ရွက်ထားကြောင်းစိစစ်တွေ့ရှိရပါက အဆိုပါအာမခံ ငွေကြေးကို ပြန်လည်ထုတ်ယူခွင့်ရရှိပြီး စာချုပ်ပါစည်းမျဉ်းစည်းကမ်းများနှင့်အညီ လုပ်ကိုင်ဆောင်ရွက်ထားခြင်း မရှိကြောင်း စိစစ်တွေ့ရှိရပါကပေးသွင်းထားသော လုပ်ငန်းအာမခံငွေကို သိမ်းယူခြင်းခံရမည်။

၇။ ခွင့်ပြုချက်ရရှိပြီး သတ္တုတူးဖော်မည့်ဧရိယာကို ထင်ရှားသောနယ်နိမိတ်များ သတ်မှတ်ရမည်။ နယ်နိမိတ်များသတ်မှတ်ခြင်းအတွက် ကုန်ကျစရိတ်ကို လုပ်ကိုင်ခွင့်ရရှိသူမှ ကျခံရမည်။

၈။ လုပ်ကိုင်ခွင့်ရရှိသည့် ဧရိယာကို လွဲပြောင်းခြင်း၊ ပေါင်နှံခြင်း၊ ရောင်းချခြင်းမပြုရ။ ခွင့်ပြုချက်ရရှိသူမှ ကိုယ်တိုင်လုပ်ကိုင်လိုခြင်း၊ ကိုယ်တိုင်လုပ်ကိုင်နိုင်ခြင်းမရှိလျှင် သစ်တောဦးစီးဌာနသို့ ပြန်လည်အပ်နှံရမည်။

၉။ သတ္တုတူးဖော်မှုကြောင့် ကျင်း၊ ချိုင့်များ ဖြစ်ပေါ်လာပါက ၎င်းနေရာတွင် ပြန်လည်၍ မြေဖို့ပေးရမည်။

၁၀။ သတ္တုတူးဖော်ခွင့်ပြုထားသည့် ဧရိယာတွင်ဖြစ်စေ၊ ဧရိယာပြင်ပတွင်ဖြစ်စေ သစ်ပင်ခုတ်လှဲခြင်းမပြုရ။ မလွဲမရှောင်သာ၍ ခုတ်လှဲရန်လိုအပ်ပါက သစ်တောဦးစီးဌာန၏ ကြိုတင်ခွင့်ပြုချက်ကို ရယူရမည်။ ခုတ်လှဲပြီးသည့် နေရာတွင် သစ်တောစိုက်ခင်းများ တည်ထောင်ပေးရမည်။ (သို့မဟုတ်) စိုက်ခင်းတည် ဆောင်စရိတ်ကျခံပေး လျော်ရမည်။

၁၁။ သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ဖြင့် ခုတ်လှဲပြီးသောသစ်ပင်များကို သတ္တုတူးဖော်သော လုပ်ငန်းရှင်မှ အသုံးပြုလိုပါက သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ကိုတောင်းခံပြီး သစ်တောဦးစီးဌာနမှ သတ်မှတ်ထားသော ဈေးနှုန်းဖြင့် ဝယ်ယူသုံးစွဲရမည်။

၁၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် လေထု၊ ရေထု၊ မြေထုညစ်ညမ်းမှုမဖြစ်စေရန်လိုအပ်သည်များကို လုပ်ကိုင်ခွင့်ရသူက ဆောင်ရွက်ပေးရမည်။

၁၃။ သတ္တုတူးဖော်ခွင့်ရရှိသော ဧရိယာအတွင်း လုပ်ငန်းဆောင်ရွက်နေထိုင်ရန် ယာယီနေအိမ်၊ တဲများမှအပ အခြားအဆောက်အအုံများ အခိုင်အမာ ဆောက်လုပ်ခြင်းမပြုရ။

၁၄။ လုပ်ကိုင်ခွင့်ရရှိသောမြေကို ခွင့်ပြုချက်ရရှိသည့် သတ္တုတူးဖော်မှုမှအပ အခြားစီးပွားရေးလုပ်ငန်းများ အတွက် ဆောင်ရွက်ခြင်းမပြုရ။

