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簡易住民移転計画

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The Report of Initial Environmental Examination (IEE)

FOR

REGIONAL DEVELOPMENT PROJECT FOR POVERT REDUCTION PHASE II

REGIONAL ROAD AND BRIDGE SECTOR

IN

THE REPUBLIC OF THE UNION OF MYANMAR

May 2016

Yachiyo Engineering Co., Ltd.

Oriental Consultants Global Co., Ltd

Abbreviations

JICA	Japan International Cooperation Agency
WB	World Bank
ADB	Asian Development Bank
WHO	World Health Organization
ASEAN	Association of South East Asian Nations
MOECAF	Ministry of Environmental Conservation and Forestry
MOC	Ministry of Construction
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MOAI	Ministry of Agriculture and Irrigation
FERD	Foreign Economic Relations Department
ECD	Environmental Conservation Department
GAD	General Administration Department
ESE	Electricity Supply Enterprise
DRD	Department of Rural Development
DoH	Department of Highways
DoB	Department of Bridges
TDC	Township Development Committee
SLRD	Settlement and Land Record Department
PMU	Project Management Unit
EIA	Environmental Impact Assessment
IEE	Initial Environmental Examination
EMP	Environmental Management Plan
A-RAP	Abbreviated Resettlement Action Plan
MC	Monitoring Committee
TOR	Terms of Reference
PAP	Project Affected Person
PAU	Project Affected Unit
ROW	Right of Way
CT	Contractor
USD	United State Dollar
ODA	Official Development Assistant

UNITS

km^2	Square Kilometer
$\mu g/m^3$	Microgram per Cubic Meter
mg/l	Milligram Per Liter
°C	Degree Centigrade
ml	Milliliter
km	Kilometer

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CHAPTER 1 Introduction

1.1 Purpose of IEE

The purpose of this study is

- To inquiry the existing baseline data that describe all relevant physical, biological, social, cultural and economic characteristics of the potential project affected area through second source reviews and field investigation
- To evaluate the significance of potential adverse and beneficial impacts which could affect to the proposed project area by project activities of transmission line and substations construction and operation of the project
- To understand the past and current history of lands to be acquired and identify the loss of assets by projects activities
- To adopt effective mitigation measures that could avoid or mitigate the potential impacts to a level deemed as acceptable
- To define the appropriate environmental and social management and monitoring mechanism to be implemented throughout the life of project cycle

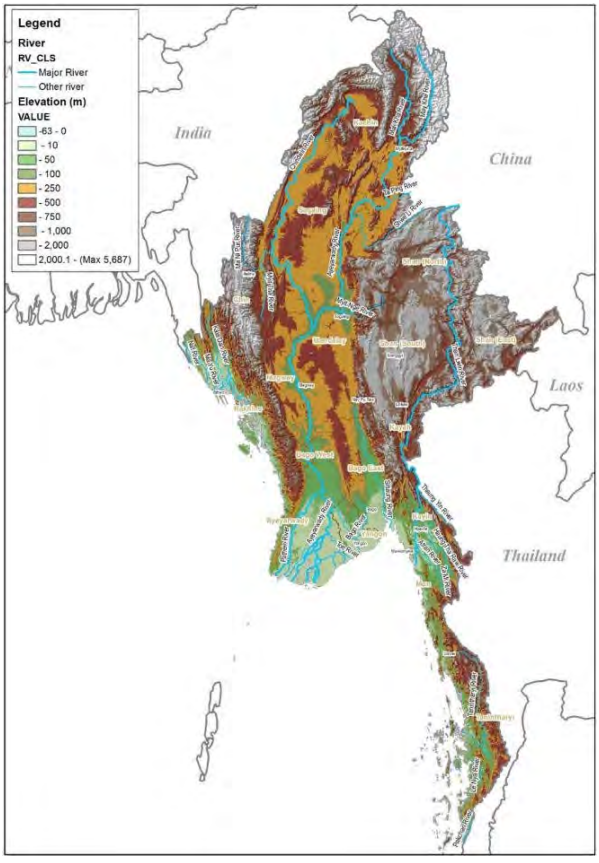
1.2 Outline of Environmental and Social Consideration

(1) Natural Condition

- *Physical Feature*: The topography of Myanmar can roughly be divided into three parts: the Western Hills Region, the Central Valley Region and the Eastern Hill Region.

- *Topography, Geology and Hydrology*: Myanmar is characterized by topographic features including mountain ranges in the north, east and west, and a long coastal strip in the south. Steep mountainous ranges traverse the entire western border of Myanmar with India and Bangladesh. Their average elevation is approximately 1,800 meters and the highest point is the top of Mt. Hkakaborazi reaching 5,881 meters above sea level. Myanmar has five main rivers: Ayeyarwady, Chindwin, Salween, Sittaung and Tenasserim, the longest of which being Ayeyarwady River, which is approximately 2,170 kilometers long, running through the country into the Gulf of Martaban. The East-West Economic Corridors passes Sittaung River, Salween River, Attran River, Gyaing River, Than Lwin River and Salween River.

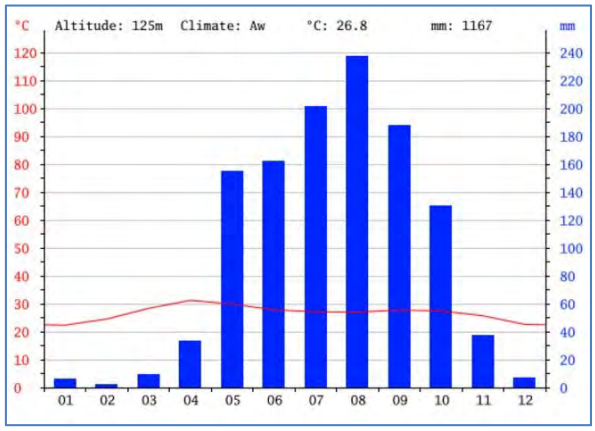
- *Climate*: The climate of Myanmar is roughly divided into three seasons: summer, rainy season and cold season. From March to mid-May are



Source: SRTM and Agricultural Atlas

Figure 1. 1 Topographic and Hydrological Feature

summer months; the rain falls from mid-May to the end of October and the cold season starts in November and ends in the end of February. Generally, Myanmar enjoys a tropical monsoon climate. However, climatic conditions differ widely from place to place due to widely differing topographical situations. For instance, Central Myanmar has an annual rainfall of less than 40 inches while the Rakhine coast gets about 200 inches. Besides, the average highest temperature in Central Myanmar during the summer months March and April is above 43.3 C° while in Northern Myanmar, it is about 36.1 C° and on the Shan Plateau between 29.4 C° and 35 C°. Temperature of towns varies according to their location and elevation. The average monthly temperature and precipitation of Nay Pyi Taw are shown as figure 1.2.

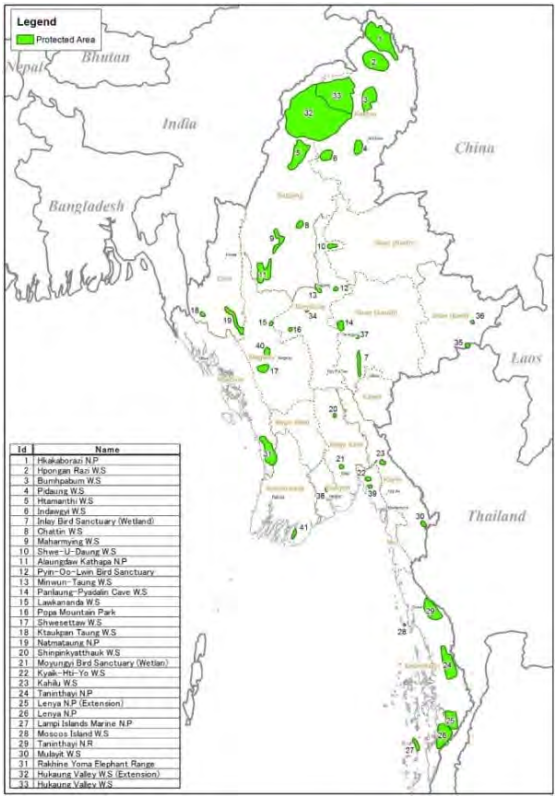


Source: Climate Data Org.

Figure 1. 2 Temperature and Rainfall in Nay Pyi Taw

- *Flora and Fauna*: Myanmar is endowed with a rich diversity of habitat types arising largely from its unusual ecological diversity. It is home to nearly 300 known mammal species, 300 reptiles, and about 100 bird species. The country is also a haven for about 7000 species of plant life. The potential worth of plant species in Myanmar is considerable. Since Myanmar considers such a rich pool of biodiversity as an important national asset, the government of the Union of Myanmar has drawn up strict regulations to protect its reservoir of biodiversity and biological resources.

- *Protected Area*: There are around 33 protected areas in Myanmar. These conservation zones are declared by laws as national parks, watershed reserves, wildlife preserves and sanctuaries.



Source: MOECAF

Figure 1. 3 Protect Area in Myanmar

(2) Social Condition

Myanmar has an estimated population of 51.4 million, consisting of diverse ethnic groups speaking over 100 languages and dialects. It is ranked 150 out of 187 countries on the Human Development Index. Economic growth has averaged 5 percent in recent years with a per capita income of USD$702. Socio-economic characteristic in Myanmar is shown as table 1.1.

Table 1. 1 Outline of Socio economic characteristic in Myanmar

Item	Description
Area (km^2) / Population (mil)	676,578 km^2 / 51.4 million people
Rural Population (%)	70 % (2015)
Poverty Rate (%)	26 % (2015)
Ethnic groups (%)	Burma 68%, Shan 9%, Kayin 7 %, Rakhine 3.5 %, Chinese 2.5 %, Mon 2 %, Kachin 1.5 % and other 135 small ethnic groups.
Religion (%)	Buddhism 74 %, Protestant 6 %, Islam 3%, Hinduism 2 %, other 11 % (2005)
Population by industry (%)	Primary 62.8 %, Secondary 11.9 %, Tertiary 25.3% (1998)
Land Use (%)	Agricultural Land 12 mil ha (18.7%), Forest 31,7 mil ha (48.6 %)
Export (2010): *92 hundred million USD*	Natural Gas 38.5%, Pearl 24.5 %, Beans 9.8 %, Timber 7.7 %, Cloths 4.4 % (to Thailand 41.7 %, Hong Kong 21.1 %, India 12.6 %, China 6.2 %, Singapore 3.6%)
Import (2010): *90 hundred million USD*	Oil 21.9 %, Machines 14.0 %, Iron & Steel 9.0 %, Textile 7.1 %, Electric Machine 5% (from China 27.1 %, Singapore 27.0 %, Thailand 11.4 %, S. Korea 6.1 %, Japan 5.3 %)

Source: Data book of the world 2014

1.3 Administrative System in Myanmar

The government body with primary responsibility for ensuring and promoting soundness of the environment in Myanmar is MOECAF (Ministry of Environmental Conservation and Forestry) although other Ministries such as the Ministry of Agriculture and Irrigation and the Ministry of Livestock, Fisheries and Rural Development also share certain level of responsibility. MOECAF was reformed in September 2011 from the Ministry of Forestry to be the focal point and coordinating agency for environmental management. While the role of MOECAF is not specified by law, responsibility of its predecessor (i.e. Ministry of Forestry) is stipulated in the Forest Policy (1995) as: forest land management; environmental protection; timber extraction; and forest policy in Myanmar. Since then, there has been only one modification to the structure of the Ministry, which is addition of ECD (Environmental Conservation Department) established in October 2012 based on Environmental Conservation Law. ECD is the department responsible for managing the EIA (Environmental Impact Assessment) process in Myanmar. The role of MOECAF in environmental conservation can therefore be considered greater than before. The Organization chart of MOECAF is as following figure.

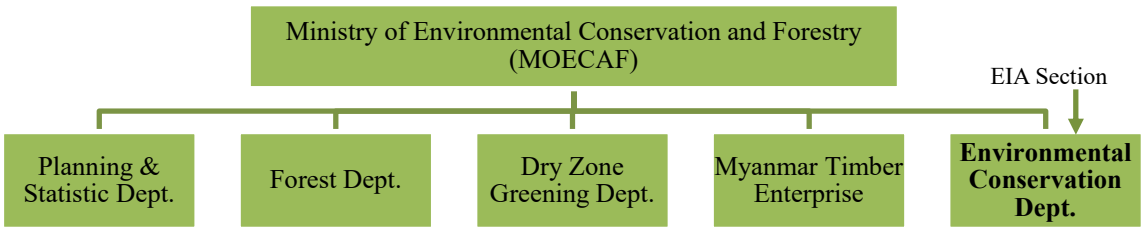


Figure 1. 4 Organizational chart of MOECAF

The role of ECD is mainly preparation and formulation of policy and strategy framework, planning of national and regional environment management, environmental licensing, pollution control, and monitoring of environmental impacts. Moreover, EDC also has the role of coordination and contribution for 1) integration of environmental issues into sector planning, 2) information

management and awareness promotion, 3) economic and financing instruments for environment and 4) international environmental agreements/ protocols/conventions. It can be said that while MOECAF mainly takes the role of decision making in many cases, ECD's role is mainly for preparation and implementation of duties relating to all environmental conservation works.

Different responsibilities of ECD are mainly categorized as 1) planning and coordination with sector authorities and different stakeholders, 2) control of pollution and other environmental impacts – establishment and administration of EIA, prior permissions, IEE, EMP including SIA, 3) management of environmental emergencies, 4) dissemination of environmental awareness, 5) establishing economic instruments and financing environmental management, and 6) enforcement and sanction. (Ref: Needs assessment for the implementation of the Environmental Conservation Law, UNDP, 2016)

The Environmental Conservation Department (ECD) has up of 156 officers and 247 staffs (403 in total) in 2015, under the supervision of the Director General at the Head Office, Nay Pyi Taw and 14 states in regions mentioned in the following diagram.

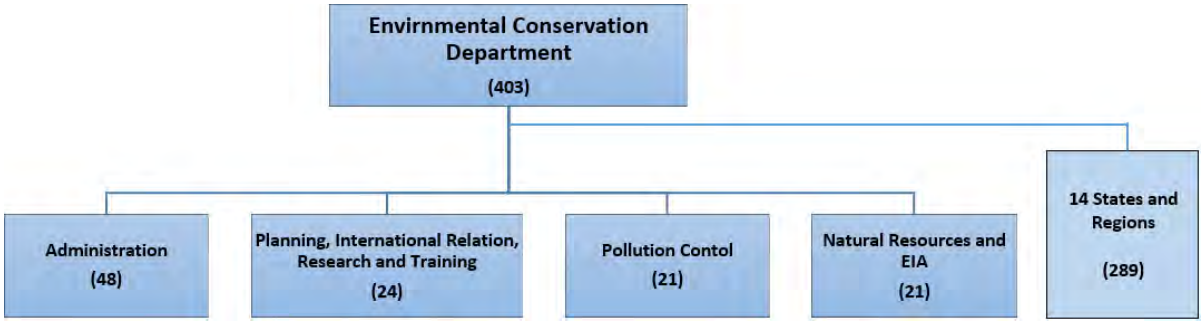


Figure 1. 5 The Organizational chart of ECD

CHAPTER 2 Policies, Legislation and Institutional Framework

2.1 Related Law and Regulations

(1) Environmental Conservation Law (2012)

The principal law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March, 2012 (The Pyidaungsu Hluttow Law No. 9/20/2130rh). The law stipulates which government bodies are in charge of environmental conservation as well as their relevant roles and responsibilities. It touches on water, noise, vibration and solid waste qualities but does not provide specific standards to be met. It also mentions both environmental and social impact assessments. In the context of project development, it is important to note that the law adopts the notion of 'polluter/beneficiary pays principle' as it implies that the project promoters are responsible for covering all environmental and social costs generated by the project. The law serves as the basis for founding ECD under MOECAF, both of which will be explained later. Following the Environmental Conservation Law are two legal arrangements: Environmental Conservation Rules; and EIA Procedures.

