

**Initial Environmental Examination (IEE) Report**

**For**

**Namp-Peain Hydropower Project**

**Revised Version- (01)**

**Proposed by Mega Myanmar Energy Company Limited**

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**Prepared by E Guard Environmental Services Company  
Limited**

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## **1. Executive Summary**

This is the Initial Environmental Examination (IEE) report for the generation of Electricity from the Namp-Peain stream with the 'Run-of-River' hydropower project to be implemented by Mega Myanmar Energy Company Limited. The project is located about 8 kilometers from the Mong Ping Township. The main objective of the proposed project is to distribute electrical energy to the Mong Ping Town for various kinds of regional development activities including small and medium enterprises (SMEs).

The government inspection teams visited the proposed area before the project was started. The inspection team from Environmental Conservation Department from Taunggyi visited the project site during November 2015 and give comments to carry out IEE study for the project. The inspection team from the Forest Department also visited and gave recommendation that the land for the project was not under the jurisdiction of the Forest Department. The inspection team from Settlement and Land Records Department also visited the site and informed that the land category of the project area was assessed as a vacant land.

The proponent has commissioned E Guard Environmental Services Company Limited as consultant to carry out the study for the Initial Environmental Examination (IEE) of this project. Thus, site reconnaissance survey, environmental quality measurements and secondary data collections were carried out during December 2015 to get the baseline data. The existing laws and regulations are applied for the preparation of this IEE report including the Environmental Management Plan (EMP).

The project activities may cause impacts on environment, ecological resources and human and also socioeconomic condition of the local people. However, there are not much negative impacts due to the nature of the project. As the project is to generate electricity, it can stimulate the development of the region.

There is concern about landslide and soil erosion due to the excavation work and removal of vegetation cover. Nevertheless, retaining wall will be constructed along the steep-slope areas and replanting of fast growing indigenous tree species will be done to compensate loss of vegetation cover and also to improve the aesthetic value. The project will not use all the water in the stream and the acceptable level of water will be left in the downstream. Thus there is no serious impacts on the riparian and terrestrial communities in the downstream. The Recommendation is made in EMP for the extraction of sand and aggregates, not to extract at



the same place for a long time as it can change not only the stream channel but also the flow rate.

The Corporate Social Responsibility (CSR) programs are also taken into account in the EMP. The proponent commitment that they will use 2% of the net profit for the sake of local communities as CSR plan. Moreover, Mega Myanmar Energy Company Limited should organize Health, Safety and Environment (HSE) team to accomplish CSR and to review EMP regularly for the improvements and modification.

Opinion of the local people and stakeholder effected by the development of the proposed project are taken into account to formulate EMP. So, public consultation and information disclosure were held on 28<sup>th</sup> Jan 2016 at the Mong Ping Town.

**For Web Disclosure** : [http://www.mediafire.com/folder/vdx0nga0yl5rv/Namp-Peain\\_Hydropower\\_Project](http://www.mediafire.com/folder/vdx0nga0yl5rv/Namp-Peain_Hydropower_Project)





### စီမံကိန်းအကျဉ်းချုပ်

ယခုအစီအရင်ခံစာမှာ မဂ္ဂါမြန်မာ စွမ်းအင် ကုမ္ပဏီလီမိတက်မှ နမ့်ပိန်းချောင်းတွင် ROR နည်းလမ်းဖြင့် ရေအားလျှပ်စစ်တည်ဆောက်ထုတ်လုပ်မည့် လုပ်ငန်းအား ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း အစီအရင်ခံစာဖြစ်ပါသည်။ ROR နည်းလမ်းဖြင့် ရေအားလျှပ်စစ်ထုတ်လုပ်ရာတွင် ဆည်တာတမံအကြီးအမား တည်ဆောက်ခြင်း၊ ရေဝပ်ဧရိယာများ လိုအပ်ခြင်း မရှိပါ။ အဆိုပြုစီမံကိန်း တည်နေရာသည် မိုင်းပျဉ်းမြို့မှ (၈) ကီလိုမီတာအကွာတွင် တည်ရှိပါသည်။ စီမံကိန်း၏ အဓိက ရည်ရွယ်ချက်မှာ မိုင်းပျဉ်းဒေသရှိ ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများအပြင် အသေးစားနှင့် အလတ်စားပုဂ္ဂလိက လုပ်ငန်းများအား လျှပ်စစ်ဖြန့်ဖြူးပေးနိုင်ရန် ဖြစ်ပါသည်။

အစိုးရအဖွဲ့အစည်းမှဆေးရေးအဖွဲ့များသည် စီမံကိန်း မပြုလုပ်မီ ယင်းဒေသသို့ လာရောက်၍ ကြိုတင်စစ်ဆေးမှုများ ပြုလုပ်ပြီး ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ စစ်ဆေးရေး အဖွဲ့သည် ၂၀၁၅ နိုဝင်ဘာ တွင်စစ်ဆေးမှုများ ပြုလုပ်ခဲ့ပြီး ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း လေ့လာမှု ပြုလုပ်ရန် မှတ်ချက်ပေးခဲ့ပါသည်။ သစ်တောဦးစီးဌာနမှ စစ်ဆေးရေး အဖွဲ့သည် စစ်ဆေးရေး ပြုလုပ်ပြီးနောက် သစ်တောမြေတွင် ပါဝင်မှုမရှိကြောင်း/ သစ်တောမြေ မဟုတ်ကြောင်း မှတ်ချက်ပြုခဲ့ပါသည်။ လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့် စာရင်းအင်းဦးစီးဌာနမှ စစ်ဆေးရေး အဖွဲ့က စစ်ဆေးမှုပြုလုပ်ပြီးနောက် စီမံကိန်းဧရိယာသည် သိန်စိုက်ပျိုးထားခြင်းမရှိသော မြေဖြစ်ပြီး မြေလွတ်မြေရိုင်းဖြစ်ကြောင်း အချက် (၆) ချက်ဖြင့် ခရိုင်သို့ သတ်ပို့မှတ်တမ်း မှတ်ချက်များပြုခဲ့ပါသည်။

ယခုကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း အစီအရင်ခံစာပြင်ဆင်ရာနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း အစီအစဉ်ရေးဆွဲရာတွင် လက်ရှိထုတ်ပြန်ထားသော ဥပဒေနှင့် နည်းလမ်းများကို အသုံးပြုထားပါသည်။ E Guard Environmental Services Company Limited နှင့်စီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များဖြစ်သော အထက်ပါလုပ်ဆောင်ချက်များကို လုပ်ဆောင်ရန် အလုပ်အပ်နှင်းခဲ့ပါသည်။ ကွင်းဆင်းလေ့လာခြင်းဖြစ်သော ပတ်ဝန်းကျင် အရည်အသွေးတိုင်းတာခြင်းနှင့် နဂိုရှိပြီးဖြစ်သော အချက်အလက်များ စုဆောင်းခြင်းများကို အခြေခံ အချက်အလက်များရရှိရန် အတွက် ၂၀၁၅ ဒီဇင်ဘာလတွင် လုပ်ဆောင်ခဲ့ပါသည်။

စီမံကိန်းလုပ်ဆောင်ချက်များသည် ပတ်ဝန်းကျင်၊ ဂေဟအရင်းအမြစ်များ၊ လူသားများ နှင့် ဒေသခံများ၏ လူမှုစီးပွားရေး အခြေအနေများကို ဆိုးကျိုးများ ဖြစ်ပေါ်စေနိုင်ပါသည်။ လျှပ်စစ်ထုတ်လုပ်ခြင်းဖြစ်သောကြောင့် ဒေသဖွံ့ဖြိုးမှုကိုလည်း အထောက်အပံ့ ဖြစ်စေပါသည်။ လုပ်ငန်းအကောင်အထည်ဖော်ရာတွင် အပင်များကို ခုတ်ခြင်း၊ အမြစ်များတူဖော်ခြင်းကြောင့် မြေတိုက်စားခြင်းနှင့် မြေပြိုခြင်းများအတွက် စိုးရိမ်စရာရှိပါသည်။ မည်သို့ပင် ဖြစ်စေကာမူ မြေတိုက်စားခြင်းနှင့် မြေပြိုခြင်းများကို ကာကွယ်ရန်အတွက် တောင်ဖောင်းနေရာများတွင် နံရံများ တည်ဆောက်ခြင်းနှင့် အကြီးမြန်သစ်မျိုး စိုက်ခင်းများကို လုပ်ဆောင်သွားပါမည်။ ယခု စီမံကိန်းသည် ချောင်းအတွင်းရှိ ရေအကုန်လုံးကို အသုံးပြုမည်မဟုတ်ပဲ ချောင်းအောက်ပိုင်းရှိရေများ



သတ်မှတ်ရေပမာဏကို ချန်ထားမည်ဖြစ်ပါသည်။ ချောင်းရေစီးကြောင်းနှင့် ရေစီးဆင်းမှု အရှိန် ပြောင်းလဲမှုမရှိစေရန် အတွက် တစ်နေရာတည်းမှ သဲ နှင့် ကျောက်များကို အချိန်ကြာကြာထုတ်ယူခြင်း မပြုလုပ်ရန် ထပ်သွင်းမှတ်ချက် ပြုထားပါသည်။ လူမှုစီးပွား ရေးတာဝန်ခံမှုအစီအစဉ် (CSR Plan) ကိုလည်း ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ထည့်သွင်းထားရပါမည်။ စီမံကိန်းအဆိုပြုသူမှာ လူမှုစီးပွားရေး တာဝန်ခံမှုအစီအစဉ် (CSR Plan) ကို စီမံကိန်းမှ အသားတင်အကျိုးအမြတ်၏ ၂ ရာခိုင်နှုန်းအား ဒေသအဖွဲ့အစည်းများအကျိုးအတွက် အသုံးပြုရမည်ဟု ဝန်ခံကတိပြုထားပါသည်။ မဂ္ဂါမြန်မား စွမ်းအင် ကုမ္ပဏီလီမိတက်သည် ကျန်းမာရေး၊ ဘေးကင်းလုံခြုံမှုနှင့် ပတ်ဝန်းကျင်အဖွဲ့ကို (CSR Plan) ပုံမှန် လုပ်ဆောင်ရန်အတွက် ဖွဲ့စည်းထားရပါမည်။ ထို့အပြင် ၎င်းအဖွဲ့မှ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်အား တိုးတက်မှုရှိစေရန်နှင့် ပြုပြင်မှုပြုလုပ်နိုင်ရန်အတွက် ပုံမှန်ပြန်လည် စစ်ဆေးပေးရပါမည်။

စီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင် သက်ရောက်မှုရှိနိုင်သော ဒေသခံပြည်သူများနှင့် ပါဝင်ပတ်သက်သူများ၏ အကြံပြုချက်များနှင့် အမြင်များကိုလည်း ပတ်ဝန်းကျင် စီမံအုပ်ချုပ်မှု အစီအစဉ်တွင်ထည့်သွင်း စဉ်းစားရပါမည်။ ထို့ကြောင့် လူထုတွေ့ဆုံဆွေးနွေးခြင်းနှင့် သတင်းအချက် အလက်ပေးခြင်း လုပ်ငန်းကို ဇန်နဝါရီလ ၂၈ ရက်၌ မိုင်းပျဉ်းမြို့တွင် ကျင်းပခဲ့ပါသည်။

ဤလင့်တွင်လည်း ဝင်ရောက်ကြည့်ရှုနိုင်ပါသည်။

[http://www.mediafire.com/folder/vdx0nga0yl5rv/Namp-Peain\\_Hydropower\\_Project](http://www.mediafire.com/folder/vdx0nga0yl5rv/Namp-Peain_Hydropower_Project)



## **2. Introduction**

### **2.1 Background of the Study**

This report is the Initial Environmental Examination (IEE) for the generation of electrical energy from the run of the river type hydropower project of Namp-Peain stream proposed by the Mega Myanmar Energy Co., Ltd. The proposed project aimed to generate electrical energy from then Namp-Peain stream with Built-Own-Operate (B.O.O) system and to distribute electricity to the Mong Ping and to its countryside for many regional development activities. With the good aims, the proponent signed the Memorandum of Understanding (M.O.U) with the Ministry of Electric Power, State Government on 19<sup>th</sup> February 2015.

According to Myanmar Environmental Conservation Law 2012, the proponents of every development project in the country have to submit an Environmental Management Plan (EMP) or Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) to the Ministry of Environmental Conservation and Forestry (MOECAF). On behalf of MOECAF, the Environmental Conservation Department (ECD) which is one of the six departments under the MOECAF, responsible for implementing National Environmental Policy, strategy, framework, planning and action plan for the integration of environmental consideration into in the national sustainable development processes. Thus, an inspection team from Taunggyi ECD visited the project site from 20<sup>th</sup> Nov 2015 to 22<sup>nd</sup> Nov 2015. Base on the nature of project, the inspection team gave comments that it will not be necessary to build a big dam, only a diversion weir will suffice. Waste generations (hazardous wastes, excavation waste and removal of vegetation) and intensities of impacts on social and natural environment should be taken into consideration. ECD made final decision to prepare an Initial Environmental Examination (IEE) and to develop a comprehensive Environmental Management Plan (EMP).

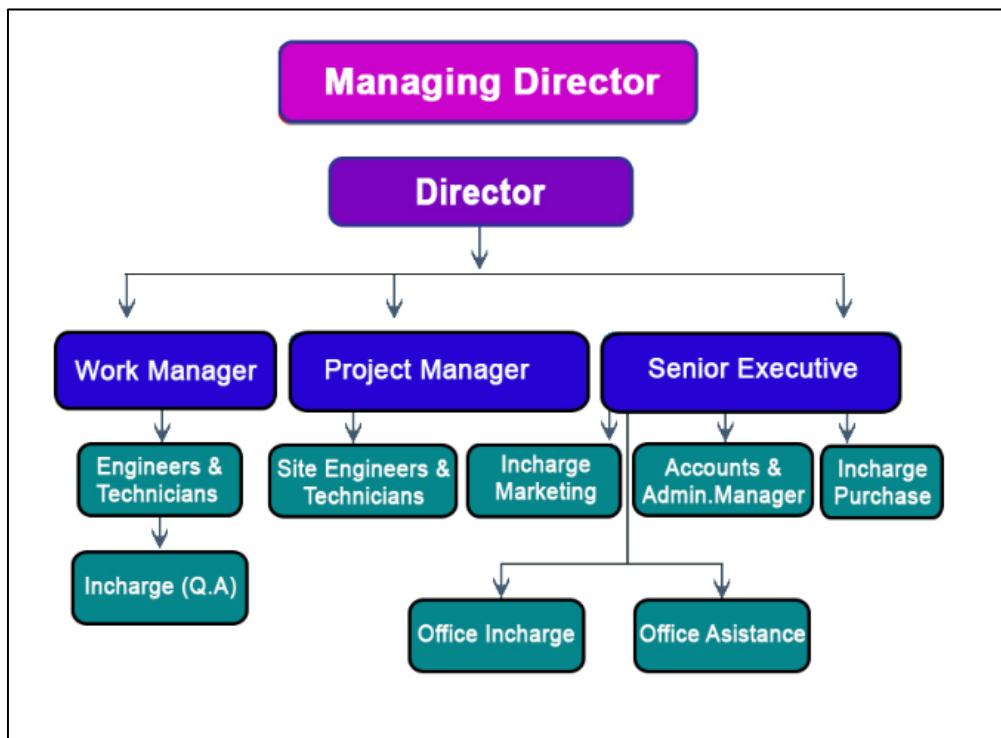
To complete the requires of ECD, Mega Myanmar Energy Co., Ltd. commissioned E Guard Environmental Services Co., Ltd. for environmental studies and to prepare this report that will be submitted to ECD.

The Initial Environmental Examination (IEE) report is prepared to assess the potential impacts of the said project and to formulate, implement and monitor the environmental protection measures in the phases of its construction, operation and decommission in order to

reduce environmental impacts or to be minimum impact to the environment and to increase its operating efficiency.

## 2.2 Detail information of the project proponent

Company Name	-	Mega Myanmar Energy Company Limited
Contact Person	-	U Zaw Min
Contact Phone number	-	+95 9 428 315 177
Company Address	-	No. (116), Zizawa Street, Kanauk Block, Taunggyi, Southern Shan State, Myanmar.
Email	-	hydroman.2005@gmail.com



**Figure 2. 1 Organization Structure of Mega Myanmar Energy Company Limited**

## 2.3 Scope of Work

The scope of study for the Initial Environmental Examination (IEE) report will vary on the scale and type of the development project. In this IEE, it was studied to cover the generation of electricity from Namp-Peain stream. This IEE is based on consideration of resource conservation and pollution abatement such as water pollution, air pollution, solid waste, noise



and vibration, dust emission, occupational safety and health and socioeconomic impact and impact to the biodiversity, prevention, maintenance and operation of environmental control system, transport system. The site survey and field survey for environmental quality were carried out by E Guard Environmental Services Company Limited having experiences in conducting environmental assessments for various kinds of development projects.

A reconnaissance study was performed the study teams from eGuard for all site-related environmental issues and baseline data were also collected from possible sources of pollution by using appropriate measuring devices. Data interpretation and analysis were made based on those collected data for the present and future conditions. In this report, recommended mitigation and monitoring measures were also included to reduce environmental impacts.

## **2.4 Study Team for Environmental Studies**

This environmental study is to prepare IEE report for Mega Myanmar Energy Co., Ltd. conducted by E Guard Environmental Services Co., Ltd. The team has measured baseline primary data of air quality including ambient gas condition, water quality, noise level, and weather data by using appropriate measuring instruments. Data for socioeconomic information and existing biodiversity condition near to the proposed project area was obtained from available secondary data sources. Data interpretation and analysis are made based on the collected baseline data and also from secondary for the present and foreseeable conditions and impacts on both socio-economic and environment. Suitable mitigation measures for impacts are proposed in Environmental Management Plan to reduce to acceptable levels.

### **2.4.1 E Guard Study Team Members' Responsibilities for IEE**

#### **U Soe Min (Director)**

U Soe Min is an acting director at E Guard Environmental Services Co., Ltd. He is a Civil and Environmental engineer. He received B.E. (Civil Engineering) from RIT, Yangon, in 1984, and M.E (Environmental Technology and Management) from AIT, Bangkok, in 2001. He had worked for Irrigation Department, Ministry of Agriculture for 8 Years. He had involved in local and international projects relating to civil, water resources and environmental projects in Myanmar, Thailand and Singapore. He was an ex-JICA participant, a member of MES, and AIT alumni. Currently he is undertaking as a director responsible for



environmental business development, environmental monitoring and data acquisition, and been involved in ESIA projects as a consultant and project manager.

#### **Daw Yinn Mar Swe Hlaing (Senior Consultant)**

Daw Yinn Mar Swe Hlaing, a consultant, got a bachelor's degree in soil and water management at Yezin Agricultural University and completed postgraduate studies from the University of Tokyo. In recent years, she has been involved in ESIA study of international funding and government supported projects, especially JICA projects. She has worked extensively as project leader in environmental and social impact, and resettlement studies in the implementation of road and bridges improvement, and upgrades in circular railway line projects. She has led socio-economic survey as well as stakeholder engagement aimed to develop a core understanding between affected communities and project owner.

#### **Daw Aye Aye Soe (Associate Consultant)**

Daw Aye Aye Soe is Associate Consultant, who holds Master of Science in Geography, specialized in Land Use, University of Dagon, Myanmar, in 2014. She has two-year experience in Social Impact Assessment, and also have experiences with applied GIS including Planning and Identifying, Coordinating, Plant Diversity calculating, Database, Data Analysis.

#### **U Zin Ko Ko Oo (Environmental Specialist)**

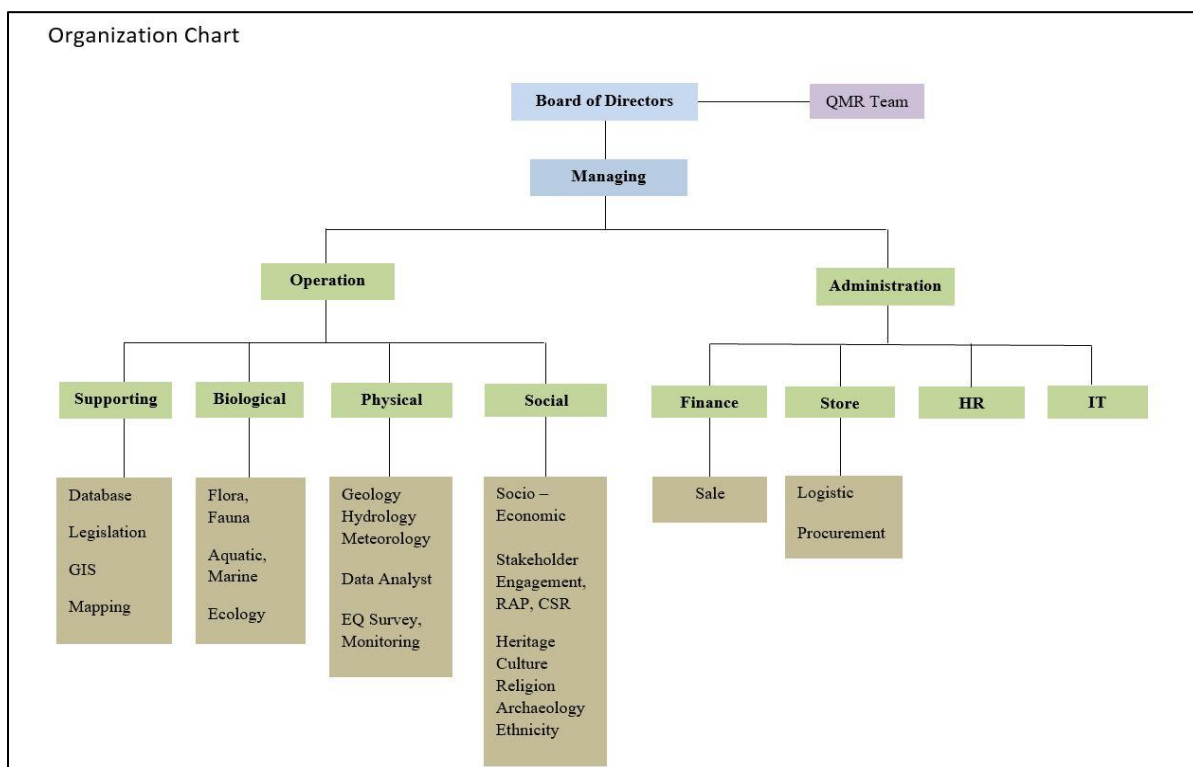
U Zin Ko Ko Oo is an Environmental Specialist, who received his Bachelor Degree in Forestry from the University of Forestry in 2013. He has more than 2 year experiences in environmental fields which include reconnaissance surveys, environmental risk assessment and remediation. His responsibilities is concerning with project management and compilation of the report for development of the projects, including public and stakeholder's consultation. He also has experiences in participating in implementation and preparations of EIA reports and RAP reports and also in communication with clients, regulators such as analytical laboratories and water sampling techniques. He is also familiar with conducting social survey.

**U Myat Thu Kyaw (Project Assistant, EQ Data Measurement and Interpretation)**

U Myat Thu Kyaw is a Project Assistant, who received his Bachelor Degree in Forestry from the University of Forestry (Yezin) in September, 2014. He has National Forestry Inventory experiences in MOECAAF from December 2014 to February 2015 and another experience is to cooperate with clients and to measure and interpret environmental qualities including air quality, water quality and also noise level.

**U Si Thu Lwin (Surveyor)**

U Si Thu Lwin is matriculates and they have more than 2 years of surveyor experience. They specialize in instrumentation and field data collection of environmental condition of the site and measuring of environment baseline data.



**Figure 2. 2 Organization Chart of E Guard**

*(as of February)*

Full Address of the company conducting IEE is:

E Guard Environmental Services Co., Ltd.

No. 99, MyaKanThar Lane, NyeinChanYay Street



10 Miles, Pyay Road, Saw BwarGyi Gone

Insein Township, Yangon 11011

Union of Myanmar

Tel: 01 667953, Fax: 01 6667953, Mobile +959 448001676

URL: [www.eguardservices.com](http://www.eguardservices.com)

Skype: eguardenvironmental



### 3. Policy, Legal and Institutional Framework

#### 3.1 Current Principals Legislations concerning with Environment Conservation

1. Conservation of Water Resources and Rivers Law, 2006
2. Environmental Conservation law, 2012
3. Environmental Conservation Rule, 2014
4. National Land Use Policy, 2016
5. Conservation of Water Resources and River Law, 2006
6. The Water Power Act, 1927
7. Environmental Impact Assessment Procedure, 2015

**Table 3. 1 Current Legislations Concerning with Environment Conservation**

<b>Current principal Legislations Concerning with the Environment Conservation</b>	
Laws and Regulations	Description
<b>Constitution 2008</b>	
Section 45	The Union shall protect and conserve natural environment.
Section 390 (b)	Every citizen has the duty to assist the Union carrying out the environmental conservation.
<b>National Environmental Policy (1994)</b>	
<i>To achieve harmony and balance between socio-economic, natural resources and environment through the integration of environmental considerations into the development process enhancing the quality of the life of all its citizens.</i>	
<b>Environmental Conservation Law, 2012</b>	
<i>This law concerns for the conservation, management, beneficial use, sustainable use of the environmental natural resources.</i>	



### Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description
Objectives: Section 3	<ul style="list-style-type: none"><li>a) to enable to implement the Myanmar National Environmental Policy;</li><li>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;</li><li>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;</li><li>d) to reclaim ecosystems as may be possible which are starting to degenerate and disappear;</li><li>e) to enable to manage and implement for decrease and loss of natural resources and for enabling the sustainable use beneficially;</li><li>f) to enable to implement for promoting public awareness and cooperation in educational programmes for dissemination of environmental perception;</li><li>g) to enable to promote international, regional and bilateral cooperation in the matters of environmental conservation;</li><li>h) to enable to cooperate with Government departments, Government organizations, international organizations, non-government organizations and individuals in matters of environmental conservation.</li></ul>

## Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description
<p style="text-align: center;">Provisions of Duties and Powers relating to the Environmental Conservation of the Ministry: Section 7</p>	<ul style="list-style-type: none"> <li>a) 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;</li> <li>b) prescribing environmental quality standards including standards on emissions, effluents, solid wastes, production procedures, processes and products for conservation and enhancement of environmental quality;</li> <li>c) 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;</li> <li>d) facilitating for the settlement of environmental disputes and, if necessary, forming bodies to negotiate such disputes;</li> <li>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;</li> <li>k) negotiating, cooperating and implementing in respect of international, regional and bilateral agreements, instruments and programmes relating to matters of environment;</li> <li>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;</li> <li>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;</li> <li>n) laying down guidances relating to the management, conservation and enhancement of environment for the matters of protection of ozone layer, conservation of biological 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;</li> <li>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 resources in environmental conservation works;</li> </ul>

### Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description
Environmental Quality Standards: Section 10	<p>The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:</p> <ul style="list-style-type: none"> <li>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;</li> <li>b) water quality standards for coastal and estuarine areas;</li> <li>c) underground water quality standards;</li> <li>d) atmospheric quality standards;</li> <li>e) noise and vibration standards;</li> <li>f) emissions standards;</li> <li>g) effluent standards;</li> <li>h) solid wastes standards;</li> <li>i) other environmental quality standards stipulated by the Union Government.</li> </ul>
Monitoring: Section 13	<p>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:</p> <ul style="list-style-type: none"> <li>b) transport, storage, use, treatment and disposal of pollutants and hazardous substances in industries;</li> <li>c) disposal of wastes come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;</li> <li>d) carrying out waste disposal and sanitation works;</li> <li>e) carrying out development and constructions;</li> <li>f) carrying out other necessary matters relating to environmental pollution.</li> </ul>
<i>Responsibilities of project proponent/business owner for reducing environmental impact</i>	
Section 14	<p>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.</p>

## Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description
Section 15	The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.
Section 16	<p>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:</p> <ul style="list-style-type: none"> <li>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;</li> <li>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;</li> <li>c) shall comply with the directives issued for environmental conservation according to the relevant industrial estate, special economic zone or business.</li> </ul>
<i>Conservation of Natural Resources and Cultural Heritages</i>	
Section 18	<p>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:</p> <ul style="list-style-type: none"> <li>a) forest resources;</li> <li>b) land resources;</li> <li>c) fresh water resources including underground water;</li> <li>d) mineral resources;</li> <li>e) agricultural resources;</li> <li>f) fisheries resources;</li> <li>g) marine resources;</li> <li>h) natural ecosystems;</li> <li>i) natural areas, wildlife, natural plants and biological diversity;</li> </ul>

<b>Current principal Legislations Concerning with the Environment Conservation</b>	
<b>Laws and Regulations</b>	<b>Description</b>
	j) other natural resources stipulated by the Union Government.
<b>Environmental Conservation Rules 2014</b>	
Rule 58	The Ministry shall form the EIA Report Review Body with the experts from the relevant Government departments, organizations.
Rule 59	The Ministry may assign duty to the Department to scrutinize the report of EIA prepared and submitted by any organization or person relating to EIA and report through the EIA Report Review Body.
Rule 61	The Ministry may approve and reply on the EIA report or IEE or EMP with the guidance of the Committee
<b>National Land Use Policy, 2016</b>	
<i>Part II Land Use Administration,</i>	
<i>Chapter (II) Determination of Land Type and Land Classification</i>	
Section 13, (c)	Other land (Urban land, village land, religious land, public land, government administrated vacant, fallow, virgin land and wasteland that are not classified as forestland and agricultural land, etc.).
<i>Part III Planning and Changing Land Use,</i>	
<i>Chapter ( III ) Changing Land Use by Individual Application</i>	
Section 28	In order to protect the land use rights of existing land users in affected and surrounding areas, procedures will be developed on providing public notice, information sharing and right to appeal, when determining whether an individual application for land use change, that is submitted to respective ministries, government departments or agencies, is permitted or not.

## Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description
<b>Conservation of Water Resources and Rivers Law, 2006</b>	
<i>In this law attains, by all means of water resources above and underground within boundaries of rivers and creeks, banks and waterfronts. In this expression also includes water resources that flow into rivers and creeks. This law concern toward the protection and conservation of water resources and rivers system both above and underground.</i>	
Objectives: Section 3	<ul style="list-style-type: none"> <li>a) to conserve and protect the water resources and rivers system for beneficial utilization by the public;</li> <li>c) to contribute to the development of State economy through improving water resources and river system;</li> <li>d) to protect environmental impact.</li> </ul>
Provisions of Duties and Powers relating to the Ministry of Transport: Section 4	<ul style="list-style-type: none"> <li>b) notifying the land boundary as waterfront boundary adjoining with bank boundary required to carry out the works of bank protection, waterway training and river-creek improvement;</li> <li>f) communicating with local and foreign government departments and organizations for conservation of water resources, rivers-creeks and carrying out thereof;</li> <li>g) carrying out in accordance with the relevant international conventions, regional agreements and bilateral agreements for environmental conservation implemented by the Union of Myanmar for conservation of water resources, rivers and creeks.</li> </ul>
<i>Miscellaneous</i>	
Section 30	Any government department and organization or any person desirous of constructing drainage, utilizing river water intake, constructing bridges spanning rivers, connecting underground pipe, connecting underground electric power cable, connecting underground telecom cable or digging in rivers and creeks, bank boundary and waterfront boundary, under the requirement of work, shall in order not to adversely affect the water resources and rivers and creeks, carry out only after obtaining the approval of the Ministry of Transport.
Section 31	The relevant Ministry, government department and organization shall, in respect of works contained in sub-sections (c) and (g) of section 6, grant permission on works that may be permitted under

### Current principal Legislations Concerning with the Environment Conservation

Laws and Regulations	Description	
	their authority only when the recommendation of the Directorate has been obtained, in order not to adversely affect the water resources, rivers-creeks and watercourses.	
Section 32	Notwithstanding anything contained in any of the existing laws, action shall only be taken under this Law on matters relating to the maintenance and protection of water resources and rivers and creeks.	
<b>The Water Power Act, 1927</b>		
When rules made under this Act prescribe licences for the use of any public water for obtaining energy or for mining operations. The term “public water” shall mean a collection of water, whether running or still, which is not the subject of private property exclusively, situate on, or flowing over or to, any land to which the State has any title in possession or in future, or in respect of which the Government has a right to use water for obtaining energy or for mining purposes.		
<b>Environmental Impact Assessment Procedure, 2015</b>		
EIA,IEE Categorization for electricity generation	Project size required for IEE Study	Project Size required for EIA Study
	Electricity generation of the capacity 1MW to under 15MW or Forebay tank size of under (20,000,000 cubic meter) or catchment area under (400 ha)	Electricity generation of the capacity over 15MW or Forebay tank size of over (20,000,000 cubic meter) or catchment area over (400 ha)

Other than the related laws and regulations listed in Table 3.2 , there are some laws concerning environmental management for the projects developed in Myanmar are as follows:

1. Electricity Law, 1984



2. Freshwater Fisheries Law, 1991
3. The Underground Water Act, 1930
4. The Retaining wall Act 1909

**Table 3. 2 Related Laws and Regulations Concerning with Environmental Management**

<b>Electricity Law, 1984</b>
This law is concerning with the exploration, production, transmission, distribution and usage of electricity and it involves inspection matter for the safety use of electricity.
<b>Freshwater Fisheries Law, 1991</b>
This law concerns, by all means of freshwater fisheries waters, fish, fishery, fishing, fishing implement and fishing vessels. The objectives of this law are; to further develop the fisheries; to prevent the extinct of fish; to safeguard and prevent the destruction of freshwater fisheries waters; to obtain duties and fees payable to the state; to manage the fisheries and to take action in accordance with the law.
<b>Underground Water Act, 1930</b>
This Act, it is expedient to conserve and protect underground sources of water supply.
<b>The Retaining wall Act 1909</b>
In this Act attains, by all means of any retaining wall constructed for the purpose of excluding, regulating or retaining water, and includes all earthen walls, dams, canals, drains, piers, groins, sluices, buildings, water-gauges, bench-marks and other works subsidiary to any such retaining wall.