၁၅။ ရွှေသတ္တုတူးဖော်မှုကြောင့် ထိခိုက်ပျက်စီးသည့် အပင်များအတွက် သစ်တောဦးစီးဌာနမှ သတ်မှတ်ထားသည့် လျော်ကြေးငွေကို ပေးချေရမည်။

၁၆။ ချုပ်ဆိုခဲ့သော ဤစာချုပ်သည် သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် လုပ်ကိုင်ခွင့်ရှိသည့် <u>ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက်</u> နှင့်သာ သက်ဆိုင်စေရမည်။

၁၇။ ဖော်ပြပါ စည်းကမ်းချက်တစ်စုံတစ်ရာကို ချိုးဖောက်ပါက လုပ်ကိုင်ခွင့်ရတ်သိမ်းခြင်း ခံရမည့်အပြင် တည်ဆဲဥပဒေများအရ ထိရောက်စွာအရေးယူခြင်းခံရမည်။

Annex - 2

အမှတ်(၁)လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ စည်းကမ်းချက်များအပေါ်
ဝန်ခံကတိလက်မှတ်ရေးထိုးခြင်း

၁။ သတ္တုတူးဖော်ရာတွင် အမှတ်(၁)လျှပ်စစ်ဝန်ကြီးဌာနမှ ဆောင်ရွက်သော ရေအားလျှပ်စစ်စီမံကိန်းတမံများ သက်တမ်းပြည့် တည်မြဲနေစေရေးအတွက် သတ္တုတူးဖော်သည့်နေရာများသည် တမံတည်နေရာ၊ ရေဝပ်ဧရိယာများနှင့် လွတ်ကင်းသော်လည်း တွက်ချက်တိုင်းတာ၍ မရနိုင်သော ရေဆင်းဧရိယာများအတွင်းတွင် ကျရောက်နိုင်သည်ဖြစ်ရာ အောက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များအတိုင်း ကုမ္ပဏီမှလိုက်နာ ဆောင်ရွက်ရမည်-

(၁) လုပ်ငန်းဆောင်ရွက်ရာတွင် (၄)ပေကျင်းလုံးစနစ်ဖြင့် ထွက်ရှိလာမည့် မြေစာ၊ ကျောက်စာများကို သဘာဝပတ်ဝန်းကျင် ပျက်စီးမှုမရှိစေရန် ချောင်း၊ မြောင်း၊ လျှိုများအတွင်း မစွန့်ပစ်ဘဲ စွန့်ပစ်ကန်တူး၍လည်းကောင်း၊ ကျင်းဟောင်းများတွင် မြေပြန်ဖို့ခြင်းဖြင့် လည်းကောင်း ဆောင်ရွက်ရန်၊

(၂) ရွှေ၊ သတ္တုထုတ်လုပ်ရာတွင် ဆိုင်ရာနိုက်ကဲ့သို့သော ဓါတုဓါတ်ဆေးများကို အသုံးမပြုဘဲ သမားရိုးကျနည်းများကိုသာ အသုံးပြုရန်၊

(၃) ထွက်ရှိလာမည့် မြေစာနည်းပါးစေရန်အတွက် ဟင်းလင်းပွင့် တူးဖော်နည်းစနစ် (Open Pit) အစား ဘဲစိုက်တွင်းတူးဖော်နည်း (Vertical Shaft)စနစ်ကိုသာ အသုံးပြုရန်၊

(၄) ရွှေ၊ သတ္တုတူးဖော်ခြင်းအတွက် လုပ်ကိုင်ခွင့်ကာလအား တိကျစွာသတ်မှတ်ခြင်းနှင့် လုပ်ငန်းရပ်ဆိုင်းရန် အကြောင်းတစ်စုံတစ်ရာ ပေါ်ပေါက်လာပါက (၁)လအတွင်း လုပ်ငန်းရပ်သိမ်းရန်၊

(၅) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် ရေထု၊ မြေထု၊ လေထု ညစ်ညမ်းမှု မဖြစ်စေရန် လိုအပ်သည်များကို သက်ဆိုင်ရာကုမ္ပဏီမှ တာဝန်ယူဆောင်ရွက်ရန်၊

(၆) သတ္တုတွင်းဝန်ကြီးဌာနနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနတို့မှ ထုတ်ပြန်ထားသော စည်းကမ်းသတ်မှတ်ချက်များအတိုင်း တိကျစွာလိုက်နာ ဆောင်ရွက်ရန်။