(2) Environmental Conservation Rules (2014)

Environmental Conservation Rules have been promulgated in 2014 and provides a platform to bridge the Environmental Conservation Law with more specific and practical rules and guidelines including EIA Procedures and environmental quality standards. However detailed guidelines for each responsible organizations, detailed guidelines, environmental standards and criteria of EIA & IEE (Initial Environmental Examination) will be provided after 2015 in the “EIA Procedure”.

(3) Environmental Impact Assessment (EIA) Procedures (2015)

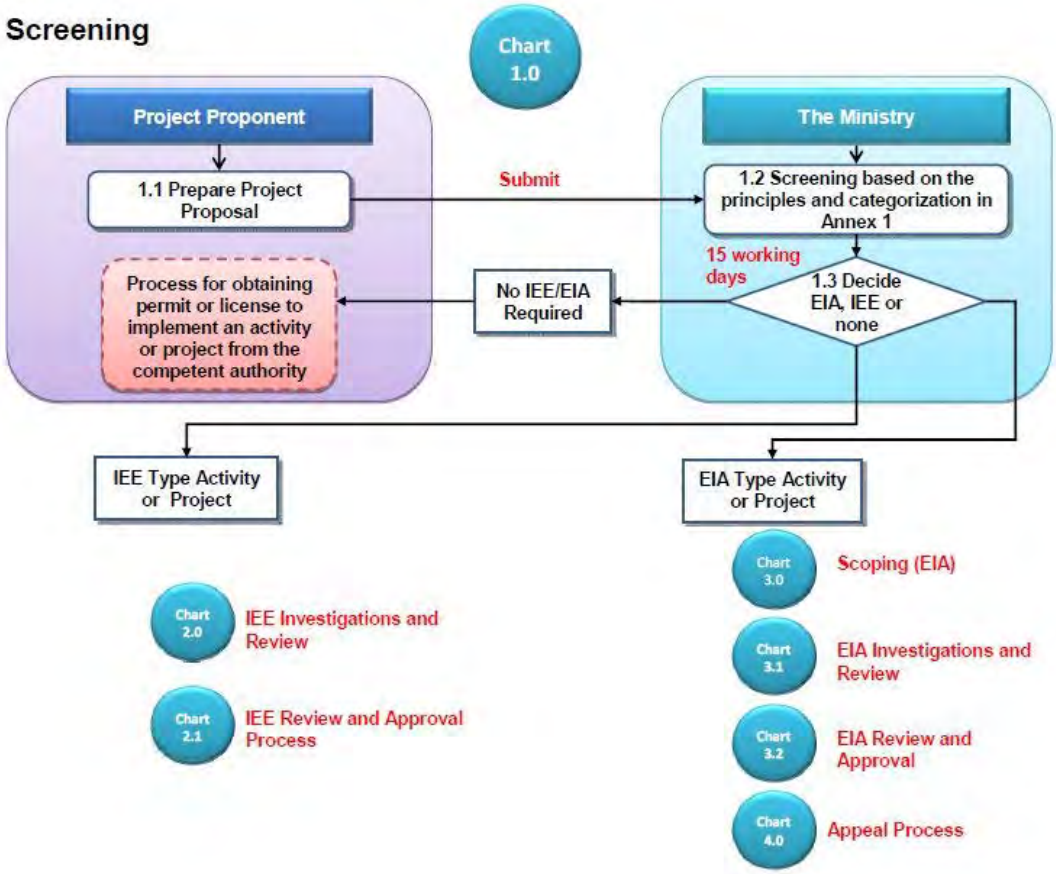
The EIA Procedures had been approved by cabinet in December 29, 2015. As of beginning of December, 2015, the Notification of EIA procedure was ongoing. It stipulates the conditions under which EIA is required and the steps to be followed in conducting and assessing the EIA. Under the Procedures, the Ministry, sets an Environmental Conservation Committee, is to give recommendations from an environmental point of view whether to approve the EIA reports or not. IEE and EIA include an Environmental Management Plan (EMP). The Procedures also include a clause for public participation in implementing the IEE, EIA, and EMP. It also mentions the notion of precautionary principle and touches on climate change, and also includes Strategic Environmental Assessment.

The Project Proponent should submit the Project Proposal to the Department (ECD) for Screening. ECD categorize the project as one of the following; 1) an EIA Type Project, or 2) an IEE Type Project or 3) neither an EIA Type Project nor an IEE Type Project, and therefore not required to undertake any environmental assessment.

Regarding IEE, prior to commencement of an IEE, the Project Proponent should inform to ECD in writing as to the identity of the organization(s) and/or person(s), who will undertake the IEE and reporting. The Project Proponent may carry out the IEE and reporting by itself or may appoint a

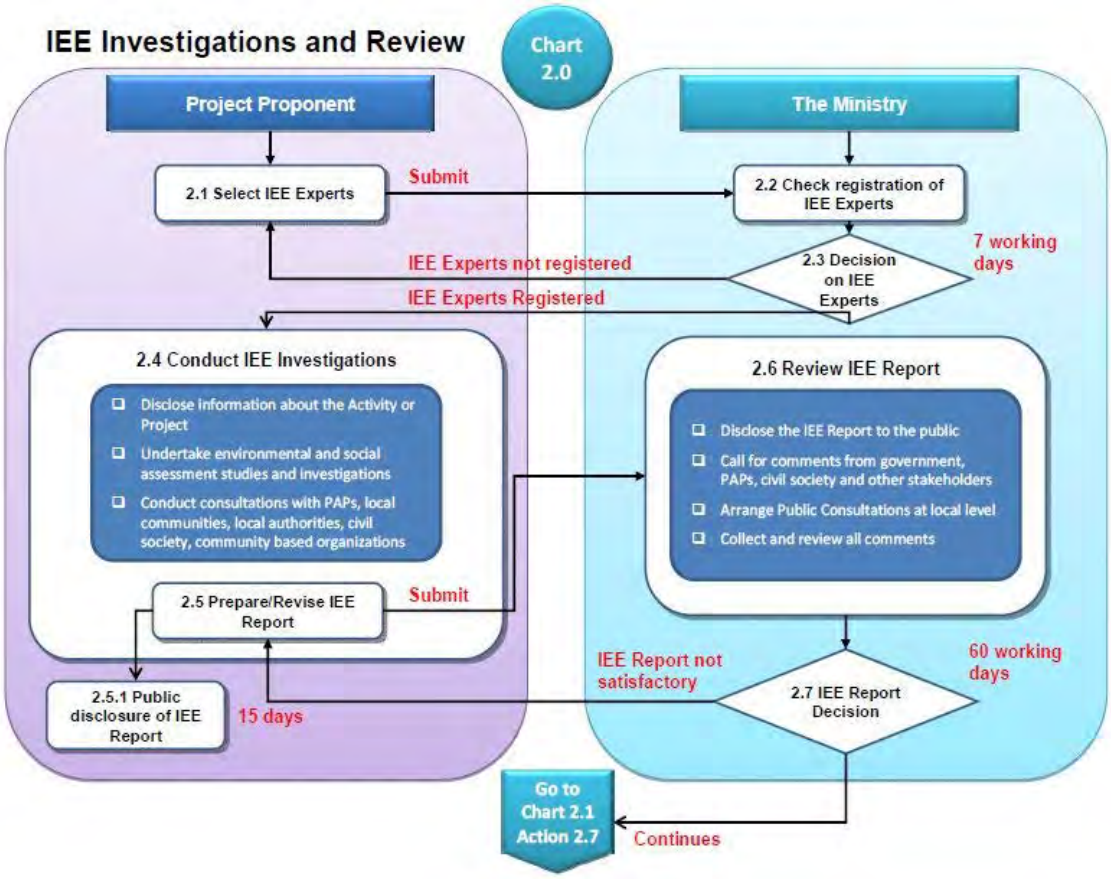
registered Consultant to do so. Within seven (7) working days of its receipt of information about the identity of any proposed organization(s) and/or person(s) selected by the Project Proponent to undertake the IEE, ECD will confirm whether such organization(s) and/or person(s) is/are in good standing with the Department. The Project Proponent should undertake the public consultation in regard to an IEE Type Project.

Screening and the IEE investigation and review process is as following figure;



Source: EIA Procedures 2015

Figure 2. 1 the Screening Process



Source: EIA Procedure 2015

Figure 2. 2 the IEE Investigation and review process

In regard to EIA, all EIA Type Projects should undergo Scoping. The Project Proponent shall be responsible to ensure that the Scoping and the preparation of the TOR for the EIA Report are undertaken in a professional manner. As part of the Scoping, the Project Proponent shall also ensure the public consultation and participation process is carried out.

Based on the Scoping, the Project Proponent shall prepare the TOR for the EIA investigations in accordance with applicable guidelines issued or adopted by the Ministry. The Project Proponent shall submit the completed Scoping Report and TOR to the ECD for review and approval.

The Project Proponent shall ensure that the EIA investigation properly addresses all Adverse Impacts and is undertaken in accordance with the TOR as approved by ECD. And EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities that may be affected by the Project during all project phase, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project. The investigations shall

include all necessary data collection, technical studies, modeling, field surveys, field sampling, laboratory analysis, engineering designs and calculations including alternative analysis. EIA procedure also stipulates the consultation process of EIA investigation.

2.2 Gap between JICA Guideline and Myanmar Legislation

Regarding policies for environmental and social considerations, those of JICA guidelines are basically same as those of World Bank and ADB. Table 2.1 shows results of comparison between the policies of Myanmar legislations including the EIA Procedures and those of JICA Guidelines. It is found that there are still considerable gaps between Myanmar legislations and JICA Guidelines.

Table 2. 1 Gaps between JICA Guidelines and Myanmar Legislation on EIA

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
(1) Underlying Principles		
1. Environmental impacts that may be caused by projects must be accessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types activities according to the defined thresholds. Article 35, 62 of the Procedures stipulates to analyze feasible alternatives as well as mitigation measures.
2. Such examinations must be endeavored to include an analysis of environment and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social and technical analyses of projects.	Procedures (A 36, 63)	Article 43, 69 of the Procedure stipulates to conduct in close harmony with the social and economic analysis of projects.
3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types to projects activities according to the defined thresholds. Article 35, 62 of the Procedure stipulates to analyze feasible alternatives as well as mitigation measures.
4. For projects that have a particularly high potential for adverse impacts or that are highly contentious, a committee of experts may be formed so that JICA may seed their opinions, in order to increase accountability.	Procedures (A 3)	Article 3 of the Procedures requires the establishment of Environmental Conservation Committee composed of at least five persons with necessary expertise. And the committee's duty is to recommend approval of the submitted IEE/EIA and EMP.
(2) Examination of Measures		
1. Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environment and social considerations. In the examination of measures, priority is to be given to avoidance of environmental impacts; when this is not possible, minimization and reduction of impacts must be considered next. Compensation measures must be examined only when impacts cannot be avoided by any of the aforementioned measures.	Procedures (A 35, 62)	Article 35, 62 of the Procedures stipulates to investigate of all potential environmental impacts including an analysis of feasible alternatives and mitigation measures. Conduct of compensation measure is not stipulated in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Appropriate follow-up plan and system, such as monitoring plans and environmental management plants, must be prepared; the costs of implementing such plans and systems, and the financial methods to find such costs, must be determined. Plans for projects with particularly large potential adverse impact must be accompanied by detailed environmental management plans.	Procedures (A 35,36,62,63)	Article 35, 62 of the Procedures stipulates to analyze feasible alternatives, mitigation measure as well as cost & benefit.
		Article 26, 63 of the Procedures requires the preparation of EMP for IEE/EIA required project.
(3) Scope of Impacts to Be Assessed		
1. The impacts to be accessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accident, water usage, climate change, ecosystem, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood , utilization of land and local resources, social institution such as social capital and local decision-making institution, existing social infrastructure and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. Items to be addressed in the specific project are narrowed down to the needed ones through the scoping process.	Procedures (A 56)	Article 56 of the Procedures stipulates that EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases including pre-construction, construction, operation, decommissioning, closure, and post-closure, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project.
2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project.	None	No laws were identified, which mentioned assessment and examination of derivative, secondary, and cumulative impacts as well as the impacts of projects which are indivisible from the project in a reasonable extent.
(4) Compliance with Laws, Standards, and Plans		
1. Projects must comply with the laws, ordinances, and standards related to environmental and social considerations established by the governments that have jurisdiction over project sites (including both national and local governments). They must also conform to the environmental and social consideration policies and plans of the governments that have such jurisdiction.	The Environmental Conservation Law 2012 (A 28, 29)	No law directly prescribes that projects must comply with the laws, ordinances, and standards related to environmental and social considerations.
		Article 28 of The Environmental Conservation Law prescribes that "No one shall, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under this Law"
		Article 29 of the law stipulated that "No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law."