### 3.2 Current Principal Legislations Concerning for the Social Safety and Security

The law and regulation related to the social safety and security consideration are listed below;

1. Fire Brigade, 2015
2. Labour Organization Law, 2011
3. Labour Organization Rule, 2012

4. Social Security Law, 2012
5. The Union of Myanmar Public Health Law, 1972

**Table 3. 3 Current Principal Legislations Concerning for the Social Safety and Security**

Current principal Legislations Concerning for the Social Safety and Security	
Laws and Regulations	Description
<b>Fire Brigade; Focal Ministry for Fire and Disaster Management, 2015</b>	
<i>The Ministry of Social Welfare, Relief and Resettlement is the ministry for emergency management. Under the Ministry, Department of Social Welfare (DSW), Relief and Resettlement Department (RRD) and Fire Services Department (FSD) are set up and Relief and Resettlement Department (RRD) for disaster management.</i>	
Objective: Section 3	<ul style="list-style-type: none"> <li>a) to the lives and properties of the people;</li> <li>b) to the State owned capital investment;</li> <li>c) to form and train firemen to become the reserve force of the State</li> </ul>
Provisions of Duties and Powers relating to the Myanmar Fire Services Department (FSD): Section 4	<ul style="list-style-type: none"> <li>a) fire precaution,</li> <li>b) fire prevention,</li> <li>c) fire extinction,</li> <li>d) social humanitarian services,</li> <li>e) to form and train firemen to become the reserve force of the State</li> </ul> <p>Peace and Development.</p>
<b>Labour Organization Law, 2011</b>	
This law concern towards the organization which protect the rights of the workers and to have the good relations among the workers or between the employer and worker and to enable to form and carry out the labour organization systematically and independently.	
<b>Labour Organization Rule, 2012</b>	
Rule 22	The labour organization shall have the right to prepare its rules or constitution, or to elect the Executive Committee members and

## Current principal Legislations Concerning for the Social Safety and Security

Laws and Regulations	Description
	representatives freely in accord with these rules.
Rule 23	The labour organization shall determine its representatives for carrying out negotiations with the employer with a view to determining terms and conditions of employment in settling the collective bargains of workers in accord with the labour laws. The officials of the organization may also provide trainings for the development of the knowledge and skill of workers and in carrying out for the welfare of the workers.
<b>Social Security Law, 2012</b>	
<i>This law mainly concern for the social welfare, social security and labor rights.</i>	
Objectives: Section 3	<ul style="list-style-type: none"> <li>a) to support the development of the State's economy through the development of production by causing to enjoy more security in social life and health care by the workers who are major productive force of the State by the collective guaranty of the employer, worker and the State;</li> <li>b) to enjoy more security in social life and medical care by the public by effecting their insurance voluntarily;</li> <li>c) to raise public confidence upon the social security scheme by providing benefits which are commensurate with the realities;</li> <li>d) to have the right to draw back some of the contributions paid by the employers and the workers as savings, in accord with the stipulations;</li> <li>e) to obtain the right to continued medical treatment, family assistance benefit, invalidity benefit, superannuation benefit, survivors' benefit, unemployment benefit, the right to residency and ownership of housing after retirement in addition to health care and pecuniary benefit for sickness, maternity, death, employment injury of the workers.</li> </ul>
<b>The Union of Myanmar Public Health Law, 1972</b>	
The Penal Code, 1861 of Offences Affecting the Public Health, Safety, Convenience,	

### Current principal Legislations Concerning for the Social Safety and Security

Laws and Regulations	Description
Decency and Morals	
Chapter 14	<ul style="list-style-type: none"> <li>a) Public nuisance.</li> <li>b) Negligent act likely to spread infection of disease dangerous to life.</li> <li>c) Malignant act likely to spread infection of disease dangerous to life.</li> <li>d) Disobedience to quarantine rule. Fouling water of public spring or reservoir.</li> <li>e) Making atmosphere noxious to health.</li> <li>f) Negligent conduct with respect to poisonous substance.</li> <li>g) Negligent conduct with respect to fire or combustible matter.</li> <li>h) Negligent conduct with respect to explosive substance.</li> <li>i) Negligent conduct with respect to machinery.</li> <li>j) Negligent conduct with respect to pulling down or repairing buildings.</li> <li>k) Negligent conduct with respect to animal.</li> <li>l) Punishment for public nuisance in cases not otherwise provided for.</li> </ul>

### 3.3 Laws and Regulations Related to Land Issue

As the present project comprises land acquisition and resettlement, present study also emphasize significant laws which have govern the issues related to land, land administration and land ownership in Myanmar since in the British Colonial time to the present day.

1. Farm Land Law, 2012
2. Farm Land Rules, 2012
3. Fellow, Vacant and Virgin Lands Management Law, 2012
4. Fellow, Vacant and Virgin Lands Management Rules, 2012
5. The Land Acquisition Act, 1894

**Table 3. 4 Laws Related to Land Issue**

<b>Farmland Law, 2012</b>
The law introduces right to use the land to farmers through land use certificate and acquiring the farmland for other purpose.
<b>Farmland Rules, 2012</b>
This rules detailed the eligibility of farmer or organization for the process of acquiring land use certificate, the role and responsibility of farm land committee in various level and the application process of land use certificate.
<b>Fellow, Vacant &amp; Virgin Lands Management Law, 2012</b>
Stipulation of claiming unused land to usable in form of agriculture, livestock, mining & government allowable other purpose.
<b>Fellow, Vacant and Virgin Lands Management Rules, 2012</b>
This rules dedicate to the process of application and approval of the unused land for various purposes.
<b>The Land Acquisition Act, 1894</b>
Consideration for calculating a suitable amount of compensation is to be made as quick as possible for affected person when the land is acquired by the government. Government has authority to acquire the land under this Act not only for public purpose but also for business reasons for the companies at that time.

### 3.4 International Guidelines and Standards

The following suitable international guidelines and standards will be referred for implementation of the Environmental Management Plan (EMP) of the proposed project.

- World Bank Safeguard Policies;
- The IFC performance standards;
- World Commission on Dams (WCDs); and
- The International Hydropower Association (IHA) Sustainability Guidelines and Sustainability Assessment Protocols.



### ***International Hydropower Association (IHA) Sustainability Guidelines (2004)***

The IHA Sustainability Guidelines (SGs), were published in February 2004 and has developed Sustainability Guidelines and an associated Compliance Protocol that provide a framework for good practice. The IHA Sustainability Guidelines set out basic principles that promote greater consideration of social responsibility, economic development and environmental protection. These principles, include the following;

- policy framework,
- the role of governments,
- decision-making processes,
- environmental aspects of sustainability,
- social aspects of sustainability and
- Economic aspects of sustainability.

### **3.5 Authorized Institution**

The Ministry of Environmental Conservation and Forestry (MOECAF) was reformed in September, 2011 from the Ministry of Forestry to be the focal point and coordinating agency for environmental management. Under the guidance of MOECAF, the Environmental Conservation Department (ECD) was established in October, 2012. ECD is the department responsible for managing the EIA process in Myanmar. The comments of MOECAF on the development of Electricity generation Project proposed by Myanmar Mega Myanmar is as follows:

- Describe the project activities and electricity generation steps in order to avoid the potential impacts on the environment, social and health that may be produced by the implementation of the proposed project. The machinery and equipment should be least impact to the environment and to apply modernized technologies.
- The opinions and comments of the local people on the proposed project should be taken into consider and the proponent should participate in local development activities.
- According to the Chapter (2), Paragraph (9) of the Environmental Impact Assessment procedure (draft), Initial Environmental Examination (IEE) should be prepared in commissioning with third party so as to mitigate the impacts on the environment, social and health.



- Based on the results of IEE studies, in order to minimize the environmental and social impacts, Environmental Management Plan (EMP) including waste management plan and monitoring plan with proper allocation of budget for mitigation measures should be prepared.
- During the implementation of the proposed project, the environmental policy, environmental laws and procedures, guidelines should be abided by along with laws and regulations prescribed by other related Ministries.



## **4. Project Description and Alternatives Selection**

### **4.1 Project Background, Objectives and Descriptions**

This project is to generate electrical energy from the Namp-Peain Stream by run of river design with diversion weir and construction of Hydropower house. This project is implemented by Mega Myanmar Energy Company Limited with the good aim of supporting mechanism for regional development activities. It is estimated to produce 800KW-1.2MW of electricity near the Namp-Peain Stream in Mong Puu Village, Mong Ping Township, Keng Tung District, eastern Shan State, Myanmar. The project is located about 8 kilometers distance from the Mong Ping Township. The main objective of the proposed project is to distribute electrical energy to the Mong Ping for various kinds of regional development activities including small and medium private enterprise (SMEs).

The Namp-Peain stream originates from the Namp-Lein stream about 37 kilometers northeast to the Mong Ping and it is connected with a stream that flows from the Kham Pop Village; 16 kilometers eastern of the Mong Ping and finally combines with the Namp-Puu stream comes from the MongPuu Village; about 8 kilometers away from the Mong Ping Township. The Namp-Peain stream finally flows to Namp-Khar River approximately 30 kilometers away from the Mong Ping. During the feasibility study it is found that the amount of running water in the Namp-Peain Stream is large quantity and the flow rate is very fast. The feasibility study was carried out by Mega Myanmar Energy Company Limited during April and May 2015.

Currently, government owned generator, small private hydropower and solar power are energy sources used to generate electricity in Mong Ping. The installed small private hydropower capacities and solar plates are sufficient only for domestic uses, not enough to distribute to the whole town. For the whole town, the electricity supply is currently managed by the Myanmar Electric Power Enterprise (MEPE) using diesel generators. The existing government owned generator's capacity is 300 KVA. The existing generator cannot supply the town for whole day. So this generator is used to distribute only on every 6:00 pm to 8:30 pm only. Thus the supply of the electrical energy for the whole day for the town is still needed. This is why the Mega Myanmar Energy Company Limited planned to implement this project.



## 4.2 Project Location, Overview Map and Site Layout Maps

The Namp-Peain stream water flows from east to west and parallel with Keng Tung – Mong Ping highway road. This stream is the confluence of Namp-Lein stream and Namp-Puu stream. The diversion weir and intake structure will be constructed near the junction of the streams, which is 8kilometers away from the Mong Ping and the hydropower house will be constructed 6kilometers away from the Mong Ping. So the approximate distance from the diversion weir and the hydropower house is 2 kilometers.

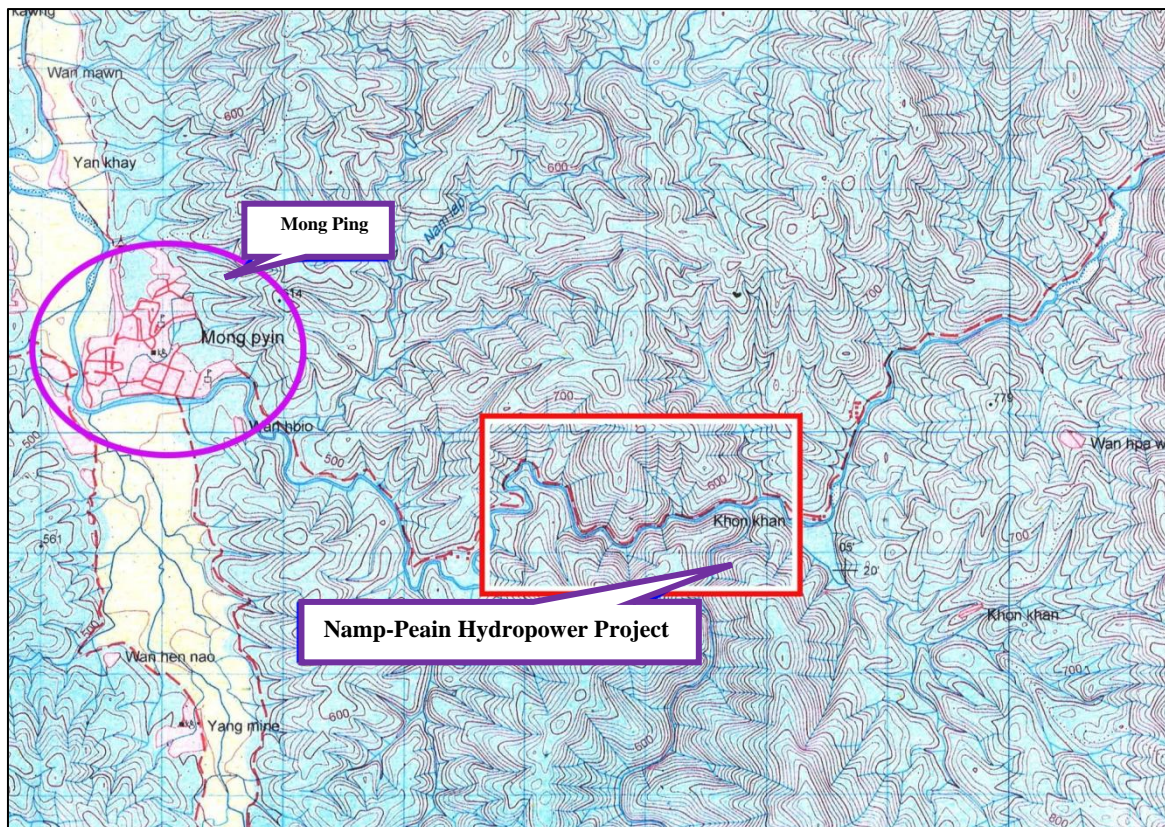


Figure 4. 1 Location showing Project Site and Mong Ping Town

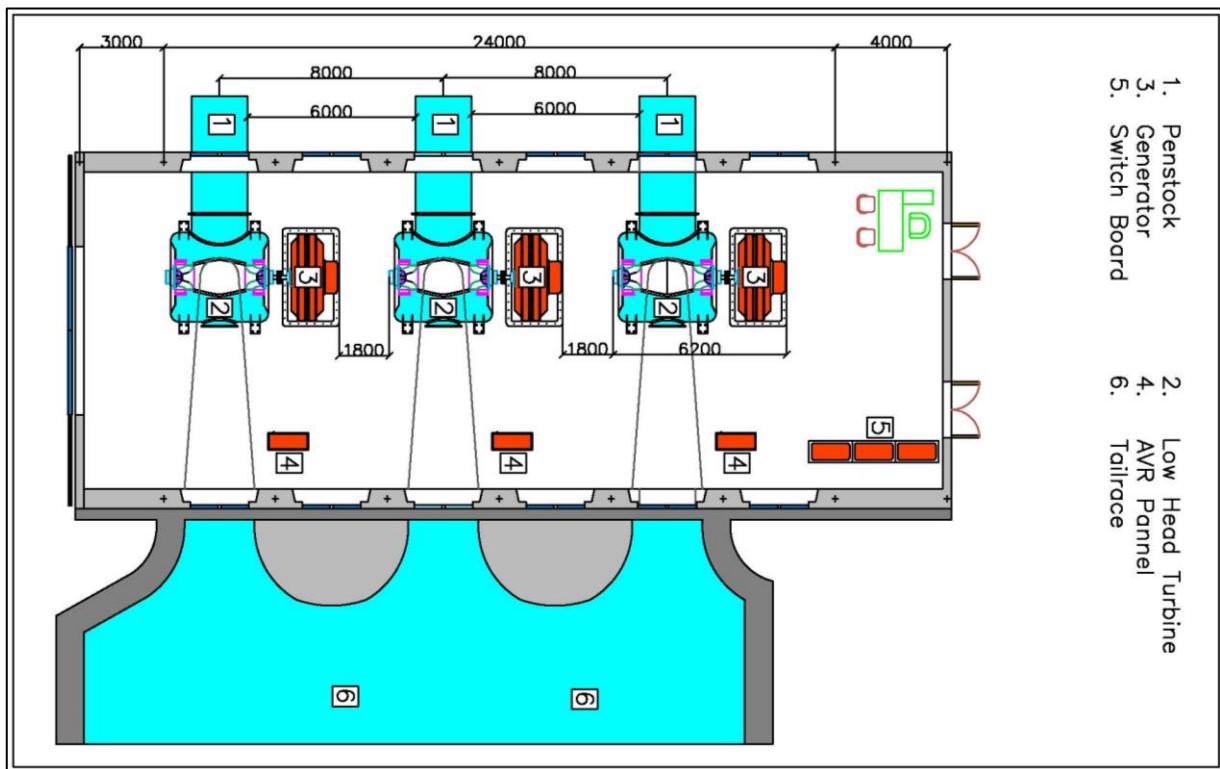
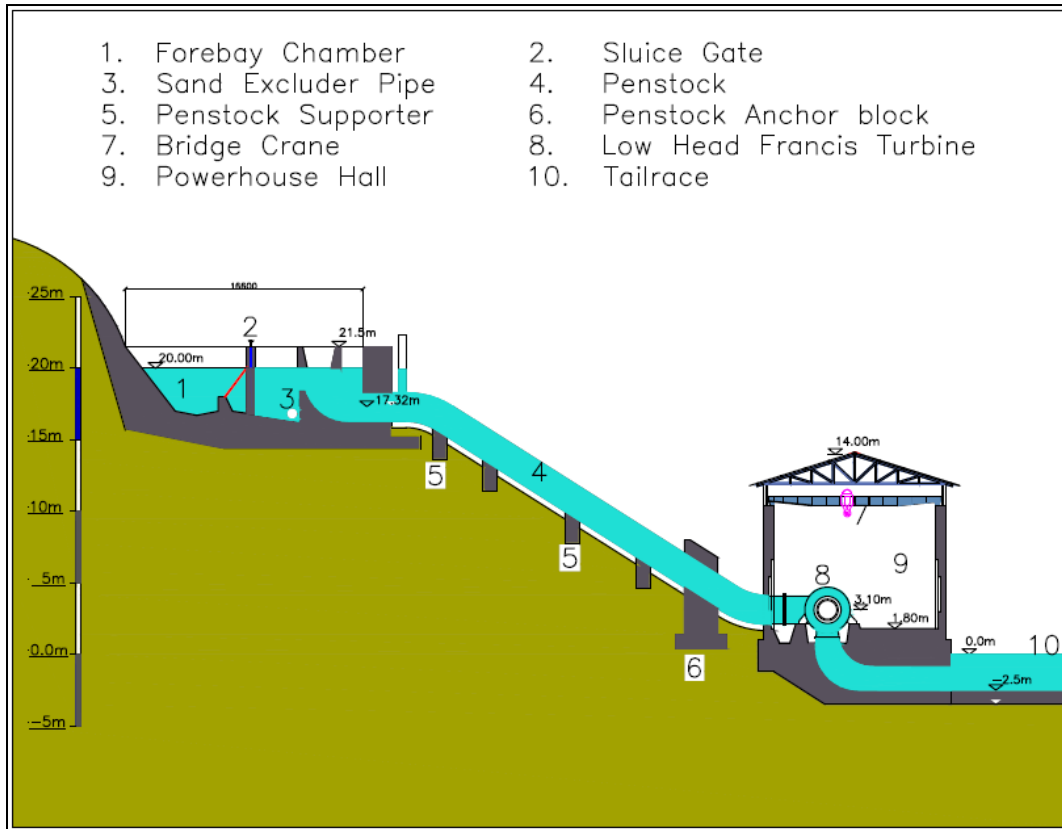


Figure 4. 2 Longitudinal Section of the Forebay Tank, Pen stock and Power House

Figure 4. 3 Layout map of the Powerhouse



### 4.3 Comparison and Selection of the Alternatives

Some alternatives to the proposed project were considered in the early stages of the project design. This considered the different options available in order to avoid or reduce any adverse environmental and/or social impacts.

The different options included:

**No Project:** (i.e. no hydropower project would be conducted): no project alternative means there will be no further generation of electricity from the Namp-Peain stream. As electricity can greatly assist the development of the region, the option on no project alternative should not be considered conceptually or practically.

**Run of River by diversion weir and channel:** It is the generation of electricity from normal flow of water by connecting with channels by the diversion weir without blocking the normal stream and remain the minimum water flow in the stream. Since it is not blocked the running water, there is no need worry about water requirements for the agricultural lands in downstream and for the disruption of the existing stream. The other advantage is that the stream flow is fast enough to generate electricity even during dry summer season with slow water flow rate. The costs of construction for its components (diversion weir, water intake structure, channel, sluice gates) are not much expensive. So electricity generation by this alternative is considered to be selected for above reasons and economic feasibility. The project is proposed two alternative alignments; alignment (A) Yellow and alignment (B) Green.



**Figure 4. 4 Alternative Alignments**

**Table 4. 1 Comparative Analysis for Diversion Channel Alignments**

Comparative Route	Alternative Alignment A (Yellow)	Alternative Alignment B (Green)
<b>Concept of Route Setting</b>	Avoiding curves and almost straight	Mostly parallel to the stream and highway road, accessible
<b>Length</b>	1.9km	2.6 km
<b>Possible impacts</b>	Explosive activities will be needed for tunnel, more civil work, cutting more trees, lost habitat and ecosystem change, higher headrace will be required, expensive	No need to explode and no need tunnel, water flow by natural Gravity
<b>Evaluation</b>	Not Recommendable (Alignment A)	<b>Recommendable (Alignment B)</b>

**Installed turbine capacities and number:** The installed capacity of turbine is a vital role in generation of electricity because it have to be systematically calculated with the flow rate, amount of water flow with times and the productive capacity of the electricity. Thus the project proposed alternative selections for the turbines. The first one is to install only one turbine with the capacities of 1000kW or 1200kW. The another alternative is to install three turbine with the capacity of 400kW each. Since the nature of project is ‘Run Of River’ type, there is less water in the stream during summer. So, the only one turbine cannot generate



electricity all the time. However, installation of three turbine with the capacity of 400 kW each can generate electricity all the time even in dry season by running of one or two turbine/s. According to the above comparison, the installation of three turbines is recommended.

#### 4.4 Description of the selected alternative

The water flows from the sources to the Namp-Peain stream is huge. Although there are some curves and bend, many slopes are present along course the stream. Most of the slopes are gently sloping and rolling to lower levels and creates a favor to flow rate rapidly. Then it is a good source to generate electricity without water logging and flooding to the agricultural and farm lands along the stream due to the rapid flow.

##### (a) Available Headrace of the Water

The rapid flow of water is occurred as the stream is sloping down to the lower levels with small waterfalls formed along course of the stream. It is favorable to generate electricity with the required headrace height 20 meter within the stream length of 2 kilometer for the generation of electricity of 1000 kW-1.2 MW. Therefore the most suitable situations for generation of electricity can be found at the proposed site which is not concerning with cultivated land, road networks and far from residential areas.

##### (b) Generation of Electricity with Minimum Impacts to Environment

Namp-Peain stream is a free flowing stream and even in case of flooding during the rainy season, seldom reach the residential areas, agricultural lands and Keng Tung – Mong Ping highway road. After feasibility study, it was found that the selected project site is not included in the reserved forests, the protected public forests, agricultural lands and residential areas. The project location is situated at the vacant land. There is no need of large extent of land for catchment area so that there is low risk of flooding the vacant lands, agricultural lands, the highway road and even the villages in comparison with building a big dam. The structures such as water intake, diversion weir, channel, and powerhouse required for generation of electricity by ‘run of river’ is simple to construct and the impacts on the land and existing forest resources will be minimized. As the project’s design is electricity generation with ‘run of river by diversion weir’, there is no need to block the normal running water and hence the impact on the aquatic ecosystem is minimal.

#### 4.4.1 Construction Activities

The required facilities for the generation hydropower include diversion weir, water intake structure, open channel, forebay tank and power house. All facilities for the proposed project and the highway road will be located on the opposite banks of the stream. So a temporary bridge will be constructed near the project site to transport machineries and equipment and materials needed for the construction activities. After completion of some of the construction activities, a permanent bridge will be changed at the same place to replace of the temporary one.

##### (a) Diversion Weir

During the rainy season, there are mass sedimentation and increase of water volume in the stream. While planning design for the diversion weir, it is needed to consider for long term stability and strength of diversion weir. A number of sand and silt excluder pipes and siltation ponds will be included in the proposed design. After collecting limited amount of sand and silt, the sluice gates beside the excluders will be opened to the connected spillway to remove collected sediments. During heavy raining season, the rapid water flow rate can be reduced by opening spillway and sand excluder pipe and also lowering down the head race to over flow to the main stream. By doing this, the effect on diversion weir due to the increasing amount of water and accelerated water flow can be minimized.

##### (b) Intake infrastructure

The intake structure will be located continuous next to the diversion weir. In the proposed design, it is recommended to flow the water through trash rack and silting basin before diverting the channel from the sluice gate to adjust the flow of water to the channel. In doing so, unnecessary things including waste and siltation can be minimized and will prolong the stability of intake structure and diversion channel. In addition, the installation of sluice gate at the intake structure will assist the removal of sediments as and when needed.

##### (c) Open Channel

The open channel will be constructed on the other side of the Mong Ping – Keng Tung highway road i.e., the channel and the road will be on each side of the Nan-Peain stream. The flow rate of the water is properly designed so as to ensure smooth flow without damaging the open channel. The channel will be made of concrete structure on good soil conditions and steel or iron pipe on poor soil conditions. The



length of the channel is approximately 2 kilometers and its width will be 6 meters at the top and 3.5 meters at the bottom. There are no houses and farming along the route of the channel. The sand and silt excluder basins will be put along the channel as necessary.

**(d) Forebay tank**

In addition, the forebay tank will consist of silting basins, bypass or overflow, trash rack and sluice gate. In the silting basins, silt extruder pipe should be installed so as to remove silt. The selected site should have enough soil bearing capacity to ensure the sustainability of the forebay tank. That is why in the design of forebay tank, the extent of silting basin and the location of the bypass or overflow is duly considered. Before water flowing to the penstock through forebay tank from channel, it should be arranged to contain sediments in the silting basin and also filtering waste in the trash rack so as not to disturb the flow of water and running of turbine. The capacity of the forebay tank is 300 cubic meter or 66,000 gallons.

**(e) Penstock**

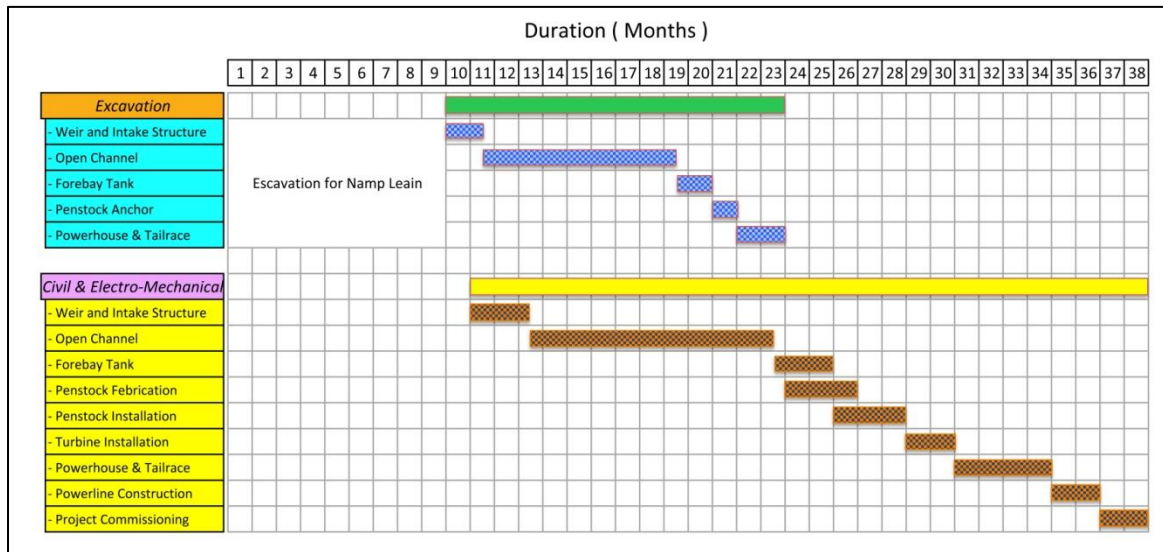
A systematically calculated design with steel structure for penstock with required thickness and size will be required to withstand the pressure of water from 20 meter height. It is also needed to consider about consequences of the shrinking and expanding of penstock due to the fluctuation of temperature such as the concrete pipe-anchors etc.,. The installation expansion joints are the solution to solve that kind of cases. So the expansion joints should be installed in the necessary places.

**(f) Powerhouse**

Powerhouse will be constructed 35 meters distance from forebay tank and it will be located on the same side with the diversion weir, the intake structure, the channel and the forebay tank. The powerhouse will include main powerhouse, reserve buildings, assembly and maintenance building. In the powerhouse, there will be 3 pairs of turbine generator with the installed capacity of 400 kW each. By installing 3 pairs of turbine, the operation of the factory can be under proper control during the dry season or summer when the water level is low by using alternative one or two turbine/s during low water level.

The installed turbine generator in the main powerhouse rotates 375 times per minute and its voltage is 400 volt. The turbine will be at 480 meter above sea level. The tail water means water after using in the turbine will be disposed of to tailrace pond so as to reduce the acceleration and pressure of outgoing water. There will be emergency

stop system for the turbine and also a crane will be installed for maintenance of the machinery in the main powerhouse. Apart from main powerhouse, there will be some buildings, including control power station, electricity transmission lines, a small bridge, entry road and staff quarters.



**Figure 4. 5 Construction Schedule for Namp-Peain Hydropower Project**

#### 4.5 Process of generation of electricity by using Run of River Type

Run of the river hydroelectricity (ROR) is a type of hydroelectric generation plant whereby little or no water storage is provided. The water are collected by diversion weir, water intake structure, channel ect. Firstly the water are diverted by diversion weir by raising or lowering the sluice gates. Before diversion to the intake structure, there is a series of trash racks are installed in order to remove big stones and trees and other rubbishes flowing with the stream water especially in rainy season. After diverted to the intake structure, the water are convey to the forebay tank by the channel: continuous next to the intake structure. There are a number of silt and stone excluders and trash racks presented in the channel and forebay tank. After water are collected in forebay tank, the water are flow to the turbine passing through the penstock. Then the turbines are running and the electrical energy is emitted. The water after using in turbines is discharged to the tailrace pond than released to the normal stream.