၂။ အထက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များကို တိကျစွာလိုက်နာဆောင်ရွက်ပါမည်ဟု ဝန်ခံကတိ လက်မှတ်ရေးထိုးပါသည်။

(မျိုးနောင်)
ဒါရိုက်တာ
ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက်
၁၃/တကန(နိုင်) ၁၂၅၀၉၂
အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊
ရန်ကုန်မြို့။

Annex - 2

သစ်တောမြေအတွင်း ရွှေ၊ သတ္တုတူးဖေါ်ခွင့်စာချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန၊ သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက် မှ ဤစာချုပ်ကို ၂၀၁၂ ခုနှစ်၊ နိုဝင်ဘာလ(၁၅)ရက်နေ့တွင် သာစည်မြို့နယ်ရှိ ကူပြင်ကြိုးဝိုင်းအတွင်း ထုံးကျောက်အကြီးစားတူးဖော်လုပ်ကိုင်ခွင့်နှင့်စပ်လျဉ်း၍ ပူးတွဲပါ သစ်တောဦးစီးဌာနနှင့် အမှတ်(၁)လျှပ်စစ် စွမ်းအားဝန်ကြီးဌာနတို့၏ စည်းကမ်းချက်များအတိုင်း ဆောင်ရွက်ရန် အောက်ဖေါ်ပြပါ အသိသက်သေများ ရှေ့မှောက်တွင် နှစ်ဦးနှစ်ဖက် သဘောတူ လက်မှတ်ရေးထိုးကြပါသည်-

(က) တိုင်းဒေသကြီး /ခရိုင် - မန္တလေးတိုင်းဒေသကြီး၊ မိတ္ထီလာခရိုင်

(ခ) သစ်တောမြေ - ကူပြင်ကြိုးဝိုင်း၊ အကွက်အမှတ်(၁၅၊၂၂၊ ၂၃၊ ၂၅၊ ၂၆)

(ဂ) ဧရိယာ(ဧက) - **(၁၀၀)ဧက**

(ဃ) နယ်နိမိတ် - ခန့်မှန်းမြေပုံညွှန်း ၉၃ - ဒီ/၅ (၉၁၃၃၁၆, ၉၂၇၃၁၆, ၉၂၇၂၉၆, ၉၁၂၂၆၉)

(င) စာချုပ်သက်တမ်း - (၃၁.၃.၂၀၁၂) မှ (၃၀.၃.၂၀၁၃)အထိ (ဒုတိယနှစ်သက်တမ်းတိုး)

(စ) အဖွဲ့အစည်း/ပုဂ္ဂလိက - အမှတ်(၃)သတ္တုတွင်းလုပ်ငန်းနှင့် အကျိုးတူ

(ဃ)သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်ရုံး၏ (၁.၆.၂၀၁၂)ရက်စွဲပါ စာအမှတ်၊ စီမံကိန်း/သတ္တု/ (၅၈၅-၈၅/၂၀၁၂)အရ ဘဏ်ချေလ်အမှတ် (၃၂)၊ နေ့စွဲ(၁၂.၆.၂၀၁၂)ဖြင့် မြေငှားခအခွန်ငွေ (၅၀၀၀၀၀/) (ကျပ်ငါးသိန်းတိတိ)နှင့် ဘဏ်ချေလ်အမှတ်(၃၃)၊ နေ့စွဲ(၁၂.၆.၂၀၁၂)ဖြင့် လုပ်ငန်းအာမခံကြေးငွေ (၅၀၀၀၀၀၀/) (ကျပ်သိန်းငါးဆယ်တိတိ)ကို ပေးသွင်းပြီး။)

(ခွင့်ပြုသူ)

လက်မှတ် -

အမည် - (ဒေါက်တာညီညီကျော်)

ထူး - ညွှန်ကြားရေးမှူးချုပ်

ဌာန - သစ်တောဦးစီးဌာန

(လုပ်ကိုင်ခွင့်ရသူ)

လက်မှတ် -

အမည် - (မျိုးနောင်)

မှတ်ပုံတင်အမှတ် - ၁၃/တကန (နိုင်) ၁၂၅၀၉၂

ရာထူး - ဒါရိုက်တာ

နေရပ် - အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊ ရန်ကုန်မြို့။

(အသိသက်သေ)