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Projects must, in principle, be undertaken outside of protected areas that are specifically designated by laws or ordinances for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such areas). Projects are also not to impose significant adverse impacts on designated conservation areas.	The Protection and Preservation of Cultural Heritage Regions Law(Article 18)	This law stipulates that no person shall construct, extend, renovate a building or extend the boundary of ancient monumental zone or ancient site zone without prior permission granted under this law.
(5) Social Acceptability		
1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans.	Procedures (A 16,36)	Article 16 of the Procedures stipulates that EIA Review body shall have responsibility if EIA report comply with procedure (including public participation in conduct of IEE/ EIA and EMP.
		Article 36 of the Procedures stipulates that EIA report shall contain the results of the public consultation and public participation processes, recommendations received from the public, and the Project Proponent's written responses to comments received during that process.
2. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, and the poor and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.	Procedures (A 7)	Article 7 of the Procedures prescribes implementation of necessary actions for the project which potentially gives adverse impact on indigenous people and causes involuntary resettlement. However, the details of actions are not provided in the Procedures.
(6) Ecosystem and Biota		
1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests.	The Environmental Conservation Law 2012 (A 18)	The Environmental Conservation Law prescribes that relevant government departments/organizations shall carry out conservation, management, beneficial use, sustainable use and enhancement regional cooperation of environmental natural resources.
	The Forest Law 1992 (A 40)	Article 40 of the Forest Law (1992) prescribes that cause of any damage to reserved forest and its environment is prohibited and will be punished.
	The Protection of Wildlife and Conservation of Natural Areas Law 1994 (A 36)	Article 36 of The Protection of Wildlife and Conservation of Natural Areas Law prescribes that cause of any damage to protected areas is prohibited and will be punished.
2. Illegal logging of forests must be avoided. Project proponents etc. are encouraged to obtain certification by forest certification systems as a way to ensure the prevention of illegal logging	The Forest Law 1992 (A 17, 40)	The Law stipulates that forest produce may only be extracted after obtaining a permit.
(7) Involuntary Resettlement		
1. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impact on involuntary resettlement. However, the details of actions are not provided in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. Prior compensation, at full replacement cost, must be provided as much as possible. Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting means for an alternative sustainable livelihood, and providing the expenses necessary for the relocation and re-establishment of communities at resettlement sites.	Land Acquisition Act 1894 (A 3)	Article 3 of the Land Acquisition Act stipulates that a person who has right in land would be entitled to claim a compensation if the land were acquired under this Act.
	Farmland Rules 2012 (A 64)	Article 64 of Farmland Rules stipulates compensation in farmland acquisition for the interest of the State or public.
	Land Acquisition Act 1894 (A 23)	Article 23 of the Act stipulates that damages on standing crops and trees, on land, properties, incidental to relocate residence or business and losses of profits due to land acquisition are considered for compensation although it does not clearly state to support PAPs can improve or at least restore their standard of living. However, these laws do not clearly state any more details of compensation and supporting measures.
3. Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	Procedures (A 15)	Article 15 of the Procedures describes that relevant agencies, institutions, civil society organizations, and project-affected persons are invited as appropriate to provide comments and suggestions on the IEE/ EIA/ EMP reports. However, it does not describe grievance mechanism.
	Land Acquisition Act 1894 (A 5A, 18)	Article 5A of the Land Acquisition Act stipulates that any person whose land is affected (acquired) can claim the objection for the land acquisition within thirty
4. For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP4.12, Annex A.	None	No laws were specifically mentioned about the requirement of resettlement action plans for large-scale involuntary resettlement.
		According to GAD (General Administration Department) of MOHA (Ministry of Home Affairs), Land Acquisition and Resettlement Action Plan (LARAP) will be required for the large-scale developments and the GAD will approve it.
(8) Indigenous People		
1. Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous people for their losses.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. When projects may have adverse impacts on indigenous people, all of their rights in relation to land and resources must be respected in accordance with the spirit of relevant international declarations and treaties, including the United Nations Declaration on the Rights of indigenous Peoples. Efforts must be made to obtain the consent of indigenous peoples in a process of free, prior, and informed consultation.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.
3. Measures for the affected indigenous peoples must be prepared as an indigenous peoples plan (which may constitute a part of other documents for environmental and social consideration) and must be made public in compliance with the relevant laws and ordinances of the host country. In preparing the indigenous peoples plan, consultations must be made with the affected indigenous peoples based on sufficient information made available to them in advance. When consultations are held, it is desirable that explanations be given in a form, manner, and language that are understandable to the people concerned. It is desirable that the indigenous peoples plan include the elements laid out in the World Bank Safeguard Policy, OP4.10, Annex B.	Procedure (A7)	The procedure prescribes that project proponent shall additionally comply with separate procedure when Indigenous People might be affected.
(9) Monitoring		
1. After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results of such monitoring.	Procedures (A 3, 71-75)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
		Environmental Conservation Committee shall carry out monitoring of the implementation of the approved EMP by the project proponent although there was little information regarding the method or terms of the monitoring conduction.
2. In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans.	Procedures (A 3)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
3. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.	None	No laws were identified, which stated that project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.

Note: JICA - JICA Guidelines for Environmental and Social Considerations, WB - World Bank Safeguard Policy, Procedures - Environmental Impact Assessment Procedures (2015), A - Article.

Source: JICA Guidelines for Environmental and Social Considerations (2010.4) and World Bank OP 4.12 and relevant Myanmar legislation

2.3 Environmental Quality Standards

(1) Outline of Environmental Quality Standards

In Myanmar, MOECAF had been already stipulated the environmental quality standards for each specific parameter, in December 29 2015, according to the following statement in the Environmental Conservation Law (2012):

- The Ministry may, with the approval of the Union Government and the Committee, insert, modify and stipulate the environmental quality standards for the interests of the public in accord with the scientific and technological advances or requirement of work according to time and area.
- If any environmental quality standard stipulated by any Government department, Government organization under any existing law is more stringent than the quality standard stipulated by the Ministry, it shall remain in force; however if it is less stringent than such standard, only the standard stipulated by the Ministry shall be in force.

These national Environmental Quality (Emission) Guidelines had been already approved in Pyidaungsu Hluttaw (Union Parliament), on the purpose to provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

So, all the developers in Myanmar must be in compliance with those Guidelines, in which two main sectors were categorized – (1) General Guidelines and (2) Industrial-specific Guidelines. They must try not to exceed those emission and/or discharge standards and environmental standards classified in those Guidelines.

(2) Pollution control standards of General Guidelines

2.1 Air Emission

According to MOECAF (ECD – Environmental Conservation Department), Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that – (i) emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines for the most common pollutants as summarized below; and (ii) emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e. not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed. Table 2.2 shows general air quality standards.

Table 2. 2 Air Emission Standards of ECD

No	Parameter	Averaging Period	Guideline Value µg/m^3
1	Nitrogen dioxide (NO_2)	1-year	40
		1- hour	200
2	Ozone (O_3)	8-hour Daily maximum	100
3	Particulate Matter PM_{10}	1-year	20
		24-hour	50

No	Parameter	Averaging Period	Guideline Value µg/m³
4	Particulate Matter $PM_{2.5}$	1- year 24- hour	10 25
5	Sulfur dioxide (SO_2)	24-hour 10-minute	20 500

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.2 Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Table xxx shows the standards for waste water discharges.

Table 2. 3 Standards for Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

No	Parameter	Unit	Guideline Value
1	5-day Biochemical oxygen demand	mg/l	50
2	Ammonia	mg/l	10
3	Arsenic	mg/l	0.1
4	Cadmium	mg/l	0.1
5	Chemical oxygen demand	mg/l	250
6	Chlorine (total residual)	mg/l	0.2
7	Chromium (hexavalent)	mg/l	0.1
8	Chromium (total)	mg/l	0.5
9	Copper	mg/l	0.5
10	Cyanide (free)	mg/l	0.1
11	Cyanide (total)	mg/l	1
12	Fluoride	mg/l	20
13	Heavy metals (total)	mg/l	10
14	Iron	mg/l	3.5
15	Lead	mg/l	0.1
16	Mercury	mg/l	0.01
17	Nickel	mg/l	0.5
18	Oil and grease	mg/l	10
19	pH	S.U	6-9
20	Phenols	mg/l	0.5

21	Selenium	mg/l	0.1
22	Silver	mg/l	0.5
23	Sulphide	mg/l	1
24	Temperature increase	˚C	< 3
25	Total coliform bacteria	100 ml	400
26	Total phosphorus	mg/l	2
27	Total suspended solids	mg/l	50
28	Zinc	mg/l	2

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.3 Regulation of Wastewater Discharge

Nobody shall be allowed to dispose and/ or flow sewage and wastewater from any activity, such as business, factory, into drainage, creeks and rivers without necessary treatment for compliance with standards, norms and criteria designated by MOECAF (ECD).

So, in addition to general and industry-specific wastewater guidelines applicable during project operations, MOECAF (ECD) had also stipulated the following guideline values to be applies during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

Table 2. 4 Standard for Site Runoff and Wastewater Discharges (Construction Phase)

No	Parameter	Unit	Maximum Concentration
1	Biological oxygen demand (BOD)	mg/l	30
2	Chemical oxygen demand (COD)	mg/l	125
3	Oil and grease	mg/l	10
4	pH	S.U	6-9
5	Total coliform bacteria	100 ml	400
6	Total nitrogen	mg/l	10
7	Total Phosphorus	mg/l	2
8	Total suspended solids	mg/l	50

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Water Quality Standards

With regard to the water quality, however, the guidelines proposed in the workshops in 1990 and 2011 (Draft), and the World Health Organization (WHO) Guidelines were compared in Table 2.5. Compared with 1990, the values for 2011 tended to be closer to the WHO Guideline. However, for copper and iron, the values are less strict than in the WHO Guidelines.

Table 2. 5 Water Quality Standards in Myanmar

No.	Parameters	Unit	Myanmar Standard		WHO Guideline
			1990	2011 (Draft)	
1	pH	-	6.5-9.2	6.5-8.5	Preferably<8.0
2	Turbidity	NTU	20	5	5
3	Color	Pt-unit	6.5-9.2	15	15
4	Aluminum (Al)	mg/l	0.2	0.2	0.2
5	Arsenic (As)	mg/l	0.05	0.05	0.01
6	Calcium (Ca)	mg/l	75-200	100	-
7	Chloride (Cl)	mg/l	200-600	250	250
8	Copper (Cu)	mg/l	1.0	2.0	1.0
9	Cyanide (CN)	mg/l	0.05	0.07	0.07
1	Hardness	mg/l	500	500	-
11	Iron (Fe)	mg/l	0.5-1.5	1	0.3
1	Manganese (Mn)	mg/l	0.3	0.3(0.1)	0.1
1	Lead (Pb)	mg/l	0.05	0.01	0.01
1	Magnesium (Mg)	mg/l	30-150	500	-
1	Nitrate (NO3)	mg/l	10(as N)	50	-
1	Sulfate	mg/l	400	250	250
1	Total dissolved	mg/l	1000	1000	1000
1	Zinc (Zn)	mg/l	5-15	3	3
1	Total Coliform	No/100ml	0	0	0
2	E.Coli	No/100ml	0	0	0

Source: The Study on the Improvement of Water Supply and Wastewater Treatment in Yangon (2012, METI, Japan)

2.5 Noise Level Standards

Noise level standards are stipulated by MOECAF (ECD) as in Table 2.6.

Table 2. 6 Noise Level Standards

No	Receptor	One Hour LAeq (dBA)	
		Daytime 07:00 – 22:00 (10:00 – 22:00 for Public holidays)	Nighttime 22:00 – 07:00 (22:00 – 10:00 for Public holidays)
1	Residential, Institutional, Educational	55	45
2	Industrial, Commercial	70	70

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Institutional Framework for Environmental Conservation

Related to the sub-projects of road sector, Implementing and Responsible Agency is MOC (Ministry of Construction), which control all environmental management and monitoring process of this project. To share the information between MOC and MOECAF (i.e. attend meeting among the related agencies regarding the environmental issue) and to prepare the Environmental Report (i.e. IEE.EIA), MOC allocated the contact person. Regarding the Power Supply Sector, implementing and responsible agency is ESE (Electricity Supply Enterprise, Ministry of Electric Power) in case of On-grid, and DRD (Department of Rural Development, Ministry of Livestock, Fisheries and Rural Development) in case of Off-grid. DRD is also implementing and responsible agency related to the Water Supply Sector.

CHAPTER 3 Scope of the Study

3.1 Outline of the Project and its Components

(1) Outline of Sub-projects

List of the sub-projects of road and bridge sector is shown in Table 3.1.

Table 3. 1 The List of the Sub-projects

No.	Project No.	State/Region	Length (km)
1	MOC - 02	Kayah State	29.92 km
2	MOC - 03	Kayin State	77.76 km
3	MOC - 04	Chin State	80 km
4	MOC - 05	Sagaing Region	52.96 km
5	MOC - 06	Bago Region	16.64 km
6	MOC - 07	Magway Region	14.72 km
7	MOC - 12	Mon State	17.60 km
8	MOC - 14	Rakhine State	43.20 km
9	MOC - 17	Shan State	39.20 km
10	MOC - 18	Ayeyarwaddy Region	32.32 km

Source: JICA Preparatory Survey Team

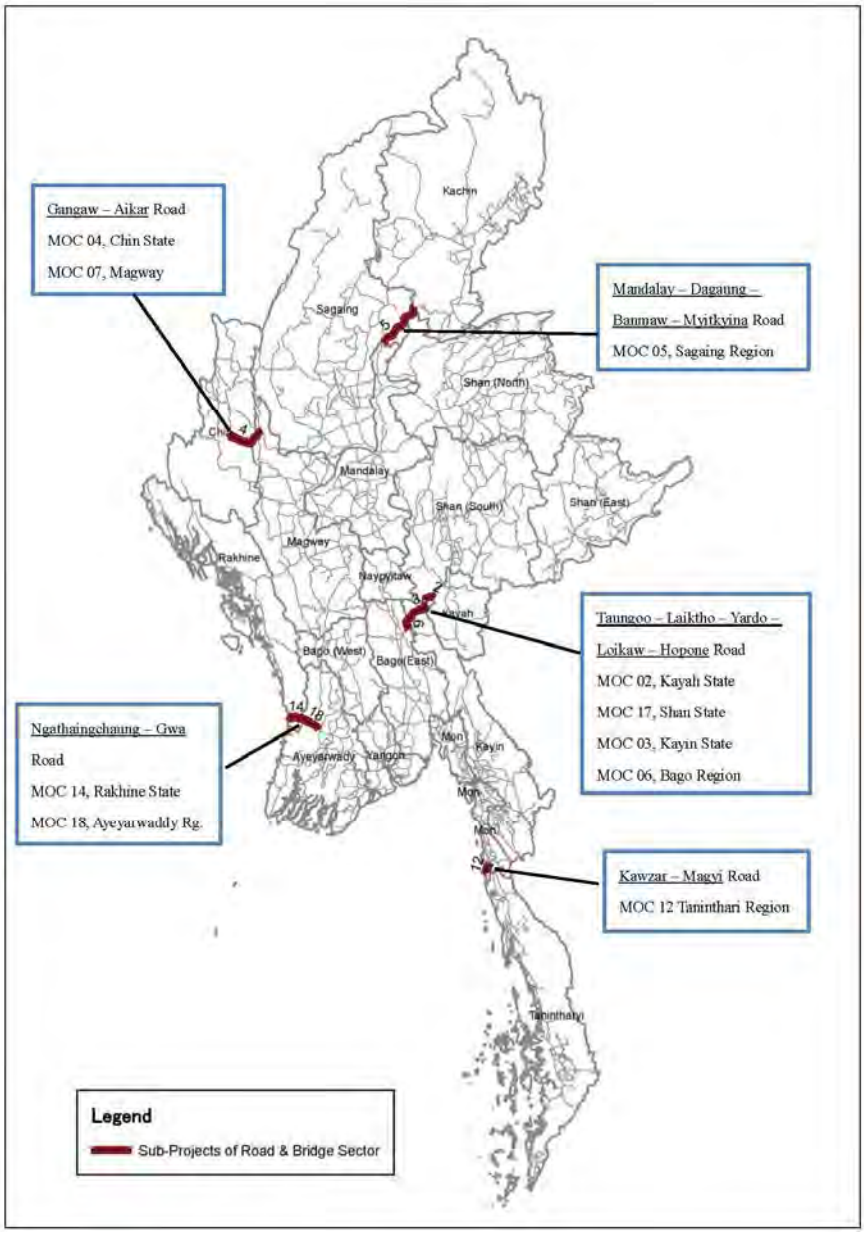
The outline of sub-projects of road and bridge sector (short-list) is shown in Table 3.2.