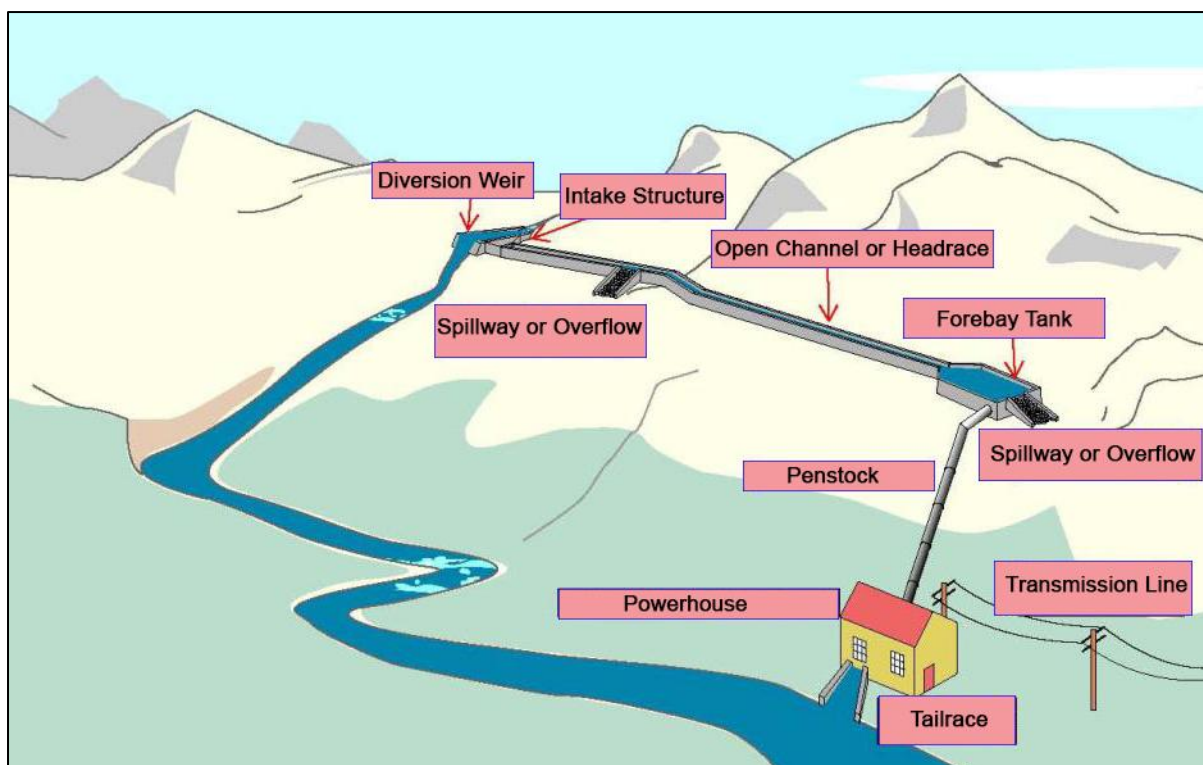


Figure 4. 6 Typical Design for Electricity Generation by Run of River (ROR) type

## 4.6 Requirements

### (i) Rocks and Sand Requirement

The sand and stones required for the construction works will be extracted from the stream. During trial extraction, it is found that there are various sizes of stones and some mass of sand settled down at the bed of the stream and are favorable to use in the construction site. The stones getting from the stream are mixing with different size and sand. A screening machine is used (with the aid of water if necessary) to separate sand and aggregated stones from the mixture and a crusher is used to crush the big stones to get the smaller requirement sizes. No quarry mine will be needed to get the required amount of stones for construction as all required amount can be available from the stream.

### (ii) Water Requirement

During construction period, the water sources for construction activities will be from the stream as all construction works will be carried out beside the stream. The water from the stream will be used in all construction related activities such as concrete

mixing and/or to separate sand and stones and/or washing of the machineries. Currently, the water supply for drinking and cooking for all workers is purified drinking water from Mong Ping. There is a plan to dig a tube well or open well within the boundary of powerhouse for drinking water source after some part of constructions work had finished. There will be an oil separator installed at the maintenance workshop to separate oil and grease waste before disposed of to the stream.

### (iii) Electricity Requirement

At the initial stage of construction for 6 to 8 months, a diesel generator of 100 kW (125 kVA) will be used to supply electricity requirement of the construction site. After that a small hydropower plant (about 100 kW) is planned to install near the Mong Ping for the requirement of the construction activities. Then the generator used in initial stage will be kept for an emergency case.

### (iv) Land Utilization

The lands required for the proposed hydropower project are as shown in bellow;

a. Diversion Weir	1.00 acre
b. Intake Structure	0.65 acre
c. Open Channel	3.40 acres
d. Forebay Tank	0.35 acre
e. Hydropower Plant	2.00 acres
f. Bridge	1 bridge
<b>Total</b>	<b>7.40 acres</b>

Apart from described above, there will some temporary access roads during construction phase and it will be about 2 acres.

**Table 4. 2 Requirement of Machineries and Equipment**

Sr. No.	Particular	Unit	Capacity	Qty
1	Back hole		21 Ton	1
2	Back hole loader		8 Ton	1
3	Stone and earth carrying truck		1 hole	2



4	Stone and earth carrying truck		1.5 hole	3
5	Crane		5 ton	1
6	Crusher	Set	Medium	1
7	Screening	Set		1
8	Dragging Machine	Set	Medium	2
9	Concrete mixer	Set	12 m <sup>3</sup> /hr	2
10	Diesel Generator	Set	100 KW (125 KVA)	1
11	Brick Maker	Set		2
12	Welding (iron)	Set	150 Ahm	4
13	Iron rebar for iron plate	Set		1
14	Conveyor	Set	30 feet long	1
15	Small hydropower house	Set	100 kW	1

**(v) Firefighting System**

The sufficient number of fire extinguishers will be installed in necessary places such as at the entrance and in the main powerhouse, and other buildings and also in the warehouse. A firefighting plan will be developed in accordance with the requirements of the Department of Fire Services. A fire protection road will be constructed around the powerhouse factory especially in the dry season, as outer fire break, as surroundings are full of shrubs and bushes. Provision of fire alarm system should be installed at the factory. In case of fire, the water in the forebay tank is proposed for firefighting.

## 5. Description of the Surrounding Environment

### 5.1 Methodology for Data Collection and Analysis

The followings are the methodologies used for data collection and analysis in order to prepare this IEE report;

1. Onsite Baseline Data Measurement – Environmental baseline parameters such as air quality, noise and water quality of the existing project before starting the project activities. Air quality (concentration of SO<sub>2</sub>, NO<sub>2</sub>, CO and CO<sub>2</sub> in the air) and noise are measured at the project location with the relevant devices up to relevant times. Water samples are collected and some parameters of water quality are measured on site and some parameters are sent to respective laboratories and results are mentioned in this Chapter.

**Table 5. 1 Environmental Measured Locations**

Point	Environmental Data	Location	Duration
1	Noise	Lat:21°20'26.771"N Long:99 °02'31.062"E	10.12.2015 to 11.12.2015
2	Air Quality (Gas)	Lat:21°20'26.771"N Long:99 °02'31.062"E	10.12.2015 to 11.12.2015
3	Water	Lat: 21°20'18.363"N, Long: 99°04'19.113"E	10.12.2015 (2:34 pm)

2. Secondary Data Collection and Analysis – The secondary data such as socioeconomic condition, physical/ biological component, and weather data and natural disaster are collected from the official township data, interviewing the local people, observation during reconnaissance site visit and also browsing the internet are analyzed by the Study team.

## 5.2 Physical Component

### (a) Earthquake Intensity of Myanmar

The origin and occurrence of earthquakes occurred in Myanmar including Shan State and other parts of the country can be interpreted as below. Earthquake intensity in the area can be seen in Figure 5.1.

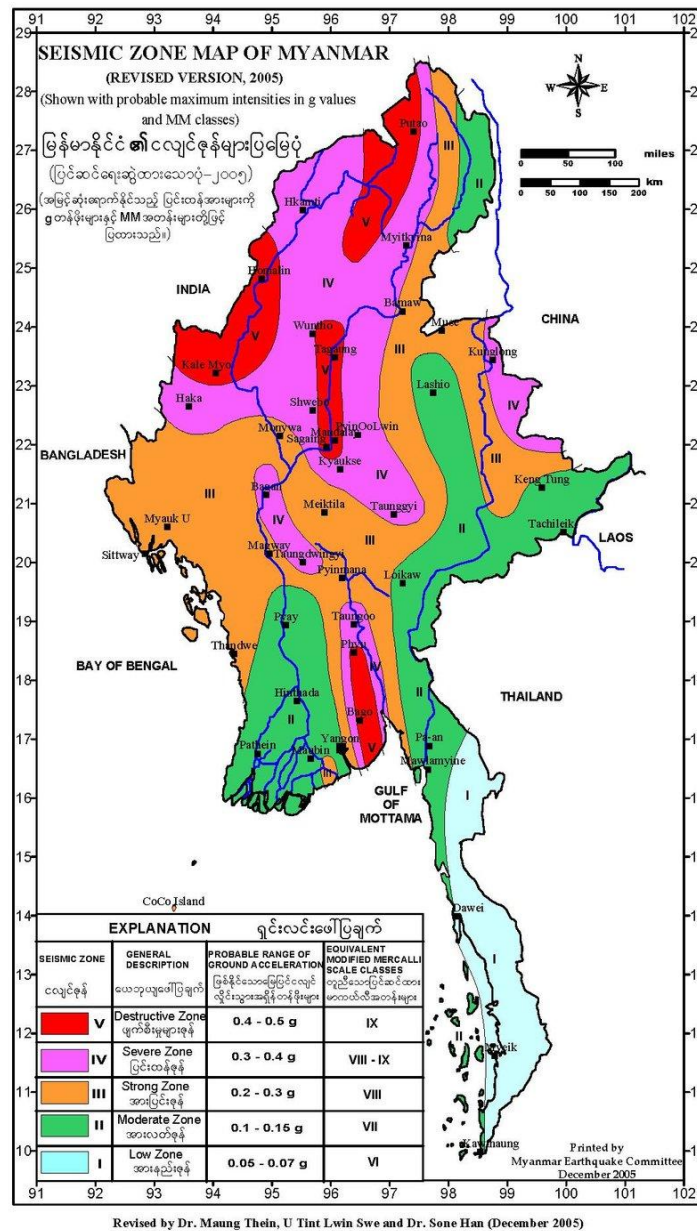


Figure 5. 1 Seismi Zone Map of Myanmar

(source: Dr. Maung Thein, U Tint Lwin Swe and Dr. Sone Han\_2015)

The approach is mainly empirical and historical in the sense that it makes use of past seismic events and history to make educated guesses about region wide intensities in the

future. It is hoped that a probabilistic seismic risk (or earthquake hazard map) on horizontal ground acceleration should be taken into account in the design. As shown in the map, five seismic zones are demarcated and named (from low to high) **Zone I (Low Zone)**, **Zone II (Moderate Zone)**, **Zone III (Strong Zone)**, **Zone IV (Severe Zone)**, and **Zone V (Destructive Zone)**, mainly following the nomenclature of the European Macro Seismic Scale 1992.

As per map the proposed project is located in adjacent with the **Zone II (Moderate Zone)** and **Zone III (Strong Zone)**. In 24<sup>th</sup> March 2011, an earthquake occurred in Tartay, eastern Shan State with the magnitude of 6.8 Richard scale. It was a violent earthquake and it destroyed many structures and killed and injured many people. The straight distance from Tarlay to proposed project site (Mong Ping) is approximately 150 kilometers. To prevent risk of earthquake effect, structural engineer should consider seismic design criteria that described in Myanmar National Building Code (MNBC) 2012 when designing the hydraulic structure as well as foundation to withstand the risk for this proposed project.

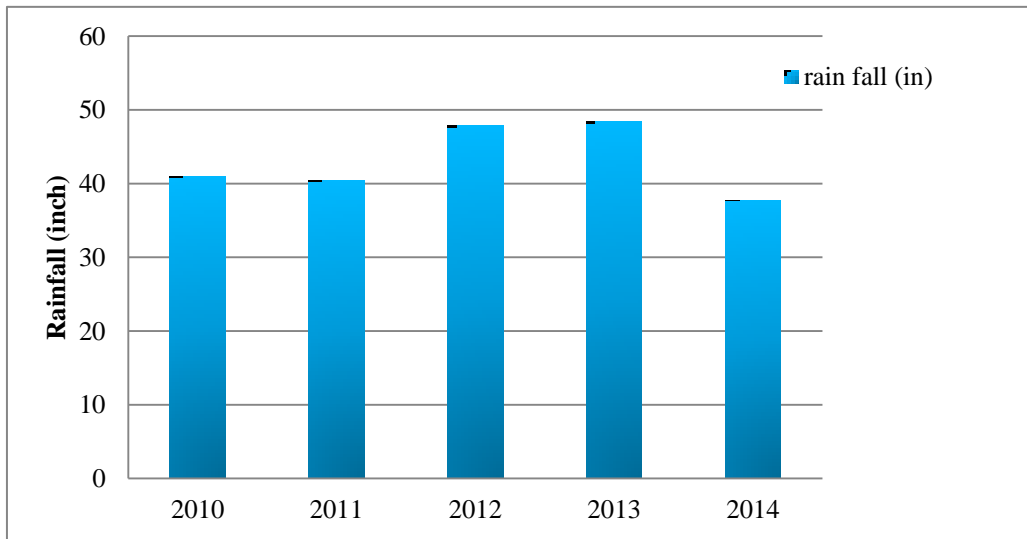
#### (b) Climate

The proposed project area is influenced by the climate of tropical. There is three distinct seasons: summer (mid-February to mid-May), rainy (mid-May to mid-October), and winter (mid- October to mid-February). Generally, there is raining in every month. However the precipitation rate in rainy season is more than winter season and it of winter season is more than summer season. In this area, the average hottest temperature is 33° C and the lowest average temperature is 10° C. The mean annual rainfall of the area is 43.073 inches with the average rainfall days of 83 days.

**Table 5. 2 Rainfall and Temperature in MongPaing Township**

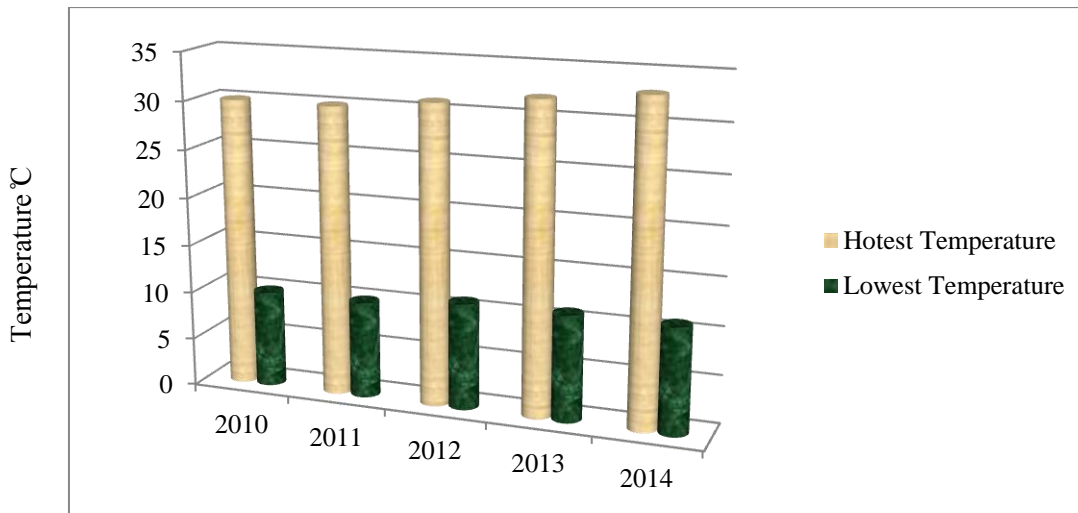
Year	Rainfall		Mean Temperature °C	
	Days	Amount (in)	Hottest	Lowest
2010	80	41.02	30	10
2011	82	40.37	30	10

2012	81	47.86	31	11
2013	89	48.39	32	11
2014	83	37.75	33	11



**Figure 5. 2 Annual Rainfall in Mong Ping Township**

(Source: Mong Ping Township Data)



**Figure 5. 3 Average Annual Temperatures in MongPaing Township**

(Source: Mong Ping Township Data)



### (c) Air Quality

The survey started with the initial visit prior to the air quality assessment in order to get the baseline data of the site for monitoring of air quality. Regarding to the data reliability and validity, this survey developed the quality assurance plan then followed by data analysis and data interpretation.

The air quality was measured at the proposed project area: air quality measuring location provides direct reading with data logging capabilities. Concentration of Carbon Dioxide (CO<sub>2</sub>), Carbon monoxide (CO), Nitrogen dioxide (NO<sub>2</sub>) and Sulphur dioxide (SO<sub>2</sub>) within the site were measured by Areoqual Gas Level monitor on December 10<sup>th</sup> 2015 and December 11<sup>st</sup> 2015. The range of various pollutant levels measured at the proposed project site was shown in table below. The observed value of the proposed project site indicated that baseline NO<sub>2</sub> and SO<sub>2</sub> lie in the range of National Environmental Emission Guidelines (2015) and CO<sub>2</sub> value lie in the range of American Conference of Governmental Industrial Hygienists (ACGIH) Guidelines.

**Table 5. 3 Gas Condition of the Proposed Project Area**

No.	Gas	Averaging Period	Observed Value (ppm)	Molecular Weight (kg/kmole)	Calculated Observed Value (µg/m <sup>3</sup> )	International Guidelines	Organization
1	CO	8 hr	0.163	28.011	196.166	-	
2	CO <sub>2</sub>	8 hr	544.167			5000 (ppm)	ACGIH
3	NO <sub>2</sub>	1 hr	0.037	46.010	73.141	200 (µg/m <sup>3</sup> )	NEEG
4	SO <sub>2</sub>	10 min	0.002	64.060	0.010	500 (µg/m <sup>3</sup> )	NEEG

*(Sources: onsite measurement)*

**Sulfur Dioxide(SO<sub>2</sub>)** is generated from combustion of fuels such as oil and coal, and a as by-product from some chemical production or wastewater treatment processes. On-road and off-road vehicles are also emission source of SO<sub>2</sub>. SO<sub>2</sub> irritates the respiratory tract, injures lung tissues and reduces visibility and level of sunlight. The emission can be controlled by





implementation of manufacturer recommended engine maintenance programs, good driving practices, installing and maintaining emissions control devices, and implementing a regular vehicle maintenance and repair program.

**Nitrogen Oxides (NO<sub>x</sub>)** in the ambient air consist of nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>) and nitrous oxide (N<sub>2</sub>O). NO<sub>2</sub> is formed by chemical reaction of NO and ozone. The main sources of NO<sub>2</sub> are combustion of fuel and on-road and off-road vehicles. NO<sub>2</sub> decreases lung function and resistance to infection. The gas emission can be monitored by combustion modification, flue gas recirculation, water/ steam injection and the same measures for SO<sub>2</sub> reduction.

Likewise, **Carbon Monoxide (CO) and Carbon dioxide (CO<sub>2</sub>)** have the same emission sources and mitigation measures for SO<sub>2</sub> and NO<sub>2</sub>. They are poisonous gas and cause damage to the respiratory organ. Guidelines 2013, adopted threshold limit values of CO<sub>2</sub> is 5,000 ppm for 8-hour, time-weighted average. Thus it can be concluded that the existing CO<sub>2</sub> level is acceptable for human health.

#### **(d) Surface Water Quality**

The existing water quality was measured by sampling water from the stream at the place proposed for diversion weir and intake structure in order to get the baseline data and to compare the difference between qualities of the surface water before and after implementation of the project. The survey team from E Guard made on site measurement and water samples are sent to respective labs for measuring some necessary parameters. With regard to the water quality standards of the National Environmental Quality (Emission) Guidelines (NEEG) (2015) and World Health Organization (WHO) can be compared for data interpretation. Most of the baseline data of ground water quality measured during December 2015 with respect to NEQG and WHO standards. Water quality tests result of on-site measurement and results from the laboratories are attached in **Appendix IV**. According to the following baseline data, all the parameters are in normal range of the NEQG and WHO standards.

**Table 5. 4 Water Quality Result at the project site**

No.	Parameters	Unit	Water quality Result	International and National Guideline	
<b>Surface Water (NampPeain Stream)</b>					
<b>On-site Measurement</b>					
1	pH	pH	8.64	6 - 9	NEG
2	Temperature	°C	20.00	-	
3	Electric Conductivity (EC)	μS/cm	208.00	-	
4	Total Dissolved Solids (TDS)	mg/l	214.00	<1000	WHO
5	Salinity	Ppt	0.00	-	
6	Dissolved Oxygen (DO)	mg/l	8.71	< 10	WHO
<b>Ecological Laboratories</b>					
1	Total Hardness	mg/l	92.00	500	WHO
2	Iron	mg/l	0.21	3.5	NEG
3	Chloride	mg/l	2.00	250	WHO
4	Suspended Solids	mg/l	13.00	50	NEG
5	Sulphate	mg/l	12.00	200	WHO
6	Dissolved Solids	mg/l	94.00	1000	NEG
7	Phosphate	mg/l	0.06		



No.	Parameters	Unit	Water quality Result	International and National Guideline	
8	Lead	mg/l	Nil	0.1	NEG
9	Nitrate	mg/l	0.03	50	WHO
10	Ammonia	mg/l	0.14	10	NEG
11	Chemical Oxygen Demand (COD)	mg/l	32.00	250	NEG
12	Biological Oxygen Demand (BOD)	mg/l	6.00	50	NEG
13	Copper	mg/l	Nil	0.5	NEG

According to the above data, it can be concluded that all measured parameters of the Namp-Peain stream water at the project site are within the range of NEQG and WHO standards. Although all baseline data measured are in the range of standard, the possible impacts on the water and stream and its mitigation measured concerning with water pollution due to construction activities are presented in the Chapter 6.

(e) Noise

Digital Sound Level meter is used to measure the sound level of the current base line condition of the project surrounding area. As the project is close to highway road of Keng Tung - Mong ping road, the measuring device for noise level was placed on the opposite bank of the road. The measured noise data is shown in the Table 5.5 below and it gives indications for the ambient noise level of the project as acceptable before the start of the project activities. The noise level guidelines described in National Environmental Quality (Emission) Guideline (NEQG) for industrial zone and residential areas were shown in Table 5.6. When the project is started, the noise level should be monitored with these guidelines.



**Table 5. 5 Current Noise Level at Project Site**

Time	dB(A)	Day/Night
12:01:00-13:00:00	44.52	Day
13:01:00-14:00:00	43.48	Day
14:01:00-15:00:00	50.28	Day
15:01:00-16:00:00	53.93	Day
16:01:00-17:00:00	49.39	Day
17:01:00-18:00:00	39.23	Day
18:01:00-19:00:00	39.69	Day
19:01:00-20:00:00	39.06	Day
20:01:00-21:00:00	38.55	Day
21:01:00-22:00:00	38.59	Day
22:01:00-23:00:00	38.19	Night
23:01:00-00:00:00	38.31	Night
00:01:00-01:00:00	38.21	Night
01:01:00-02:00:00	37.75	Night
02:01:00-03:00:00	37.69	Night
03:01:00-04:00:00	37.64	Night



04:01:00-05:00:00	39.16	Night
05:01:00-06:00:00	43.59	Night
06:01:00-07:00:00	48.93	Night
07:01:00-08:00:00	50.25	Night
08:01:00-09:00:00	46.84	Day
09:01:00-10:00:00	53.56	Day
10:01:00-11:00:00	48.34	Day
11:01:00-12:00:00	53.43	Day

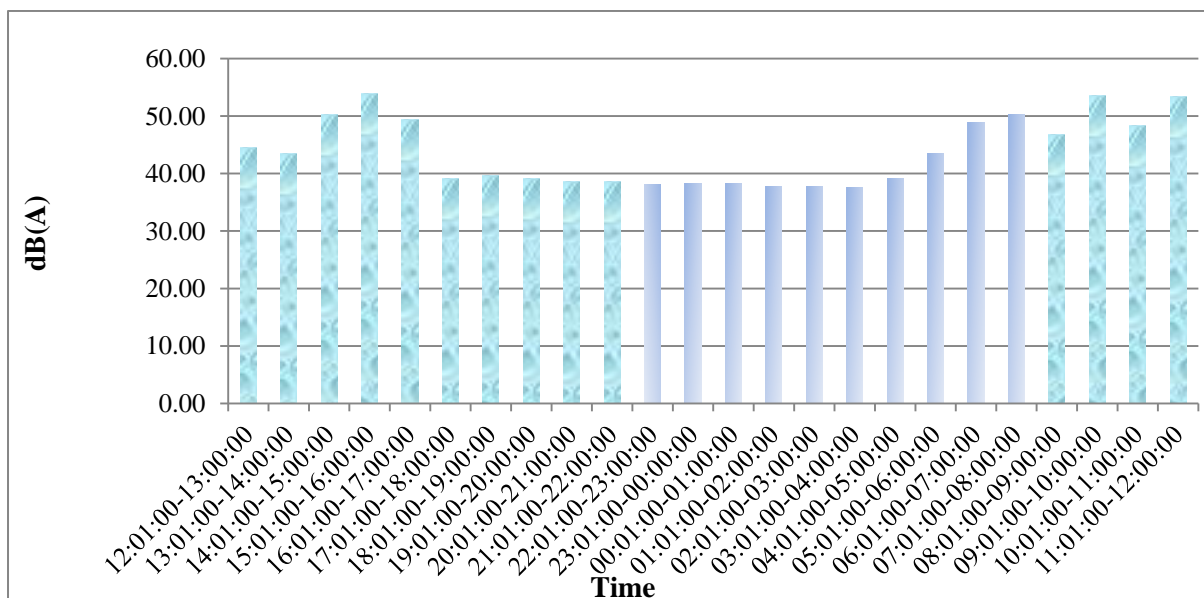


Figure 5. 4 Noise Level Measuring at the project site



**Figure 5. 5 Noise Level Meter**

**Table 5. 6 Noise Level Guidelines for Sources**

Receptor	Day Time 07:00-22:00	Night 22:00-07:00
Residential; institutional; Educational	55	45
Industrial; commercial	70	70

*(Source: International Finance Corporation, 2013)*

According to the baseline data, the noise level measured at the parameter of the proposed project area found to be with the range of NEQG standards. It is found that the noise level in day time is higher than the noise level in night time. This can be concluded as the high level of noise during day time is coming out from the vehicle movement from the Keng Tung – Mong Ping highway road. However, these noise levels cannot affect the health of the people as there are no villages close to the project site. The current noise level condition of the project area cannot affect the health of the workers at the factory area according to the maximum and minimum noise levels measured for 24 hours in the project site. Specialize description of occupational health and safety will be provided in the impact assessment in chapter 6.

### 5.3 Topography

The topography of the Mong Ping Town is mountain ranges and the slope are rolling in some places and steep in some places. A lot of mountains are present around the Mong Ping Town and it is situated at the elevation of 1,518 ft. The highest hill in the Mong Ping is Lwoi Se hill with the height of 7,329 ft. Mong Ping Township sharing boundaries with Mong Khat Township in the Northeast, Mhat Hman Township in the Northwest, Than Lwin river and Lwoi Lin District in the west, Mong Tone Township in the Southwest, Mong Hsat Township in the Southeast and Keng Tung Township in the East.

### 5.4 Economic Component

Mong Ping Township is least economic developing township which is one of the townships located in Shan State. The major livelihood of the local people in the township is agriculture and major products are dry green tea leaves and Yagae that are sent to Keng Tung for trade.

**Table 5. 7 Land Use Area (Acre)**

Sr.	Type of Land	Area (Acre)
1	Net Agricultural Land	29012
2	Fellow Land	72
3	Pasture Land	-
4	Industrial Land	-
5	Urban Land	387
6	Village Land	2289
7	Non Cultivated Area	626
8	Reserved/ Protected Public Forest	347416



9	Virgin Forest	168374
10	Vacant Land	360117
11	Uncultivated Land	584727
	Total	1492395

(Source: Mong Ping Township Data, 2015)

**Transportation:** The main mode of transportation within the project area is by road. Major roads in the township are Keng Tung – Mong Ping highway road.

## 5.5 Cultural and Visual Components

The inspection teams from Settlement and Land Recorded Department and Forest Department visited to the proposed project area and give the comments and recommendation.

Comments from Department of Land Acquisition and Statistics

(a) Location and Area

NampPeain Hydropower Project –Hydropower house is about 3 mile distance from Mong Ping and consist of 3.50 Ac.

Ma Pa Nya (Map Index) - 93-O/3 (A-O-928824, B-O-929823, C-O-928822, and D-O-927823

(b) Land Type

The proposed area is ‘Vacant Land’ and this area was found that there is no cultivation of crops.

(c) Tenant and occupation

It is found that there is no farmers working on the proposed area and so no one possesses this land.

(d) Is there Existing Operation or not

There is no existing operation running on the proposed area.

(e) Under Reserved/ Protected Public Forest or not

The proposed area is not belonging to the Reserved/ Protected Public Forest.

(f) Lapping of working block or not





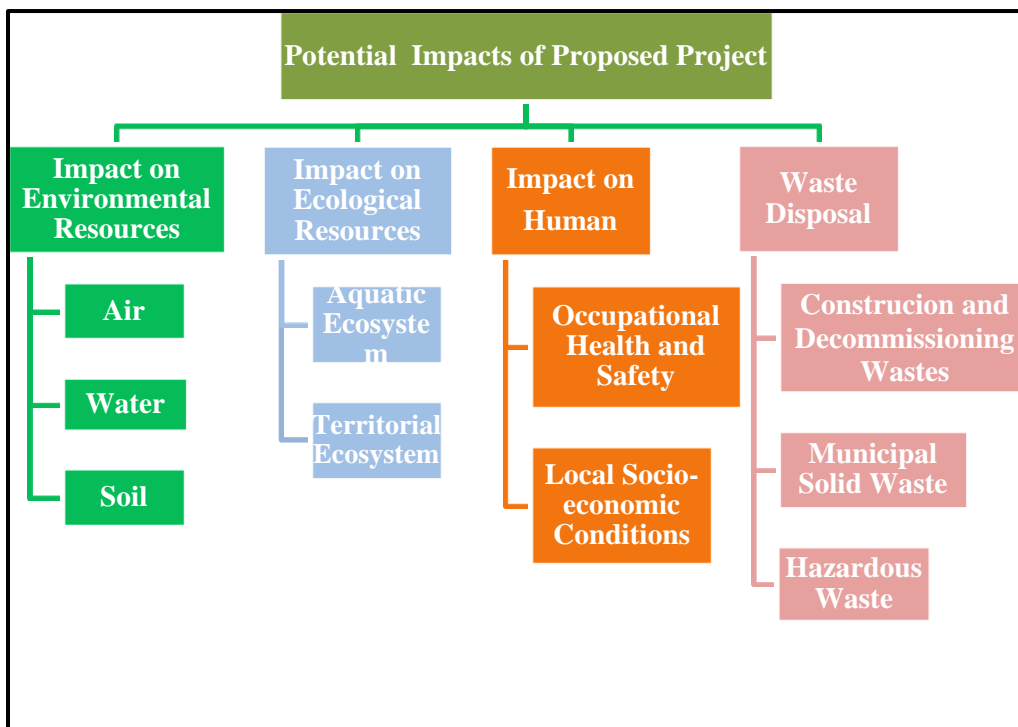
There is no private company and/or organization which were previously applied for this proposed area for other purposes, so this area is not lapping working blocks.

And recommendation from Forest Department is that the proposed project of Namp-Peain Hydropower Project is included under neither Reserved Forest nor Protected Public Forest category (i.e., not under forest area of the Mong Ping Township). Thus, there are no cultural components near and at the project site.

## 6. Impact Assessment, and Mitigation Measures

The local environment in terms of physical, biological and socio-economic aspects can be changed due to the development of the proposed project. The impacts generated by this project are both positive and negative. Based on the analysis of environmental baseline data and activities that are to be performed by the proposed project, the possible environmental impacts are identified. Most of the identified impacts have been quantified to the extent possible on the value judgment. Each of the environmental issues has been examined in terms of their current conditions, likely impacts during construction, operation and decommissioning phases. The impacts on the environment from various activities of the project can be categorized as follows:

### 6.1 Impact Assessment Methodology and Approach



In order to assess the impacts of the proposed project, the method developed by Institute of Environmental Management and Assessment (IEMA) from United Kingdom is slightly modified. According to this method, the impacts are categorized into two groups: environmental impact and business impact. Then the criteria are designed under the impact group. Three criteria such as **Severity, Occurrence and Level of Control** are defined for environmental impact. Similarly, **Legal Compliance, and Stakeholder Complaint** are the criteria for business impact. Each criterion has three levels of weighting ranging from 1 to 3.

Impacts, criteria and weightings are mentioned in Table 6.1. Individual project activity causing the impacts is considered as per the above procedure. Finally, overall score for impact of individual project activity is obtained by multiplication of weighting of each respective criterion. The value of overall score ranges from 1 to 243 as shown in Table 6.2 and the largest range 183-243 shows that the whole process of the project activity must be redesigned and considered to plan again.

**Table 6. 1 Impact and Criteria for Assessment of Significance**

No.	Description	Criteria	Indicators	Weighting		
				1	2	3
1	Environmental Impact	Severity	Toxicity	low	Medium	High
			Quantity	small	Average	Large
			Impact on man and environment	low	Medium	High
		Occurrence	Period	Annual or never occurred	Monthly or weekly frequency	Daily frequency or chronicle
		Level of Control	Detection	easy	Medium	No
			Precaution	important	Average	No
2	Business Impact	Legal Compliance	Regulatory Control	for existing legislation	for near future (impending or amending legislation)	No
		Stakeholder Complaint	Objection	no	Potential	serious

**Overall Score = Weighting of (Severity \* Occurrence \* Level of Control \* Legal Compliance \***

**Stakeholder Complaint)**

**Severity (S)**

This criterion is used to evaluate the effects on man and environment, depending on the toxicity, quantity and impact of the activities.