လက်မှတ် -

အမည် - (ခင်မောင်ဦး)

ရာထူး - ညွှန်ကြားရေးမှူး(စီမံကိန်း)

ဌာန - သစ်တောဦးစီးဌာန

(အသိသက်သေ)

လက်မှတ် -

အမည် - (ထွန်းထွန်း)

မှတ်ပုံတင်အမှတ် - ၁၂/မဂတ (နိုင်) ၀၃၁၄၅၂

နေရပ် - Junction Center Office၊ ဟိုတယ်ဇုန်၊ နေပြည်တော်။

Annex - 2

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန
သစ်တောဦးစီးဌာန
ကြိုးဝိုင်း/ကြိုးပြင်ကာကွယ်တောအတွင်း ရွှေနှင့်သတ္တုအမျိုးမျိုးတူးဖော်ဆောင်ရွက်ခြင်းဆိုင်ရာ
စည်းကမ်းချက်များ

၁။ သတ္တုတူးဖော်ထုတ်လုပ်ရန်အတွက် မြေဖွာရမ်းခြင်းကို သတ္တုတွင်းဝန်ကြီးဌာနမှ သတ်မှတ်ထားသော နှစ်အဝိုင်းအခြားပေါ်မူတည်၍ သတ်မှတ်ခွင့်ပြုပါသည်။

၂။ သစ်တောမြေအတွင်း သတ္တုတူးဖော်ခွင့်ရရှိသူသည် စာချုပ်ချုပ်ဆိုသည့်နေ့မှစ၍ လုပ်ကွက်မြေ တစ်ဧကအတွက် တစ်နှစ်လျှင် ၅၀၀၀/-နှုန်းဖြင့် သစ်တောဦးစီးဌာနသို့ နှစ်စဉ်မြေဖွာရမ်းခ ပေးဆောင်ရမည်။

၃။ ပထမနှစ်အတွက် သတ်မှတ်ထားသောအခွန်တော်ငွေကို စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။ ဒုတိယနှစ်မှစ၍ နှစ်စဉ်နှစ်ကုန်ပြီး တစ်လအတွင်း ပေးသွင်းရမည်။

၄။ အခွန်တော်နှုန်းထားကို သစ်တောဦးစီးဌာနက အခါအားလျော်စွာ ပြင်ဆင်သတ်မှတ်နိုင်သည်။

၅။ ထုံးကျောက်တူးဖော်ခြင်း လုပ်ငန်းဆောင်ရွက်ခွင့်အတွက် အာမခံကြေးငွေကို (၁)ဧကလျှင် (၅)သောင်း ကျပ်နှုန်းဖြင့် နှစ်စဉ်ဆောင်ရွက်မည့် စီမံချက်ပါဧရိယာအတိုင်း သစ်တောဦးစီးဌာနမှ သတ်မှတ်သည့် မြန်မာ့စီးပွားရေးဘဏ်တွင် စာချုပ်မချုပ်ဆိုမီ ကြိုတင်ပေးသွင်းရမည်။
လုပ်ငန်းဆောင်ရွက်ပြီးစီး၍ သတ္တုတူးဖော်ခွင့်ရရှိသူမှ လုပ်ကွက်ပြန်လည်အပ်နှံသည့်အချိန်တွင် စာချုပ်ပါစည်းကမ်းချက်များနှင့်အညီ ဆောင်ရွက်ထားကြောင်းစိစစ်တွေ့ရှိရပါက အဆိုပါအာမခံ ငွေကြေးကို ပြန်လည်ထုတ်ယူခွင့်ရရှိပြီး စာချုပ်ပါစည်းမျဉ်းစည်းကမ်းများနှင့်အညီ လုပ်ကိုင်ဆောင်ရွက်ထားခြင်းမရှိကြောင်း စိစစ်တွေ့ရှိရပါကပေးသွင်းထားသော လုပ်ငန်းအာမခံငွေကို သိမ်းယူခြင်းခံရမည်။
ခွင့်ပြုချက်ရရှိပြီး သတ္တုတူးဖော်မည့်ဧရိယာကို ထင်ရှားသောနယ်နိမိတ်များ သတ်မှတ်ရမည်။ နယ်နိမိတ်များသတ်မှတ်ခြင်းအတွက် ကုန်ကျစရိတ်ကို လုပ်ကိုင်ခွင့်ရရှိသူမှ ကျခံရမည်။