Table 3. 2 the outline of sub-projects of road and bridge sector

No.	Sub-Project No.	Project Components
1	MOC-02, Kayah State	Current 12' bituminous road (18miles 7furlongs) will be improved into 18' bituminous road. 12 numbers of RC bridges and installation of drainage, guard rail and retaining wall shall be included in the sub-project.
2	MOC-03, Kayin State	Current 10 miles of 12' bituminous road will be improved into 18' bituminous road. In addition, road formation width will be widened to be 40'. Seven (7) numbers of RC bridges, one (1) number of box culvers shall be included in the sub-project.
3	MOC-04, Chin State	Current earth road with 50 miles in length will be improved into one lane (3.65m) bituminous road. 20 number of box culvers shall be included in the sub-project.
4	MOC-05, Sagaing State	Current 33 miles 1 furlongs of earth road will be improved into 18' bituminous road. 27 existing timber bridges shall be replaced to RC bridges in the sub-project.
5	MOC-06, Bago Region	Current 12' bituminous road with 10 miles 4 furlongs in length will be improved into 18' bituminous road.
6	MOC-07, Magway Region	Current unpaved road with 9 miles 2 furlongs in length will be improved into 1.5 lane (5.5m) bituminous road. One (1) number of RC bridge, 10 numbers of box culvert and installation of stone masonary retaining wall shall be included in the sub-project.
7	MOC-12, Mon State	Current 11 miles of earth road will be improved into 18' bituminous road. Five (5) number of RC bridges and 10 number of box culverts shall be included in the sub-project.
8	MOC-14, Rakhine State	Current bituminous road with 27 miles in length will be improved into 1.5 lane (5.5m) bituminous road.
9	MOC-17, Shan State	Current 12' bituminous road (24 miles 7furlongs between 75/0 to 99/5) will be improved into 18' bituminous road. Four (4) number of RC bridges, 34 number of box culvers and installation of drainage, guard rail and retaining wall shall be included in the sub-project.
10	MOC-18 Ayeyarwaddy Region	Current 12' bituminous road with 22 miles 2 furlongs in length will be improved into 1.5 lane (5.5m) bituminous road.

Source: JICA Preparatory Survey Team

It should be noted that most of the sub-projects are connected as in one route. (i.e., MOC 02+03+06+17 in one route, MOC 04+07 in another route and MOC 04+18 in another route). The connected sub-projects can be studied in Figure 3.1.



Source: JICA Preparatory Survey Team

Figure 3. 1 Location Map of the Sub-projects

(2) Current Condition of the Sub-projects

Current condition of the sub-projects are described in Table 3.3

Table 3. 3 Current Condition of sub-projects of roa d and bridge sector

No.	Sub-Project	Current Condition
1	MOC-02, Kayah State	Taungoo – Laik Tho – Yar Do – Loikaw – Ho Pone Road is 334.74 km in length and passes Bago Region, Kayin State, Shan State and Kayah State. The targeted section is located in Kayah State and consists currently of 29.92 km 12' bituminous road. Under the budget for fiscal year of 2015-2016, bituminous pavement for the section between 75/0 to 120/0 will be rehabilitated. Current traffic volume is approximately 40 vehicles per day by MoC since the section in Shan State and Kayin State (Mountain Area) is inferior in road condition (unpaved and narrow). Three hours are necessary at least once the road is closed to traffic for rehabilitation due to landslides during rainy season. The public bus connecting Taungoo to Loikaw has been suspended since 2014 due to the poor road condition and low safety. Under the poor road condition, the traffic to/from Yangon is compelled to detour to the other route (Taungyi – Meiktila – Yangon) in spite that the "Taungoo – Leik Tho – Yar Do – Loikaw – Ho Phone Road" is the shortest route to Yangon. In terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder. Under the above situation, residents along the route have difficulty in access to public facilities and regional / urban economic centers.
2	MOC-03, Kayin State	Taungoo – Laik Tho – Yar Do – Loikaw – Ho Phone Road is 334.74Km in length and passes Bago Region, Kayin State, Shan State and Kayah State. The targeted section is located in Kayin State and consists currently of 77.76km (20/2 – 69/0) 12' bituminous road However, around 20% of the targeted section has been heavily damaged. Current traffic volume is approximately 40 vehicles per day by MoC since the section in Shan State and Kayin State (Mountain Area) is inferior in road condition. The route is passable even in rainy season, however three hours are necessary at least once the road is closed to traffic for rehabilitation due to landslides etc. The public bus connecting Taungoo to Loikaw has been suspended since 2014 due to the poor road condition and low safety. Under the poor road condition, the traffic to/from Yangon is compelled to detour to the other route (Taungyi Meiktila – Yangon) in spite that the "Taungoo – Leik Tho – Yar Do – Loikaw – Ho Phone Road" is the shortest route to Yangon. In terms of road safety, it is difficult/ dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder.Under the above situation, residents along the route have difficulty in access to public facilities and regional / urban economic centers.
3	MOC-04, Chin State	Gan Gaw – Aika Road is totally 80km in length and passes Magway Region and Chin State. The targeted section is located in Chin State and consists currently of 50 miles (24/7 – 74/7) unpaved (granular or earth) road. Currently, embankment widening is being implemented under the budget for 2015- 2016. For the existing road, mountain areas on the route are cut with the height of about 10m to 30m and with very steep slopes without slope protection although most of the mountains along the route consist of brittle clay. Therefore, landslides are frequently observed after heavy rain and the road cannot be frequently passable during less than a day. It is very dangerous for the users since the existing earth road in the mountain area is easy to become slipper and flooded during rainy season. Under the above situation, residents along the route, who are approximately 1,000 people, have difficulty in access to public facilities and regional / urban economic centers.
4	MOC-05, Sagaing State	Mandalay – Dagaung – Bhamaw – Myityina Road (Mya Taung - Tharyar Gone Section) is a part of the route from Mandalay to Myitkyina, the capital of Kachin State. The targeted section is totally 35 miles in length and mostly consists of earth road. The section is usually

		passable in rainy season, however, the route is occasionally closed for several days in the case of floods after heavy rains. For instance, duration of closure was three days for ordinary cars or five days for large vehicles since bridges along the route was collapsed due to the flood last rainy season. Public bus line between Mandalay and Bha Mo is currently operated with five runs per day and it takes 14 hours for one way due to the bad road condition. At present, the crops is transported to Mandalay by river traffic along the Ayeyarwaddy River, which needs two days for one way. Under the above situation, the residents face to difficulty in social access in rainy season.
5	MOC-06, Bago Region	Taungoo – Laik Tho – Yar Do – Loikaw – Ho Phone Road is 208miles in length and passes Bago Region, Kayin State, Shan State and Kayah State. The targeted section is located in Bago Region and consists currently of 10 miles 6 furlongs (7/6 – 18/2) 12' bituminous road. Road surface of this section is in good condition compared with other sections in Kayin State and Shan State. Current traffic volume is approximately 40 vehicles per day by MoC since the section in Shan State and Kayin State (Mountain Area) is inferior in road condition. The route is passable even in rainy season, however three hours are necessary at least once the road is closed to traffic for rehabilitation due to landslides etc. The public bus connecting Taungoo to Loikaw has been suspended since 2014 due to the poor road condition and low safety. Under the poor road condition of the sections in Kayin State and Shan State, the traffic to/from Yangon is compelled to detour to the other route (Taungyi – Meiktila – Yangon) in spite that the "Taungoo – Leik Tho‐Yar Do – Loikaw – Ho Phone Road" is the shortest route to Yangon. In terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder. Under the above situation, residents along the route have difficulty in access to public facilities and regional / urban economic centers.
6	MOC-07, Magway Region	Gan Gaw – Aika Road is totally 75miles 2 furlongs in length and passes Magway Region and Chin State. The targeted section is located in Magway Region and consists currently of 13 miles 2 furlongs (3/4 – 16/6) unpaved road. Currently, embankment widening for the section of 7/4 – 16/6 is being implemented under the budget for 2015- 2016. RC bridge (40' in length and 24' width) will be constructed until February 2015 by MoC. The targeted section is not flooded unlike the section in Chin State, however the travel time from Aika to Gangaw is totally about 6 hours even in dry season since the road is unpaved. Under the above situation, residents along the route, who are approximately 1,000 people, have difficulty in access to public facilities and regional / urban economic centers.
7	MOC-12, Mon State	Khaw Zar –Ma Kyi Road is 10 miles in length and located in Mon State. The targeted section is currently earth road although the current road condition is granular road. The current earth road is impassable in rainy season by vehicles, therefore the villagers face to difficulty in access to the public facilities such as hospital, school and market etc. Currently, the existing bridge nearby the beginning point has been fall down due to the fire by someone. Based on information from MoC staff, under the budget for 2015-2016, the current earth road (8miles between 0/0 and 8/0) will be upgraded into 12' bituminous road and the collapse bridge will be reconstructed by MoC. The route is expected to be a main transportation route for agriculture, fishery and potential tourism (a beach is open to public by a minority group), however it does not fully play the role due to its poor road condition. In terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles or pass each other along the current 12' bituminous road with unpaved shoulder.
8	MOC-14, Rakhine State	Nga Thaing Chaung – Gwa Road is totally 55miles 4 furlongs in length and passes Ayarwaddy Region and Rakhine State. The targeted section is located in Rakhine State and consists currently of 27 miles (28/4 – 55/4) 12' bituminous road. Currently, embankment widening has been implementing by MoC. The route is passable even in rainy season, however, in terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder. The major industry along / near the route is forestry (bamboo), agriculture (rice), tourism (beach) and fishery. In particular, Gwa, the endpoint of the route, has much of potential for tourism and fishery. However the economic activity related tourism and fishery is limited since the road

		width is still narrow and the traffic of vehicles beyond 13t is limited on this road.
9	MOC-17, Shan State	Taungoo – Laik Tho – Yar Do – Loikaw – Ho Phone Road is 208miles in length and passes Bago Region, Kayin State, Shan State and Kayah State. The targeted section is located in Shan State and consists currently of 24 miles 5 furlongs 12' bituminous road . However, most of the section has been heavily damaged. Under the budget for 2015-2016 fiscal year, bituminous pavement for the section between 75/0 to 120/0 will be rehabilitated. Current traffic volume is approximately 40 vehicles per day by MoC since the section in Shan State and Kayin State (Mountain Area) is inferior in road condition (unpaved and narrow). The route is passable even in rainy season, however three hours are necessary at least once the road is closed to traffic for rehabilitation due to landslides etc. The emergency rehabilitations were frequently observed during the site survey. The public bus connecting Taungoo to Loikaw has been suspended since 2014 due to the poor road condition and low safety. Under the poor road condition, the traffic to/from Yangon is compelled to detour to the other route (Taungyi – Meiktila – Yangon) in spite that the "Taungoo – Laik Tho – Yar Do – Loikaw – Ho Pone Road" is the shortest route to Yangon. In terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder. Under the above situation, residents along the route have difficulty in access to public facilities and regional / urban economic centers.
10	MOC-18 Ayeyarwaddy Region	Nga Thaing Chaung – Gwa Road is totally 55miles 4 furlongs in length and passes Ayarwaddy Region and Rakhine State. The targeted section is located in Ayarwaddy Region and consists currently of 22 miles 2 furlongs (6/2 – 28/4) 12' bituminous road. Currently, embankment widening has been implementing by MoC. The route is passable even in rainy season, however, in terms of road safety, it is difficult / dangerous to overtake low speed large-vehicles along the current 12' bituminous road with unpaved shoulder. The major industry along / near the route is forestry (bamboo), agriculture (rice), tourism (beach) and fishery. In particular, Gwa, the endpoint of the route, has much of potential for tourism and fishery. However the economic activity related tourism and fishery is limited since the road width is still narrow and the traffic of vehicles beyond 13t is limited on this road.

Source: JICA Preparatory Survey Team

Current conditions of the sub-projects can also be seen in some of the following pictures.

MOC 02 (Kayah State)

Warning Signs of a Public Protected Forest

Existing Road Condition

MOC 03 (Kayin State)

One of the bridges needed to be reconstructed

Existing Road Condition

MOC 04 (Chin State)

End Point (MP 75/4) near Aikar Village

Existing Road Condition (MOC's work with State Budget)

MOC 05 (Sagaing Region)

Existing Road Condition (Earth and Metal Road)

Existing Road Condition (Earth and Metal Road)

MOC 06 (Bago Region)

Starting Point of the project site (Bago Section)

Existing Road Condition

MOC 07 (Magway Region)

A Bridge Construction Area (MP 4/3) near Zebya Village

Existing Road Condition (Earth and Metal road)

MOC 12 (Mon State)

Embankment Widening by MOC State Budge.

Some parts of Existing Road Condition (Earth and Metal Road)

MOC 14 (Rakhine State)

Existing Road Condition

Embankment widening by MOC State Budget

MOC 17 (Shan State)

Embankment Widening by MOC Budget

Existing Road and Bridge Condition

MOC 18 (Ayeyarwaddy Region)

Warning Sign of a Reserved Forest beside the road

Existing Road Condition (12 feet Bituminous Road)

(3) Administration for Road Development and Organization for Implementation

In Myanmar, Department of Highways (DoH) and Department of Bridges (DoB) in MoC, are mainly responsible for road development and maintenance although the army corps of engineers or NATALA are responsible for roads in border areas depending on the security conditions. In addition, the roads in city areas are under City Development Committee, and the rural roads between villages are under the Department of Rural Development (DRD) of MoLFRD.

Planning and design of roads and bridges are implemented in Nay Pyi Taw (Headquarter) and project implementation is carried out by "Construction Unit" located in States and Regions. The following figures show the organization chart of MoC.

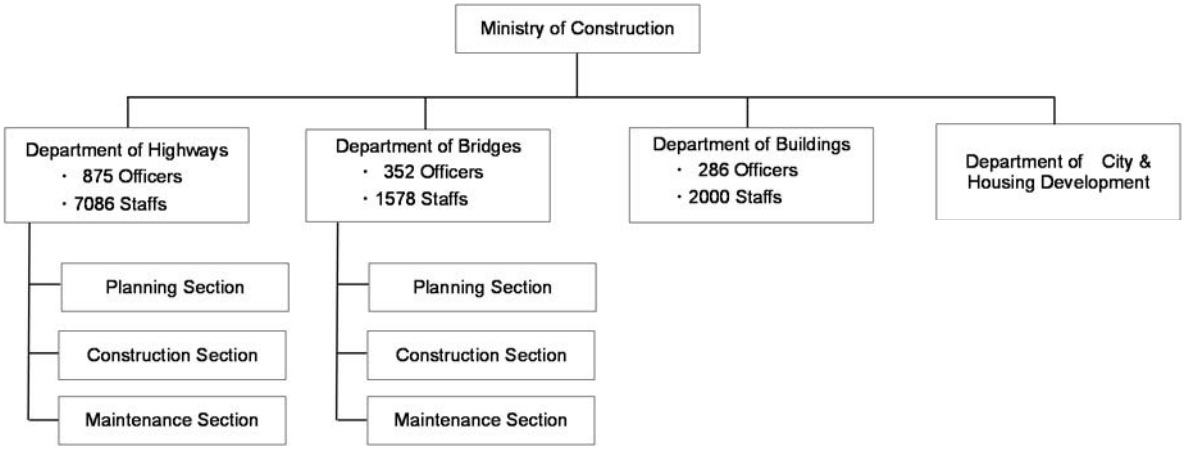


Figure 3. 2 Organization Chart of MoC, Nay Pyi Taw (Headquarter)

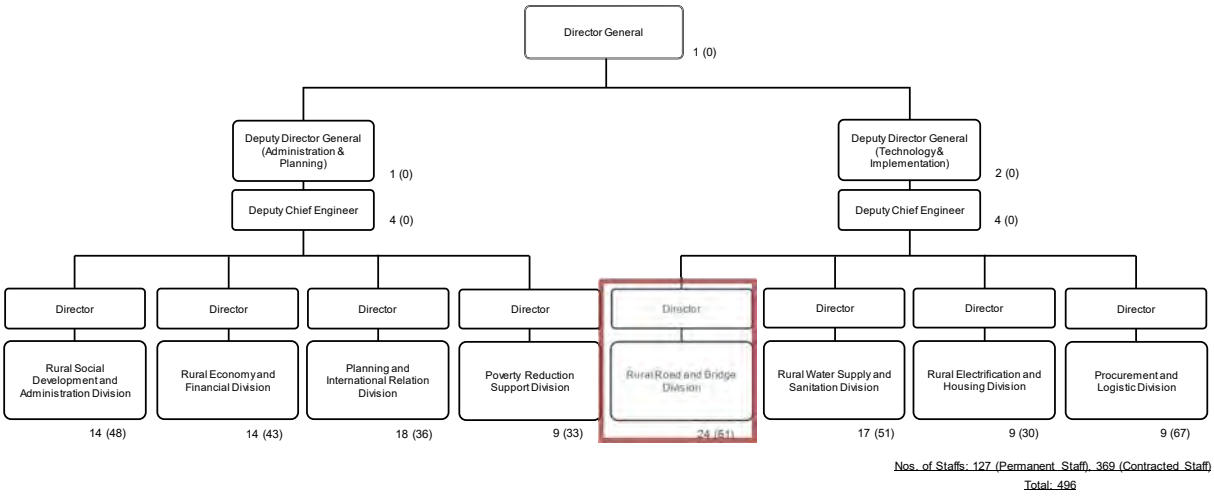


Figure 3. 3 Organization Chart of Department of Rural Development (DRD),
Ministry of Livestock, Fisheries and Rural Development

Department of Highway (DoH) will be responsible for the implementation of Road and Bridge Sub-Projects, except for a large-sized bridge of more than 100m long, for which Department of Bridge (DoB) will be responsible.