<b>Weighting</b>	<b>Description</b>
1	Low severity: low toxicity, low quantity, low impact on man and environment
2	Medium severity: medium toxicity, averaged quantity, low effect on environment
3	High severity: high toxicity, very important quantity, high impact on environment

**Occurrence (O)**

This criterion is corresponding to the frequency of the impact occurrence.

<b>Weighting</b>	<b>Description</b>
1	Low: Annual frequency or never occurred
2	Medium: Monthly or Weekly Frequency
3	High: Daily frequency or chronicle

**Level of Control (C)**

This criterion is used to evaluate the level of control of the aspect, depending on the detection, available means, the operating procedures and the precautions taken.



Weighting	Description
1	High, easy detection and control with operating procedures regularly checked and/or important precautions taken to lower impact
2	Medium detection and control with operation procedures not regularly checked and/or average precautions taken to lower impact
3	No control, no detection and/or no precaution taken to lower impact

### Legal Compliance

Weighting	Description
1	Subject to be existing regulatory controls (local, international and company regulations)
2	Subject to regulatory control in the near future (Impending or amending legislation within the next 5 years)
3	No regulatory control

### Complaint from Stakeholders

Weighting	Description
1	No complaint
2	Potential to a cause of serious complaint
3	Complaint raised by partners, neighbors, customers, employees and communities

**Table 6. 2 Significance of Impact**

Score	Significance of Impact	Significance Description
1 – 60	Low	No significant impact
61 – 121	Moderate	Low impact, try to improve
122 – 182	High	Significant impact, real necessity to improve
183 – 243	Very High	Unsustainable situations

## 6.2 Identification of Impacts and Its Mitigation Measures

### *(a) Impact on Air and mitigation measure*

Emission of air pollutants can occur with the activities relating to Construction phase, Operation Phase and Decommissioning Phase of the proposed project. The air pollutants include dust and gases. During construction phase, dusts can generate from the construction activities such as construction of access roads, buildings and other facilities and vehicles movement for transportation of materials, equipment and workers and also from the earth excavation works and the gaseous emission from various kinds of operation involving machineries and equipment as well as open burning of solid wastes, burning of vegetation debris.

In addition, similar to construction phase, negative impacts on surrounding air quality such as emissions of dust particles, CO<sub>2</sub> and SO<sub>2</sub> could be expected during the decommissioning or dismantling phase of the proposed project.

However, these impacts are controllable and can be reduced to minimum level by using environment friendly design, new machines, equipment and vehicles, and impact control/reduction techniques, regular maintenance of the machines. In order to reduce gaseous emission from the burning of vegetables and bamboos, segregation should be done such as combustible leaves, twigs and small branches and stem or weeds, creepers and climbers and



bamboos. The bamboos, big branches, beams and beams should not be burn and must be used in local for any purposes. Land fill should be adopted instead of burning if possible.

***(b) Impact on Noise and Vibration and Mitigation Measure***

During the construction phase, major sources of noise generation could be from vehicles used for transportation of construction materials. The noise generation could also be arisen from the operation of other construction machineries and equipment such as backhoe, dozer, compactor, cutter, welder and trucks. Noise can be generated from the iron-rebar. Another noise source will be come from operation of the generator (125 kVA) and the operation concrete mixers. The sources for vibration will be the same source as the noise.

These impacts can be minimized by using selected low-noise equipment and generator, avoiding works of heavy equipment during night time, preparation of temporary accommodation in silent place for sensitive receptors and informing the construction schedule to surrounding communities to obtain their consensus. But all these impacts are not last longer as the construction time is limited (38 months)and limited to the site.

In the operation phase, the primary sources of noise level will be from the operation of 3 sets of turbine generators and also from the running water in the penstock and channel. This impact can be mitigated by using low-noise type and noise barrier if possible. Another source will be from transport vehicles for required materials and goods, maintenance of the machineries and also from emergency generator.

During the decommissioning phase, just like construction phase, heavy vehicles, machinery and equipment used for dismantling and transportation of demolished materials could affect the noise level of the area.

***(c) Impact on Soil and Mitigation Measure***

The permanent land required for the facilities for the hydropower electricity generation project from the Namp-Peain stream will be 7.4 acres and the temporary land used will be 2 acres. There will be an access bridge near the powerhouse. So, the land use change will be occurred.

During construction and demolition, erosion, degradation and loss of topsoil can be occurred due to removal of vegetation cover and compaction of soil, working activities, exposed roads



and open areas. The removal of vegetation covers and its roots for the purpose of constructing buildings can reduce the stability of the soil and it may lead to land slide and soil erosion especially in raining season. The total soil waste volume will be came out from the proposed project's earth excavation work is estimated 32,000 m<sup>3</sup> in volume. The machines to be used are crane, truck, concrete mixer and backhoe. The accidental spillage during fuel transfer, fuel refueling, and fuel storage is another sources to soil contamination. The leakage of waste water from maintenance of machineries and equipment is one the sources for soil contamination. The oil spill absorbent equipment, adequate secondary containment and oil and grease separator are needed. In order to reduce soil degradation, soil erosion due to the implementation of proposed project, the feasible study for soil stability should be carried out before the project is started. The chosen channel alignment and selected locations of the facilities must be the least impact to the soil. To mitigate the landslide, the retaining wall must construct along the channel at the necessary places and re-plantation of tree along the channel.

During the operation phase, land contamination will be occurred when transferring and refilling of the fuel to the machines. In order to mitigate these impacts, secondary containment should be taken into account. The employees will use the toilet facilities. There may a number of toilets during the operation phase. Septic tank system will be used, but cautions should be undertaken as there is likely to contaminate the soil due to overload of the sewage system. In order to mitigate this, regular inspection should be done and regular pump out should be carried out after bacterial treatment for digestion of the sludge.

#### ***(d) Impact on Water and Mitigation Measure***

In the phases of construction and demolition, the turbidity of the stream may be increased as the construction site is close to the stream, it means all of the construction activities for diversion weir, intake structure, long opened channel, forebay tank and hydropower plant's buildings will be parallel along the stream. The soil wastes due to excavation works can increase the turbidity rate of the stream. To minimize these impacts, tarpaulin cover or bamboo mats cover should be used during the excavating works to ensure that excavate waste does not reach the stream. The constructions of the bridge, transportation of machineries and equipment across the stream, transportation of workers and excavation waste can affect the quality of the water in the stream. However the impact can be negligible. The other activities such as sand dredging and quarrying can impact to increase the turbidity of





the stream. However the time of the extraction is short term only during construction phase and so there will be no severe environmental impact on the stream.

The accidental spillage of oil and grease can be occurred due to careless transportation and refueling of fuel. This impact can be minimized by using leak proof containment and paving the floor at the handling areas and installation of secondary containments. During rainy periods, wastewater generated can contain oil and grease from vehicles and machines. These contaminations shall be reduced by avoiding earth work in the rainy season, discharging wastewater into existing stream.

The main source of water supply for the project during primary stage construction phase will be stream for domestic use and purified drinking water for cooking and drinking. After completing some part of construction, a tube well will be dig. In the operation phase, the same source of water will be used.

During operation, surface and ground water can be contaminated by waste spills in waste storage area, oil spills and leaks from vehicles and spillage of sludge from the septic tank. This can be treated by bacterial dozing before pump out. Regular inspection and cleaning, oil traps and adequate cover for all waste storage areas can decrease these contaminations.

#### ***(e) Ecological/ Biological Resources***

The proposed Namp-Peain hydropower project is not include under any protected public forests or reserved forest or wildlife sanctuary. The nearest protected public forest is Naung-Cho protected forest. The proposed project and the Naung-Cho Protected Forest are divided by the Kyine Tone – MongPaing highway road. Although proposed project is not include in the protected forest, secondary data for fauna and flora were collected to get the baseline condition of the proposed project area.

Although, some valuable woody tree species and pine species are found in the Mong Ping Township, most plant species found in the project areas are bamboos, shrubs, herbs and grasses. The site inspection and the information received from the Forest Department concluded that the proposed project area is located at the vacant land, with no commercial valuable woody tree species. As the proposed project will extract required sand and stones from the stream, there may some impacts to the stream flow rate, stream course and or habitat and growth of the microorganisms like benthos. The secondary data recorded for fish,

amphibian, reptile, bird, mammal, and plants species are listed below. These secondary data are referred from inventory list of Forest Department (2013) and Township Data (2014) and also from the interview with local people and observation result during site reconnaissance.

**Table 6. 3 List of Fish Species recorded in Namp-Peain Stream**

Sr. No.	Scientific name	Common name	Family	IUCN Status
1	<i>Channa striata</i>	Striped snake head	Channidae	LC
2	<i>Channa orientalis</i>	Snake head	Channidae	LC
3	<i>Clarias batrachus</i>	Walking catfish	Claridae	LC
4	<i>Botia berdmorei</i>	Loach	Cobitidae	LC
5	<i>Notopterus notopterus</i>	Featherback	Notopteridae	LC
6	<i>Mystus cavasius</i>	Catfish	Bagridae	LC
7	<i>Mystus aaculatus</i>	Catfish	Bagridae	LC
8	<i>Mystus vittatus</i>	Catfish	Bagridae	LC
9	<i>Bargarius bargarius</i>	Catfish	Sisoridae	LC

**Table 6. 4 List of Amphibian Species recorded near the Namp-Peain Stream**

Sr. No.	Scientific name	Common name	Family	IUCN Status
1	<i>Rana limnocharis</i>	Paddy frog	Ranidae	LC
2	<i>Polypedates leucomystax</i>	Common Tree frog	Rhacophoridae	LC
3	<i>Bufo melanostictus</i>	Common toad	Bufoidea	LC
4	<i>Kalouallata pulchra</i>	Painted bull frog	Microhylidae	LC

**Table 6. 5 List of Reptile Species Recorded in the Mong Ping Township**

Sr. No.	Scientific name	Common name	Family	IUCN Status
1	<i>Najakaouthia</i>	Monocellate cobra	Elapidae	LC
2	<i>Ptyaskorros</i>	Indo-chinese rat snake	Colubridae	LC
3	<i>Amphiesmastolata</i>	Striped keelback	Colubridae	LC
4	<i>Calotesversicolor</i>	Garden fence lizard	Agamidae	LC
5	<i>Calotesemma</i>	Tree dwelling lizard	Agamidae	LC
6	<i>Gekko gekko</i>	Tokay Gecko	Gekkonidae	LC

**Table 6. 6 List of Mammal species recorded in the Mong Ping Township**

Sr. No.	Scientific name	Common name	Family	IUCN status
1	<i>Niviventerfulvscens</i>	White belleyed rat	Muridae	LC
2	<i>Callosciuruspygerithrus</i>	Gray squirrel	Sciuridae	LC
3	<i>Callosiurusfinlaysoni</i>	Red squirrel	Sciuridae	LC

*Note: LC – Least concern*

**Table 6. 7 List of Bird Species recorded in the Mong Ping Township**

Sr. No.	Scientific name	Common Name	Family	IUCN Status
1	<i>Ardecola bacchus</i>	Chinese pond-heron	Ardeidae	LC



Sr. No.	Scientific name	Common Name	Family	IUCN Status
2	<i>Egretta gazetta</i>	Little Egret	Ardeidae	LC
3	<i>Vanellus indicus</i>	Red-wattled Lapwing	Vanellidae	LC
4	<i>Phalacro coraxniger</i>	Little Cormorant	Phalacrocoracidae	LC
5	<i>Milvus migrans</i>	Black kite	Falconidae	LC
6	<i>Accipiter badius</i>	Shikra	Falconidae	LC
7	<i>Streptopelia Chinensis</i>	Spotted Dove	Colmbidae	LC
8	<i>Streptopelia decaocto</i>	Eurasian Collared Dove	Colmbidae	LC
9	<i>Oriolus Chinensis</i>	Black- naped Oriole	Oriolidae	LC
10	<i>Halcyon smyrnensis</i>	White- throated Kingfisher	Alcedinidae	LC
11	<i>Halcyon pileata</i>	Black-capped Kingfisher	Alcadinidae	LC
12	<i>Dicrurus macrocerus</i>	Black Drongo	Dicruridae	LC
13	<i>Lanius cristatus</i>	Brown Shrike	Laniidae	LC
14	<i>Lonchura punctulata</i>	Scaly-breasted Munia	Laniidae	LC
15	<i>Pyconotus jocosus</i>	Red-Whiskered BulBul	Pycnontidae	LC
16	<i>Pyconotus cafer</i>	Red-Vented BulBul	Pycnontidae	LC
17	<i>Acridotheres tristis</i>	Common Myna	Sturnidae	LC
18	<i>Sturnia malabarica</i>	Chestnut-tailed starling	Sturnidae	LC

Sr. No.	Scientific name	Common Name	Family	IUCN Status
19	<i>Aegithina tiphia</i>	Common Iora	Aegithidae	LC
20	<i>Prinia flaxiventris</i>	Plain prinia	Cisticolidae	LC
21	<i>Copsychus saularis</i>	Oriental Magpie-Robin	Saxicolidae	LC
22	<i>Ficedula albicilla</i>	Taiga flycatcher	Muscicapidae	LC
23	<i>Rhipidura aureola</i>	White-browed Fantail	Rhipiduridae	LC
24	<i>Orthotomus sutorius</i>	Common Tailorbird	Sylviidae	LC
25	<i>Passer domesticus</i>	House Sparrow	Passeridae	LC
26	<i>Passer montanus</i>	Eurasian Tree-sparrow	Passeridae	LC
27	<i>Delichon dasypus</i>	Asian House-Martin	Hirundinidae	LC
28	<i>Hirundo rustica</i>	Barn Sallow	Hirundinidae	LC
29	<i>Corvus splendens</i>	House Crow	Corvidae:corvinae	LC

Note:LC – Least Concern

**Table 6. 8 List of Butterfly species recorded in the Mong Ping Township**

Sr.No.	Scientific name	Common name	Family	Abundance status
1	<i>Catopsiliapomonapomona</i>	lemon emigrant	Pieridae	Common
2	<i>Hypolinas misippus</i>	Danaid Eggfly	Nymphalidae	Common
3	<i>Phalantaphalanta</i>	Common Leopard	Nymphalidae	Common
4	<i>Melanitis phedimaganapati</i>	Dark Evening Brown	Satyridae	Common

Sr.No.	Scientific name	Common name	Family	Abundance status
5	<i>Lethe duradura</i>	Scarce Lilacfork	Satyridae	Uncommon
6	<i>Ypthimasavara</i>	No common names	Satyridae	Uncommon
7	<i>Ypthimaavanta</i>	Jewel Fourring	Satyridae	Common
8	<i>Mycalesisperseusblasius</i>	Common Bushbrown	Satyridae	Common
9	<i>Castaliusrosimon</i>	Common Pierrot	Lycaenidae	Widespread

**Table 6. 9 List of flora species recorded in the Mong Ping Township**

Sr. No.	Scientific Name	Local Name	Family	Habit
1	<i>Tectonagrandis</i>	Kyun	Verbenaceae	T
2	<i>Shoreasiamensis</i>	Ingyin	Eurhorbiaceae	T
3	<i>Pterocarpusmacrocarpus</i>	Padauk	Papilionaceae	T
4	<i>Shoreaoblongifolia</i>	Thitya	Dipterocarpaceae	T
5	<i>Quercusserrate</i>	Thit-e	Fagaceae	T
6	<i>Chebulasp.</i>	Panga	Combretaceae	T
7	<i>Pinuskhasyasp.</i>	Tin-shu	Pinaceae	T
8	<i>Grandiflorasp.</i>	La-pan	Apocynaceae	T
9	<i>Sauropusalbicans</i>	Ma-kaw	Euphorbiaceae	T
11	<i>Purpureasp.</i>	Swedaw	Caesalpinaceae	T

Sr. No.	Scientific Name	Local Name	Family	Habit
12	<i>Oliveri Gamble</i>	Tabauk	Papilionaceae	T
13	<i>Speciosalegistomea</i>	Pyinma	Lythraceae	T
14	<i>Bellerica</i> sp.	Thit-sein	Combretaceae	T
15	<i>Mangiferacaloneura</i>	Taw-thayet	Anacardiaceae	T
16	<i>Swintonia floribunda</i>	Taung-thayet	Anacardiaceae	T
17	<i>Juglansregia</i>	Thit-kya	Urticaceae	T
18	<i>Dalbergiapaniculata</i>	Ta-pauk	Fabaceae	T
19	<i>Haplophragmasp.</i>	Phet-than	Bignoniaceae	T
20	<i>Lanneacoromandelica</i>	Nabe	Anacardiaceae	T
21	<i>Grewiahirsute</i>	Tayawgyi	Tillaceae	T
22	<i>Ziziphusoenoplia</i>	Taw-Zee	Rhamnaceae	T
23	<i>Suaveolenssp.</i>	Kywema-gyolein	Bignoniaceae	T
24	<i>Ziziphusoenoplia</i>	Paungbet	Rhamnaceae	S
25	<i>Melicopesp.</i>	Thi-pyu	Rutaceae	S
26	<i>Capparisglauca</i>	Kaukkwe	Capparaceae	S
27	<i>Atylosiascarabaeoides</i>	Pe-new	Fabaceae	H
28	<i>Commelinabenghalensis</i>	Wetkyut	Commelinaceae	H

Sr. No.	Scientific Name	Local Name	Family	Habit
29	<i>Ficushispida</i>	Kha-aung	Moraceae	ST
30	<i>Brideliasp.</i>	Seik-chay	Euphorbiaceae	ST
31	<i>Tinospracordifolia</i>	Sindonmanwe	Menispermaceae	Cl
32	<i>Angustiafoliumvahl.</i>	Taw sepal	Oleaceae	Cl
33	<i>Combretumacuminatum</i>	Nabu new	Combretaceae	Cl
34	<i>Grandiflorasp.</i>	La-pan	Apocynaceae	C
35	<i>HamiltoniiNees</i>	Wabo-myetsangye	Graminae	G
36	<i>Bambusabambos</i>	Kyaket-wa	Graminae	G
37	<i>Bambusalongispiculata</i>	Tabindaing-wa	Graminae	G
38	<i>longispathussp.</i>	Wanet	Graminae	G
39	<i>Pettusasp.</i>	Padaw-phyu	Gremineae	G
40	<i>Caricosussp.</i>	Padaw-ni	Gremineae	G
41	<i>Eleusineaeegyptiaca</i>	Myet lay gwa	Gremineae	G
42	<i>Camus Rottboelliastrata</i>	Khaingmyet	Gremineae	G

Note: T- Tree, ST-Street Tree, S-Shrub, H-Herb, Cl-Climber, C-Creeper, G-Gress

### Impact on Aquatic Ecology

The fish species found in this area are highly survival and not necessary to migrate for reproduction. This species can also struggle for the change of the waterway as well as these



species are described as least concern in IUCN red list. Although the diversion weir is constructed and allocate water from the stream to the channel, it will not take all the water from the stream and 10% to 20% of the stream water will discharge to the downstream for the survival of aquatic organisms. Sand dredging and quarrying may lead to have some impact on aquatic organisms due to the turbidity of the stream. However, these activities will occur only short time during construction phase. There will be no severe impact on aquatic ecology.

**(f) Impact on Human**

**Health and Safety**

During the construction phase, risk of accidents, slip and fall, fire and electric shock will cause health and safety impacts of the workers. Health and Safety Coordinator shall be appointed in order to control these potential impacts. Moreover, in order to minimize these impacts, Personal Protective Equipment (PPE) such as safety gloves, boots, belts, masks, helmet, goggles, ear-mufflers etc., should be provided and cautions should be taken, particularly in the sensitive areas. Personal protective equipment will be provided during construction, operation and demolition phases. Site fencing and safety signage will be done both Myanmar and local languages in construction of the proposed project. For the safety of construction staff, adequate safety measures including availability of first aid facilities are implemented on the project site.









**Figure 6. 1 Safety Signage for Construction Site**

Occupational health impacts can occur due to noise, lighting activities and also accidental injuries. Mitigation can be performed by providing caution signage in the relevant area. There may also fire risk in adjacent with the burning of vegetation cover during construction phase.

Thus the Mega Myanmar should be arranged the training to workers who will operate firing the removal so as to burn the removals and not to reach the fire to the residential areas. Moreover, a fire safety plan should be drawn and workers must follow guidelines for fire safety of the factory. The risk of fire can be reduced by installation of sufficient numbers of fire extinguishers: especially at the construction area, in the warehouse, in the fuel storage room, at the generator house and at the exit of the powerhouse main building. It is also planned to construct fire line along the powerhouse boundary for the protection of fire as the proposed project is located on the vacant land. Water in the forebay tank is also meant for firefighting. Fire drills should also be done once a month. The proposed project should also arrange training of workers for firefighting for emergency cases. Emergency exit doors, fire alarm systems, signage of directions for evacuation routes and emergency contact numbers should be well placed in case of fire.

Table 6. 10 Personal Protective Equipment (PPE) and Functions

Part of Body to be protected	Required PPE	Functions of PPE	Features and characteristics of PPE
Eyes and face	Protective Goggles	Protection from dust, particles, flying chips while cutting or grinding, and smoke	
Head	Hat	Protection from electric shock and burns and temperatures and	
Hand and arm	Gloves	Protection from skin absorption of harmful substances, severe cuts, severe abrasions, punctures, chemical burns, irritating materials, thermal burns, harmful temperature extremes and electric shock	

<b>Foot</b>	Safety Footwear	Protection from falling objects, slips, electric shock and burns	
<b>Body</b>	Protective work clothing (vests, jackets, aprons, coveralls, rain-coats, reflective clothing, and etc.)	Prevention of cuts, electric shock and burns, chemical burns, and temperature extremes	
<b>Hearing</b>	Earplugs and Ear muffs	Protection from high noise levels	

(Source; [www.hse.gov.uk](http://www.hse.gov.uk))

During the operation, potential health risk of the proposed project may introduce infectious diseases such as AIDS, sexual transmitted diseases, malaria and another new infectious diseases from immigrant workers not only to the workers working at the factory but also to the local communities as well. Mitigation measures should be taken by arranging knowledge enhancement program to improve health status of local people and employees through preventive actions and provide adequate health facilities and health awareness trainings should be done very frequently. Employers must provide adequate and appropriate welfare facilities for their employees in the workplace. Based on the Labor Law of the country, proponent will set up employees' welfare plan including leave and the followings:

Mess building

If necessary, mess building should be constructed for employees. It should be provided with adequate tables, desks and soaps.

Knowledge Improvement

A library should be established in order to improve knowledge of employees and training should be arranged to improve their quality.



### Risk Prevention

Evacuation plan in case of emergency will be drafted and explained to all employees for in case of emergency such as earthquake, fire and other disasters. All employees must follow existing Laws.

### **Socio-economic Impacts**

Most of the impacts on socio-economic environment may be positive. The development of Mong Ping Township will be obvious not only in social standards but also in economic section as the project will generate electricity and distribute to the whole city. Eventually it may lead to the economic growth at local and regional level. Implementation of the proposed project may create temporary employment for the duration of construction and demolition phases and permanent jobs in the operational phase. There is one activity that is floating bamboo raft along the stream by the local people at the time of full water in the stream, especially during end of rainy season and winter season. However the time of floating raft is limited because during rainy season the flow of the stream is rough and during summer seas there is less water in the stream. The proponent will arrange transportation route near the diversion weir to carry by motorcycle or car. The other one is the time of construction for diversion weir and the rafting will not be coincide because the rafting time is rainy and winter season but the construction time is summer season. Then during operation phase, the floating raft can pass through the overflow of diversion weir. The negotiation with the communities and proponent should be carried out for the floating period.

### **(g) Waste Disposal**

#### **Wastes from Construction Activities**

Construction wastes may include un-used concretes, useless concretes and masonry materials, mixed debris with high gypsum, plaster, metal scrap, plastics, glass and wood scrap. The mitigation measures to reduce and control of wastes disposal, due to the construction activities should be conducted with the appropriate methods not to over use of construction materials. Health and safety procedures should be followed according to the regulatory requirements. The system of three Rs should be priority adopted. If some materials that are no needed much should be reduced in order to minimize the waste generation and some types of waste should be reused, and some recycled.



Excavation (soil) wastes generating and wastes of vegetation removals will be occurred during construction phase. These wastes should be systematically disposed of whether it will be cut and fill and for vegetation waste it is recommended to compost. During transportation, these wastes should be packed or enclosed or not over load on the truck so that not to fall any wastes along the way to dispose site.

### Non-hazardous Waste

During construction, waste coming from site should be properly segregated and collected in rubbish bins or containers. Waste from toilets should be collected in septic tanks and disposed of treated with bacterial dozing.

In the operation phase, septic tanks will be used to manage sanitary waste generated from over 30 employees and staff. There will be 5 water closets for common use. The guidelines of Health and Safety Executive (UK), an executive non-departmental public body, have recommended the minimum numbers of toilets that should be provided for workers as shown in Table 6.11. According to that guideline, the toilets provided by the project proponent are enough for the workers. For gender, toilets rooms should be marked with simple signage. Toilet rooms must have an adequate exhaust ventilation system and lighting system. Toilet areas should be cleaned daily with a disinfectant cleaner not to induce accidental slip and fall. There should be toilet tissue, washing soap and towel in each toilet room.

**Table 6. 11 Number of toilets should be provided to the Workers**

No. of Worker or residents of each gender	Minimum no. of water closets	Minimum no. of sink
<b>1 – 15</b>	1	1
<b>16 – 35</b>	2	2
<b>36 – 36</b>	3	3
<b>56 – 80</b>	4	4
<b>81 – 110</b>	5	5

111 -150	6	6
> 150	**	**

(source; [www.hse.gov.uk](http://www.hse.gov.uk))

The waste generating from decommissioning phase will be mostly the same with the construction phase and the mitigation measures should be adopted as the same. If the building will be dismantled, the debris getting from the activities should be disposed of by properly.

### Hazardous Waste

During construction and decommissioning phase, hazardous wastes can include paint, electronic waste, cement waste, packaging waste, metal and wooden wastes etc. These wastes should be managed through proper management including wastes collection, waste segregation, and proper waste disposal.

## 6.3 Environmental Impact and Significance

The project activities, their impacts and significance of impacts are provided in Table 6.12 in detail. According to results of analysis, it can be concluded as most of the project activities show no or low significance impacts on environment while some show moderate significance which needs to improve for environmental performance and some show high significance.

**Table 6. 12 Project Activities and Significance of Their Impacts**

Significance of activities	Construction Phase	Operation Phase	Decommissioning Phase
Low	10	7	4
Moderate	3	1	0
High	0	0	0



Very High	0	0	0
Positive	1	1	1
Total	14	9	5

**Table 6. 13 Project Activities, Impacts and its Significance**

No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
<b>A</b>	<b>Construction Phase</b>									
1	Access Road construction	Dust, noise, vibration, disposal of solid waste, accidents, loss of top soil, increase turbidity.	Air pollution, noise pollution, nuisance, soil degradation, water pollution, landslide, injury	2	2	2	1	2	16	Low
2	Main building (power house) and Facilities construction	Dust, noise, vibration, disposal of solid waste, accidents, loss of top soil, increase turbidity	Air pollution, noise pollution, nuisance, soil degradation, water pollution, landslide, injury	3	2	2	1	2	24	Low
3	Bridge construction	Dust, noise, vibration, disposal of solid waste, accidents, increase turbidity	Air pollution, noise pollution, nuisance, water pollution, landslide, injury	3	1	2	2	2	24	Low



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
4	Vehicles Movement for transportation of heavy Machineries, Equipment, Workers and wastes	Dust, noise, vibration, emission, fuel leakage, accidents, traffic congestion, increase turbidity.	Air pollution, noise pollution, nuisance, water pollution, soil contamination, injury	3	2	3	2	2	72	Moderate
5	Operation of Construction Machineries and equipment	Noise, vibration, fuel leakage, dust, emission, accident	Air pollution, noise pollution, nuisance, water pollution, soil contamination, injury	3	3	2	1	2	36	Low
6	Removing of Vegetation Covers and its roots	Vegetation Waste, soil exposure, dust, loss of top soil, increase turbidity	Soil Degradation, soil erosion, Habitat loss, Air pollution, lost aesthetic view, ecosystem change, water pollution, soil erosion	3	3	2	2	2	72	Moderate
7	Storage of Construction Materials	Percolation through the soil	Soil contamination	2	2	2	1	2	16	Low



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
8	Penstock Installation	Noise, iron dust	Nuisance, soil contamination	2	2	2	1	2	16	Low
9	Excavation (civil) Work	Dust, Noise, vibration, disposal of solid waste, loss of top soil	Air pollution, water pollution, soil degradation, erosion and landslide	3	2	2	1	2	24	Low
10	Accidental spillage, leakage while storage, transportation and refueling	Fuel leakage, fire	Soil pollution, water pollution, fire hazard	2	2	1	2	2	16	Low
11	Sand Dredging and Quarrying	Aquatic ecosystem, increase turbidity, sedimentation	Change waterway and flow rate, Habitat loss for aquatic ecosystem, Water pollution	3	2	3	2	2	108	Moderate
12	Labor onsite	Accidents	Injury/ mortality	2	3	2	2	2	48	Low



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
13	Construction of Diversion Weir	Increase turbidity, economic	Water Pollution, socioeconomic impact to the bamboo rafters	2	1	2	2	3	24	Low
14	Temporary employment	Job opportunities for local people	Positive impact	x	x	x	x	x	x	Positive
<b>B</b>	<b>Operation Phase</b>									
1	Operation of 3 set of turbines	Noise, Accidents, shock, explosive, fire	Nuisance, Hand injury, mortality, fire hazard	3	3	2	2	1	36	Low
2	Operation of emergency generator	Noise, vibration, fuel leakage, emission, accident	Nuisance, Air pollution, noise pollution, soil contamination, injury	3	1	2	2	1	12	Low
3	Waste from Maintenance	Effluent, rubbishes, accident	Nuisance, Soil Contamination, Water Pollution, injury	2	2	3	3	1	36	Low



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
4	Non-hazardous waste	Leakage and spillage of sludge, improper disposal	Soil Contamination, Water pollution, Air pollution	2	1	3	2	2	24	Low
5	Storage, Refueling and transportation of fuel	Fuel leakage	Soil Contamination, water pollution	3	2	2	2	1	24	Low
6	Vehicles movement for transportation of required goods to power house and workers	Dust, Noise, emission, fuel spill, Accident,	Air Pollution, Soil pollution, water pollution, injury	2	2	2	2	1	16	Low
7	Sediment exclusion to the normal stream	Mass dispose at the bank, increase turbidity	Water pollution, blocking the stream	3	2	3	2	1	36	Low
8	Diversion the water flow	Decrease flow rate and water level at original watercourse, temperature, increase in flux rate	Downstream Impact, Aquatic Ecosystem impact, socioeconomic impact	3	3	2	2	3	108	Moderate



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
9	Project Implementation	Business opportunities, growth of Economic and regional development	Positive	x	x	x	x	x	X	Positive
<b>C</b>	<b>Decommissioning Phase</b>									
1	Decommissioning of Building	Dust, emission, demolished wastes and materials	Air pollution, water pollution, nuisance, noise pollution, loss of aesthesis feature, soil contamination	3	1	2	2	2	24	Low
2	Transportation and disposal of demolished material and waste and wastes from labor onsite	Dust, emission, demolished wastes and materials, fuel leakage, municipal waste and sludge	Air pollution, water pollution, soil contamination, water pollution	3	3	2	2	1	36	Low
3	Operation of dismantling machines	Noise, fuel leakage	Noise Pollution, nuisance, soil and water pollutions	3	2	2	2	1	24	Low
4	Workers and staff	Accidents	Injury or mortality	3	2	2	2	1	24	Low



No.	Project Activities	Aspect of Risks	Impacts	Severity	Occurrence	Control	Compliance	Complaint	Result Score	Significances
5	Temporary employment	Job opportunities	Positive impact	x	x	x	x	x	x	Positive



## **7. Environmental Management Plan**

The Environmental Management Plan (EMP) prepared for the proposed project covers the anticipated impacts that may generate in the future of the proposed project, mitigation measures, management and monitoring plan during each of the phases;

- (a) Construction Phase
- (b) Operation Phase
- (c) Decommissioning Phase

The detail EMP based on the project activities is seen in Table 7.1 and the monitoring plan based on the environmental concerns is in Table 7.2



**Table 7. 1 Environmental Management Plan (EMP)**

Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
<b>A Construction Phase</b>									
1	Access Road construction	Air pollution, noise pollution, nuisance, soil degradation, water pollution, landslide, injury	Use modernize and good engine machines and maintenance should be done carefully, make ensure the cut soil not more than the required size, pave the road after construction, use tarpaulin or bamboo mats in order not to fall the cut soil into the soil, retaining wall should be considered if necessary, provide PPEs for the worker onsite	Contractor and Mega Myanmar Energy	500	Low	Regular Checking the machine and inspection to the site	Once a week	Mega Myanmar Energy and HSE Team





Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
2	Main building and Facilities construction	Air pollution, noise pollution, nuisance, soil degradation, water pollution, landslide, injury	Use modernize and good engine machines and carefully maintain, foundation and other basement should be firmly anchorage, retaining wall or should be taken into account, provide PPEs for workers onsite	Contractor and Mega Myanmar Energy	400	Low	Inspection to the Contraction Site	Once a week	Mega Myanmar Energy and HSE team
3	Bridge construction	Air pollution, noise pollution, nuisance, water pollution, landslide, injury	Should be done Soil baring capacity test, retaining wall should be installed, Provide PPEs to onsite workers.	Contractor and Mega Myanmar Energy	200	Low	Regular checking the project site and stream	Once a week	Mega Myanmar Energy and HSE team
4	Vehicles Movement for transportation of Heavy	Air pollution, noise pollution, nuisance, water pollution, soil contamination,	Use modernize and good engine machines and maintenance should be done frequently, inform date and	Contractor and Mega Myanmar Energy	400	Low	Regular checking the project site and check the	Monthly	Mega Myanmar Energy and HSE team



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
	Machineries, Equipment, Workers and wastes	injury	time for the movement heavy machineries to the local communities, follow the rule of the road and notice its capacity, avoid working heavy machineries during night time, provide PPEs onsite workers.				machineries		
5	Operation of Machineries and equipment	Air pollution, noise pollution, nuisance, water pollution, soil contamination, injury	Use modernize and good engine machines, regular maintenance to the engine should be done, avoid working heavy machineries during night time, notification sign boards should be placed at the working places.	Contractor and Mega Myanmar Energy	400	Low	Regular checking the machineries and inspection the project site	Monthly	Mega Myanmar Energy
6	Removing of Vegetation	Soil Degradation, soil erosion, Habitat	Make sure the required area of the land including trees have to	Contractor and Mega	300	Low	Regular inspection of	Every day check	HSE



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
	Covers and its roots	loss, Air pollution, Loss aesthetic view, ecosystem change, water pollution, soil erosion	be cut in order not to over cut of the trees, retaining walls should be taken into account if needed, fast growing trees of the native species should be replanted after construction phase, some big trees must left if possible. Segregation of leaves, twigs, poles and bamboo should be done, usable poles and bamboo should be used in other applications. cut vegetable should be decomposed.	Myanmar Energy			the cutting area	up during cutting times	Team
7	Storage of Construction Materials	Soil contamination	Paved the ground of the storage area or leak proof underneath should be placed.	Contractor	150	Low	Regular checking to the storage area	Monthly	HSE Team



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
8	Iron Rebar	Nuisance, soil contamination	Separate the working area Paved the ground of the working area with leak proof materials	Contractor	150	Low	Regular checking the working area	Monthly	HSE Team
9	Excavation (civil) Work	Air pollution, water pollution, soil degradation	Avoid during rainy season, make sure the working area not to over cut off the soil, use tarpaulin or bamboo mats in order to save the cut soil falling to the stream, notification sign boards should be placed, should be carry out soil barring capacity test, landscape should be taking in to consider after construction phase. Waste from excavation work should be cut and fill in	Contractor and Mega Myanmar Energy	500	Low	Regular checking the project site	Monthly	Mega Myanmar Energy and HSE team



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
			required area.						
10	Accidental spillage, leakage while storage, transportation and refueling	Soil pollution, water pollution, fire hazard	Applied secondary containments, paved the floor to be impermeable. Provide sufficient amount of fire extinguishers at the storage area, taking care during refueling	Mega Myanmar Energy and Contractor	300	Low	Regular checking the storage area	Monthly	HSE Team
11	Sand Dragging and Quarrying	Change waterway and flow rate, Habitat loss for aquatic ecosystem, Water pollution	Avoid extraction sand and stone at the same place for long time. Avoid extraction close to the banks so as to avoid changing of water way. Record existing amount the sand and stone sediments and make sure not to over exploitation	Contractor	400	Low	Regular check the extraction area	Once a week	HSE Team



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
12	Labor on site	Soil pollution, water pollution, injury, water consumption	Provide PPEs, application of temporary toilets, separate septic tanks, application of the best construction practices, providing first aid facilities, site fencing and safety signboards	Contractor	300	Low	Regular inspection of the labor	Twice a year	Mega Myanmar Energy, HSE Team
13	Construction of Diversion Weir	Water Pollution, socioeconomic impact to the bamboo rafters	Rafting should be allowed to float half size of the stream at the diversion weir construction area during construction times. However, it is seldom to rafting during construction phase due to summer season. After construction phase, the raft should be allow to float by overflow water.	Mega Myanmar Company Limited	300	Low	Regular inspect to the construction area and ensure the flow of water	Once in construction time	HSE Team and Mega Myanmar Energy Company Limited



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
14	Temporary employment	Positive impact							
<b>B Operation Phase</b>									
1	Operation of 3 set of turbines	Nuisance, Hand injury, mortality, fire hazard	Noise proof type should be applied, provide PPEs and notice sign boards should be placed at dangerous places, sufficient number of fire extinguisher should be kept, Training should be arranged for the workers and cautions should be labeled	Mega Myanmar Energy	500	Low	Regular check to the turbine	Twice a year	HSE Team and Mega Myanmar Energy
2	Operation of emergency generator	Nuisance, Air pollution, noise pollution, soil contamination,	Use silent type generator, place in a separate room, pave the floor to be impervious, taking	Mega Myanmar Energy	100	Low	Regular check the generator	Twice a year	HSE Team and Mega Myanmar Energy



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
		injury	care during refueling.						
3	Waste from Maintenance of machineries	Nuisance, Soil Contamination, Water Pollution, injury	Pave the floor of the maintenance area, Install oil and grease separator for the waste water	Mega Myanmar Energy	150	Low	Regular check the maintenance area	Twice a year	HSE Team and Mega Myanmar Energy
4	Non-hazardous waste	Soil Contamination, Water pollution, Air pollution	Regular pump out of the sludge, disposed of properly	Mega Myanmar Energy	100	Low	Regular check the septic tank	Twice a year	HSE Team
5	Storage, Refueling and transportation of fuel	Soil Contamination, water pollution, fire hazard	Pave the floor of the storage areas, secondary containments, taking careful while refueling, tightly close the tank while transport, install sufficient amount of fire extinguishers	Mega Myanmar Energy	200				HSE Team and Mega Myanmar Energy
6	Vehicles movement for	Air Pollution, Soil pollution, water	Give training to the driver, obey the guidelines of driving	Mega Myanmar	100	Low	Regular check the	Twice	HSE Team and





Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
	transportation of required goods to power house and workers	pollution, injury	(safety first) and road. give information about the project to the local people	Energy			vehicles	a year	Mega Myanmar Energy
7	Sediment exclusion to the normal stream	Water pollution	Avoid excluding mass sedimentation directly to the normal stream	Mega Myanmar Energy	No more cost	Low	Regular check the sluice	During heavy raining season	HSE Team
8	Diversion the water flow	Downstream Impact, Aquatic Ecosystem impact, socioeconomic impact	Water should be released continuously to the downstream for the survival of aquatic organisms. Make sure that the level of water to be left at the downstream area especially in during the summer season. As ROR type, it will not take all the stream's water and should be left 20% or 10%. Bamboo raft should be allow to pass	Mega Myanmar Energy	300	Low	Regular Check the downstream area	During Summer	HSE Team and Mega Myanmar



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
			over the diversion weir.						
9	Project Implementation	Positive							
<b>C</b>	<b>Decommissioning phase</b>								
1	Decommissioning of Building	Air pollution, water pollution, nuisance, noise pollution, loss of aesthesis feature, soil contamination	Spraying water over designated the working area, installation of temporary cover to control of dust. Keep temporary noise barriers. Provide protective wears to workers.	Contractor and Mega Myanmar Energy	150	Low	Regular check the demolished area	Daily	HSE Team
2	Transportation and disposal of demolished material and	Air pollution, water pollution, soil contamination, water	Usage of vehicles having efficient engines & exhaust system, installation of	Contractor and Mega Myanmar	250	Low	Regular checking the waste generation	Monthly	HSE Team



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
	waste and wastes from labor onsite	pollution	temporary cover and adopted waste segregating system for reuse and recycle wastes.	Energy			area and waste transfer note		
3	Operation of dismantling machines	Noise Pollution, nuisance, soil and water pollutions	Used of machines & equipment having efficient engines. Used frequently maintained exhaust system. Applied properly designed noise control system for equipment.	Contractor and Mega Myanmar Energy	200	Low	Regular check the machineries	Monthly	HSE Team and Mega Myanmar Energy
4	Workers and staff	Injury or mortality	Adopt proper demolishing management system in order to reduce accidents. Use of personal protective equipment relating to demolishing (belt, safety boots, gloves, helmet, mask and coverall), providing first aid facilities.	Contractor and Mega Myanmar Energy	400	Low	Regular inspect	Monthly	



Item	Activities	Potential Environmental Impact	Mitigation and Enhancement				Monitoring		
			Measures	Responsible party	Estimated cost (000) MMK	Residual Impact	Type	Frequency	Responsible party
5	Temporary employment	Positive							

**Table 7.2 Environmental Monitoring Plan**

Item	Environmental Concerns	Parameters	Frequency	Locations	Estimated Cost (MMK) (000)	Responsible Party
<b>A</b>	<b>Construction Phase</b>					
1	Ambient air quality	PM <sub>10</sub> , PM <sub>2.5</sub> , CO, CO <sub>2</sub> , NO <sub>2</sub> , SO <sub>2</sub> , VOC	Annually	One point on construction site	200	HSE Team, Mega Myanmar Energy



Item	Environmental Concerns	Parameters	Frequency	Locations	Estimated Cost (MMK) (000)	Responsible Party
2	Noise level and vibration	Equivalent noise and vibration level dB(A)	Annually	At major construction area	300	HSE Team, Mega Myanmar Energy
3	Water Quality	Colour, Turbidity, Total Hardness, Biological Oxygen Demand (BOD), Suspended Solid, Oil and Grease, Arsenic	Twice a year	Surface downstream water of the Namp-Peain Stream	300	HSE Team, Mega Myanmar Energy
<b>B</b>	<b>Operation Phase</b>					
1	Ambient air quality	PM <sub>10</sub> , PM <sub>2.5</sub> , CO, CO <sub>2</sub> , NO <sub>2</sub> , SO <sub>2</sub> , VOC	Twice a Year	One points in project area	200	HSE Team, Mega Myanmar Energy
3	Noise level and vibration	Equivalent noise level dB(A)	Twice a Year	One point at the entrance of the factory (receptor)	300	HSE Team, Mega Myanmar Energy



Item	Environmental Concerns	Parameters	Frequency	Locations	Estimated Cost (MMK) (000)	Responsible Party
4	Water quality	pH, Colour, Turbidity, Biological Oxygen Demand (BOD), Total Dissolved Oxygen and Total Suspended Solid (SS) and temperature	Once in rainy season	Tube well	200	HSE Team, Mega Myanmar Energy
6	Tail water	Colour, Turbidity, Total Hardness, Biological Oxygen Demand (BOD), Electro conductivity (EC), Temperature, pH	Twice a month	At the tail race pond	200	HSE Team, Mega Myanmar Energy
<b>C</b>	<b>Decommissioning Phase</b>					
1	Ambient air quality	PM <sub>10</sub> , PM <sub>2.5</sub> , CO, CO <sub>2</sub> , NO <sub>2</sub> , SO <sub>2</sub> , VOC, O <sub>3</sub>	Once	One point on site	400	HSE Team, Mega Myanmar Energy
2	Noise level and vibration	Equivalent noise and vibration level dB(A)	Once	One point on site	300	HSE Team, Mega Myanmar Energy



## 7.1 Institutional Arrangement and Responsibility of HSE Team

The development and implementation of the proposed electricity generation from Namp-Peain Stream will be managed by Mega Myanmar Energy Company Limited. A Health, Safety and Environment (HSE) Coordinator and assistants for Health, Safety and Environment (HSE) issues should be appointed throughout the lifespan of the project. HSE coordinator is responsible for implementation and monitoring of Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMOP) as well as coordination with the construction company, local authorities, decommissioning company and also with the nearby communities. HSE Team also makes regular review of EMP to cover all potential impacts, improvement and modification in the operation and decommissioning phase of the proposed project.

## 7.2 Corporate Social Responsibility (CSR) Plan

The proposed project of Mega Myanmar Energy Company Limited will implement Corporate Social Responsibility (CSR) plan together with EMP during its operation period. The objective of this plan is to create social welfare of factory workers and local community. The project proponent will implement CSR plan by using 2% of net profit. CSR plan formulated for the proposed project can be seen in Table 7.3.

**Table 7. 3 Corporate Social Responsibility (CSR) Budget Plan**

No.	Activity	Timing
1	Development of Health Aspect	Annually
2	Development of Education Aspect	Annually
3	Regional Development activities and Natural Disaster Protection Program	Annually
<b>Total</b>		<b>(2% of Net profit)</b>



## 8. Public Consultation and Disclosure.

### 8.1 Importance of Public Consultation and Information Disclosure

The opinions of the local people, social organizations and stakeholders affected by the development of the proposed project have been taken into account in this IEE. The public consultation indicated the transparency of IEE proponents to the local people. Consultation meetings were held with people affected by the project, administrative, community based and social organizations. The results getting from the consultations meeting and negotiations with environmentally and socially of the affected people were taken into consideration in evaluation of impacts, design of mitigation measures and monitoring plans. Negotiation with related governmental organizations was also done.

All feedbacks from public consultation meetings were well addressed and considered in the formulation of EMP, environmental monitoring plan and CSR plan.

### 8.2 Objectives, Invitation and Participation

Public consultation and information disclosure concerning with the Initial Environmental Examination (IEE) for generation of electricity for the Mong Ping Township proposed by Mega Myanmar Energy Company Limited was held on 28<sup>th</sup> January, 2016 at hall of General Administrative Department (Mong Ping). The objective of the meeting is to disclose the findings including the baseline environmental data of project site and existing socio-economic condition of local people, and potential impacts of project activities and mitigation measures and, to receive public's opinions and recommendations and feedbacks on the proposed project. The proponent invited the stakeholders via invitation cards. The invitation list and the participants list will be seen in appendix. The number of participants attending the meeting is briefly shown in table below.

No.	Category	Number of Participant
1	Government Officials	12





2	Private Company	3
3	Local People	52
4	NGOs/INGOs/ POs	18
Total		85

### 8.3 Event of the Meeting

The meeting was held according to the following agenda.

1. Opening of the meeting
2. Opening speech by the Township Administrative Officer, Mong Ping Township
3. Introduction of the proposed project by U Zaw Min, Managing Director, Mega Myanmar Energy Company Limited for Construction and Generation of Electricity with Build-Own-Operate (BOO) system
4. Presentation of Initial Environmental Examination by Daw Yinn Mar Swe Hlaing, Senior Consultant, E Guard Environmental Services Co., Ltd.
5. Exchange Opinions by the attendees
6. Closing remarks by U Zaw Min, Managing Director, Mega Myanmar Energy Company Limited
7. Closing of the meeting

According to Agenda described above, the opening of meeting was announced and then,

**Opening Speech:** Township Administrative Officer, Mong Ping Township greeting all attendees and he told the objectives of today's ceremony. Then he explained that the implementation of this project is important for the development of our township. Then local people involvements are also play in importance role to implement this project. We have to thank to the proponent as he implement this project. Detail information concerning with project



implementation and environmental impacts will be explained by the responsible persons of the relative departments. If all local communities may involve for implementation of the project, the project can be smoothly done and will be fulfill the requirement of the electricity without any difficulties.

**Briefly Explain about the Project Description:** U Zaw Min, Managing Director, Mega Myanmar Energy Company Limited greeted all attendees and introduced the summary of the proposed project. He continued to explain that the project would be implemented under the Environmental Conversation Law and other relevant laws. He requested the stakeholders to give comments and suggestions on project implementation.

Then, Daw Yinn Mar Swe Hlaing, Senior Consultant, Director of E Guard Environmental Services Co., Ltd., made a presentation to disclose the following information of the project to the public.

1. Project Description
2. Required Facilities for the Project
3. Project Alternatives Selections
4. Required resources for the project
5. Study Team for IEE and Authorized Institution
6. Objectives of the Public Consultation
7. Objectives of IEE
8. Current situations of the Project
9. Potential Environmental Impacts and Significance
10. Environmental Management Plan (EMP)
11. Emergency Response Plan
12. Corporate Social Responsible (CSR)
13. Recommendation

She also pointed out that environmental management and monitoring plans are formulated based on the existing conditions, measured data and according to the phases of the project and thus those plan might be modified within the investment period or in future.



**Question no. (1):** U Sai Ai Twae, villager form Hta Naung Village (7 mile) said that there is bamboo rafting activity along the stream. And he want to know that the activity will be burned or not if the project will be implemented?

**Answer no. (1):** Daw Yinn Mar Swe Hlaing, Senior Consultant from E Guard Environmental Services answered that we will consider the current socioeconomic condition of the local people. If the socioeconomic condition will be affected by the proposed project, the proponent have to address and have to discuss with the communities to have no or least affect on the socioeconomic condition. Then U Zaw Min, Managing Director from Mega Myanmar Energy Company continue explained that during construction phase, the raft can be floated up to the diversion weir and there may be an access road then the villagers can transport via road. After diversion weir the villagers can use the stream again. However the construction phase will be during dry season. Then after construction phase, villager can use the stream at the place of diversion weir by the over flow water. But there is nothing concern with our company if the Forest Department taking action with the Forest Law.

**Question no. (2):** U Sai Ai Twae, villager form Hta Naung Village (7 mile) asked how about the flood water will reach to the farmland?

**Answer no. (2):** U Zaw Min, Managing Director from Mega Myanmar Energy Company Limited answered that we will not construct big dam and we can create required head race with diversion weir. So the water cannot be reached to the farmland. Then there is no farmland along the channel.

**Question no. (3):** U Sai Ai Twae, villager form Hta Naung Village (7 mile) how about the impacts of flooding to above villages (Yan Kham village)?

**Answer no. (3):** U Zaw Min, Managing Director from Mega Myanmar Energy Company Limited answered that there will not affect to the above villages due to the nature of proposed project.

**Question no. (4):** U SaiOhnPhay, Chairman, Township Development Committee asked that will use all the water from both streams of Namp-Leain and Namp-Peain?



**Answer no. (4):U Zaw Min, Managing Director** from Mega Myanmar Energy Company Limited answered that we will not use all the water from the streams, we will left some amount (the water level should have) of water in the downstream area.

Finally **U Zaw Min, Managing Director** from Mega Myanmar Energy Company Limited made a closing remark and thanks everyone who attended that meeting for public consultation and information disclosure.

After closing remark, the meeting was closing and successfully accomplished.



## **9. Conclusion and Recommendation**

### **9.1 Conclusion**

This study was meant for the formulation of the Environmental Management Plan (EMP) by studying Initial Environmental Examination (IEE) for the Namp-Peain Hydropower project proposed by Mega Myanmar Energy Company Limited. Primary data collection such as onsite measured results: surface water quality (Namp-Peain Stream water), air quality (NO<sub>2</sub>, SO<sub>2</sub>, CO<sub>2</sub>, CO) and noise and laboratory results for surface water quality (Namp-Peain Stream water) and secondary data collection for socioeconomic condition, biodiversity condition and weather condition were analyzed to determine the environmental and social impacts. As per analyzed data, it was observed that there are not only positive impacts or negative impacts during project's construction, operation and decommissioning phases.

According to the results of the data analyzing, the air quality indicated that NO<sub>2</sub> and SO<sub>2</sub> qualities are lie in the range of NEQG standards while that of CO<sub>2</sub> line in the American Conference of Governmental Industrial Hygienists (ACGIH) guideline. Then the noise level measured and water quality measured are also lie in the NEQG standards. The water quality result getting from the Laboratory are also in the range of NEQG standards.

The modified method of Institute of Environmental Management and Assessment (IEMA) from United Kingdom is used to assess the significance of the impacts. As per the results of analysis, most of the project activities have low significance impacts and positive significance on the environment and a few have moderate significance impacts on the environment which have to improve for environmental performance. The good point is there is no high or very high significance impacts on the environment. There are concerning with land slide and soil erosion due to excavation works and removing of the vegetation covers and roots. Both activities should be carefully carried out and taken into account the impact on the environment.

The Environmental Management Plan (EMP) covering the anticipated impacts, mitigation measures, management and monitoring plan during all phases should be implemented. Besides of EMP, Corporate Social Responsibility (CSR) plan will be performed annually by the project proponent for the sake of employees and local community. These plan should be accomplished by Health, Safety and Environmental (HSE) Team of the Mega Myanmar Energy Company



Limited and the team should be review EMP regularly to cover all potential impacts, improvements and modification.

## 9.2 Recommendation

The following recommendations have been made for efficient and effective implementation of EMP.

- ♣ Provide relevant Personal Protective Equipment (PPEs) for the workers during all phase of the project
- ♣ Keep acceptable level of water at the downstream before water released from the tailrace
- ♣ Avoid extracting sand and stone at the same place for a long time
- ♣ Make sure not to over cut the vegetation and its roots more than enough
- ♣ Soil excavation work should be done before rainy season so as to control soil erosion to and land slide
- ♣ Use tarpaulin and/or bamboo mats along the excavation area in order to save soil waste falling to the stream and control the turbidity of the stream due to excavation work
- ♣ Avoid operating heavy machines at night time
- ♣ Apply secondary containments or pave the floor with leak proof materials at the fuel storage area not to soil contamination
- ♣ Use proper dispose method of soil waste such landfill at the lowland area
- ♣ Segregate vegetation waste such as poles, post, bamboo can be reused and other twigs, leaves, climbers, creepers can be burned or should be landfill for fertilizer if possible
- ♣ Label and caution should be tagged at the dangerous places
- ♣ Provide sufficient amount of fire extinguishers and develop firefighting plan
- ♣ Construct Retaining Wall in necessary places to prevent landslide
- ♣ Training programs should be done for the workers and staff for firefighting and environmental awareness to meet the environmental performance
- ♣ Environmental Management Plan should be modified according to the feedbacks obtained and lessons learned from the monitoring and current process
- ♣ Plant fast growing tree species after construction period
- ♣ Corporate Social Responsibly (CSR) Plan should be implement annually



# Appendixes



**Appendix I – Check List for IEE**

**INITIAL ENVIRONMENTAL EXAMINATION (IEE) CHECKLIST**

**(Hydropower project- Generation of Electricity)**

This IEE Checklist has been prepared for Hydropower project- Generation of Electricity.

Read the questions carefully and write the required information on the blank spaces provided or otherwise check ( ✓ ) the appropriate boxes  or parenthesis ( ). Boxes with check marks () are automatically required. Use additional sheets if necessary and indicate this in the appropriate space.

**PROJECT FACT SHEET**

Project Name:	
Type of Project	
Type of Business	
Project Location: (Please kindly provide vicinity map/s and photographs of the project site and site development/layout plan.)	
Project Alternatives	
Geographic Coordinates of the project area	





Project Size Size of diversion weir Length of channel Size of forebay tank Length of penstock Size of power house	
Project Proponent:	
Office Address:	
Contact Person:	
Designation:	
Contact Number/s Fax Number: Mobile : E-mail Address:	

## PROJECT DESCRIPTION

### 1.1 PROJECT COMPONENTS

Facilities	No. of Units	Area (sq. m.) / Capacity	Specification/ Description / Remarks
------------	--------------	--------------------------	--------------------------------------



Facilities	No. of Units	Area (sq. m.) / Capacity	Specification/ Description / Remarks
Support Facilities Generators Warehouse Freezer/Temperature Control Area Boilers Transformer Others, specify _____ _____			Please kindly provide service area and its support facilities.
Admin support Canteen Office Mess Clinic Library Quarters Septic Tanks Others, specify _____ _____			
Water source/ supply (uses)			
Waste water management Facility			
Drainage system			



### MACHINERIES/EQUIPENT/FACILIGIES

Machineries/Equipment/Facilities	No of Units	Specification
Construction machineries Transportation Equipment (trucks etc) Others. .....		Please attached detail machinery lists.

### UTILITIES/REQUIREMENTS (Construction Phase):

Utilities	Source	Estimated Demand/Consumption
Water		Gallon /day
Source of water		
<input type="checkbox"/> ground water <input type="checkbox"/> well <input type="checkbox"/> spring <input type="checkbox"/> others: _____		
<input type="checkbox"/> Surface water <input type="checkbox"/> river <input type="checkbox"/> lake <input type="checkbox"/> others: _____		

### UTILITTIES/REQUIREMENTS (Operation Phase)

Utilities	Source	Estimated Demand/Consumption
Power/Electricity		KWh



Water		/day
Source of water		
<input type="checkbox"/> ground water <input type="checkbox"/> well <input type="checkbox"/> spring <input type="checkbox"/> others: _____		
<input type="checkbox"/> Surface water <input type="checkbox"/> river <input type="checkbox"/> lake <input type="checkbox"/> others: _____		

**MANPOWER**

*Please also provide Organization chart of company.*

Manpower Requirement	Expertise/Skills	Women	Men	Total
Number of construction workers				
Number of factory staff				
Numbers of office staff				
(Others)				
Total				

**TOTAL PROJECT INVESTMENT**

Estimated Total Project Cost:.....

Land	
Construction of the Facilities	



Equipment	
Access Road	
Water Supply	
Cash	
Others/Specify	
Total Project Investment	

#### CONSTRUCTION/ RENOVATION PROCESS/DEMOLITION PROCESS

Size of main building and type	
Size of subsidiary buildings and type	
Construction plans (please also provide with maps and photos)	
Company to be constructed, its reputation, compliance with environmental rules and regulations?	
Time frame for construction	
Construction Activities	Time Frame number of days)
Site Preparation and Clearing	
Excavation	
Construction of the diversion facilities	
Installation of Equipment	



Others ,please specify	
------------------------	--

### Operational Phase

Process/Technology Option	
Process Operation duration per day Power Generation per day Waste Management System	
Transmission Length of the transmission line? New or existing? If new, how many posts will be there? If existing, does renovation work require?	

### II Environmental Checklist for possible impacts

Possible Environmental/ Social Impacts	Baseline Environment
LAND	
Consistency with land use	Current land use w/in 1km radius (as per zoning ordinance): Residential



Possible Environmental/ Social Impacts	Baseline Environment
	Commercial/ Institutional Industrial Agricultural/ Recreational Protected Areas Others, specify _____
Disturbance to wildlife due to vegetation clearing Threat to existence of important local species Threat to abundance ,frequency and distribution of important species	Existing vegetation in the area: Forestland Marshland Grassland Mangrove Wetland Others, specify _____
Change in surface landform/ topography/ terrain/slope Soil Erosion (Please provide soil investigation Report including soil quality assessment and its erosion potential)	Slope: flat (0-3%) gently sloping to rolling (3-18%) steep (>18%)
Experience with land slide	Frequent Every 5 year



Possible Environmental/ Social Impacts	Baseline Environment
	Last 5 year Every 10 year Last 10 Year Never been Other specify.....
Soil/Land contamination due to improper solid waste disposal	Existing soil type in the area: sandy clay sandy-loam Others, specify _____
Increased siltation due to project activities  Water quality degradation  Others, specify _____	Specify nearest/receiving water body: _____  Distance to nearest/receiving water body: 0 to less than 0.5 km 0.5 to 1 km More than 1 km  Current Water Use: Fishery Tourist Zone / Park Recreational





Possible Environmental/ Social Impacts	Baseline Environment
	<p>Drinking/Domestic</p> <p>Agricultural</p> <p>Other</p> <p>Distance of project area to the nearest well used:</p> <p>0 to less than 0.5 km</p> <p>0.5 to 1 km</p> <p>More than 1 km</p> <p>Use of the nearest well:</p> <p>Drinking/Domestic</p> <p>Livestock</p> <p>Agricultural</p>
<p>Competition in water use</p> <p>Depletion of water resources</p>	<p>Size of population using receiving surface water:</p> <p>≤ 1,000 persons</p> <p>&gt;1,000 and ≤ 5,000persons</p> <p>&gt;5,000person</p> <p>Available/nearest water source.</p> <p>Deep well</p> <p>Surface water</p> <p>Others, specify</p>



Possible Environmental/ Social Impacts	Baseline Environment
	_____
<p>Occurrence of flooding</p> <p>Is the project site located in an area identified as flood prone area?</p> <p>Yes</p> <p>No</p>	<p>Occurrence of Drought</p> <p>Is the project site located in an area identified as drought area?</p> <p>Yes</p> <p>No</p>
<b>AIR / NOISE</b>	
<p>Air quality degradation</p>	<p>Distance to nearest community:</p> <p>0 to less than 0.5 km</p> <p>0.5 to 1 km</p> <p>More than 1 km</p>
<p>Emission to air</p> <p>Dust Emission</p>	<p>Emission throughout process</p> <p>Emissions from machines and equipment</p> <p>Emission from raw materials</p> <p>Other possible emissions</p> <p>Is there any preventive measures to control air emissions</p>
<p>Change in local climate such as temperature changes and rainfall pattern</p> <p>Global warming potential</p>	<p>Please provide monthly average rainfall data of the proposed project area.</p>



Possible Environmental/ Social Impacts	Baseline Environment
<p>Noise generation</p> <p>(Pleas provide if there any control measures)</p>	<p>Major sources of Noise (please specify)</p> <p>1.</p> <p>2.</p> <p>3.</p> <p>4</p> <p>.....</p>
<p>Nuisance due to noise generation</p>	<p>Distance to nearest community:</p> <p>0 to less than 0.5 km</p> <p>0.5 to 1 km</p> <p>More than 1 km</p>
<p>Hydrology/Hydrogeology</p>	
<p>Change in drainage system</p> <p>Change in river, stream ,lake water depth</p> <p>Reduction in stream volumetric flow</p> <p>Inducement of flooding</p>	<p>Please provide the following hydro- geological information.</p> <p>Drainage System of Proposed area</p> <p>Regional hydro geological map</p> <p>Mean Monthly flow data of affected stream or river (if applicable)</p> <p>Flood or drought history of proposed project area ,its surrounding and downstream affected areas</p>



Possible Environmental/ Social Impacts	Baseline Environment
Ground water pollution Stream water pollution Lake water Pollution Marine water pollution	Identify specific source of possible pollution load and assimilative capacity of the receiving water body
Threat to fresh water ecology Threat to marine ecology Threat to abundance, frequency and distribution of aquatic species Loss of habitat	Is there any ecologically and economically important species around the proposed project area?
SOLID WASTE	
Potential source of waste generation          Volume of solid waste generated from current sources  Handling and disposal of hydropower related substances	Material handling waste  Glass waste  Oil , Spills and Lubricants  Furnace sludge (waste from furnace)  Others (Please specify) _____ -----



Possible Environmental/ Social Impacts	Baseline Environment
<b>PEOPLE</b>	
<p>Displacement of residents in the project site and within its vicinity</p> <p>Displacement of Indigenous People</p> <p>Enhanced employment and/or livelihood opportunities</p> <p>Reduced employment and/or livelihood opportunities</p> <p>Disruption/Competition in delivery of public services (e.g., education, peace and order, etc.)</p> <p>Enhanced delivery of public services (e.g., education, peace and order, etc.)</p> <p>Increase in traffic volume and worsening of traffic flow</p>	<p>Size of population of nearest resident:</p> <p>≤ 1,000 persons</p> <p>&gt;1,000 and ≤ 5,000persons</p> <p>&gt;5,000person</p> <p>Classification of project area:</p> <p>Urban</p> <p>Rural</p> <p>Available services within/near project site:</p> <p>Schools (e.g. elementary, high school, college)</p> <p>Health facilities (e.g., clinics, hospitals, etc.)</p>
<p>Impacts on community health and safety</p> <p>Common illness</p> <p>Respiratory illness</p> <p>Others, specify</p> <p>_____</p>	<p>Peace and order (e.g., police office.etc)</p> <p>Recreation and sports facilities</p> <p>Others, specify</p> <p>_____</p>



Possible Environmental/ Social Impacts	Baseline Environment
Please specify type and rate of occurrence :	
Local Benefits from the project  Affect on basic infrastructure (road, electricity etc.)  Risk disaster Management in case of Dam failure	Provide socioeconomic profile of affected community.  Please describe detail plan of disaster management plan in case of dam failure (Worst Case Scenario).

### 2.1. Pollution Control Devices

Pollution Control Devices	No of Units	Specification
Solid Waste Management  .....		
Hazardous Waste Management  .....		
Liquid Waste Management  Waste Water Treatment Plant  Septic/Sewage Treatment Plant  Oil/Grease Separator		Please kindly provide detail layout plan of waste water treatment plant if applicable.