၆။ လုပ်ကိုင်ခွင့်ရရှိသည့်ဧရိယာကို လွှဲပြောင်းခြင်း၊ ပေါင်နှံခြင်း၊ ရောင်းချခြင်းမပြုရ။ ခွင့်ပြုချက်ရရှိသူမှ ကိုယ်တိုင်လုပ်ကိုင်လိုခြင်း၊ ကိုယ်တိုင်လုပ်ကိုင်နိုင်ခြင်းမရှိလျှင် သစ်တောဦးစီးဌာနသို့ ပြန်လည်အပ်နှံရမည်။

၇။ သတ္တုတူးဖော်မှုကြောင့် ကျင်း၊ ချိုင့်များ ဖြစ်ပေါ်လာပါက ၎င်းနေရာတွင် ပြန်လည်၍ မြေဖို့ပေးရမည်။

၈။ သတ္တုတူးဖော်ခွင့်ပြုကာသည့် ဧရိယာတွင်ဖြစ်စေ၊ ဧရိယာပြင်ပတွင်ဖြစ်စေ သစ်ပင်ခုတ်လှဲခြင်းမပြုရ။ မလွဲ[illegible]ပါက သစ်တောဦးစီးဌာန၏ ကြိုတင်ခွင့်ပြုချက်ကိုရယူရမည်။ ခုတ်လှဲပြီးသည့်[illegible]တွင် သစ်တောစိုက်ခင်းများ တည်ထောင်ပေးရမည်။ (သို့မဟုတ်) စိုက်ခင်းတည်ထောင်စရိတ် ကျခံပေးလျော်ရမည်။

၉။ သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ဖြင့် ခုတ်လှဲပြီးသောသစ်ပင်များကို သတ္တုတူးဖော်သော လုပ်ငန်းရှင်မှ အသုံးပြုလိုပါက သစ်တောဦးစီးဌာန၏ ခွင့်ပြုချက်ကိုတောင်းခံပြီး သစ်တောဦးစီးဌာနမှ သတ်မှတ် ထားသော ဈေးနှုန်းဖြင့် ဝယ်ယူသုံးစွဲရမည်။

၁၀ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် လေထု၊ ရေထု၊ မြေထုညစ်ညမ်းမှုမဖြစ်စေရန်လိုအပ်သည်များကို လုပ်ကိုင်ခွင့်ရသူက ဆောင်ရွက်ပေးရမည်။

၁၁။ သတ္တုတူးဖော်ခွင့်ရရှိသော ဧရိယာအတွင်း လုပ်ငန်းဆောင်ရွက်နေထိုင်ရန် ယာယီနေအိမ်၊ တဲများမှအပ အခြားအဆောက်အအုံများ အခိုင်အမာ ဆောက်လုပ်ခြင်းမပြုရ။

၁၂။ လုပ်ကိုင်ခွင့်ရရှိသောမြေကို ခွင့်ပြုချက်ရရှိသည့် သတ္တုတူးဖော်မှုမှအပ အခြားစီးပွားရေးလုပ်ငန်းများ အတွက် ဆောင်ရွက်ခြင်းမပြုရ။

၁၃။ ရွှေသတ္တုတူးဖော်မှုကြောင့် ထိခိုက်ပျက်စီးသည့် အပင်များအတွက် သစ်တောဦးစီးဌာနမှ သတ်မှတ်ထားသည့် လျော်ကြေးငွေကို ပေးချေရမည်။

၁၄။ ချုပ်ဆိုခဲ့သော ဤစာချုပ်သည် သစ်တောဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်နှင့် လုပ်ကိုင်ခွင့်ရှိသည့် ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက် နှင့်သာ သက်ဆိုင်စေရမည်။

၁၅။ ဖော်ပြပါ စည်းကမ်းချက်တစ်စုံတစ်ရာကို ချိုးဖောက်ပါက လုပ်ကိုင်ခွင့်ရတ်သိမ်းခြင်း ခံရမည့်အပြင် တည်ဆဲဥပဒေများအရ ထိရောက်စွာအရေးယူခြင်းခံရမည်။