3.2 Environmental Scoping of the Project

(1) Setting of Environmental Components and items

To grasp whole features of possible environmental impacts caused by the project, it is necessary to identify and evaluate environmental components and items, which compose of environmental and social considerations, one by one and to integrate the impacts. According to the JICA Guidelines for Environmental and Social Considerations, possible impacts to be assessed include those on human health and safety, as well as on the natural environment, which are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.

In addition to the direct and immediate impacts of projects, the derivative, secondary, and cumulative impacts as well as impacts associated with indivisible projects will also be assessed with regard to environmental and social considerations, so far as it is rational to do so.

In this examination by taking into consideration the JICA Guidelines, and relevant laws and regulations of Myanmar Government, together with environmental condition of the areas related to sub-project sites, four environmental components (pollution, natural environment, social environment and others) and 30 items (Pollution 8, Natural environment 4, Social Environment 16, and others 2) as indicators expressing environmental and social conditions.

(2) Categorization of IEE and EIA

The Categorization of IEE and EIA based on the Myanmar EIA procedure is shown in Table 3.4

Table 3. 4 Categorization of IEE and EIA (Transportation)

No.	Type of Investment Project	Size of Project which require IEE	Size of Project which require EIA
127	Bridges, River Bridges and Viaducts (New construction)	Length ≥ 0.2 km but < 2 km	Length ≥ 2 km
128	Bridges, River Bridges and Viaducts (Upgrading)	Length ≥ 300m	All activities where the Ministry requires that the Project shall undergo EIA
130	Expressways and Highways (ASEAN Highway Standard; new construction or widening with one lane or more)	Length ≥ 2 km but < 50 km	Length ≥ 50 km
131	Other Roads (state, region, urban; new construction or widening ≥ one lane)	Length ≥ 50 km but < 100 km	Length ≥ 100 km

132	**Road improvement (national, provincial and district roads)**	**Length ≥ 50 km**	**All activities where the Ministry requires that the Project shall undergo EIA**

Source: Environmental Impact Assessment Procedures (2015)

Based on the discussion with and confirmation by MOECAF (ECD), it is necessary to combine as 1 route if each sub project is linked (see below Table 3.5). And IEE study is required for Rd-01, 02, 03, and 05 because of the total length of road is over 50km. Regarding another sub-projects (Rd 04), it is not necessary to conduct neither IEE nor EIA but to prepare an EMP (Environmental Management Plan).

Related with the JICA Guideline (2010), all sub-projects are not large scale road project (not sensitive sector), and not sensitive character and not inside of sensitive area. Only MoC-14 passes in reserved forest and wildlife habitat. Regarding MoC-14, further confirmation is needed.

Table 3. 5 Environmental Condition each sub-project

No	Name of the Road	Road No.	States & Region	Length in Kilometer
Rd-01	**Mandalay – Dagaung – Ban Maw – Myitkyina Road**	**MOC 05**	**Sagaing**	**52.94**
Rd-02	**Taungoo – Laiktho – Yardo – Loikaw - Hopon Road**	**MOC 02+03+ 06+17**	**Kayah + Kayin + Bago + Shan**	**163.52**
Rd-03	**Gangaw – Aika Road**	**MOC 04 + 07**	**Magway + Chin**	**94.70**
Rd-04	Yae – Kalawt – Khawzar - Magyi Road	MOC 12	Mon	17.60
Rd-05	**Nga Thine– Gwa Road**	**MOC14+18**	**Rakhine + Ayeyawaddy**	**75.52**

Source: JICA Preparatory Survey Team

(3) Activities due to the Project

Activities due to the project by stage are shown in Table 3.6. Possible impacts are identified by using impact matrix comparison and the extent of the impacts are also evaluated one by one with rating against the above mentioned 30 environmental items.

Table 3. 6 Anticipated Activities due to the Project

Project Stage	Anticipated Activities by the Project
Planning Stage (I)	Securing land/space for road, bridge and related facilities
	Securing temporary land/space for construction work
	Change of utilization of land and local resources
Construction Stage (II)	Procurement of construction materials, equipment, plants, etc.
	Civil engineering works such as earth moving
	Operation of construction machines, vehicles, plants, etc.
	Installation of construction work offices worker's camps, storage sites, etc.
	Construction of road, bridge and related facilities
Operation Stage (III)	Operation related facilities and structures

Project Stage	Anticipated Activities by the Project
	Spatial occupancy related facilities and structures

Source: JICA Preparatory Survey Team

(4) Method of Scoping

The scoping process is based on a literature review, interview surveys, and site observation, among which, site observation and interviews are the most informative. A description of the survey is summarized in Table 3.7.

Table 3. 7 Description of Environmental Condition Survey

Methodology
• Observation of the natural conditions along the roads • Recording of the situation along the roads by video camera as well as whenever any notable object or situation was observed.
Items Observed
• Environmental Pollution – 8 items (Air pollution, Water pollution, Soil contamination, Bottom sediment, Solid waste, Noise and Vibration, Ground Subsidence, Offensive odor) • Natural Environment – 4 items (Protected Area, Ecosystem, Hydrology, Topography and geology) • Social Environment –16 items (Involuntary resettlement, The poor, Indigenous and ethnic people, Local economy such as employment and livelihood, Utilization of land and local resources, Water usage, Existing social infrastructures and services, Social institutions such as local decision making institution, Misdistribution of benefit and damage, Local conflict of interests, Cultural and historical heritage site, Landscape, Gender, Right of children, Infectious diseases such as HIV/AIDS, Land environment) • Others –2 items (Accidents, Cross boundary impacts and climate change)

Source: JICA Preparatory Survey Team

3.3 Comparing Alternatives

All sub-projects are improvement of existing road. Other routes or alternative routes have not been considered. Among 19 sub-projects (MOC 1-19), each sub project were evaluated by items such as purposiveness, cost benefit performance, needs urgency and feasibility. And then the short list was decided.

Table 3. 8 Comparison of Alternatives

	With Project	Without Project
Pollution	+	+/-

Natural Environment	+/-	+/-
Social Environment	+	+/-

Note: Significant positive impact: + +, Moderate positive impact: +
Significant negative impact: - - , Moderate negative impact: - , Neutral: +/-

(1) Without Project

If the Project is not implemented, the environmental condition will not be drastically changed.

(2) With Project

One of the most beneficial advantages is the significant improvement of transportation and related economic conditions. Even though an increase in the frequency of cars and speed may result in an increase in traffic accidents, installation of warning signs and traffic regulators can minimize these accidents. Water and air pollution caused during the construction stage can be mitigated by ordinary countermeasures.

3.4 Results of Scoping

The result of scoping for sub-projects of road sector is shown in Table 3.9.

Table 3. 9 Scoping results

	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	B－	C	**Construction phase:** Temporary negative impacts are expected on air quality due to using construction machines and equipment. **Operation phase:** Some negative impact is expected due to the increase in traffic number. However, expected impact is very limited because the all site located mountain or rural area
	2	Water pollution	B－	D	**Construction phase:** Turbid water may be generated by earth works and excavation in the river where bridges are planned. Additionally Organic polluted water may be discharged from base camp. **Operation phase:** No impacts are expected
	3	Waste	B－	D	**Construction phase:** Construction waste such as waste soil and cutting trees are expected. Additionally domestic waste and night soil may be generated from construction base camp. **Operation phase:** No impacts are expected
	4	Soil contamination	D	D	**Construction and Operation phase:** No impacts are expected.
	5	Noise and vibration	B－	C	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** Noise generation is expected because of the increase in traffic number and travelling speed. However, the expected impact is very limited because the all site located mountain or rural area.
	6	Ground subsidence	D	D	**Construction and operation phase:** No impacts are expected since activities which cause ground subsidence not expected.
	7	Odor	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	**Construction and Operation phase:** No impacts are expected.
Natural environment	9	Protected area	B－	D	**Construction phase:** there is conservation forests/plantation (not national parks) along the road. Cutting many trees is not expected but some negative impact is expected. **Operation phase:** No impacts are expected.
	10	Ecosystem	C	C	**Construction and Operation phase:** Extent of impact is unknown at this stage

	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
	11	Hydrology	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the river.
	12	Topography and geology	C	C	**Construction and operation phase:** Cutting land is expected. However, considerable topography and geological sites are not located in the project area and the impact is limited.
Social environment	13	Involuntary resettlement	B－	D	**Pre-Construction phase:** No resettlement is expected but land acquisition along some routes may be caused. **Operation phase:** No impact is expected
	14	The poor	C	B＋	**Construction phase:** Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected by improvement of access
	15	Indigenous and ethnic people	C	B＋	**Construction phase:** Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected by improvement of access
	16	Local economy such as employment and livelihood	D	B＋	**Pre-construction phase:** Some shops are observed in the project area. However the number of residents and workers affected is limited. **Operation phase:** Few impacts are expected.
	17	Land use and utilization of local resources	C	D	**Pre-construction phase:** Few impacts are expected due to the land acquisition for agricultural land etc. **Operation phase:** No impacts are expected.
	18	Water usage	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected.
	19	Existing social infrastructures and services	B－	B＋	**Pre-Construction and Construction phase:** Traffic restriction might give impact on the access to such as emergency services and social infrastructure (ex. School, hospital etc.). **Operation phase:** Few positive impacts are expected (ex. Improvement of access to social services etc.).
	20	Social institutions such as local decision making institutions	D	D	**Construction and operation phase:** Impacts are not expected, since local decision making institute represented by village, township and state will continue after the construction.
	21	Misdistribution of benefit and damage	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by this project is not expected.
	22	Local conflict of interests	D	D	**Construction and operation phase:** Local conflict of interests caused by this project is not expected.
	23	Cultural heritage	D	D	**Pre-Construction, construction and operation phase:** Religious and cultural facility are not observed at the project site.
	24	Landscape	D	D	**Construction and operation phase:** No impacts are expected because those projects are improvement for existing road.
	25	Gender	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.
	26	Right of children	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	**Construction and operation phase:** No impacts are expected because all routes are domestic road not international corridor.
	28	Labor environment	D	D	**Construction and operation phase:** No impacts are expected.
Others	29	Accidents	B－	C	**Construction phase:** Construction vehicles may use existing local road near residential areas, thus number of traffic accident may increase. **Operation phase:** Although the increased of travelling speed is expected, the alignment will be better.

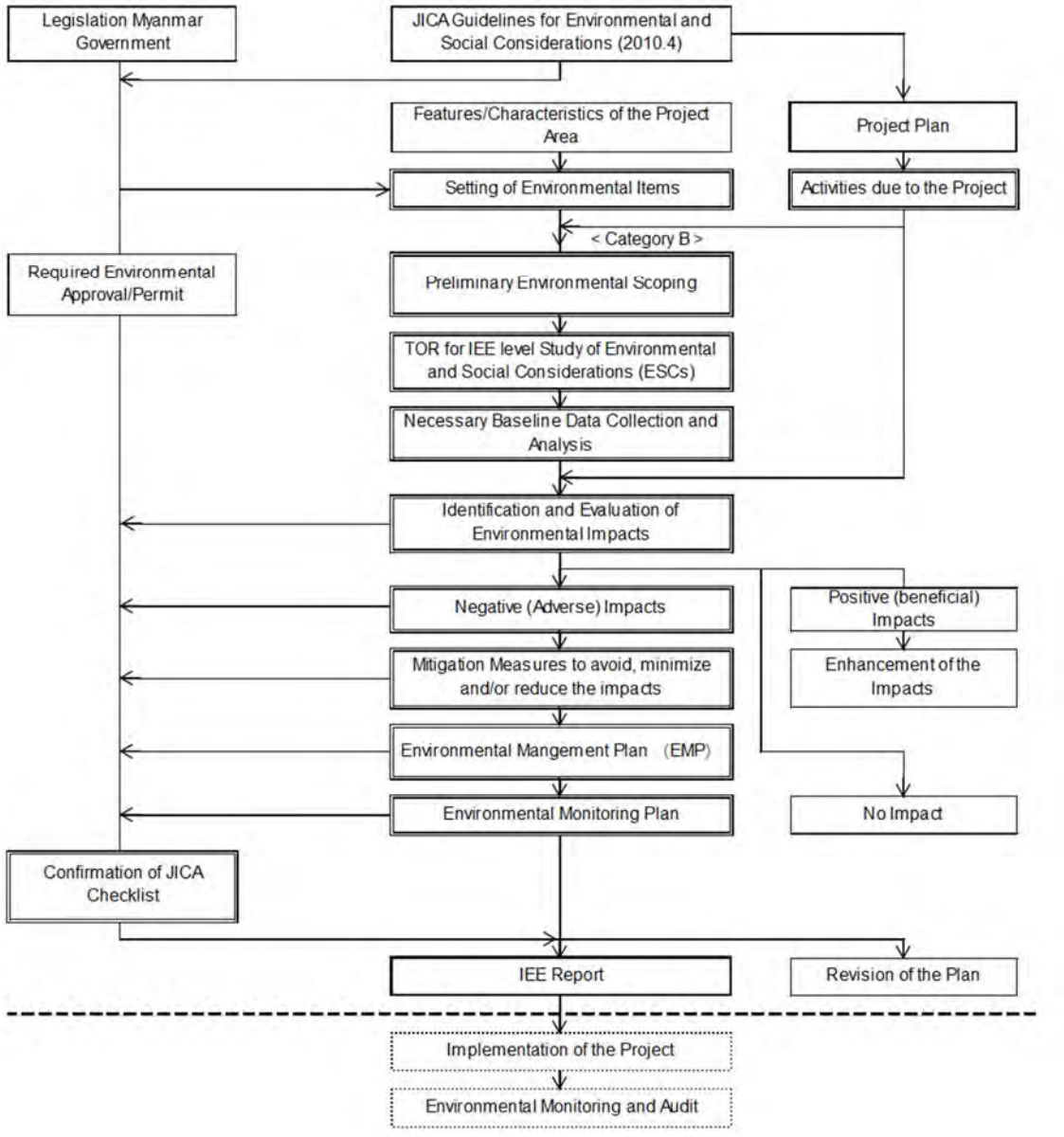
	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
	30	Cross boundary impacts and climate change	D	D	**Construction and operation phase:** No impacts are expected.