Sedimentation Pond Others .....		
Gaseous and Noise Control Devices  .....		
Watershed Management Plan		Please provide watershed management plan in detail. (including restoration and re-vegetation plan )

**ABANDONMENT /DECOMMISSIONING/REHABILITATION POLICIES AND GENERIC GUIDELINES (if Applicable)**

Project Life or Service: \_\_\_\_\_ years

Provide description of the Abandonment activities, such as, dismantling and waste disposal.

Demolition Process (after expiry of the building life)	
Demolition plans	
Time frame for demolition	
Restoration plan (if applicable)	



#### IV. Other projects around the project site

Sand Dragging

Mining / Quarry

Gold finders along the creek

Other

#### V. Others requirements (soft copy)

Design of Water Treatment Plant

Construction design of the facilities

Detail maps to show location of the project site, Mong Pyin tsp, water bodies, transmission line, communities areas, cultural heritage areas etc.,.



### Appendix II – Area Photos of the Project Site



Proposed Diversion Weir Location



Proposed Power House Location

### Appendix III – Site Visit Photos



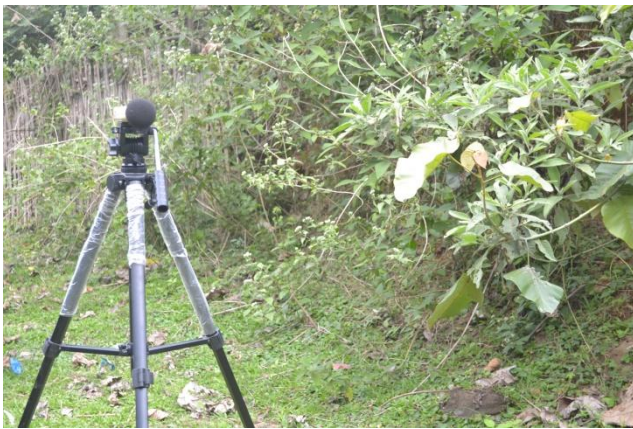
Inquarying about project with Proponet



Taking picture with Proponent



Site Investigation



Noise Level Measuring by Digital Sound Meter



Water Sample Collection



Onsite Water Quality Measuring



Current Composition of Vegetation at the Project Site



Current Composition of the Vegetation on the Project Site



Current Composition of the Vegetation on the Project Site



### Appendix IV – Laboratory Water Quality’s Result



Laboratory Technical Consultant: U Saw Christopher Maung  
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.  
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001  
Issue Date - 01-12-2012  
Effective Date - 01-12-2012  
Issue No - 1.0/Page 1 of 2

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#### WATER QUALITY TEST RESULTS FORM

Client E-Guard Environmental Services  
 Nature of Water Stream Water (1), နမ့်ပိန်းချောင်း  
 Location Mong Pyin Hydro Power Project  
 Date and Time of collection 13.12.2015  
 Date and Time of arrival at Laboratory 14.12.2015  
 Date and Time of commencing examination 15.12.2015  
 Date and Time of completing 20.12.2015

#### Results of Water Analysis

#### WHO Drinking Water Guideline (Geneva - 1993)

pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	92	mg/l as CaCO <sub>3</sub>	500 mg/l as CaCO <sub>3</sub>
Calcium Hardness		mg/l as CaCO <sub>3</sub>	
Magnesium Hardness		mg/l as CaCO <sub>3</sub>	
Total Alkalinity		mg/l as CaCO <sub>3</sub>	
Phenolphthalein Alkalinity		mg/l as CaCO <sub>3</sub>	
Carbonate (CaCO <sub>3</sub> )		mg/l as CaCO <sub>3</sub>	
Bicarbonate (HCO <sub>3</sub> )		mg/l as CaCO <sub>3</sub>	
Iron	0.21	mg/l	0.3 mg/l
Chloride (as CL)	2	mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO <sub>4</sub> )	12	mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	13	mg/l	
Dissolved Solids	94	mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate	0.06	mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature: Zaw Hein Oo

Name: Zaw Hein Oo  
B.Sc (Chemistry)  
Sr. Chemist

(a division of WEG Co.,Ltd.)

Approved by

Signature: Soe Thit

Name: Soe Thit  
B.Sc (Civil) 1980  
Technical Officer

ISO TECH Laboratory

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



Laboratory Technical Consultant: U Saw Christopher Maung  
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.  
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)



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**WATER QUALITY TEST RESULTS FORM**

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Location Mong Pyin Hydro Power Project  
Date and Time of collection 13.12.2015  
Date and Time of arrival at Laboratory 14.12.2015  
Date and Time of commencing examination 15.12.2015  
Date and Time of completing 20.12.2015

**Results of Water Analysis**

**WHO Drinking Water Guideline  
(Geneva - 1993)**

Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (N.NO <sub>3</sub> )	0.3	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH <sub>3</sub> )	0.14	mg/l	
Ammonium (NH <sub>4</sub> )		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	6	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

**Tested by**

Signature:   
Name: Zaw Hein Oo  
B.Sc (Chemistry)  
Sr. Chemist  
ISO TECH Laboratory

**Approved by**

Signature:   
Name: Soe Thit  
S.E (Civil) 1980  
Technical Officer,  
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.  
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



The Government of the Republic of the Union of Myanmar  
Ministry of Agriculture and Irrigation  
Department of Agriculture  
Plant Protection Division  
Pesticide Analytical Laboratory

E-mail: [ppmas.moai@mptmail.net.mm](mailto:ppmas.moai@mptmail.net.mm)

Tel : 640344, 644214, 644213,

Fax : 95-1-644019

CERTIFICATE OF HEAVY METAL ANALYSIS  
HM - 197/ 2015

Description of consignments / lot : Stream Water 1 (နမ့်ပိန်းချောင်း)  
Name of owner and address : E Guard Environmental Services Company Limited  
Original of sample : မိုင်းပြင်းမြို့နယ်၊ ရှမ်းပြည်နယ် အရှေ့ပိုင်းခရိုင်  
Designation of Sample : Stream Water 1 (နမ့်ပိန်းချောင်း)  
Laboratory registration No : HM- 197 / 2015  
The sample was taken by : E Guard Environmental Services Company Limited  
Date of sampling : 14-12-2015  
Place of Sampling : မိုင်းပြင်းမြို့နယ်၊ ရှမ်းပြည်နယ် အရှေ့ပိုင်းခရိုင်  
Date of analysis : 30-12-2015  
Remarks on the condition of the sample : Sample is packed in Plastic Bottle

**RESULTS:**


Herewith it is certified that the heavy metal content in the sample commodity (based on the samples submitted by E Guard Environmental Services Company Limited) are as follow;


Heavy Metal Contaminants	Laboratory Finding (ppm)	Maximum Permitted Level (ppm)
Chromium (Cr)	ND	0.36

**NB: The results are valid only for the quantities the sample represented.**

Date: 30- 12- 2015

Note: ND – Not Detected

  
.....  
(Analytical Chemist)  
Pesticide Analytical Laboratory  
Plant Protection Division  
Department of Agriculture  
Yangon, Myanmar

  
.....  
(Assistant Director)  
Head of Laboratory  
Pesticide Analytical Laboratory  
Plant Protection Division  
Department of Agriculture  
Yangon, Myanmar



Appendix V – Onsite Water Quality Result

**eGuard**  
ENVIRONMENTAL SERVICES

Form – EQ01      **WQ Baseline Sampling/Survey Field Notes**

Project : Mang Hlaing      Date : 10.12.2015      Time : 2:34 PM  
 Client : \_\_\_\_\_      Surveyor : \_\_\_\_\_  
 Lat 91°50'45.363 Long 99°09'19.113°  
 Elevation      m      ft      Location : \_\_\_\_\_  
 Distance from the R/L Bank      m      GPS Way Point no. : \_\_\_\_\_  
 Barometric Pressure      mm      Weather : Sun / Cloud / Light Wind

Sample ID: MTK 30

Surface/Ground/Effluent Water      Temp: 20 °C      End Time: \_\_\_\_\_

Sl.	pH	Electrical Conductivity			DO (ppm)	Flow Rate (m/sec)	Depth (m)	Remark
		EC (µS/cm)	TDS (ppm)	Salinity (ppt)				
	<u>8.64</u>	<u>802</u>	<u>212</u>	<u>0</u>	<u>1.8</u>			<u>(u = 0 L = 0 D = 0)</u>

Turbidity by Secchi Depth \_\_\_\_\_ cm. From chart below converted NTU = \_\_\_\_\_

**Length to Turbidity Conversion Chart**

cm	NTU	cm	NTU
< 5	> 240	31 to 34	21
6 to 7	240	34 to 36	19
7 to 8	185	36 to 39	17
8 to 9	150	39 to 41	15
9 to 10	120	41 to 44	14
10 to 12	100	44 to 46	13
12 to 14	84	46 to 48	12
14 to 16	60	48 to 51	11
16 to 18	48	51 to 54	10
18 to 21	40	54 to 57	9
21 to 24	35	57 to 60	8
24 to 26	30	60 to 70	7
26 to 29	27	70 to 85	6
29 to 31	24	> 85	< 5

**Notes:**  
 Aim of Sampling: Quality, Consistency, Representative Sample, Prevent Deterioration, Prevent Contamination  
 Suitable sampling techniques; Accurate field measurements; Transportation; Time;  
 Preparation:  
 Monitoring Schedule: Review previous field sheets; Equipment: \_\_\_\_\_





**Appendix VI – Tentative Invitation List and Invitation Letter**

စဉ်	ဧည့်သည်အဖွဲ့အစည်း	မှတ်ချက်
တ	ဌာနဆိုင်ရာ ထောက်ပံ့မှုများ	
၁။	လွှတ်တော်အမတ်	
၂။	ညွှန်ကြားရေးမှူးချုပ်၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ နေပြည်တော်။	
၃။	ဒေါက်တာ ဆန်ဦး၊ ညွှန်ကြားရေးမှူး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ နေပြည်တော်။	
၄။	ဒေါက်တာ စိန်မမ၊ ညွှန်ကြားရေးမှူး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ ရှမ်းပြည်နယ်။	
၅။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ သစ်တောဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၆။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ ကြေးမုံမြို့နယ်မြေစာရင်းဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၇။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ ဆည်မြောင်းဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၈။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ လျှပ်စစ်ဓါတ်အားပေးလုပ်ငန်း၊ မိုင်းပျဉ်းမြို့နယ်	
၉။	မြို့နယ်အုပ်ချုပ်ရေးမှူး၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၁၀။	ဥက္ကဋ္ဌ ဖွံ့ဖြိုးရေးအထောက်အကူပြုကော်မတီ၊ မိုင်းပျဉ်းမြို့နယ်။	
၁၁။	မြို့နယ်ကျန်းမာရေးမှူး၊ ကျန်းမာရေးဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်။	
၁၂။	နယ်စပ်ဒေသဖွံ့ဖြိုးရေး၊ မိုင်းပျဉ်းမြို့နယ်	
၁၃။	စခန်းမှူး၊ မြန်မာနိုင်ငံရိတ်ခွဲ၊ မိုင်းပျဉ်းမြို့နယ်	
၁၄။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ ဝိသေသဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၁၅။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ အလုပ်သမားဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၁၆။	ဦးစိုးမိုး/ ဒု-ဦးစိုးမိုး၊ လယ်ယာစိုက်ပျိုးရေးဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့နယ်	
၁၅။	မိုင်းပျဉ်းမြို့နယ်အတွင်းလုပ်ဆောင်လျှက်ရှိသော NGOများ -အမျိုးသားအဖွဲ့ -ဖိစင်းနှင်တားလေ့လာစာတတ်ရေးအဖွဲ့ -အခြား NGOများ	
ခ	စီမံကိန်းအနီးကျန်ရှိသောဆိုင်ရာအသိပညာပြင်ပများ -တက္ကသိုလ်များ -ရောင်းချ/ဆေးကုရေးဦးစီးဌာနများ -တက္ကသိုလ်/ တက္ကသိုလ်များ -အခြား စီမံကိန်းအား စိတ်ဝင်စားသူများ	

**ဧည့်သည်အဖွဲ့အစည်း**

ကျွန်တော်များ Mega Myanmar Energy Co., Ltd. အနေဖြင့် ၊ မိုင်းပျဉ်းမြို့နယ်အတွင်းရှိ နမ့်ပိန်းချောင်းနှင့် နမ့်လိန်ချောင်းရေအားလျှပ်စစ်စီမံကိန်းတည်ဆောက်ပြီး လျှပ်စစ်ဓါတ်အားထုတ်လုပ်ခြင်းစီမံကိန်း၏ ကနဦး ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း ( Initial Environmental Examination –IEE ) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူများ၏ သဘောထားခံယူပွဲ ( Public Hearing ) အား အောက်ပါအတိုင်း ကျင်းပမည်ဖြစ်သောကြောင့် တက်ရောက်ဆွေးနွေးပေးပါရန် လေးစားစွာဧည့်သည်အဖြစ်အပ်ပါသည်။

နေ့ရက် ။ ။ ၂၈.၁.၂၀၁၆ (ကြာသပတေးနေ့)။

အချိန် ။ ။ နံနက် (၁၀:၀၀)နာရီ မှ (၁၁:၀၀) နာရီအထိ။

နေရာ ။ ။ အောင်ဇေယျာသီရိခန်းမ၊ မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ မိုင်းပျဉ်းမြို့။

Appendix VII – Presentation of the Public Hearing



**မဂ္ဂါမြန်မာ စွမ်းအင် ကုမ္ပဏီ လီမိတက်** 

နမ့်ပိန်းချောင်းနှင့် နမ့်လိန်ချောင်း ရေအားလျှပ်စစ် စီမံကိန်း

**ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့်ပတ်သက်၍**

**သက်ဆိုင်သူများအားရှင်းလင်းတစ်ပြခြင်းနှင့်**

**သဘောထားအကြံပြုများ ရယူခြင်းအစစ်အနား**

၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီလ(၂၈)ရက်၊ ကြာသပတေးနေ့၊

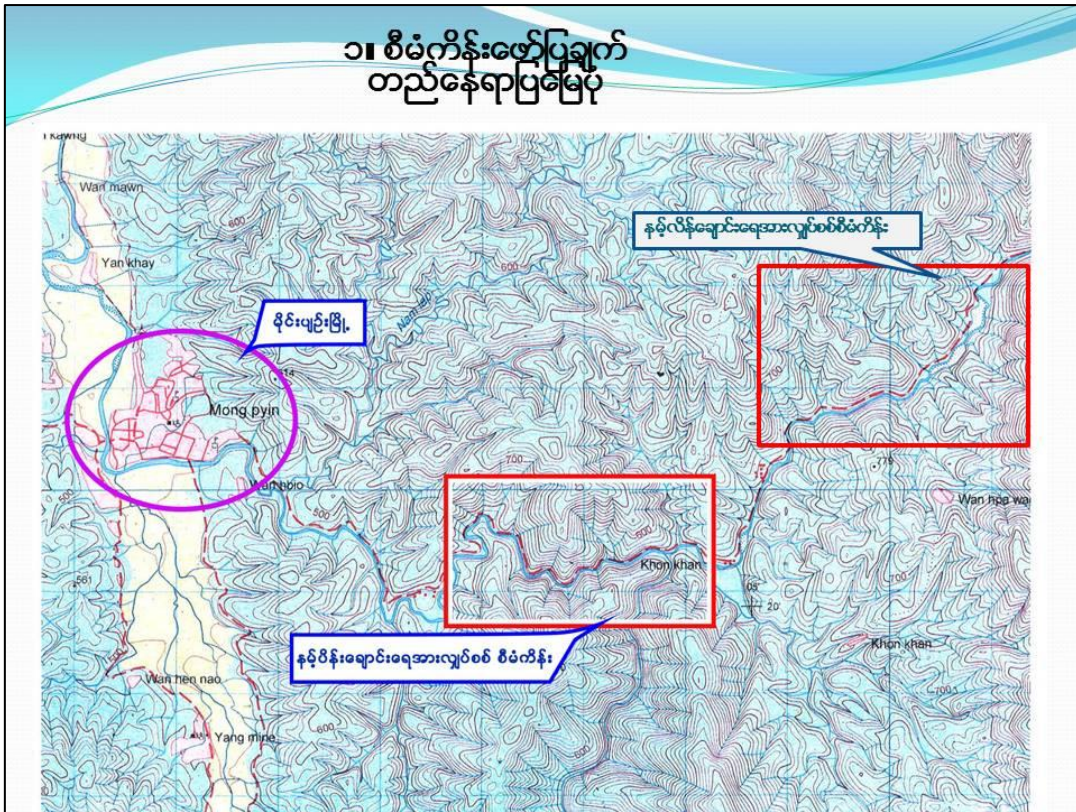
အောင်လေယာသီရိ ခန်းမ၊ ဝိုင်းပျဉ်းမြို့၊

- မာတိကာ**
- ၁။ စီမံကိန်းအကျဉ်းချုပ်ဖော်ပြချက်
  - ၂။ စီမံကိန်းအတွက်လိုအပ်သည့် အထောက်အကူပြု အဆောက်အအုံများ
  - ၃။ စီမံကိန်း၏ အခြားရွေးချယ်စရာနည်းလမ်းများ
  - ၄။ စီမံကိန်းအတွက်လိုအပ်ချက်များ
  - ၅။ ဆန်းစစ်ခြင်းဆောင်ရွက်သည့်အဖွဲ့အစည်းနှင့် စိစစ်ခွင့်ပြုသည့် အဖွဲ့အစည်း
  - ၆။ စီမံကိန်းသက်ဆိုင်သူများနှင့် ဆွေးနွေးညှိနှိုင်း သဘောထား ရယူခြင်း၏ရည်ရွယ်ချက်များ
  - ၇။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း၏ ရည်ရွယ်ချက်များ
  - ၈။ စီမံကိန်းပတ်ဝန်းကျင်၏ လက်ရှိအနေအထား
  - ၉။ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သောပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများ
  - ၁၀။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်
  - ၁၁။ အရေးပေါ်ကိစ္စများအတွက်စီမံချက်
  - ၁၂။ လူမှုစီးပွားတာဝန်ယူမှု
  - ၁၃။ အကြံပြုချက်များ



# (၁) စီမံကိန်းအကျဉ်းချုပ်ဖော်ပြချက် (မဂ္ဂါမြန်မာ စွမ်းအင် ကုမ္ပဏီလီမိတက်)

၁။ စီမံကိန်းအကျဉ်းချုပ်ဖော်ပြချက်	
လျှပ်စစ်ဓါတ်အားပေးစက်ရုံတည်နေရာ	- မိုင်းပျဉ်းမြို့နှင့် (၆)မိုင်အကွာ နမ့်လိန်ချောင်းအနီး မိုင်းပျဉ်းမြို့နှင့် (၃.၅)မိုင်အကွာ နမ့်ပိန်းချောင်းအနီး
ရေလွှဲအဆောက်အအုံတည်နေရာ	- နမ့်လိန်ရေအားလျှပ်စစ်အတွက် ထနောင်းကျေးရွာအနီး နမ့်ပိန်းရေအားလျှပ်စစ်အတွက် ပုံခက်ကျေးရွာအနီး
အမြဲတမ်း မြေအသုံးချမှု	- (၅.၅) ဧက နှင့် (၇.၄)ဧက
ယာယီ မြေအသုံးချမှု	- (၂) ဧက
လုပ်ငန်းအမျိုးအစား	- ရေအားလျှပ်စစ်ထုတ်လုပ်ခြင်း
ရည်ရွယ်ချက်	- မိုင်းပျဉ်းမြို့တွင် လိုအပ်နေသော လျှပ်စစ်ဓါတ်အား ဖြည့်ဆည်းခြင်းဖြင့် ဒေသဖွံ့ဖြိုးတိုးတက်မှုအား အထောက်အကူပြုစေရန်
တည်ဆောက်ရေး	- (၃၂) လ နှင့် ( ၃၈ ) လ
ထုတ်လုပ်နိုင်မှု စွမ်းအား	- နမ့်လိန်တွင် (၇၀၀) ကီလိုဝပ်မှ (၁၀၀၀) ကီလိုဝပ်ထိ နမ့်ပိန်းတွင် (၈၀၀) ကီလိုဝပ်မှ (၁၂၀၀) ကီလိုဝပ်ထိ
တပ်ဆင်မည့်တာဘိုင်	- နမ့်လိန်တွင် (၃၅၀) ကီလိုဝပ် (၃) လုံး နမ့်ပိန်းတွင် (၄၀၀) ကီလိုဝပ် (၃) လုံး

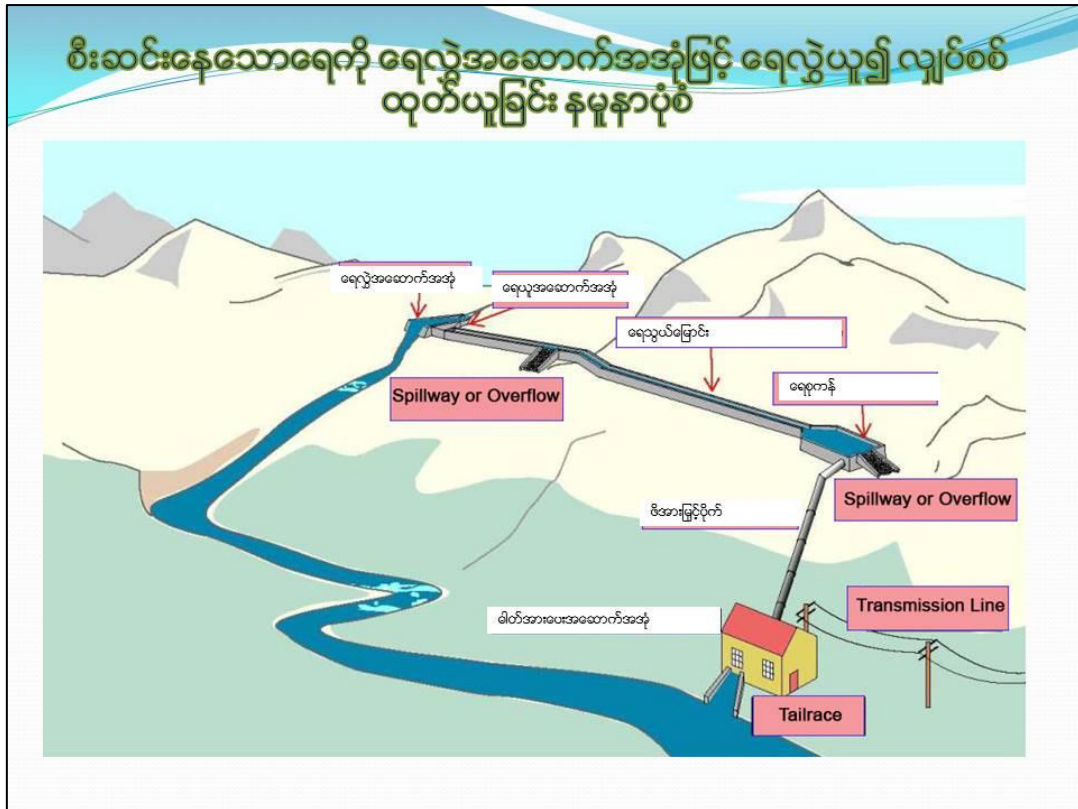


### ၂။ စီမံကိန်းအတွက် လိုအပ်သည့် အဆောက်အအုံများ

**အဆိုပြုစီမံကိန်း၏ ရေအား လျှပ်စစ်ထုတ်ယူမည့် ဒီဇိုင်းပုံစံမှာ တာတစ်ဆည်အကြီးစား ဆောက်လုပ်ရန် မလိုအပ်ဘဲ သဘာဝအတိုင်း စီးဆင်းနေသောရေကို ရေလွှဲအဆောက်အအုံဖြင့် လွှဲယူ၍ ရေအားလျှပ်စစ် ထုတ်ယူ ရသော ပုံစံမျိုးဖြစ်သည်။**

လိုအပ်သော အဆောက်အအုံများ

- ၁။ ရေလွှဲအဆောက်အအုံ
- ၂။ ရေယူအဆောက်အအုံ
- ၃။ ရေသွယ်မြောင်း
- ၄။ ရေဖြည့်ကန်
- ၅။ ဖိအားမြှင့်ရေသွယ်ပိုက်
- ၆။ လျှပ်စစ်ဓါတ်အားပေးစက်ရုံနှင့် သီးခြားအဆောက်အအုံများ



**၃။ စီမံကိန်း၏ အခြားရွေးချယ်စရာနည်းလမ်း နှင့် ဝိန်းရေအားလျှပ်စစ်လုပ်ငန်း**

နိုင်းယှဉ်စရာ	အခြားရွေးချယ်စရာ လမ်းကြောင်း အေ (အပီ)	အခြားရွေးချယ်စရာ လမ်းကြောင်း ဘီ (အပီမီး)
လမ်းကြောင်း၏ အခြေခံအချက်အချာ	အကွေ့အကောက်များရှောင်ထားပြီး၊ ခြောက်ပုံစံရွေးထားခြင်း၊ ဥပမာလိုက်ခေါင်းပုံစံ ၁.၉ ကီလိုမီတာ	မူလရောင်း၊ အပေးပြေးလမ်းနှင့် အပြိုင် သွားရလွယ်ကူသောနေရာအားရွေးချယ်ထားခြင်း ၂.၆ ကီလိုမီတာ
ဖြစ်ပေါ်လာနိုင်သော အကျိုးသက်ရောက်မှု	တောင်စောင်းဘက်ဖြစ်၍ဖောက်ခွဲရေး လုပ်ငန်းများ လိုအပ်မည်ဖြစ်သည်။ ထို့ကြောင့် မြေသား လုပ်ငန်း ပိုလုပ်ရခြင်း၊ အပင်နှင့် တောရိုင်းတိရစ္ဆာန်များ၏ စားကျက်များ ပိုမိုထိခိုက်ခြင်း၊ ဝေဟစနစ် ပိုမို ထိခိုက်၊ ငွေတန်ကြေးကျများ	မြောင်းဖြင့်သွယ်ယူမည်ဖြစ်ရာ ဥပမာလိုက်ခေါင်း ဖောက်ရန် ဖောက်ခွဲရေးလုပ်ငန်းမပါဝင်ပါ။ ဝေဟစနစ်ထိခိုက်မှု အနည်းအကျဉ်းရှိမည်ဟုခန့်မှန်း
အကျိုးပြုခြင်း	ထောက်ခံမှုမပေး (လမ်းကြောင်း အေ)	ထောက်ခံမှုပိုရရှိ (လမ်းကြောင်း ဘီ)

**၃။ စီမံကိန်း၏ အခြားရွေးချယ်စရာနည်းလမ်း  
နမ့်လိန်ရေအားလျှပ်စစ်လုပ်ငန်း**



- နမ့်လိန်ရေစီးအားမှာ အလွန်ကောင်းမွန်သည့် အတွက်ကြောင့် ရေအားလျှပ်စစ်ထုတ်ယူရန်အတွက် လိုအပ်သော ရေအားကို အကွာအဝေး (၁.၅) ကီလိုမီတာအတွင်း ရရှိနိုင်ပြီး သဘာဝပတ်ဝန်းကျင်အား ထိခိုက်မှု အနည်းဆုံးဖြစ်မည့် အနေအထားတွင် ရှိသည်။
- အခြား ရွေးချယ်စရာနည်းလမ်း တစ်ခုမှာ ရေလွှဲအဆောက်အအုံနှင့်ရေယူဆောက်အအုံကို ရေဖြည့်ကန်နှင့် ပိုနီးကပ်သွားစေနိုင်သော်လည်းလိုအပ်သော ရေအရှိန်မရနိုင်သည့် အတွက်ကြောင့် လက်ခံနိုင်ဖွယ်မရှိဟု ယူဆပါသည်။

**၄။ စီမံကိန်းအတွက်လိုအပ်ချက်များ**

**လုပ်ငန်းလည်ပတ်မှုအတွက် အခြေခံလိုအပ်ချက်များ**

**❖ ရေသုံးစွဲမှု**

- ဝန်ထမ်းများအတွက် လိုအပ်သော သောက်သုံးရေနှင့် ချက်ပြုတ်ရေအား တွင်းရေမှ ရယူသုံးစွဲမည်ဖြစ်ပြီး လျှော်ဖွတ်ရေ နှင့် ချိုးရေအား ချောင်းရေမှ အသုံးပြုမည်ဖြစ်သည်။)
- ဆောက်လုပ်ရေးလုပ်ငန်းသုံးအတွက်ကိုလည်း ချောင်းရေ အရင်းအမြစ်မှပင် သုံးစွဲသွားမည်။
- မီးဘေးအတွက်ရေအရင်းအမြစ်ကိုရေစုကန်အတွင်း၌ သိုလှောင်ထားရှိပါမည်။

**❖ လျှပ်စစ်မီးသုံးစွဲမှု**

စီမံကိန်းဆောက်လုပ်ရေးပထမပိုင်းကာလများ တွင် လိုအပ်သော လျှပ်စစ်အတွက် (၁၀၀)ကီလိုဝပ် (၁၂၅ ကေပီအေ) ဂျင်နရေတာ အားထားရှိအသုံးပြုမည်ဖြစ်ပြီးနောက်ပိုင်းကာလတွင် ရေအားလျှပ်စစ်အသေးစား တစ်လုံးတပ်ဆင်၍ အသုံးပြုရန်စီစဉ်ထားပါသည်။ စီမံကိန်းဆောက်ဆောက်လုပ်ရေးနောက်ပိုင်းကာလတွင် ဂျင်နရေတာအား အရေးပေါ်ကိစ္စတွင်သုံးရန်ထားမည်ဖြစ်ပြီး ရေအားလျှပ်စစ်အသေးစားအား ၎င်းနှင့် အနီးတွင်ရှိသော ကျေးရွာအား လျှပ်စစ်ဓါတ်အားထောက်ပံ့ပေးနိုင်ရန် ဆက်လက်ထားရှိပေးသွားမည်ဖြစ်သည်။

## ၄။ စီမံကိန်းအတွက်လိုအပ်ချက်များ

### ❖ ဆောက်လုပ်ရေးအတွက် ကျောက်နှင့်သဲ လိုအပ်ချက်

စီမံကိန်းဆောက်လုပ်ရေးအတွက် လိုအပ်သော ကျောက်စရစ်နှင့် သဲကို နမ့်ပိန်းချောင်း မှထုတ်ယူသုံးစွဲသွားမည်ဖြစ်သည်။ ချောင်းထဲတွင် သဲ၊ အလူးကျောက်နှင့် ကျောက်ကြီးများ အသင့်တင့် ပါဝင်သောကြောင့် လိုအပ်သောကျောက်ရရှိနိုင်ပါသည်။ ထို့အတွက်ကြောင့် ဆောက်လုပ်ရေးအတွက် လိုအပ်သော ကျောက်နှင့်သဲကို အခြားကျောက်မိုင်းကျင်းများမှ ထုတ်ယူသုံးစွဲရန် လိုအပ်မည်မဟုတ်ပါ။





ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းနှင့် ပတ်သက်၍  
လေ့လာတွေ့ရှိချက်များအား ရှင်းလင်းတင်ပြခြင်း

**E Guard Environmental Services Co., Ltd.**

၅။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအား ဆောင်ရွက်သည့် အဖွဲ့အစည်းနှင့် စိစစ်ခွင့်ပြုသည့် အဖွဲ့အစည်း





**စိစစ်ခွင့်ပြုသည့် အစိုးရအဖွဲ့အစည်း -**  
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာ ဝန်ကြီးဌာန (MOECAF)



**ဆောင်ရွက်သည့် တတိယအဖွဲ့အစည်း -**  
E Guard Environmental Services Co., Ltd.

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၆။ စီမံကိန်းသက်ဆိုင်သူများနှင့် ဆွေးနွေးညှိနှိုင်း သဘောထား ရယူခြင်း၏ ရည်ရွယ်ချက်များ

- ၁) မိဂါမြန်မာ စွမ်းအင်ကုမ္ပဏီ လီမိတက်၏လုပ်ငန်း အစီအစဉ်အား အသိပေးတင်ပြနိုင်ရန်။
- ၂) ဖြစ်ပေါ်လာနိုင်သည့် စီမံကိန်း၏ ကောင်းကျိုး၊ ဆိုးကျိုးများကို အစီရင်ခံတင်ပြနိုင်ရန်။
- ၃) စီမံကိန်းအကောင် အထည်ဖော်ဆောင်ရွက်ရာတွင် ပွင့်လင်းမြင်သာမှုရှိစေရန်နှင့် စီမံကိန်းသက်ရောက်မှုများအား ပိုမိုတာဝန်ယူနိုင်မှုရှိလာစေရန်။
- ၄) စီမံကိန်းတွင်ပါဝင်ပတ်သက်သူများ၏ သဘောထားနှင့် အကြံပြုချက်များကို ရယူနိုင်ရန်။
- ၅) ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း၏ ရည်ရွယ်ချက်များအား သိစေရန်။