Annex - 2

အမှတ်(၁)လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ စည်းကမ်းချက်များအပေါ်
ဝန်ခံကတိလက်မှတ်ရေးထိုးခြင်း

သတ္တုတူးဖော်ရာတွင် အမှတ်(၁)လျှပ်စစ်ဝန်ကြီးဌာနမှ ဆောင်ရွက်သော ရေအား‌လျှပ်စစ်စီမံကိန်း၊ တမံများ သက်တမ်းပြည့် တည်မြဲနေစေရေးအတွက် သတ္တုတူးဖော်သည့်နေရာများသည် တမံတည်နေရာ၊ ရေဝပ်ဧရိယာများနှင့် လွတ်ကင်းသော်လည်း တွက်ချက်တိုင်းတာ၍မရနိုင်သော ရေဆင်းဧရိယာများအတွင်းတွင် ကျရောက်နိုင်သည်ဖြစ်ရာ အောက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များအတိုင်း ကုမ္ပဏီမှလိုက်နာ ဆောင်ရွက်ရမည်-

(၁) လုပ်ငန်းဆောင်ရွက်ရာတွင် (၄)ပေကျင်းလုံးစနစ်ဖြင့် ထွက်ရှိလာမည့် မြေစာ၊ ကျောက်စာများကို သဘာဝပတ်ဝန်းကျင် ပျက်စီးမှုမရှိစေရန် ချောင်း၊ မြောင်း၊ လျှိုများအတွင်း မစွန့်ပစ်ဘဲစွန့်ပစ်ကန်တူး၍လည်းကောင်း၊ ကျင်းဟောင်းများတွင် မြေပြန်ဖို့ခြင်းဖြင့်လည်းကောင်း ဆောင်ရွက်ရန်၊

(၂) ရွှေ၊ သတ္တုထုတ်လုပ်ရာတွင် ဆိုင်ရာနိုက်ကဲ့သို့သော ဓါတုဓါတ်ဆေးများကို အသုံးမပြု ဘဲ သမားရိုးကျနည်းများကိုသာ အသုံးပြုရန်၊

(၃) ထွက်ရှိလာမည့် မြေစာနည်းပါးစေရန်အတွက် ဟင်းလင်းပွင့် တူးဖော်နည်းစနစ် (Open Pit)အစား ဘဲစိုက်တွင်းတူးဖော်နည်း (Vertical Shaft)စနစ်ကိုသာ အသုံး ပြုရန်၊

(၄) ရွှေ၊ သတ္တုတူးဖော်ခြင်းအတွက် လုပ်ကိုင်ခွင့်ကာလအား တိကျစွာသတ်မှတ်ခြင်းနှင့် လုပ်ငန်း ရပ်ဆိုင်းရန် အကြောင်းတစ်စုံတစ်ရာ ပေါ်ပေါက်လာပါက (၁)လအတွင်း လုပ်ငန်းရုပ်သိမ်း ရန်၊

(၅) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတွက် ရေထု၊ မြေထု၊ လေထု ညစ်ညမ်းမှု မဖြစ်စေရန် လိုအပ်သည်များကို သက်ဆိုင်ရာကုမ္ပဏီမှ စာဝန်ယူဆောင်ရွက်ရန်၊

(၆) သတ္တုတွင်းဝန်ကြီးဌာနနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနတို့မှ ထုတ်ပြန်ထားသော စည်းကမ်းသတ်မှတ်ချက်များအတိုင်း တိကျစွာလိုက်နာ ဆောင်ရွက်ရန်။

၂။ အထက်ဖော်ပြပါ စည်းကမ်းသတ်မှတ်ချက်များကို တိကျစွာလိုက်နာဆောင်ရွက်ပါမည်ဟု ဝန်ခံကတိ လက်မှတ်ရေးထိုးပါသည်။

(မျိုးနောင်)
ဒါရိုက်တာ
ရွှေတောင်သတ္တုတူးဖော်ရေးကုမ္ပဏီလီမိတက်
၁၃/တကန(နိုင်) ၁၂၅၀၉၂
အလုံတာဝါ၊ ကမ်းနားလမ်း၊ အလုံမြို့နယ်၊
ရန်ကုန်မြို့။

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