Note) Rating:
A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected.
C: Extent of impact is unknown at this stage D: No impacts are expected.
Source: JICA Preparatory Survey Team

CHAPTER 4 Result of IEE

4.1 Procedure of IEE Level Study

Procedures of IEE level study for the sub-project are shown in Figure 4.1.



Source: JICA ESC Guidelines

Figure 4. 1 Procedures of IEE level Study according to the JICA Guidelines

4.2 Terms of Reference for IEE

Table 4.1 shows a Terms of Reference on the IEE which was prepared based on the scoping outcome.

Table 4. 1 Terms of References for Initial Environmental Examination

No	Impacts	Item for Study	Methodology
1. Pollution			
	Air Pollution	✓ Collect information on present air quality ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc. ✓ Confirm present environmental management system
	Water Pollution	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
	Waste	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and location of construction worker's camp/office
	Soil Contamination	✓ Collect information on present management against soil contamination ✓ Impacts during an operation Phase	✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm present environmental management system
	Noise and Vibration	✓ Confirm ambient noise standard in Myanmar ✓ Confirm present condition in the project area	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project
2. Natural Environment			
	Protected Area	✓ Collect information on protected area in the project area	✓ Hearing from relevant authorities
	Ecosystem	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Hydrology	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Topography and Geographical Features	✓ Collect information in the project area ✓ Impacts during construction	✓ Hearing from relevant authorities, conduct field survey ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
3. Social Environment			
	Involuntary Resettlement	✓ Confirm scale of land acquisition and resettlement ✓ Prepare Resettlement Action Plan (RAP) in case of acquiring land or resettling assets and/or	✓ Collect legislations relevant to land acquisition and resettlement, conducting field survey to confirm the condition such as land usage and type of assets within ROW and proposed substation area and hearing from relevant authorities.

No	Impacts	Item for Study	Methodology
		people resulting from the project	✓ Prepare RAP in complying with legislations in Myanmar as well as JICA guidelines
	Vulnerable(poor households, female headed households etc)	✓ Confirm vulnerability of affected people	✓ Collect legislations relevant to the vulnerability of affected people ✓ Collect information on similar project, Conduct hearing from relevant authorities and affected people
	Indigenous and Ethnic Minority	✓ Collect information on indigenous and ethnic minority	✓ Collect legislations relevant to the indigenous and ethnic minority, ✓ Conduct hearing from relevant authorities and affected people
	Land Use and Utilization of Local Resources	✓ Collect information on land usage in the project area	✓ Collect information on land usage from relevant authorities
	Existing Social Infrastructures and Services	✓ Impact during a construction phase	✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc
	Cultural Heritage	✓ Collect information on cultural heritage in project area	✓ Hearing from relevant authority, conduct field survey
	Landscape	✓ Impact during a construction	✓ Confirm content, method, period, location, area on construction works
	Gender	✓ Collect information on the land acquisition procedures relevant to gender issues ✓ Confirm gender issues in the project area	✓ Collect information on the similar project in the past ✓ Collect information on gender issues at administrative body in the project area
	Communicable Diseases such as HIV/AIDS	✓ Impact during a construction phase	✓ Confirm information on similar Project
	Working Environment (includes work safety)	✓ Confirm legislations on working environment in Myanmar	✓ Collect relevant legislations, confirm information on similar project
4. Others			
	Accidents	✓ Impact during construction	✓ Confirm access road for construction vehicles and conditions around the area
	Cross boundary impacts and climate change	✓ Impact during a construction and operation	✓ Confirm information on similar Project

4.3 Prediction of Environmental Impact

The prediction of environmental impact based on the survey is shown in Table 4.2.

Table 4. 2 Prediction of environmental impact

	Items		Situation and Prediction
Pollution	1	Air Pollution	Machines and vehicles used during construction are likely to generate air pollution, most prominently in the form of dispersal of sandy dust. Normal measures can reduce the negative impacts.
	2	Water Contamination	For water bodies along the road, Ayeyarwaddy River is located close to MOC 05. Most of the sub-projects cross a number of streams and creeks. But agricultural land and forest land are mostly located next to those streams and creeks. People take water mostly from those rivers and streams as well as the dug wells and tube wells.

	Items		Situation and Prediction
			No major work is planned for the bridges (i.e. a few culverts and/or small bridges), so no significant negative impact is expected. Nevertheless, the above areas should be kept in mind so that construction works do not result in soil or water contamination.
	3	Waste	General wastes such like a pet bottle, plastics, kitchen wastes, are not significantly bad at project site. Waste condition is good enough so far, because all the sub-projects are located in the rural and less-populated areas. Waste from the construction workers and camps are likely to generate the waste to some extent, but due to relatively less population and poor economic activities no significant adverse impact is expected.
	4	Soil Pollution	No major work is planned for the bridges (i.e. a few culverts and/or small bridges), so no significant negative impact is expected. Nevertheless, the above areas should be kept in mind so that construction works do not result in soil or water contamination.
	5	Noise and Vibration	Noise and vibration level could temporarily be higher during construction due to operation of vehicles and use of construction equipment. In the operation phase, impact of the noise could be accelerated due to an increase in the frequency and speed of vehicles. Normal measures can reduce those adverse impacts.
	6	Ground subsidence	There was no such case in record in all sub-project sites, but embankment widening is likely to cause ground subsidence unless the work is properly done.
	7	Odor	The sub-project sites are an environmentally sound area. Although some bad odor from asphalt pavement works during the construction may temporarily affect the people, no other significant negative impact is expected.
	8	Bottom Sediment	No major work is planned for large-scaled bridges, so no significant negative impact is expected.
Natural Environment	**9**	Protection Area	The sub-project site (existing road) passes through the reserved forests and public protected forest and some natural forested areas. And there will include some road widening works which will affect the mountain sides to some extent in those forests and natural areas. In MOC 03, MOC 04, MOC 14, MOC 17 and MOC 18, the subprojects are expected to affect the environment (mountain sides) but it is not very significantly (up to 10 or 20 feet) because sub-project is just a rehabilitation work and the existing formation width is mostly 40 feet which is the maximum requirement of the sub-project. Therefore, no significant impacts is expected.
	10	Ecosystem	No wildlife or tree species that require special attention/ protection has been identified within the sub-project sites. But there are many forest plantations (both government and private) and natural forests along the project sites (MOC 03, MOC 04, MOC 14, MOC 17 and MOC 18). Construction works may affect those plantations and natural forests, especially if earthwork matters from embankment widening are disposed carelessly.
	11	Hydraulic Situation	Only MOC 05 is close to the main river Ayeyarwaddy. All other sub-projects cross a number of streams and creeks along the sites. But no significant changes are expected.

	Items		Situation and Prediction
	12	Topography and Geology	MOC 04 and 07 lies mostly in the western mountain ranges of Myanmar. Target road sector is also crossing the middle part of Chin Hills or Chin Mountain Ranges (also known as Indo-Burman Ranges) (formed by hard rocks – western fold belts consisted of a thick Mesozoic and Eocene flysch sequence). MOC 05 lies along and east of Ayeyarwaddy River in northern Myanmar. MOC 02, 03, 06 and 17 cross a lot of mountain ranges in south west part of Shan Plateau (formed by hard rocks – protolith rocks spanned Precambrian to Late Paleozoic). MOC 14 and 18 cross the mountain ranges and the road lies from east to west. Target road sector is also located across the southern part of the famous Rakhine Yoma (i.e., Ranges), in Tectonic Province of Rakhine Coastal Belt (formed by sedimentary rocks consisting of sandstones, shale and clay). MOC 12 is generally in flat-plain area and it lies along the coast of Andaman Sea in southern Myanmar. Target road sector is also the end lining of Taninthari Range in Tectonic Province of Shan-Taninthari Block (formed by hard rocks – protolithic rocks spanned Precambrian to Late Paleozoic). The soil types mainly found in the site are (1) Clay and clay swampy soils, (2) Swampy soils, (3) lateritic soils, and (4) Yellow brown forest soils. No large-scale land alteration is expected due to construction work.
Social Environment	13	Involuntary Resettlement	No involuntary resettlement is expected, because the sub-projects are just a rehabilitation work on an existing road. Formation width is mostly more than 40 feet even in some resident areas (i.e. villages).
	14	Poor	Most of the people living in the project sites, are ethnic people and have very low income from traditional agriculture business. It is expected after the sub-projects, that they will get better access to main townships and benefit from improved goods' flow, better health care, and other socio-economic improvements.
	15	Indigenous or Ethnic people	Ethnic minorities such as Chin, Kayah, Kayan, Kayin, Kachin, Mon and Shan are mostly, because all the sub-projects are located in those rural areas where most of the ethnic minorities live.
	16	Local Economies, such as employment, livelihood	Economy in those areas is largely dependent on agriculture (i.e. rice, corn, banana, sugar cane) and some businesses (e.g. sugar milling and Nickel mining) and grocery shop management to which, no -alteration is expected. During construction, some people are likely to be employed as a work force for road construction. Food drink shops are also expected to benefit from an increase in demand.
	17	Land use and utilization of local resources	Paddy fields, Banana and Sugar Cane farms, Reserved Forests and Public Protected Forests occupy the sub-project sites. No change is expected to the current state since it is a rehabilitation project.
	18	Usage of water and water Right	People take water mainly from the wells and some villages from the river. No water Right issue is found in the sub-project sites. Neither any change nor any negative impact is expected by the sub-project.
	19	Existing social infrastructure and services	There are some social infrastructures in all sub-project sites, such as public hospital, primary schools, churches, Buddhist Monasteries and Pagodas. It is not expected to affect those social infrastructures by the sub-projects
	20	Social Institution such as local decision making institution	Kayan Pyi Thit Party in Shan State (MOC 17), is found as a strong decision-making institution, but no such kind of strong institutions are identified in other sub-project sites.
	21	Misdistribution of benefits and damages	It is not likely to happen the misdistribution of benefits and damages between local communities or regional institutions.
	22	Local conflict of interest	All the sub-project sites are under the control of Myanmar Government (road management under Ministry of Construction – Department of Highways) But it is still necessary to include careful approach and timely security alert for implementation and monitoring of the sub-project works for ethnic areas such as MOC 02, MOC 03 and MOC 12.

	Items		Situation and Prediction
	23	Cultural Heritage	No cultural Heritage is identified in the project sites.
	24	Landscape	As it is just a rehabilitation work, the sub-projects are not expected to negatively affect the beauty of existing landscape (crops and farmlands, river, natural forests and forest plantations, forest mountains and rock mountains).
	25	Gender	According to normal measures in compliance with JICA guidelines, it is not likely to happen gender inequality in the implementation works of the sub-projects.
	26	Children's Right	According to normal measures in compliance with JICA guidelines, it is not expected to affect the Children' Right in the implementation works of the sub-projects.
	27	Infection diseases such as HIV/AIDS	It is not also expected to induce the infection of diseases such as HIV/AIDS by the sub-projects.
	28	Work Environment	According to normal measures in compliance with JICA guidelines, it is not likely to happen any notable damage in the work environments.
Others	29	Accident	Increase in number and speed of vehicles may induce traffic accidents.
	30	Global Warming	As a rehabilitation project, the impacts by the sub-projects are not expected to contribute any significant damages to or increase in Global Warming.

Source: JICA Preparatory Survey Team

4.4 Evaluation of Environmental Impact

(1) Results of evaluation of environmental impact

Possible impacts are identified and the extent of the impacts is also evaluated one by one with rating against the 30 environmental items (pollution, natural environment and social environment). Results are shown together with the results of scoping in Table 4.3.

Table 4. 3 Evaluation of Environmental Impact

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	B-	C	B-	D	**Construction phase:** Temporary negative impacts are expected on air quality due to construction machines and equipment. **Operation phase:** Negative impact is expected due to the increase in traffic number. However, expected impact is very limited.
	2	Water pollution	B-	D	B-	D	**Construction phase:** Turbid water may be generated by earth works and excavation in the river where bridges are planned. Additionally Organic polluted water may be discharged from base camp. **Operation phase:** No serious impacts are expected
	3	Waste	B-	D	B-	D	**Construction phase:** Construction waste such as waste soil and cutting trees are expected. Additionally domestic waste and night soil may be generated from construction base camp. **Operation phase:** No serious impacts are expected
	4	Soil contamination	D	D	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected
	5	Noise and vibration	B-	C	B-	D	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** Noise generation is expected because of the increase in traffic number and travelling

	№	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
							speed. However, the expected impact is very limited.
	6	Ground subsidence	D	D	D	D	**Construction and operation phase:** No impacts are expected since activities which cause ground subsidence not expected.
	7	Odor	D	D	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	D	D	**Construction phase:** No impacts are expected since there are not any polluted lands nearby project area. **Operation phase:** Road operation which causes impacts on sediment quality is not expected.
Natural environment	9	Protected area	B-	D	B-	D	**Construction phase:** There are forest reserves and public protected forest along roads. Cutting many tree will not be expected but some negative impact is expected. **Operation phase:** No impacts are expected during operation.
	10	Ecosystem	C	C	D	D	**Construction and Operation phase:** Any designated protected areas and considerable species habitats have not been identified in the sub-project area.
	11	Hydrology	D	D	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the rivers.
	12	Topography and geology	C	C	D	D	**Construction and operation phase:** Cutting land is expected. However, considerable topography and geological sites are not located in the project area and the impact is limited.
Social environment	13	Involuntary resettlement	B-	D	B-	D	**Pre-Construction phase:** No resettlement is expected. But land acquisition of only one area may be caused. **Operation phase:** No impact is expected
	14	The poor	C	B+	B+	B+	**Pre-Construction phase:** Few positive impacts are expected such as working opportunity. **Operation phase:** Few positive impacts are expected by improvement of access
	15	Indigenous and ethnic people	C	B+	D	D	**Pre-Construction phase:** There are indigenous or ethnic people at the sub-project site. But no serious impact is expected. **Operation phase:** No obvious impacts are expected
	16	Local economy such as employment and livelihood	D	B+	D	B+	**Pre-construction phase:** Some shops are observed in sub-project sites. However the number of residents and workers affected is limited. **Operation phase:** Few impacts are expected.
	17	Land use and utilization of local resources	C	D	D	D	**Pre-construction phase:** Few impacts are expected. **Operation phase:** Few impacts are expected.
	18	Water usage	D	D	D	D	**Construction phase:** No impact is expected. **Operation phase:** No impact is expected.
	19	Existing social infrastructures and services	B-	B+	B-	B+	**Pre-Construction and Construction phase:** Traffic restriction might give impact on the access to such as emergency services. **Operation phase:** Few positive impacts are expected

	№	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
	20	Social institutions such as local decision making institutions	D	D	D	D	**Construction and operation phase:** No impacts are expected, since local decision making institute represented by village, township and state will continue after the construction.
	21	Misdistributio n of benefit and damage	D	D	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by the road construction is not expected.
	22	Local conflict of interests	D	D	D	D	**Construction phase:** No impact is expected. **Operation phase:** No impact is expected
	23	Cultural heritage	D	D	D	D	**Pre-Construction and Construction Phase:** Religious and cultural facility are not observed at the project site. **Operation phase:** No impact is expected
	24	Landscape	D	D	D	D	**Construction phase:** Few impact is expected **Operation phase:** There are no law-based designated landscape areas around project area.
	25	Gender	D	D	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.
	26	Right of children	D	D	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	D	D	**Construction phase:** Few impacts are expected. **Operation phase:** Operation which causes infectious diseases is not expected.
	28	Labor environment	D	D	D	D	**Construction phase:** Construction work environment needs to be considered in accordance with relevant laws and regulations. **Operation phase:** No impact is expected.
Others	29	Accidents	B-	C	B-	D	**Construction phase:** Construction vehicles may use existing local road near residential areas, thus number of traffic accident may increase. **Operation phase:** Although the increased of travelling speed is expected, the alignment will be better.
	30	Cross boundary impacts and climate change	D	D	D	D	**Construction phase:** Significant deforestation is not expected on this project, and number of construction machines is limited, thus few impacts are expected. **Operation phase:** No impacts are expected.