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**ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း လုပ်ဆောင်ခြင်းအကြောင်းအရာ** 

ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅ ခုနှစ် ဇူလိုင်လ ၂၉ရက်) ထုတ်ပြန်ချက်တွင် ပါရှိသော လုပ်ငန်းအလိုက် လုပ်ဆောင်ရမည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်မှုများအရ


စီမံကိန်းအမျိုးအစား - ရေအားလျှပ်စစ်စီမံကိန်း


<u>ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းပြုလုပ်ရန်လိုအပ်သည့် အရွယ်အစား</u>	<u>ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းပြုလုပ်ရန် လိုအပ်သည့်အရွယ်အစား</u>
ထုတ်လုပ်မှု ပမာဏ ၁ မီဂါဝပ် နှင့်အထက် ၁၅ မီဂါဝပ်အောက်နှင့် ကန်ပြည်သိုလှောင်ပမာဏ ၂၀,၀၀၀,၀၀၀ အောက် နှင့် ရေလှောင်တမံဧရိယာ ၄၀၀ ဟက်တာအောက်	ထုတ်လုပ်မှု ပမာဏ ၁၅ မီဂါဝပ် နှင့်အထက် (သို့) ရေသိုလှောင်ပမာဏ ကုစဇီတာ ၂၀,၀၀၀,၀၀၀ နှင့်အထက် (သို့) ရေလှောင်တမံဧရိယာ ၄၀၀ ဟက်တာနှင့်အထက်

**၇။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆိုင်ရာ ရည်ရွယ်ချက်များ** 

- စီမံကိန်းဆောင်ရွက်မှုကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်သက်ရောက်မှုများကို ဖော်ထုတ်နိုင်ရန်။
- ထိခိုက်သက်ရောက်မှုများအား လျော့ချပေးနိုင်မည့် အစီအစဉ်များကို အကြံပြုတင်ပြနိုင်ရန်။
- စောင့်ကြည့်စစ်ဆေးမည့် အစီအစဉ်များကို လက်တွေ့အကောင်အထည်ဖော်ဆောင်ရွက်နိုင်ရန်။

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၈။ စီမံကိန်းပတ်ဝန်းကျင် လက်ရှိအခြေအနေအထား




### လေ့လာဆန်းစစ်မှု

- ✓ အဆိုပြုစီမံကိန်း၏ လက်ရှိအခြေအနေအား ကွင်းဆင်းစစ်ဆေးခြင်း
- ✓ လက်ရှိပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးများအားတိုင်းတာစစ်ဆေး၊ မှတ်တမ်းတင်ခြင်း
- ✓ စီမံကိန်းနှင့်ပတ်သက်သည့်အသေးစိတ်အချက်အလက်များအား စီမံကိန်းပိုင်ရှင်နှင့် တွေ့ဆုံမေးမြန်းခြင်း

လက်ရှိအခြေအနေအား တိုင်းတာခဲ့သည့်ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးများနှင့် ပတ်ဝန်းကျင်အခြေအနေအထား-

၁) လေထုထဲတွင်ပါဝင်သော ဓါတ်ငွေ့ - ကမ္ဘာ့ကျန်းမာရေးအဖွဲ့ (WHO) နှင့် နိုင်ငံတကာဘဏ္ဍာရေး ပူးပေါင်းဆောင်ရွက်မှုအဖွဲ့ (IFC) ၏ သတ်မှတ်ချက် အတွင်းတွင်ရှိ

၂) ပတ်ဝန်းကျင်ဆူညံသံ - နိုင်ငံတကာဘဏ္ဍာရေးပူးပေါင်းဆောင်ရွက်မှုအဖွဲ့ (IFC) ၏ သတ်မှတ်ချက် အတွင်းတွင်ရှိ

၃) ရေအရည်အသွေး - ကမ္ဘာ့ကျန်းမာရေးအဖွဲ့ (WHO) ၏ သတ်မှတ်ချက်အတွင်းတွင်ရှိ (မြေပေါ်ရေ-ချောင်းရေ) အဆိုပြုစီမံကိန်း၏ တည်နေရာမှာ ကြီးပိုင်းသစ်တော၊ ကြီးပြင်ကာတွယ်သော သဘာဝဘေးမဲ့တောများ အတွင်းသို့ မကျရောက်ဘဲ မြေလွတ်မြေရိုင်းဖြစ်ကြောင်းတွေ့ရှိရသည်။

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၉။ စီမံကိန်းပတ်ဝန်းကျင် လက်ရှိအခြေအနေအား လေ့လာမှုမှတ်တမ်း




ချောင်းအတွင်းရေနမူနာကောက်ယူခြင်း









ဝန်းကျင်ဆူညံသံတိုင်းတာခြင်း

စီမံကိန်း ဧရိယာရှိ လက်ရှိရေအရင်းအမြစ်များမှ ရေနမူနာကောက်ယူ၍ ရေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း

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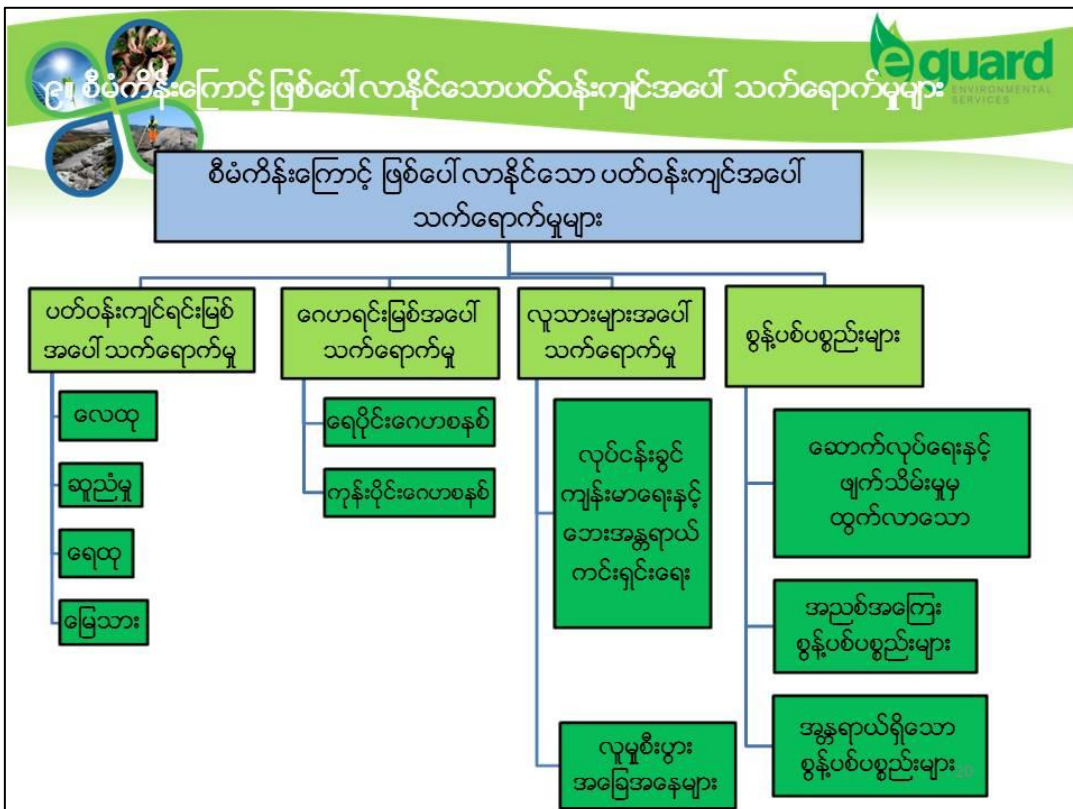
**eGuard**  
ENVIRONMENTAL SERVICES

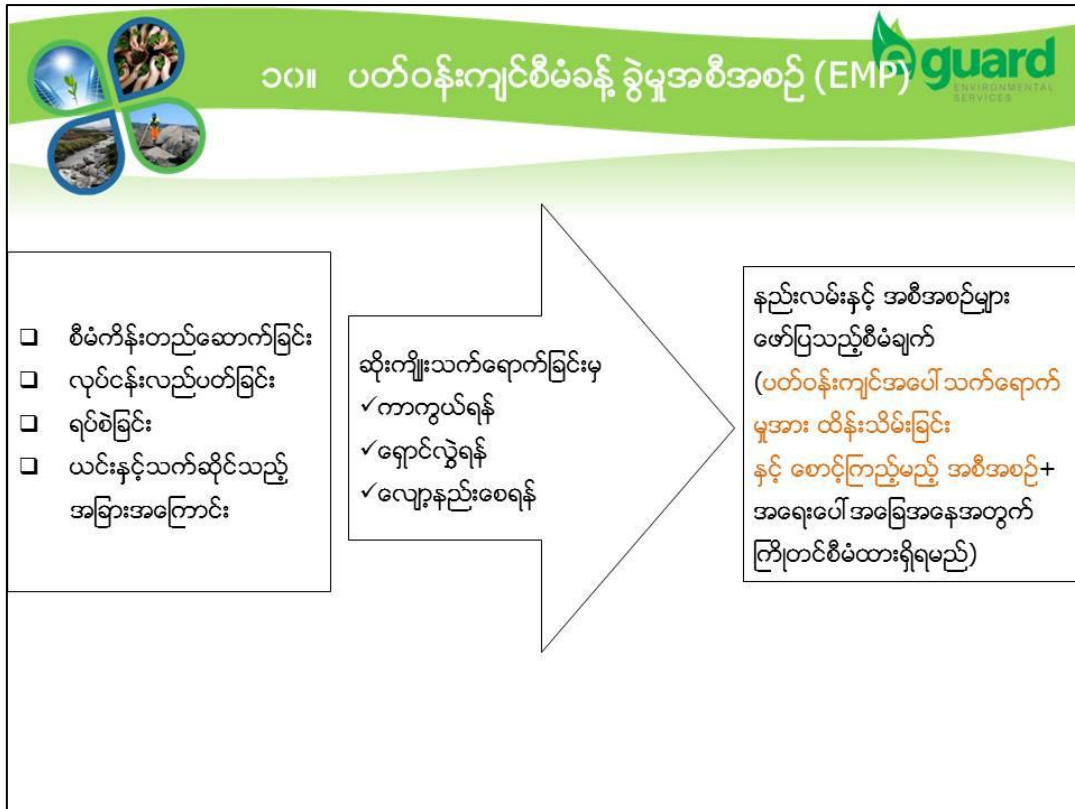
စီမံကိန်းပတ်ဝန်းကျင် လက်ရှိအခြေအနေအား လေ့လာမှုပတ်ဝန်းကျင်



**စီမံကိန်း အဆိုပြုသူနှင့် တွေ့ဆုံ၍ သိလိုသည်အချက်များအားပေးမြန်းဆွေးနွေးခြင်း**

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၁၀၁။ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၁) လေထုညစ်ညမ်းခြင်း ဆောက်လုပ်ရေးကာလ**

- ဆောက်လုပ်ရေးသုံးယာဉ်များသွားလာခြင်းနှင့် လိုအပ်သော အထောက်အကူအဆောက်အအုံ တည်ဆောက်ရေးလုပ်ငန်းများတည်ဆောက်ခြင်းမှ ဖုန်မှုန့်များ၊ လုပ်ငန်းသုံး စက်နှင့် ယာဉ်များမှ ထွက်ရှိလာသော ဓာတ်ငွေ့များ၊ မြေသားလုပ်ငန်းများ၊ လမ်းဖောက်လုပ်ခြင်း၊ ရှင်းလင်းခုတ်ထွင်ပြီးသော အပင်များအား မီးရှို့ခြင်း တို့ကြောင့်ပတ်ဝန်းကျင်ရှိ လေထုညစ်ညမ်းမှုကို ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ - အင်ဂျင်နှင့် မီးခိုးထွက်စနစ် ကောင်းမွန်သည့် ယာဉ်/စက်များ အသုံးပြုခြင်း၊ လုပ်ငန်းဆောင်ရွက်မည့် နေရာများအား ယာယီအုပ်ဆိုင်းခြင်း၊ ရေများဖျန်းထားခြင်း၊ ယာဉ်များကို သတ်မှတ်နှုန်းအတိုင်း မောင်းနှင်စေခြင်း၊ မီးရှို့ရမည့်အစား မြေမြုပ်ခြင်းသော်လည်းကောင်း၊ မီးရှို့မည်ဆိုလျှင် မီးလောင်လွယ်သော အကိုင်းအခက်များအား မီးရှို့၍ ကျန်သော ဝါးနှင့်အခြားတိုင်းများအား အသုံးပင်သောနေရာများတွင်အသုံးပြုခြင်းနှင့် စနစ်တကျ လုပ်ကိုင်ခြင်းတို့ဖြင့် ထိခိုက်မှုများကို လျော့ချနိုင်သည်။

**စီမံကိန်းသက်တမ်းကုန်ဆုံး၍ ဖြိုဖျက်ရေးကာလ**

- စက်ယန္တရားများသွားလာခြင်း၊ အဆောက်အဦးဖြိုဖျက်သည့်လုပ်ငန်းများမှ လေထုညစ်ညမ်းမှုကို ဖြစ်ပေါ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ - အင်ဂျင်နှင့် မီးခိုးထွက်စနစ် ကောင်းမွန်သည့် ယာဉ်/စက်များ အသုံးပြုခြင်း၊ လုပ်ငန်းဆောင်ရွက်မည့်နေရာများအား ယာယီအုပ်ဆိုင်းခြင်း၊ ယာဉ်များကို သတ်မှတ်နှုန်း အတိုင်းမောင်းနှင်စေခြင်းနှင့် စနစ်တကျလုပ်ကိုင်ခြင်းတို့ဖြင့် လျော့ချနိုင်သည်။

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၁၀၃။ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၂) မြေထုညစ်ညမ်းခြင်း**

ဆောက်လုပ်ရေးကာလ

- ဆောက်လုပ်ရေးယာဉ်များသွားလာခြင်း၊ အပင်များခုတ်ထွင်ရှင်းလင်းလိုက်သောကြောင့် မြေဆီလွှာ ပျက်စီးခြင်း၊ မြေသားလုပ်ငန်းကြောင့် အပေါ်ယံမြေသားဆုံးရှုံးခြင်း၊ လောင်စာဆီသိုလှောင်မှုမှ ဆီယိုစိမ့်ခြင်း၊ ဆီဖြည့်ရာတွင် ဖိတ်စင်ခြင်း၊ ဆောက်လုပ်ရေး လုပ်သားများ၏ စွန့်ပစ်ပစ္စည်းများကြောင့် မြေထုနှင့် ရေထုညစ်ညမ်းမှုကို ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ - မြေသားခံနိုင်ရည်တန်ဖိုး တွက်ချက်သိရှိထားရန်၊ မြေပြိုမှုတားဆီးနိုင်ရန် တာဘောင်များလိုအပ်သလို ထည့်သွင်းဆောက်လုပ်ရန်၊ ဆီယိုစိတ်မှုမရှိစေရန် စိမ့်ထွက်မှုကင်းသည့် သံကန်၊ အုတ်ကန်များထား၍ ဂရုတစိုက်ဆောင်ရွက်ခြင်း၊ စွန့်ပစ်ပစ္စည်းများကိုစနစ်တကျ သိုလှောင် ထားရှိခြင်း၊ စွန့်ပစ်ပစ္စည်းများကို စနစ်တကျစွန့်ပစ်ခြင်းတို့ဖြင့်လျော့ချနိုင်သည်။

လုပ်ငန်းလည်ပတ်သည့် ကာလ

- ယာဉ်သွားလာမှုနှင့် စက်သုံးဆီများ ယိုဖိတ်ခြင်း၊ ရေအိမ်တို့မှ ထွက်ရှိသည့် အညစ်အကြေးများမှ ညစ်ညမ်းမှုကို ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- စက်သုံးဆီယိုဖိတ်မှုမရှိစေရန် သံကန်များထား၍ ဂရုတစိုက် ဆောင်ရွက်ခြင်း၊ မိလ္လာအညစ်အကြေးများအား စနစ်တကျ ပုံမှန်စုပ်ထုတ်၍ စွန့်ပစ်ခြင်းတို့ဖြင့် လျော့ချနိုင်သည်။

၁၀၄။ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၃) ဆူညံမှုနှင့် တုန်ခါမှု**

ဆောက်လုပ်ရေးကာလ

- ဆောက်လုပ်ရေးပစ္စည်းများ သယ်ယူခြင်းနှင့် ယာဉ်ယန္တရား များသွားလာခြင်း၊ ဆောက်လုပ်ရေး လုပ်ငန်းများ၊ ဆောက်လုပ်ရေးသုံးစက်များ၊ မြေသားလုပ်ငန်း၊ ဂျင်နရေတာအသုံးပြုခြင်းတို့မှ အသံဆူညံမှုကို ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ဆူညံသံကာကွယ်ရေးပစ္စည်းကိရိယာများအသုံးပြုခြင်း၊ ဂျင်နရေတာကို ဆူညံသံလျော့သော အမျိုးအစား အသုံးပြုခြင်း၊ ယာဉ်များအား ပုံမှန်ထိန်းသိမ်းပြုပြင်ခြင်း၊ ညဘက်တွင် လုပ်ငန်းကြီးများအား ရပ်ဆိုင်းထားခြင်းဖြင့်လျော့ချနိုင်သည်။

လုပ်ငန်းလည်ပတ်သည့် ကာလ

- တာဘိုင်ဂျင်နရေတာ သုံးလုံးလည်ပတ်ခြင်း၊ သယ်ယူယာဉ်များမောင်းနှင်ခြင်း၊ အရေးပေါ် မီးစက် အသုံး ပြုခြင်းမှ ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ဆူညံသံကာကွယ်ရေးပစ္စည်းကိရိယာများအသုံးပြုခြင်းဖြင့် လျော့ချနိုင်သည်။ လက်ခံနိုင်သော အနေအထားတွင်ရှိပါသည်။

စီမံကိန်းသက်တမ်းကုန်ဆုံး၍ ဖြိုဖျက်ရေးကာလ

- စက်ပစ္စည်းများ ပြန်လည်သယ်ဆောင်ခြင်း၊ စက်ယန္တရားများ သွားလာခြင်း၊ အဆောက်အဦး ဖြိုဖျက်သည့် လုပ်ငန်းများ၊ မီးစက်အသုံးပြုခြင်းတို့ကြောင့် ဆူညံသံများ ဖြစ်စေနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ဆူညံလျော့ချသည့်ရေးပစ္စည်းကိရိယာများ၊ ကောင်းမွန် သောစက်များ အသုံးပြုခြင်း ဖြင့် လျော့ချနိုင်သည်။

၁၀.၁။ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျော့ရေးနည်းလမ်းများ

**၄) ရေထုနှင့် ချောင်းအား ထိခိုက်ခြင်း**

**ဆောက်လုပ်ရေးကာလ**

- ဆောက်လုပ်ရေး လုပ်ငန်းများသည် ချောင်းနှင့်ကပ်နေသဖြင့် မြေသားလုပ်ငန်းမှ မြေများကျခြင်း၊ သယ်ပို့ယာဉ်များ တံတားမဆောက်မီချောင်းတွင်းဖြတ်သန်းခြင်း၊ သဲနှင့် ကျောက်ထုတ်လုပ်ခြင်း တို့ကြောင့် နောက်ကျိနုန်းမြင့်ခြင်းနှင့် ချောင်းအတိမ် အနက်နှင့် ရေလမ်းကြောင်းပြောင်းခြင်း၊ ရေနေတိရိစ္ဆာန်များ၏ စားကျက်အားထိခိုက်ခြင်း၊ စက်ဆီများသယ်ယူ သို့လှောင်၊ ပြန်ဖြည့်ခြင်းတို့မှယိုဖိတ်ခြင်း။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ကာကွယ်ရေးပစ္စည်းကိရိယာများ (တာပေါ်လင်၊ ဝါးကပ်)အား မြေသားလုပ်ငန်း တစ်လျှောက် တစ်ဆင့်အသုံးပြုစေခြင်း၊ သဲနှင့် ကျောက်ထုတ်လုပ်ငန်းအား ချောင်းမပျက်စီးစေရန်နှင့် စားကျက်များ ထိန်းသိမ်းနိုင်ရေးအတွက် စနစ်တကျထုတ်ယူရန်၊ စက်ဆီဖြည့်ရာနှင့် သိုလှောင်ရာတွင် သံကန်အောက်ခံများ အသုံးပြုရန်။

**လုပ်ငန်းလည်ပတ်သည့် ကာလ**

- လည်ပတ်နေသည့်ကာလတွင် အနည်ကျ သဲ စွန့်ထုတ်ခြင်း၊ ခြောက်သွေ့ကာလအတွင်း ရေအမြင့် မြင့်တင်ခြင်းကြောင့် ချောင်းအောက်ပိုင်းတွင် ရေပမာဏလျော့ကျခြင်း၊ စက်ပြုပြင်ထိန်းသိမ်းခြင်းလုပ်ငန်းမှ ထွက်လာမည့် စွန့်ပစ်အရည်များ
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများမှာ- အနည်ကျသဲအား စနစ်တကျစွန့်ပစ်၍ ချောင်းပိတ်မှုမဖြစ်စေရန် ဂရုပြုရန်၊ ချောင်း၏ရှိသည့်ရေပမာဏအား ထားရှိပေးထားရန်နှင့် ပြုပြင်ထိန်းသိမ်းခြင်းလုပ်ငန်းမှ ထွက်လာနိုင်သည့် ရေဆိုးများအား ဆီနှင့် ရေခွဲခြားသည့် စနစ်အားအသုံးပြုပြီးမှ စွန့်ထုတ်ရန်

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၁၀.၁။ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျော့ရေးနည်းလမ်းများ

**၅) ဂေဟစနစ်နှင့် သက်ရှိမျိုးစုံ မျိုးကွဲများ**

- စီမံကိန်း၏ ဧရိယာသည် ကြီးပိုင်းတော၊ ကြီးပြင်ကာကွယ်တောနှင့် ဘေးမဲတောများတွင်မပါဝင်ပါ။
- အနီးဆုံးကြီးပြင်ကာကွယ်တော - နောင်ချိုကြီးပြင်တော (ကျိုင်းတုံ-မိုင်းပျဉ်းကားလမ်း၏အခြား တစ်ဖက်) (ချောင်းတလျောက် မီတာ ၂၀၀မှ ၅၀၀ အထိ ကွာဝေးသည်)
- စီမံကိန်းဧရိယာတွင် ပေါက်ရောက်နေသော ပင်များမှာ ဝါးပင်၊ ချုံပင်နှင့် နွယ်ပင်များ
- မိုင်းပျဉ်းမြို့နယ်အတွင်းတွေ့ရှိ ကျက်စားနေသော သတ္တဝါများမှာ အပြည်ပြည်ဆိုင်ရာ သဘာဝထိန်းသိမ်းရေး သမဂ္ဂ (IUCN) ၏ RED List အရ မျိုးတုန်းပျောက်ကွယ်လု မျိုးစိတ်များ မတွေ့ရှိရပါ။
- ရေပိုင်း ဂေဟစနစ်တွင် ရေလွှဲရန် ရေအမြင့်မြင့်ခြင်းနှင့် သဲနှင့်ကျောက်ထုတ်ယူခြင်းမှ ထိခိုက်နိုင်သည်။ ရေအမြင့်မြင့်ရာတွင် ချောင်းတွင် ရေပြတ်မှုမရှိစေရန် ဂရုပြု ဆောင်ရွက်ရန်နှင့် ပုံမှန်ရေကျော်မှ ရေများမပြတ်လွတ်ထားပေးရမည်။ သဲ/ကျောက်ထုတ်ယူ ရာတွင်လည်း ချောင်း၏လမ်းကြောင်း ပြောင်းလဲမှု မရှိစေဘဲ၊ လိုအပ်သောပမာဏထက်ပိုထုတ်ခြင်း၊ နေရာတစ်နေရာတွင်သာ ကွက်ထုတ်ခြင်းအားရှောင်ရှားရမည်။

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၁၀.၁ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၆) လူမှုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုနှင့်လုပ်ငန်းခွင်အန္တရာယ်**

**ဆောက်လုပ်ရေးကာလ**

- ဆောက်လုပ်ရေးလုပ်ငန်းများ၊ စက်ကိရိယာများ တပ်ဆင်ခြင်းနှင့် သယ်ဆောင်ခြင်း၊ ဂဟေဆော်ခြင်း လုပ်ငန်းများမှ မီးဘေးအန္တရာယ်၊ ဓါတ်လိုက်ခြင်းနှင့် မြေပိခြင်း စသည့်စက်ရုံဝန်ထမ်းများအား ရုပ်ပိုင်းဆိုင်ရာထိခိုက်မှုများရှိနိုင်သည်။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ကာကွယ်ရေးပစ္စည်းကိရိယာများတပ်ဆင်အသုံးပြုစေခြင်း၊ ဝန်ထမ်းများအား မီးဘေးပညာပေးသင်တန်းပေးထားရန်၊ ရှေးဦးသူနာပြုရေး ဆောင်ရွက်ထားရှိခြင်း တို့ဖြင့် ထိခိုက်မှုများကို လျော့ချနိုင်သည်။

**လုပ်ငန်းလည်ပတ်သည့်ကာလ**

- လုပ်ငန်းချိန်အတွင်း စက်ပစ္စည်းများကိုင်တွယ် အသုံးပြုရာမှ မတော်တဆထိခိုက်မိခြင်း၊ နာတာရှည် ဒဏ်ရာရခြင်းစသည့် ထိခိုက်မှုများ ရှိနိုင်သည်။ ဝန်ထမ်းများမှ ကူးစက်ရောဂါများ ဖြစ်စေခြင်း၊
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- စက်ရုံဝန်ထမ်းများအား စက်ပစ္စည်းကိုင်တွယ်ပုံ အဆင့်ဆင့် နှင့် ပတ်သက်၍ စနစ်တကျ သင်ကြားပြသခြင်း၊ သင်တန်းပေးခြင်း၊ သတိပေးဆိုင်းဘုတ်များတပ်ဆင်ခြင်း၊ စက်များကို ကာရံထားခြင်း ၊ ထိခိုက်မှုဖြစ်စေတတ်သော စက်ပစ္စည်းများအား သင့်တော်သော လုပ်ငန်းခွင်သုံးအကာအကွယ်များဖြင့် သုံးစွဲစေခြင်း၊ လုပ်ငန်းခွင်မဝင်ခင် ကျွမ်းကျင်မှုရှိစေရန် သင်တန်းပေးခြင်းစသည့် နည်းလမ်းများဖြင့် လျော့ချနိုင်သည်။ ကျန်းမာရေး ပညာပေးများပြုလုပ်ရန်

၁၀.၁ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၆) လူမှုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုနှင့်လုပ်ငန်းခွင်အန္တရာယ် (အဆက်)**

**စီမံကိန်းသက်တမ်းကုန်ဆုံး၍ ဖြိုဖျက်ရေးကာလ**

- အဆောက်အဦးဖြိုဖျက်ရေး လုပ်ငန်းများလုပ်ဆောင်ခြင်း၊ စက်ကိရိယာများသိမ်းဆည်းဖြုတ်ယူခြင်းနှင့် သယ်ယူခြင်း လုပ်ငန်းများမှ ဝန်ထမ်းလုပ်သားများအပေါ် ထိခိုက်မှုများရှိနိုင်သည်။ သယ်ယူရွှေ့ပြောင်းရာတွင် စနစ်ကျမှုမရှိခြင်းကြောင့် အနီးပတ်ဝန်းကျင်ရှိ လူများမတော်တဆဖြစ်ခြင်း။
- သက်ရောက်မှုလျော့ချရေးနည်းလမ်းများ- ကာကွယ်ရေးပစ္စည်းကိရိယာများတပ်ဆင်အသုံးပြုစေခြင်း၊ ရှေးဦးသူနာပြုရေး ဆောင်ရွက်ထားရှိခြင်းတို့ဖြင့် ထိခိုက်မှုများကို လျော့ချနိုင်သည်။ သတ်မှတ်ထားသော အမိုးအကာများဖြင့် စနစ်တကျ သယ်ယူရွှေ့ပြောင်းခြင်း။

၁၉.၁၂ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၇) စွန့်ပစ်ပစ္စည်းများ**

-ဆောက်လုပ်ရေးလုပ်ငန်းသုံး အကြွင်းအကျန်များ (ဘိလပ်မြေအိတ်များ၊ ဝါယာကြိုးစများ၊ သံတိုသံစများ၊ သစ်တိုသစ်စများ)၊ ဆောက်လုပ်ရေးဝန်ထမ်းများမှ ဝန်ထမ်းများမှ အစားအသောက်အကြွင်းအကျန်များ၊ မိလ္လာများ၊ မြေသားလုပ်ငန်းမှ စွန့်ပစ်မြေများ၊ ခုတ်ထွင်ရှင်းလင်းထားသော ခြံပင်နွယ်ပင်များ၊ ဖျက်သိမ်းရာမှထွက်ရှိလာသော အဆောက်အဦပစ္စည်းဟောင်းများ

-သက်ရောက်မှုလျှော့ချရေးနည်းလမ်းများ- စွန့်ပစ်ပစ္စည်းများစွန့်ပစ်နိုင်ရန် သင့်တော်သော စီမံအုပ်ချုပ်မှု ရေးဆွဲခြင်း၊ စွန့်ပစ်ပစ္စည်းများအား ခွဲခြားစွန့်ပစ်ခြင်း၊ အဟောင်း/ အပိုင်းအစများ ဝယ်သူများနှင့်ချိတ်ဆက် ထားခြင်း၊ အသုံးပြုရန်သည်များအား ပြန်သုံးခြင်း၊ မိလ္လာအား စနစ်တကျအသုံးပြု၍ ပုံမှန် စုပ်ထုတ်ရန်။



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၁၉.၁၂ ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများအား ဖြေလျှော့ရေးနည်းလမ်းများ

**၈) မီးဘေးအန္တရာယ်နှင့် လျှော့ချနိုင်ရန်ကြိုတင်ဆောင်ရွက်ရမည့် နည်းလမ်းများ**

- ခုတ်ထွင်ပြီး ခြုံနွယ်ပင်၊ ဝါးပင်များကို မီးရှို့သောအချိန်အပါအဝင် အခြားအချိန်များ တွင်လည်း မတော်တဆမီးလောင်မှုရှိနိုင်ပါသည်
- မီးဘေးအန္တရာယ်ကာကွယ်နိုင်ရန်အတွက် မီးသတ်ဆေးဘူးများနှင့် မီးသတ်ကိရိယာများကို လုံလောက်စွာ တပ်ဆင်ထားရမည်။
- မီးသတ်ဆေးဘူးများကိုလည်း သတ်မှတ်သုံးစွဲနိုင်သည့် ရက်ထက် ကျော်လွန်မှု ရှိ/မရှိအား လစဉ်စစ်ဆေးပေးရမည်။
- ဝန်ထမ်းနှင့်အလုပ်သမားများအား မီးဘေးနှင့်ပတ်သက်သည့် ပညာပေးဟောပြောပွဲများ၊ သင်တန်းများအား လစဉ် (သို့) ၄လတစ်ကြိမ် (သို့) ၆လ တစ်ကြိမ်ပြုလုပ်ပေးရမည်။
- မီးချိတ်/ကတ်နှင့် ရေပုံး၊ သဲများကိုလည်း အဆင်သင့်ထားရှိရမည်။
- မီးဘေးအကြို လေ့ကျင့်မှုများအား ဝန်ထမ်းများနှင့် အလုပ်သမားများကို လေ့ကျင့်ပေးထားရမည့် အပြင် အရေးပေါ်ကယ်ဆယ်ရေးအစီအစဉ်များ ရေးဆွဲထားရမည်။
- မီးဘေးနှင့်ပတ်သတ်၍ မြန်မာနိုင်ငံမီးသတ်ဦးစီးဌာနမှ ကြီးကြပ်ညွှန်ကြားချက်အတိုင်း ဆောင်ရွက်ရမည်။



## အလုပ်အကိုင်အခွင့်အလမ်းများရရှိနိုင်မှု နှင့် လူမှုစီးပွားရေးအကျိုးကျေးဇူးများ

- ဤစီမံကိန်းကြောင့် ဒေသပတ်ဝန်းကျင်တွင် နေထိုင်သူများအတွက် ကာလတိုအလုပ်အကိုင် အခွင့်အလမ်းများ ဖြစ်ပေါ်လာနိုင်သည်။
- လျှပ်စစ်ဓါတ်အားပေးလုပ်ငန်းဖြစ်သည့်အတွက် မိုင်းပျဉ်းမြို့၏ လူမှုစီးပွားရေး တိုးတက်မှုရှိမည်။
- စက်ရုံလည်ပတ်နေသည့်ကာလအတွင်း လုပ်ငန်းခွင်လိုအပ်ချက်အလိုက် ကိုက်ညီသည့် ကျွမ်းကျင်ဝန်ထမ်း လုပ်သားများ ခေါ်ယူခန့်ထားခြင်းနှင့် စပ်လျဉ်း၍ ကာလရှည် အလုပ်အကိုင် အခွင့်အလမ်းများ ဖြစ်ပေါ်လာနိုင်သည်။