Source: JICA Preparatory Survey Team

(2) Categorization of sub-project

Among the results of identification and evaluation anticipated impacts shown in Table 4.3, items affected with rating (A-), which means significant negative impact is not identified, and items affected with rating (B-), which means not significant but considerable negative impacts and with rating (D) which means negligible or no negative impacts are identified for most of the items. According to the JICA Guidelines any project is classified into four categories, i.e., Category A, B, C and FI by the extent of environmental and social impacts, taking into account of an outline of the project, scale, site condition etc.

The proposed project is classified into Category B due to following reasons:

(i) The project does not belong to (1) sensitive sectors such as large scale development of roads and bridges, (2) sensitive characteristics such as large-scale involuntary resettlement of more than 200 PAPs and (3) sensitive areas such as nationally-designated protected areas, primeval forests areas or areas with unique archaeological, historical, or cultural value as listed in Appendix 3 of the JICA Guidelines.

(ii) Results of identification and evaluation of expected environmental and social impacts indicate that there is no item affected with rating of (A-), which means negative (adverse) impact and other affected items are classified into rating (B-), which means not significant but some negative impact, or rating (D), which means no or negligible negative impact as shown in Table 4.3.

(3) Major negative impacts

Major negative impacts with rating (B-) are described with corresponding stage as follow:

1) Planning stage

a) Social Environment

(i) Involuntary Resettlement –

- There is no resettlement is expected. However land acquisition in some area may be needed in the planning stage.
- The project is corresponding to "category B", which means number of PAPs is less than 200 in terms of resettlement. Thus, Abbreviated Resettlement Action Plan (A-RAP) must be prepared and necessary compensation and support of resettlement assistance for these PAUs and PAPs should be provided by MoC (DoH) after identification of eligibility of each PAU and PAP and consultation with each PAU and PAP.
- Detailed features are described in the Abbreviated Resettlement Action Plan (A-RAP)

2) Construction Stage

a) Environmental Pollution

(i) Air pollution

- Air pollutants emission such as PM and NO_x from construction vehicles, machines, and earthmoving and construction work may deteriorate air quality temporarily. In addition, during construction the road will be closed in some area and traffic route has to be diverted to other roads. Thus, some increase in emission of air pollutants such as PM, NOx is expected in surrounding area due to traffic congestion.

(ii)Water pollution

- Water pollution is expected due to following pollutant generation from construction work, although temporarily: (a) Run-off of dirty water including soils from cutting, filling and excavation of earthmoving work. (b) Wastewater from worker' camps and construction office. (c) Spilling over of toxic materials such as oil and lubricants.

(iii)Noise and vibration

- Generation of noise and vibration from construction machines and vehicles is expected, although ambient noise and vibration standards were not established in Myanmar.

b) Natural Environment

(i)Protected area

- There are forest reserve and public protect forest along the roads. A few cutting tree may occur during construction

c) Social Environment

(i) Existing social infrastructures and services

- Construction works may cause further traffic congestion and nuisance to road users and surrounding communities.

d) Others

(i)Accidents

- Occurrence of accidents may increase due to deploying machines and plants and handling construction materials as well as traffic accidents due to construction vehicles and machines.

3) Operation Stage

There is no major negative impact with rating (B-).

(4) Major positive impacts

On the other hand, major positive impacts with rating (B+) are as follows:

1) Construction Stage

a) Social Environment

(i) The poor: (B+)

- The project may create employment opportunity of vulnerable groups such as the poor and women for construction work.

2) Operation Stage

a) Social Environment

(i)Existing social infrastructures and services: (B+)

- Transport by new roads is more convenient and comfort as well as making easier access to the place and social services.

4.5 Mitigation Measure

Mitigation measures, which may avoid, minimize, eliminate and/or reduce above mentioned negative impacts, were examined for respective items in planning, construction and operation stage as well as whole stages in order that the project can achieve intended objectives with minimizing

accompanied environmental impacts. In addition, Environmental Management Plan (EMP) was prepared by incorporating mitigation measures and monitoring as well as the roles of implementing, responsible and supervising organizations as shown in Table 4.4.

Table 4. 4 Mitigation Measure against Negative Impact and Environmental Management Plan

	№	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
Pollution	1	Air pollution	[Dust] ✓ Water sprinkling near residential area ✓ 20 kph speed limit for construction machines at construction sites adjacent to settlement areas ✓ Law emission construction machinery shall be used to avoid high emission of exhaust gases	Not required	Contractor	D.o.H., MoC
	2	Water pollution	[Turbid water and other items] ✓ Discharge through sedimentation pond and silt fence ✓ Installation of portable toilet for workers ✓ Appropriate waste and construction machines management ✓ Appropriate explanation and response shall be given to affected fishermen, if necessary	Not required	Contractor	D.o.H., MoC.
	3	Waste	[Construction waste (trees and waste soil)] ✓ After considering the possibility of reuse, construction waste is disposed at disposal site [Garbage from base camp] ✓ Garbage at workers camp and waste oil shall be brought to disposal site or facility [Night soil] ✓ Temporary sanitation facility such as septic tank shall be introduced to the workers camp. ✓ After confirming with and getting permission from Forest Department or community, earthwork matters from embankment widening will be disposed at the specific disposal sites.	✓ Demolished waste concrete shall be reused and/or disposed in designated disposal sites.	[Const.] Contractor [Operation] D.o.H., MoC.	D.o.H., MoC..

	№	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
	5	Noise and vibration	[Construction noise] ✓ Installing noise barrier and selecting low-noise equipment. ✓ Avoiding works of heavy equipment during night time. ✓ Informing the construction schedule to surrounding communities to obtain their consensus.	Not required	Contractor	D.o.H., MoC...
Natural environment	10	Ecosystem	✓ Construction development area shall be marked and not be disturbed. ✓ Hazardous waste material should be stored properly before final disposal. ✓ Planting trees, vegetation, sodding in the public space. ✓ Installation of sediment to ponds, silt fence and portable toilet not to disturb habitats of aquatic lives.	✓ Appropriate land use management not to develop natural area along the road ✓ Setting up sign boards where animals crossing the road from the view of natural conservation	[Const.] Contractor [Operation] Local government,	D.o.H., MoC...
	11	Hydrology	✓ Designing of bridges with sufficient capacity ✓ Installation of sufficient drainage facilities on bypass ✓ Secure waterways in construction area	Not required	Contractor	D.o.H., MoC..
Social environment	13	Involuntary resettlement	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	Settlement & Land Record Department (SLRD under MOAI), DoH, GAD	D.o.H., MoC...
	14	The poor	✓ Appropriate social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, DoH, GAD	D.o.H., MoC.
	16	Local economy such as employment and livelihood	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, DoH, GAD	D.o.H., MoC.
	17	Land use and utilization of local resources	✓ Appropriate land acquisition and compensation for agricultural area ✓ Assistance of establishment of land use map in every township	✓ Management of appropriate land use in accordance with approved established new land use plan in every township and village	[Const.] SLRD, MOAI, consultants [Operation] Local government	D.o.H., MoC.
	18	Water usage	✓ Drainage facility, sedimentation pond and sheet are prepared to prevent turbid water generated by earth work in accordance with the site	Not required	[Const.] Contractor	D.o.H., MoC.

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
			condition. ✓ Domestic waste and other construction waste will be collected properly and disposed to designated dumping site. ✓ Installation of portable toilet.			
	19	Existing social infrastructures and services	✓ Construction of diversion road and existing community road will be connected with new bypass.	Not required	Contractor	D.o.H., MoC.
	22	Local conflict of interests	✓ Local workforce is prioritized for construction of the road and bridges ✓ Implementation of appropriate education for hired workers from other area	Not required	Contractor	D.o.H., MoC.
	27	Infectious diseases such as dengue and HIV/AIDS	✓ Installation of sufficient drainage facilities not to provide habitat for vector mosquito ✓ Provision of adequate temporary sanitation facilities ✓ Enforcement of medical screening and periodical medical check-up ✓ In order to prevent spread of infectious diseases such as HIV/AIDS, awareness of the labors is promoted	Not required	Contractor	D.o.H., MoC.
Others	29	Accidents	✓ Deploying flagman at the gate and crossing points of the construction vehicles ✓ Installation of safety sign board ✓ Installing fence around the construction site to keep out local people such as children ✓ Installation of lightning in the night time ✓ Installation of parking for idling construction machines ✓ Restricting mobilization speed in the construction site ✓ Safety training for the workers ✓ Safety patrol at the construction site by supervisors	✓ Maintenance of the road and Safety Signs	Contractor	D.o.H.

Source: JICA Preparatory Survey Team

4.6 Environmental Monitoring Plan

The environmental monitoring of the Rural Road will be undertaken by the Ministry of Construction, Department of Highways to ensure the compliance of the Contractor with each mitigation measure specified in the Project Environmental Management Plan during the construction period. The compliance of the Contractor could be presented in tabulated form by presenting each mitigation measure, corresponding level of compliance (Yes, No, Partial), and remarks explaining why compliance level is "No" or "Partial". The corrective actions are presented in matrix form with the following details: (i) non-compliance/implementation of mitigation measures, (ii) issues and

concerns, (iii) responsibility for implementation of recommendation action. DoH will prepare a monthly monitoring report which will be submitted to supervision consultants (JICA and Project Management Unit) and delivered to Project Monitoring Committee (as an independent group) which will be formed in grass-root level by GAD, Community leaders, and other concerned parties within the sub-project sites.

The environmental monitoring is designed to:

i. Determine whether the contractor is carrying out the subproject in conformity with environmental standards and agreements if any;
ii. Identify problems as they arise during implementation and recommend means to resolve them;
iii. Recommend changes in subproject concept/design, as appropriate, as the subproject evolves or circumstances change; and
iv. Identify the key risks to subproject sustainability and recommend appropriate risk management strategies;
v. Ensure that environmental monitoring activities undertaken based on direct or indirect indicators of emissions (NO_2, SO_2 and PM (dust particulates);
vi. Waste and garbage disposal are followed as required by the management authority;
vii. Ensure that construction workers have received environment, health and safety (EHS) orientation;
viii. Report incidents of accidents and needed emergency action to the to their supervisor;
ix. Ensure that access to the project sites is permitted and that monitoring is undertaken;
x. Ensure approval of environmental permits, as necessary, (i.e. waste management and disposal; erosion control; etc.

If deemed necessary conduct brief consultation with beneficiaries and affected communities to assess impacts of the sub-project.

Table 4. 5 Environmental Monitoring Plan

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
(I) Planning Stage								
1) Approval/ permission etc.	Permission of Project Implementation and Environmental Clearance Certificate	1) Permission procedures of projects for public purpose 2) Environmental Clearance Certificate by MOECAF	FERD, MOC, MOECAF	Before commencement of construction work	1) Environmental Conservation Law (2012), Environmental Conservation Rules and Regulation (2015)	MOC, DoH	FERD, MOC, DoH, MOECAF	MOC, DoH
2) Social Environment	Implementation of compensation and resettlement assistance to PAPs, and resulting	Interview survey on PAPs and PAUs	PAPs and PAUs in all project areas	Before commencement of construction work	1) Land related legislation of Myanmar, 2) JICA Guidelines	MOC, DoH	GAD	MOC, DoH

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
	existing living condition and livelihood of PAPs							
	Securing necessary land clearance for the project site	1) Site observation,	Areas to be secured	Before commencement of construction work	Land related legislation of Myanmar	MOC, DoH	GAD	MOC, DoH
	Designs and Specifications adaptable to Climate Change	Verify designs and specifications	MOC	Before commencement of construction work	The Highways Law (2000)	MOC, DoH	Consultants, DoH and MOC	MOC, DoH
	Stakeholders' Meetings and Information Disclosures	Explanation of project plans and getting public's opinions relating to their concerns, suggestions and requests	All project sites	Before commencement of construction work	1) Myanmar Environmental Conservation Rules and Regulations (2015) 2) JICA Guidelines	MOC, DoH	Consultants, DoH and MOC	MOC, DoH
(II) Construction Stage								
1) Social Environment	Increase in traffic congestion and disturbance of access to public facilities etc.	1) Collection of complaints, 2) Physical observation of road traffic condition, 3) hearing 4) warning signs	Construction sites and surroundings	Every day of construction work	-	CT	CT, DoH, GAD, MC, Consultants	CT
	Safety, Public health and Sanitation	1) Assign full time HSE officers 2) Safety plan, fire protection plan, control of hazardous materials, PPEs 3) warning signs 4) Sanitary toilets, garbage bins, runoff controls, waste management	Construction sites and surroundings	Symptom of workers and inhabitants within and around construction site	Health Law, Labour Safety Law	CT	CT, DoH, GAD, MC, Consultants	CT

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
		in camps						
	Infectious Diseases such as HIV/AIDS	Medical examination of construction workers and peoples making contact with HIV/AIDS sufferers, if any	Construction sites and surroundings	Before and after construction stage as required	Health Law, Labour Safety Law, Prevention of HIV/AIDS Law	CT	CT, DoH, GAD, MC, Consultants	CT
	Working condition	1)Medical check and symptom of workers 2)First Aid Cases	Construction sites and surroundings	As required	Labour Safety Law	CT	CT, DoH, GAD, MC, Consultants	CT
	Natural disaster/risks	Records of natural disaster and hazards in the project area	Construction sites and surroundings	Daily	Disaster Prevention Law	CT	CT, , GAD, DoH, MC, Consultants	CT
	Accident	Records of accidents in the project area	Construction sites and surroundings	Daily	Labour Law, Labour Safety Law	CT	CT, DoH, GAD, MC, Consultants	CT
	Social issues	1)Collection of complaints, requests 2)Hearing	Construction sites and surroundings	As required	-	CT	CT, DoH, GAD, MC, Consultants	CT
2) Natural Environment	Replanting trees	1) Physical observation, 2) Hearing	Construction sites and surroundings	As required	-	CT	CT, DoH, GAD, MC, Consultants	CT
3) Environmental Pollution	Air pollution	1) Complaints, 2) Physical observation, 3) Dust Control 3) Air quality measurement (SO_2, NO_2, PM10)	1) & 2) Construction site and surroundings ; 3) Air quality measurement (3 locations)	1) & 2) & 3) Daily , 4) 3 times/year, construction period-year	Community perception	CT, MOC, Consultants	CT, DoH, GAD, MC, Consultants	CT
	Water pollution	1) Complaints, 2) Physical observation, 3) Wastewater analysis (pH, BOD, COD, TS, SS)	1) & 2) Construction site and surroundings ; 3) Wastewater	1) Daily (physical observation), 2) wastewater analysis (as required)	Community perception	CT, MOC, Consultants	CT, DoH, GAD, MC, Consultants	CT

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
			analysis (critical areas)					
	Soil Contamination	Physical observation	Construction site and surroundings	Daily	Community perception	CT	CT, DoH, GAD, MC, Consultants	CT
	Sold waste management	Record of collection, transportation and disposal	Construction site and surroundings	Daily	Community perception	CT	CT, DoH, GAD, MC, Consultants	CT
	Noise	1) Complaints, 2) Physical observation, 3) Noise level measurement	1) & 2) Construction site and surroundings 3) 2 locations (sensitive receptor/background)	1) & 2) Daily; 3) 3 times/year,	Community perception	CT	CT, DoH, GAD, MC, Consultants	CT
(III) Operation Stage								
1) Social Environment	Traffic Volume increased and Accidents	1) Collection of complaints, 2) Physical observation/ road traffic surveys, 3) hearing 4) warning signs and barricades	Project area	2) 3 times per year 1) and 3) and 4) as required	Disaster Prevention Law	DoH, MOC	DoH, MOC	DoH, MOC
2) Environmental pollution	Water pollution	1) Complaints, 2) Physical observation, 3) Wastewater analysis (pH, BOD, COD, SS, TS)	Discharged points from wastewater treatment plant of depot	3 times /year for 2 years after operation	Environmental Emission Standards (2015) of Myanmar Government, WHO and Japan Standards	DoH, MOC	DoH, MOC	DoH, MOC

Note 1: Monitoring cost in the Construction Stage will be covered by the Constructors (CT). Cost for air quality measurements are estimated as USD 30,000 per year per road which are at least more than 50 kilometer.