### ပတ်ဝန်းကျင်ဆိုင်ရာအကျိုးသက်ရောက်မှုအဆင့်များ

ယခု ကနဦးပတ်ဝန်းကျင်လေ့လာဆန်းစစ်မှုများအရ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်အပေါ် အကျိုးသက်ရောက်နိုင်သော လုပ်ဆောင်ချက် (၂၈) မျိုးအားတွေ့ရပြီး ၎င်းတို့၏ ထိခိုက်မှုအဆင့်များကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း အစီအရင်ခံစာတွင် အသေးစိတ်ဖော်ပြထားပါသည်။

**၁၀.၃။ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုအား ထိန်းသိမ်းခြင်းကို စောင့်ကြည့်မည့် အစီအစဉ် (EMOP)**

စဉ်	ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်	တိုင်းတာမည့်အကြိမ်		တိုင်းတာမည့်နေရာ	
		ဆောက်စဉ်	တာဝိုင်လည်ပတ်စဉ်	ဆောက်စဉ်	တာဝိုင်လည်ပတ်စဉ်
၁	လေထုအရည်အသွေး	၄ လ တစ်ကြိမ်	၆ လ တစ်ကြိမ်	သင့်တော်သောနေရာ ၂ ခု	
၂	ဆူညံမှု	၃ လ တစ်ကြိမ်	ပထမ ၆လတွင် တစ်ကြိမ်၊နောက်ပိုင်း တစ်နှစ်တစ်ကြိမ်	Site နှင့် နီးသော နေရာ	တာဝိုင်ထားသောနေရာ
၃	ရေထုအရည်အသွေး	၃ လ တစ်ကြိမ်	ပထမ ၆လတွင် တစ်ကြိမ်၊နောက်ပိုင်း တစ်နှစ်တစ်ကြိမ်	Site နှင့် ချောင်းရေ	Powerhouse ဝင်းအတွင်းနှင့် တာဝိုင်တွင်သုံးပြုပြီးရေ
၄	မြေအရည်အသွေး	မြေသားခံနိုင်ရည်အား အနည်းဆုံးတစ်ကြိမ်တိုင်းတာရမည်		ဆောက်လုပ် မည့်နေရာ	စက်ပြင်သည့်နေရာ



### ၁၁။ အရေးပေါ်ကိစ္စများအတွက်စီမံချက်

စဉ်	အရေးပေါ်ကိစ္စ	ကြိုတင်ကာကွယ်ရေး နည်းလမ်း	ပေါ်ပေါက်ပါကဖြေရှင်းပည့်နည်းလမ်း
၁	မီးဘေး	<ul style="list-style-type: none"> <li>■ လျှို့ဝှက်အဆင့်အလိုက် မီးဘေး လျှို့ဝှက်ရေးစီမံချက် ရေးဆွဲခြင်း။</li> <li>■ မီးသတ်ကိရိယာများအား လုံလောက်စွာထားရှိခြင်း။</li> <li>■ ထွက်ပေါက် အစီအစဉ် ထားရှိရန်</li> </ul>	<ul style="list-style-type: none"> <li>▶ အရေးပေါ်အခြေအနေအား အခြားနေရာများသို့ မပြန် ပွားစေရန် ဆောင်ရွက်ခြင်း</li> <li>▶ လူနှင့်ပစ္စည်း ပျက်စီးဆုံးရှုံးမှု အနည်းဆုံးဖြစ်စေခြင်း</li> <li>▶ ထိရောက်သောကယ်ဆယ်မှု နှင့် ဆေးဝါးကုသမှုပေးခြင်း</li> <li>▶ ဘေးကင်းရာသို့ ရို့ ဆောင်ပေးခြင်း</li> </ul>
၂	ငလျင်ဘေး	အဆောက်အဦအား ငလျင်ဒဏ် ခံနိုင်စေရန် နိုင်ငံတကာအဆင့်နှင့် အညီ ဒီဇိုင်းရေးဆွဲတည်ဆောက်ခြင်း	


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### ၁၂။ လူမှုစီးပွားတာဝန်ယူမှု (Corporate Social Responsibility, CSR) အစီအစဉ်


စဉ်	ဆောင်ရွက်မည့်အစီအစဉ်
၁	ကျန်းမာရေးကဏ္ဍတွင် ဦးစားထားစေရေးလုပ်ငန်းများ
၂	ပညာရေးကဏ္ဍတွင် ဦးစားထားစေရေးလုပ်ငန်းများ
၃	စည်ပင်သာယာရေး နှင့် သဘာဝဘေးအန္တရာယ်ကြိုတင်ကာကွယ်ရေးလုပ်ငန်းများ
	စုစုပေါင်း ထည့်ဝင်ငွေ (အသားတင်အမြတ်၏ - ၂%)

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၁၂။ အကြံပြုချက်များ

- (၁) အဆိုပြုထားသည့် စီမံချက်များအား အကောင်အထည် ဖော်ဆောင်ရာတွင် ပတ်ဝန်းကျင် ထိခိုက်မှုအား တတ်နိုင်သမျှ အနည်းဆုံးဖြစ်စေမည့်နည်းလမ်းများဖြင့် ဆောင်ရွက်ရန်။
- (၂) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ သိမှတ်ဖွယ်ရာများကို စက်ရုံဝန်ထမ်းများ နှင့် စက်ရုံဝန်းကျင် အနီးရှိလူထုအား သိရှိစေရန် ပညာပေးကဏ္ဍများပြုလုပ်ရန်။
- (၃) အခါအခွင့်သင့်တိုင်း စက်ရုံဝန်ထမ်းများအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး၊ လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေးနှင့် လုပ်ငန်းကျွမ်းကျင်စေရန် သင်တန်းများပေးရန်။
- (၄) ရရှိလာသော တုန့်ပြန်မှုနှင့် အတွေ့အကြုံသင်ခန်းစာများအပေါ် အခြေခံ၍ ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံချက်များကိုမွမ်းမံရန်။
- (၅) သဘာဝဘေးအန္တရာယ်နှင့်ပတ်သက်သည့် သင်တန်းများပေးရန်။
- (၆) မီးဘေးသုံးပစ္စည်းများအား လုံလောက်စွာ ထားရှိရန်နှင့် ပစ္စည်းများအား ပုံမှန်စစ်ဆေးရန်။
- (၇) အလုပ်သမားများအား ကျန်းမာရေးစစ်ဆေးချက်ပုံမှန်လုပ်ပေးပြီး၊ အသက်အာမခံများထားပေးရန်။



သက်ရောက်လာသူများမှ သိလိုသည်များနှင့် အကြံပြုချက်များ မေးမြန်းဆွေးနွေးခြင်း



ကျေးဇူးအထူးတင်ပါသည်။

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**Appendix VIII - Attendance List of the Public Consultation Meeting**

မိဂျီမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ ဒေသခံပြည်သူများ                      ရက်စွဲ - ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈)ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁	ဦးအိ.စေး	၈၁၅၂၂၂၂	ဗဟိုအိ	၀၉-၂၅၀၁၁၁၁၁၁၁	
၂	ဦးခင်ဦး	၇၂၂၂၂၂၂၂	ဗဟိုအိ	၀၉-၂၅၀၁၁၁၁၁၁၁	
၃	ဦးအိ.စေး	"	ရေကန်ချေးကမ်းရိုးတန်း	၀၉-၂၅၀၁၁၁၁၁၁၁	
၄	ဦးတင်ထွဋ်	အုပ်ချုပ်ရေးဌာန	ရေကန်ချေးကမ်းရိုးတန်း	၀၉-၂၅၀၁၁၁၁၁၁၁	
၅	မအုလှ	<del>၇၂၂၂၂၂၂၂</del> အိမ်ထောင်ရေးဌာန	(၇၂၂၂၂၂၂၂) (ဝေလှေ)		၀
၆	မအုလှ	"	"		၀
၇	မအုလှ	"	"		၀
၈	မအုလှ	"	"		၀

မိဂျီမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ ဒေသခံပြည်သူများ                      ရက်စွဲ - ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈)ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၉	မအုလှ	<del>၇၂၂၂၂၂၂၂</del> အိမ်ထောင်ရေးဌာန	(၇၂၂၂၂၂၂၂) (ဝေလှေ)		၀
၁၀	မအုလှ	"	"		၀
၁၁	မအုလှ	"	"		၀
၁၂	မအုလှ	"	"		၀
၁၃	ဦးကျော်	"	"		၀
၁၄	ဒေါ်နန်းစိန်	"	မိုးပျဉ်း		
၁၅	ဦးခင်မောင်	ဦးခင်မောင်	မိုးပျဉ်း		
၁၆	ဦးခင်မောင်	ဦးခင်မောင်	မိုးပျဉ်း		



မိမိပြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ ဒေသခံပြည်သူများ ရက်စွဲ - ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈)ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်စနစ်	လက်မှတ်
၁၇	ဦးစိုးဦး	ဆရာ	၁၄၀	၀၇ ၂၅၀၄၇၇၇၂၇	
၁၉	ဦးအိပ်	လယ်	ကျောက်စွန်းကျေးရွာ	၀၇ ၂၀၉	
၂၀	ဦးစိုးဦး	ကျောက်စွန်း	ကျောက်စွန်းကျေးရွာ	၀၇၇-၇၀၀၇၉	
၂၁	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇၇၇၇-၇၇၇၇၇	
၂၂	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇၇၇၇၇၇၇	
၂၃	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇၇၇၇၇၇၇	
၂၄	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇၇၇၇၇၇၇	
၂၅	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇၇၇၇၇၇၇	

မိမိပြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ ဒေသခံပြည်သူများ ရက်စွဲ - ၂၀၁၆ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈)ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်စနစ်	လက်မှတ်
၂၆	ဦးစိုးဦး	လယ်	ကျောက်စွန်းကျေးရွာ	၀၇ ၂၅၀၁၃၁၆၂	
၂၇	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇ ၂၅၀၁၃၁၆၂	
၂၈	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ	၀၇ ၂၅၀၁၃၁၆၂	
၂၉	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		၀
၃၀	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		၀
၃၁	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		
၃၂	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		
၃၃	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		
၃၄	ဦးစိုးဦး	ကျေးရွာ	ကျေးရွာ		



ပိတ်ပြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/ အဖွဲ့အစည်း	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
၁။	ဦးထင်လွင်	အုပ်ချုပ်ရေးဗဟို	ဝန်ထမ်း ချေး ဝန်ထမ်း	၀၇၄၇၀၄၀၀၇၁	
၂။	ဦးဦးလှိုင်	"	ဒီပလိုမာ	၀၇၄၇၀ ၂၈၃၀	
၃။	ဒေါ်အေးအေး	ဒီပလိုမာ	ဒီပလိုမာ		
၄။	ဒေါ်အေးအေး	ဒီပလိုမာ	ဝန်ထမ်း ချေး ဝန်ထမ်း		
၅။	ဦးခင်စိန်	ဒီပလိုမာ	ဒီပလိုမာ		
၆။	ဒေါ်ခင်စိန်	ဝန်ထမ်း	ဝန်ထမ်း	၀၇-၄၅၈၀၃၇၇၇	
၇။	ဒေါ်ခင်စိန်	ဝန်ထမ်း	ဝန်ထမ်း	၀၇-၂၀၁၆၁၀၄၁၁	
၈။	ဒေါ်ခင်စိန်	ဝန်ထမ်း	ဝန်ထမ်း		

ပိတ်ပြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/ အဖွဲ့အစည်း	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
	ဒေါ်ခင်စိန်	ဒီပလိုမာ	ဒီပလိုမာ	၀၇ ၄ ၇၀ ၂၈ ၃၀	
	ဒေါ်ခင်စိန်	ဒီပလိုမာ	ဒီပလိုမာ		
	ဒေါ်ခင်စိန်	ဒီပလိုမာ	ဒီပလိုမာ	၀၇-၂၅၀-၁၅၁၄၈၈	
	ဒေါ်ခင်စိန်	ဒီပလိုမာ	ဒီပလိုမာ	၀၇-၂၅၀၀၂၃၁၁	



မီဂါမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်အေးအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ပုဂ္ဂလိကကုမ္ပဏီများ (Private Company)

ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

စဉ်	အမည်	ရာထူး	ကုမ္ပဏီ	ဆက်သွယ်ရန်စုန်း	လက်မှတ်
၁။	ဦးစောမင်း	M.D	မဂ္ဂါ ဖြန့်ဖြူးရေး နှင့် အင်ဂျင်နီယာဦးစီးဌာန	၀၉-၄၂၈၃၁၅၁၇၇	
၂။	ဒေါ်နန်းဖြူစိန်	Director	မဂ္ဂါ ဖြန့်ဖြူးရေး နှင့် အင်ဂျင်နီယာဦးစီးဌာန	၀၉-၂၆၂၇၁၇၁၁၇	
၃။	ဦးစွန်းဘိလိန်	Supervisor	မဂ္ဂါ ဖြန့်ဖြူးရေး နှင့် အင်ဂျင်နီယာဦးစီးဌာန	၀၉-၄၉၀၄၀၀၄၇	

မီဂါမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်အေးအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ အသေခံပြည်သူများ

ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်စုန်း	လက်မှတ်
	ဦးခင်	ဆောင်ရွက်	၂၅၂ ဘီလူး / ဘီလူး		✓
	ဦးစိုးကျော်စွန်း	ရွေးချယ်ရေး	ကျောက်စိမ်း၊ မြောက်ဘက်	၀၉၅၀၁၅၁၅၀၈	
	ဦးစိုးလှ	"	ကျောက်စိမ်း၊ တောင်	၀၉၄၄၅၅၀၄၄	
	ဦးစိုးကျော်စွန်း	"	ကျောက်စိမ်း	၀၉၄၂၆၂၂၅၅၅၆	
	ဦးစိုးကျော်စွန်း	"	ကျောက်စိမ်း၊ တောင်	၀၉၄၄၀၃၃၅၅၆	
	ဦးကျော်စွန်း	ဆောင်ရွက်	၂၅၂ ဘီလူး / ဘီလူး		✓
	ဦးကျော်စွန်း	"	"		✓
	ဦးကျော်စွန်း	"	"		✓





မီဂါမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

ရပ်မိရပ်ဖ/ ဒေသခံပြည်သူများ ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈)ရက်

စဉ်	အမည်	အလုပ်အကိုင်	နေရပ်လိပ်စာ	ဆက်သွယ်ရန်စနစ်	လက်မှတ်
	ဦးဆန်းစွန်း	၇၅၆/၆	၀၁၆၂၅	၀၉၄၄၈၀၅၀၈၄၀	
	ဦးမျိုးစိုး	"	(၆) ခုံ ၆ / ရွာယုစား		
	ဦးဟန်တင်	"	ဗိုလ်ချုပ်	၄၃၈၉၀၇၅၃	
	ဒေါ်နန်းစိန်	"	ကလေးတို့	၀၉၄၅၀၄၀၁၃၇	
	ဦးဂျော့	"	(၂) ခုံ ၆		၀
	ဦးကျွမ်	"	"		၀
	ဦးကျော်	"	"		၀
	မ.န.အိ	"	"		၀

မီဂါမြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း(IEE) နှင့် ပတ်သက်၍ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Hearing) သို့  
တက်ရောက်လာသူများစာရင်း

INGOs / NGOs / CSOs PO၃ ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

Sr./ စဉ်	Name/ အမည်	Organization/ Position အဖွဲ့အစည်း/ ရာထူး	Email address/ Phone no. အီးမေးလ်လိပ်စာ/ ဆက်သွယ်ရန်စနစ်	Signature/ လက်မှတ်
၁	ဒေါ်နန်းစိန်	မ.န.အိ	၀၉၂၅၀၁၅၁၄၁၉	
၂	ဦးစိုးစိုး	မေ.မေ.အေ.အေ.အေ.အေ.အေ	၀၈၄.၇၀၂၂၈	
၃	ဦးမျိုးကျော်	ကျေးရွာအုပ်စု	၀၉.၂၆၀၅၃၈၄၆၂	
၄	ဦးစိုးမင်း	ဒေါ်မေအေး	၀၉.၄၂၈၂၂၃၄၁၁	
၅	ဦးစိုးစိုး	ကျေးရွာအုပ်စု	၀၉၄၄၂၀၈၀၁၆၈	
၆	ဦးစိုးကျော်	ကျေးရွာအုပ်စု	၀၉၄၀၃၂၃၈၅	
၇	ဦးစိုးကျော်	"	၀၉၄၀၃၅၂၄၇	
၈	ဦးစိုးကျော်	"	၀၉၄၂၈၂၀၇၇၃	
	ဒေါ်နန်းစိန်		၀၉.၄၂၈၂၂၅၈၇၄	



ပိတ်မြန်မာစွမ်းအင်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်မည့်ရေအားလျှပ်စစ်ထုတ်လုပ်သည့် စီမံကိန်းအတွက်  
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တက်ရောက်လာသူများစာရင်း

INGOs /NGOs /CSOs ပါဝင်

ရက်စွဲ - ၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ၊ (၂၈) ရက်

Sr./ စဉ်	Name/ အမည်	Organization/ Position အဖွဲ့အစည်း/ ရာထူး	Email address/ Phone no. အီးမေးလ်လိပ်စာ/ ဆက်သွယ်ရန်နံပါတ်	Signature/ လက်မှတ်
၇.	ဒေါ်နုနုခိုင်	စာမပျံ့ပျံ့အဖွဲ့	၀၉-၅၅-၀၈၇-၇၀၆၃	
၁၀.	ဒေါ်နုနုခိုင်	အဖွဲ့အစည်း	၀၉-၅၅-၇၀၇၅	
၁၁.	ဒေါ်အေးအေး	အဖွဲ့အစည်း	မိမိ	
၁၂.	ဒေါ်အေးအေး	အဖွဲ့အစည်း	၀၉၅၂၅၂၂၇၇၇၇	
၁၃.	ဒေါ်အေးအေး	အဖွဲ့အစည်း		
၁၄.	ဒေါ်အေးအေး	အဖွဲ့အစည်း	၀၉၅၇၀၃၄၀၇၀	
၁၅.	ဒေါ်အေးအေး	အဖွဲ့အစည်း	၀၉၅၅၀၈၈၈၉၉၄	
၁၆.	ဒေါ်အေးအေး	အဖွဲ့အစည်း	၀၉၅၅၀၂၅၁၃၁၇	

၁၇ ဒေါ်အေးအေး အဖွဲ့အစည်း ၀



**Appendix IX Commitment Letter**



No. (11), Airport Avenue Road, (ဧလစ်ဘိယာလမ်း)  
Aangon Airport Road, Saw Bwar Gyi Gone Quarter,  
Insein Township, Yangon 11011, Myanmar.  
Tel: (95) 1 666512 Fax: (95) 19667757  
H.P (95) 9 44801676



Reg: TH 16/9463

**Commitment to follow and compliance with Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental (Quality) Emission Guidelines, Standard and Mitigation Measures stated in the Initial Environmental Examination (IEE) Report**

With Regard to the above matter, we, E Guard Environmental Services Co., Ltd has prepared the Initial Environmental Examination (IEE) Report for Namp-Peain Hydropower Project (Mega Myanmar Energy Company Limited) . Our company strongly commits that this IEE report has been prepared by following Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015), National Environmental Quality (Emission) Guidelines (2015) and other relevant environmental standards through successful implementation of mitigation measures stated in Initial Environmental Examination (IEE) Report.

Aye Thiha  
Managing Director  
E guard Environmental Services



Email: [info@eguardservices.com](mailto:info@eguardservices.com)

URL: [www.eguardservices.com](http://www.eguardservices.com)



## MEGA MYANMAR ENERGY CO.,LTD.

HYDRO-ELECTRIC DEVELOPMENT & CONSTRUCTION

No.116, Zizawar Road, Kan-auk Quarter, Taunggyi, Shan State, Myanmar.

**Commitment to follow Environmental Conservation Laws, Rules, Standards and Mitigation Measures Standards and Mitigation Measures State in the Environmental Management Plan (EMP) of the Report**

With regard to the above matter, we, **Mega Myanmar Energy Company Limited** will invest to construct **Hydropower house with Run of River type** in order to generate **Electricity for Mong Ping Township** from the **water of Namp-Peain Stream**. Our company strongly commits that all our operations will be performed in an environmentally friendly manner by following Environmental Conservation Law 2012, Environmental Conservation Rules 2014, and relevant environmental standards through successful implementation of mitigation measures stated in the Environmental Management Plan (EMP) of the Initial Environmental Examination (IEE) Report.

Zaw Min  
Managing Director  
MEGA MYANMAR ENERGY CO.,LTD.

Mobile : 09-428315177 : 09-49350127  
09-36014634

Res : 081-2123873



Mega Myanmar Energy Co., Ltd ၏ နမ့်ပိန်ချောင်း ရေအားလျှပ်စစ်စီမံကိန်း (၁၂၀၀ ကီလိုဝပ်) အတွက် တင်ပြလာသည့် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (Initial Environmental Examination-IEE) အစီရင်ခံစာအပေါ်စိစစ်တွေ့ရှိချက် ၊ သုံးသပ်အကြံပြုချက်များ နှင့် ပြန်လည်ဖြေကြားချက်များ။

စဉ်	စိစစ်တွေ့ရှိချက်များ	ထပ်မံဖြည့်စွက်ရမည့်အချက်များ	ပြန်လည်ဖြေကြားချက်များ
၁။	<p>စီမံကိန်းအကြောင်းအရာအကျဉ်းချုပ် (မြန်မာ-အင်္ဂလိပ်)၊ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်၊ စီမံကိန်းအဆိုပြုသူ၏ အကြောင်းအရာဖော်ပြချက်၊ လိုက်နာဆောင်ရွက်မည့်ဥပဒေမူဘောင် ဆိုင်ရာအချက်အလက်များ၊ အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးမှု လုပ်ငန်းစဉ်မှရလာဒ်အခြေအနေများ၊ စီမံကိန်းလုပ်ငန်းစဉ်အဆင့်တိုင်း အတွက်ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် များအား ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဖော်ပြထားသည်ကိုစိစစ်တွေ့ရှိရပါသည်။</p>	<p>အထူးသဘောထားမှတ်ချက်ပေးရန်မရှိပါ။</p>	
၂။	<p>လက်ရှိစီမံကိန်းပတ်ဝန်းကျင်အခြေအနေ</p>		



<p>(က) စာမျက်နှာ(၃၃)၊</p>	<p>စီမံကိန်းတည်နေရာသည် ငလျင်ဖုန်းများပြ မြေပုံမှတ်တမ်းအရ Zone II(Moderate Zone) နှင့် Zone III (Strong Zone) နှင့် နီးကပ်နေကြောင်း စိစစ်တွေ့ရှိရပါသည်။</p>	<p>စီမံကိန်းတည်နေရာသည် ငလျင်ဖုန်းများနှင့်နီးကပ်နေခြင်း၊ ၂၀၁၁ တွင် တာလေမြို့၌ ရစ်ချ်တာစကေး(၆.၈)အဆင့်ရှိ ငလျင်လှုပ်ခဲ့သည့် ရာဇဝင်ရှိခြင်းကြောင့် ငလျင်ဘေးအန္တရာယ်ကျရောက်ခဲ့ပါကတုန့်ပြန် ဆောင်ရွက်မည့်အစီအစဉ် (Emergency Response Plan)အား ပြင်ဆင်ရေးဆွဲတင်ပြရန်။</p>	<p>စီမံကိန်းတည်နေရာသည် ငလျင်ဖုန်းများနှင့် နီးကပ်နေခြင်း၊ ၂၀၁၁တွင်တာလေမြို့၌ ငလျင်လှုပ်ဖူးသည့် ရာဇဝင်ရှိခဲ့သော်လည်း ROR နည်းလမ်းဖြင့် ရေအားလျှပ်စစ်ထုတ်လုပ်ရာတွင် ဆည်တာတံအကြီးအမား တည်ဆောက်ခြင်း၊ ရေပိတ်ဖိလိယာများ လိုအပ်ခြင်းမရှိပါ (စာမျက်နှာ ၃၊ ၂၄၊ ၂၅၊ ၂၈ တွင်ဖော်ပြထား ပါသည်။)။ သို့သော် ငလျင်ဘေးကြုံတွေ့လာပါက မလိုလားအပ်သော ဆုံးရှုံးမှုများအား ကာကွယ်နိုင်ရန်အတွက် အခြေခံအဆောက်အအုံများနှင့် Hydraulic structure နှင့် Foundation များအား Design တွက်ချက်ရာတွင် Myanmar National Building Code(MNBC)2012 တွင်ပါဝင်သော သက်ဆိုင်ရာဒေသ၏ Seismic Design Criteria များအားထည့်သွင်းစဉ်းစားရန် စာမျက်နှာ ၄၀ တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။ သဘာဝဘေးအန္တရာယ် တွေ့ကြုံလျှင် ဘေးကင်းရာအရပ်သို့ ပြောင်းရွှေ့နိုင်ရေး အရေးပေါ် အစီအမံရေးဆွဲ၍ အလုပ်သမားများအား ချပြရှင်းလင်းသွားမည်ဖြစ်ကြောင်း စာမျက်နှာ ၇၀ တွင်ဖော်ပြထားပြီးဖြစ်ပါသည်။</p>
<p>၃။</p>	<p>ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆောင်ရွက်သည့်ကျွမ်းကျင်သူများ၏အကြောင်းအရာ ဖော်ပြချက်နှင့်လုပ်ငန်းတာဝန်များ (Terms of Reference)</p>		



(က)	စာမျက်နှာ(၇-၉)တွင် ဖော်ပြထားကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းဆောင်ရွက် သည့်ကျွမ်းကျင်သူများအားလုပ်ငန်း တာဝန်များအလိုက် ဖော်ပြထားသော်လည်း Public Consultation Meeting တွင် စီမံကိန်းအတွက်လေ့လာတွေ့ရှိချက်များအား ရှင်းလင်းတင်ပြသည့်Senior Consultant သည်စာမျက်နှာ(၇-၉)တွင် ဖော်ပြထားသော ကျွမ်းကျင်သူပညာရှင်စာရင်းတွင် ဖော်ပြထားခြင်းမရှိ၍ အဖွဲ့ဝင်တစ်ဦးချင်းစီ အလိုက်ကျွမ်းကျင်မှုနှင့် လုပ်ငန်းတာဝန်များအား စိစစ်ဖော်ပြရန်။	Senior Consultant ၏ ကျွမ်းကျင်မှုနှင့် လုပ်ငန်းတာဝန်များအား စာမျက်နှာ ၈ တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။
၄။	ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာသက်ရောက်မှုများအတွက် ဆန်းစစ်ချက်နှင့်ထိခိုက်မှုများအတွက်လျော့ပါးသက်သာစေမည့်နည်းလမ်းများ		
(က)	စာမျက်နှာ (၄၄-၅၈) တွင် ရေထု၊ လေထု၊ မြေထု၊ ရေအရည်အသွေး တိုင်းတာစစ်ဆေးခြင်း၊ ဆူညံသံ၊ တုန်ခါမှုစောင့်ကြည့်စစ်ဆေးခြင်း၊ လူထုဆွေးနွေးပွဲများမှ ဆန္ဒသဘောထား ရယူခြင်းများ ဆောင်ရွက်ခဲ့ကြောင်းနှင့် ထိခိုက်မှုလျော့နည်းသက်သာစေရန် နည်းလမ်းများဖော်ပြထားသည်ကို	စီမံကိန်းအတွက်ချောင်းမှရေလွှဲရယူမည်ဖြစ်၍ မူလနမူနာလိန်ချောင်း၏ ရေစီးရေလာ ပြောင်းလဲသွားမည်ဖြစ်ခြင်း၊ ချောင်းတစ်လျှောက်မှီခိုကျက်စားနေသော ရေနေသက်ရှိများ(Aquatic Ecosystem) အားထိခိုက်နိုင်ခြေရှိ၍၎င်းတို့အတွက်သီးခြား Aquatic Ecosystem Management Plan ရေးဆွဲတင်ပြရန်။	ချောင်း၏ရေစီးရေလာပြောင်းလဲနိုင်မှုနှင့် ချောင်းတစ်လျှောက် မှီခိုကျက်စားနေသော ရေနေသက်ရှိများ (Aquatic Ecosystem) အားထိခိုက်နိုင်ခြေများအား စာမျက်နှာ (၆၆)ရှိ Impact on Aquatic Ecology တွင်ဖြည့်စွက်ဖော်ပြထားပါသည်။  ဒေသခံများသည်ဝါးဖောင်သုံစွဲသွားလာခြင်း အတွက် နမ့်ပိန်းချောင်းအား မိုးအကုန်ဆောင်းအကူးနှင့် ဆောင်းရာသီတွင်သာ သုံးစွဲခြင်းဖြစ်ကြောင်း၊ စီမံကိန်း



	<p>စိစစ်တွေ့ရှိရပါသည်။</p>	<p>ဒေသခံများ၏နမ့်လိန်ချောင်းအတွင်း ဝါးဖောင်သုံးစွဲသွားလာနေခြင်းဖြစ်၍ ရေလွှဲ အဆောက်အအုံတည်ဆောက်ခြင်း ကြောင့် ချောင်းတစ်လျှောက်သွားလာမှုအပေါ် ထိခိုက်မှု မရှိစေရေးစီမံဆောင်ရွက်ထားရှိမှုအားရေးဆွဲ တင်ပြရန်။</p> <p>နမ့်လိန်ချောင်းသည် ကျိုင်းတုံ-မိုင်းပျဉ်း ကားလမ်းဘေး၊ တောင်စောင်းတွင် တည်ရှိခြင်း၊ စီမံကိန်းဧရိယာသည်မိုးများသည့် ဒေသတွင်တည်ရှိခြင်းဖြစ်၍ စီမံကိန်းဆက်စပ် အဆောက်အအုံများ အတွက် landslide ဖြစ်နိုင်ခြေအား ထည့်သွင်းစဉ်းစား၍ စီမံထားရှိမှုအားရေးဆွဲတင်ပြရန်။</p>	<p>တည်ဆောက်ရေးကာလမှာ နွေရာသီတွင် ဖြစ်ပြီး ချောင်းအတွင်းရေနည်းချိန်ဖြစ်ကြောင်း၊ စီမံကိန်း လည်ပတ်စဉ်ကာလတွင် ရေလွှဲတမံ၏ အပေါ်တွင် ဖြတ်သန်းစီးဆင်းနေသောရေကျော်အားဖြတ်၍ ဝါးဖောင်သုံးစွဲနိုင်ကြောင်း စာမျက်နှာ ၇၀ ရှိ Socio-economic Impacts အခန်း၌ ရှင်းလင်းတင်ပြထားပါသည်။ ထို့အပြင် စာမျက်နှာ ၈၈ ရှိ Table 7.1 Environmental Management Plan ၏ Item 13 တွင်လည်း ထည့်သွင်းထားပြီးဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ ဒေသခံများ ဝါးဖောင်သုံးစွဲသွားလာခြင်းအား ထိခိုက်မှုမရှိနိုင်ပါ။</p> <p>Land Slide ဖြစ်နိုင်ခြေရှိသည့်နေရာများတွင် မြေထိန်းနံရံ (Retaining wall) များတည်ဆောက်သွားမည် ဖြစ်ကြောင်းနှင့် သစ်ပင်များပြန်လည်စိုက်ပျိုးသွားမည် ဖြစ်ကြောင်း စာမျက်နှာ (၅၇)ရှိ Impact on soil and mitigation measure အခန်းတွင် ဖော်ပြထားပါသည်။ ထို့အပြင် စာမျက်နှာ ၈၂ ရှိ Table 7.1 Environmental Management Plan ၏ Item 1,2,3 တွင်လည်း ထည့်သွင်းထားပြီးဖြစ်ပါသည်။</p>
၅။	နိဂုံးချုပ်နှင့်အကြံပြုချက်များ		
	ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း၊အပိုဒ် (၃၆) နှင့်အညီ စီမံကိန်းလုပ်ငန်းစဉ်အဆင့်ဆင့်တွင်ပတ်ဝန်းကျင်ထိခိုက်မှု အနည်းဆုံးဖြစ်စေရန်၊		





	လုပ်ငန်းဆောင်ရွက်မှုအဆင့်ဆင့်အားလုပ်ငန်းရှင်မှအထူးကြပ်မတ်ဆောင်ရွက်သွားရန်။	
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