Note 2: Implementing Organizations/ Responsible and supervising organizations - CT: Contractor, MOC – Ministry of Construction, DoH – Department of Highways, FERD - Foreign Economic Relations Department, GAD- General Administration Department, MOECAF - Ministry of Environmental Conservation and Forestry, MC – Monitoring Committee which will be formed by ESE, GAD, and Community Elders (honourable persons).

Source: JICA Preparatory Survey Team

4.7 Cost, Financial Sources, and Framework

Implementation frame works, cost and financial sources for the environmental management and the monitoring during construction and operation are presented below. Environmental management and monitoring organization is shown in Table 4.6, including the concerned agencies by construction stage and their functions. All planned mitigation measures are carried out by the contractors and reported to DoH, the supervision consultants and the Project Management Unit (PMU). The monitoring results are reviewed and conducted corrective and preventive action, if necessary. The roles and responsibilities of the organization which will conduct monitoring and environmental management works are shown in Table 4.6.

Table 4. 6 Environmental Management and Monitoring Organization

Stage	Name of Organization	Role and Responsibility
Pre-Construction and during Construction	Land Acquisition Team (DoH, SLRD and Detailed design consultant)	• Overseeing the updating of the Abbreviated Resettlement Action Plan (A-RAP) after the Detailed design • Monitoring actual payments of compensation to affected landowners, structure owners, and crops/trees owners; • Other necessary roles upon finalization of the A-RAP during the Detailed design
	The Construction Supervision Consultant	• Inspection of mitigation measures and environmental monitoring conducted by the contractor based on the approved IEE • Report the monitoring result to DoH and donor (JICA) on monthly report
	Road and Bridge Construction Committee (DoH, Local Government, contractor, supervision consultant, local NGO such as farmer association, religious group, peace group and political group etc.)	• Overseeing the implementation of the EMP by the Contractor • Evaluation of result of environmental monthly report and respond necessary action • Validate project compliance with the conditions stipulated in the IEE and A-RAP; • Receive complaints, gather relevant information to facilitate determination of validity of complaints or concerns about the project and timely transmit to the DoH recommended measures to address the complaint; • Prepare, integrate and disseminate simplified validation reports to community stakeholders; and • Compile monitoring data gathered by the Contractors and supervise preparation of semi-annual monitoring reports to be submitted to the DoH
	The Contractor	• Implementation of mitigation measures and monitoring based on the approved EMP on EIS and A-RAP • Submission of report for all conducted mitigation measures and monitoring
Operation	DoH. and Local Government	• DoH. shall conduct monitoring on the approved IEE and A-RAP, and report to ECD and Local Government Environmental Section • The result of monitoring shall be disclosed at DoH and Local Government office • Regular inspection and maintenance of the Bypass Road and bridges • The monitoring is carried out for two (2) years after construction of the bypass

Source: JICA Preparatory Survey Team

Financial sources for the environmental management and monitoring works at the construction and operation phases are shown below.

Table 4. 7 Cost and Financial Sources for Environmental Management Work

Stage	Name of Organization	Cost and Financial Sources
Pre-Construction and during Construction	Land Acquisition Team (DoH, SLRD and Detailed design consultant)	• Part of DoH/SLRD project preparation (minimal cost) • Part of consultants task
	The Construction Supervision Consultant	• Part of construction supervision contract
	Road and Bridge Construction Committee	• Minimal cost to DoH, and Local Government • Part of construction supervision contract • Part of contraction cost
	The Contractor	• Part of cost of contract (EMP is included in tender and contract documents)
Operation	DoH. and Local Government	• Minimal cost since it is only visual inspection and record verification

Source: JICA Preparatory Survey Team

The contract documents will contain a provision allocating part of construction cost for the implementation of the environmental management such as mitigation measures. This is estimated at about 0.5-2.0 % of total contract budget.

CHAPTER 5 Results of Stakeholders' Meeting and Information Disclosure

Stakeholders meetings were held on purpose – 1) to inform all the stakeholders of the Sub-project, its potential negative and positive impacts on them, 2) to understand and take into account stakeholders' views, concerns and values in the project design, and 3) to improve transparency and accountability in order to reduce conflicts and ensure smooth implementation of the Sub-projects.

Stakeholder meetings for Taungoo – Laiktho – Yardo – Loikaw – Hopone Road Upgrading Sub-project, were held two times:

1) First stakeholder meeting was held at Sibu village, Phekon Township, Shan State, on March 11, Friday, 2016 with participation of 76 attendants including community elders, etc. DoH and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.
2) Second stakeholder meeting was held at Laiktho Sub-township, Kayin State, on March 12, Saturday, 2016 with participation of 51 attendants including Government Organization, Non-government Organization and community elders, etc. In the meeting DoH and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.

The Report of Initial Environmental Examination (IEE)

FOR

REGIONAL DEVELOPMENT PROJECT FOR POVERT REDUCTION PHASE II

RIGIONAL POWER SUPPLY SECTOR (ON GRID)

IN

THE REPUBLIC OF THE UNION OF MYANMAR

May 2016

Yachiyo Engineering Co., Ltd.

Oriental Consultants Global Co., Ltd

Abbreviations

JICA	Japan International Cooperation Agency
ADB	Asian Development Bank
WB	World Bank
WHO	World Health Organization
ASEAN	Association of South East Asian Nations
MOECAF	Ministry of Environmental Conservation and Forestry
MOEP	Ministry of Electric Power
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MOAI	Ministry of Agriculture and Irrigation
FERD	Foreign Economic Relations Department
ECD	Environmental Conservation Department
GAD	General Administration Department
MEPE	Myanmar Electric Power Enterprise
ESE	Electricity Supply Enterprise
DRD	Department of Rural Development
SLRD	Settlement and Land Record Department
PMU	Project Management Unit
EIA	Environmental Impact Assessment
IEE	Initial Environmental Examination
EMP	Environmental Management Plan
NEP	National Electrification Plan
A-RAP	Abbreviated Resettlement Action Plan
MC	Monitoring Committee
TOR	Terms of Reference
PAP	Project Affected Person
PAU	Project Affected Unit
CT	Contractor
ODA	Official Development Assistant
ACSR	Aluminium Conductor Steel Reinforced
HDBC	Hard Drawn Bare Copper
ABC	Aerial Bundled Cable

UNITS

$\mu g/m^3$	Microgram per Cubic Meter
km^2	Square Kilometer
$\mu g/m^3$	Microgram per Cubic Meter
mg/l	Milligram Per Liter
°C	Degree Centigrade
ml	Milliliter
km	Kilometer
kV	Kilo Volt
MW	Mega Watt

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CHAPTER 1 Introduction

1.1 Purpose of IEE

The purpose of this study is

- To inquiry the existing baseline data that describe all relevant physical, biological, social, cultural and economic characteristics of the potential project affected area through second source reviews and field investigation
- To evaluate the significance of potential adverse and beneficial impacts which could affect to the proposed project area by project activities of transmission line and substations construction and operation of the project
- To understand the past and current history of lands to be acquired and identify the loss of assets by projects activities
- To adopt effective mitigation measures that could avoid or mitigate the potential impacts to a level deemed as acceptable
- To define the appropriate environmental and social management and monitoring mechanism to be implemented throughout the life of project cycle

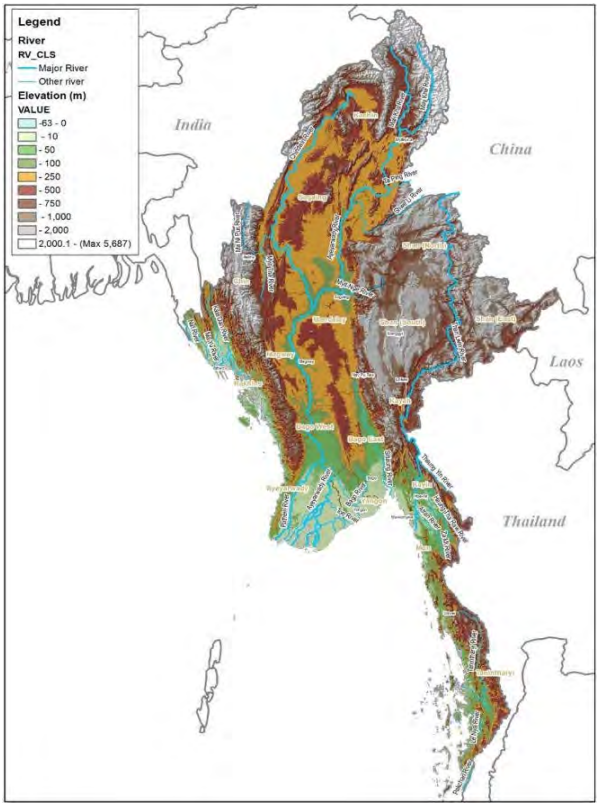
1.2 Outline of Environmental and Social Consideration

(1) Natural Condition

- *Physical Feature*: The topography of Myanmar can roughly be divided into three parts: the Western Hills Region, the Central Valley Region and the Eastern Hill Region.

- *Topography, Geology and Hydrology*: Myanmar is characterized by topographic features including mountain ranges in the north, east and west, and a long coastal strip in the south. Steep mountainous ranges traverse the entire western border of Myanmar with India and Bangladesh. Their average elevation is approximately 1,800 meters and the highest point is the top of Mt. Hkakaborazi reaching 5,881 meters above sea level. Myanmar has five main rivers: Ayeyarwady, Chindwin, Salween, Sittaung and Tenasserim, the longest of which being Ayeyarwady River, which is approximately 2,170 kilometers long, running through the country into the Gulf of Martaban. The East-West Economic Corridors passes Sittaung River, Salween River, Attran River, Gyaing River, Than Lwin River and Salween River.

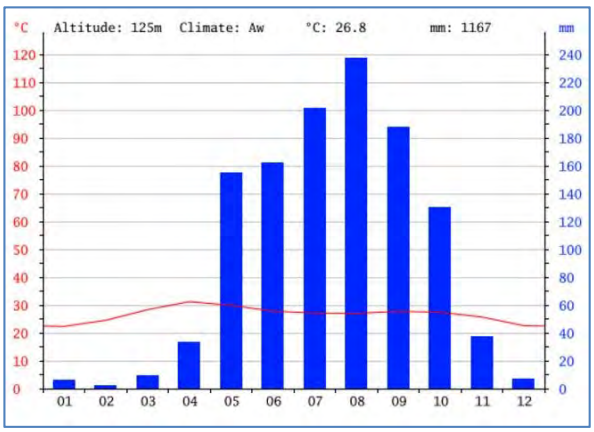
- *Climate*: The climate of Myanmar is roughly divided into three seasons: summer, rainy season



Source: SRTM and Agricultural Atlas

Figure 1. 1 Topographic and Hydrological Feature

and cold season. From March to mid-May are summer months; the rain falls from mid-May to the end of October and the cold season starts in November and ends in the end of February. Generally, Myanmar enjoys a tropical monsoon climate. However, climatic conditions differ widely from place to place due to widely differing topographical situations. For instance, Central Myanmar has an annual rainfall of less than 40 inches while the Rakhine coast gets about 200 inches. Besides, the average highest temperature in Central Myanmar during the summer months March and April is above 43.3 C° while in Northern Myanmar, it is about 36.1 C° and on the Shan Plateau between 29.4 C° and 35 C°. Temperature of towns varies according to their location and elevation. The average monthly temperature and precipitation of Nay Pyi Taw are shown as figure 1.2.



Source: Climate Data Org.

Figure 1. 2 Temperature and Rainfall in Nay Pyi Taw

Flora and Fauna: Myanmar is endowed with a rich diversity of habitat types arising largely from its unusual ecological diversity. It is home to nearly 300 known mammal species, 300 reptiles, and about 100 bird species. The country is also a haven for about 7000 species of plant life. The potential worth of plant species in Myanmar is considerable. Since Myanmar considers such a rich pool of biodiversity as an important national asset, the government of the Union of Myanmar has drawn up strict regulations to protect its reservoir of biodiversity and biological resources.

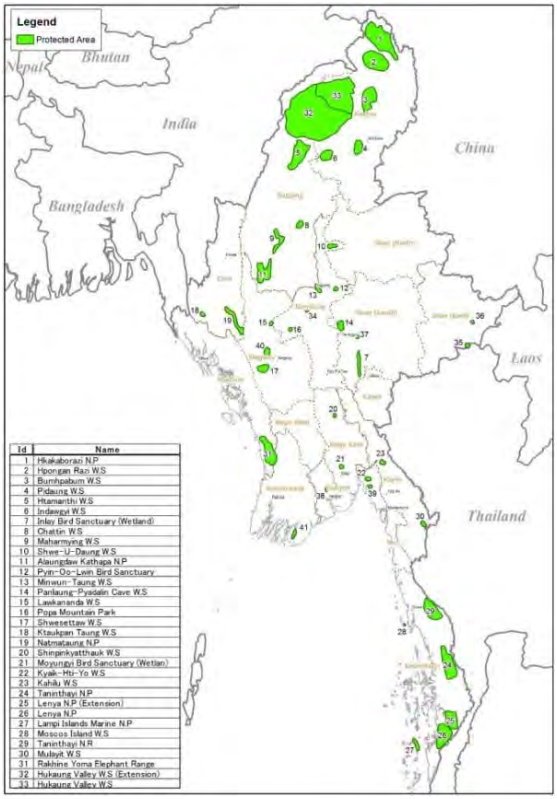


Figure 1. 3 Protected Areas in Myanmar

- *Protected Area*: There are around 33 protected areas in Myanmar. These conservation zones are declared by laws as national parks, watershed reserves, wildlife preserves and sanctuaries.

(2) Social Condition

Myanmar has an estimated population of 51.4 million, consisting of diverse ethnic groups speaking over 100 languages and dialects. It is ranked 150 out of 187 countries on the Human Development Index. Economic growth has averaged 5 percent in recent years with a per capita income of USD$702. Socio-economic characteristic in Myanmar is shown as table 1.1.

Table 1. 1 Outline of Socio economic characteristic in Myanmar

Item	Description
Area (km^2) / Population (mil)	676,578 km^2 / 51.4 million people
Rural Population (%)	70 % (2015)
Poverty Rate (%)	26 % (2015)
Ethnic groups (%)	Burma 68%, Shan 9%, Kayin 7 %, Rakhine 3.5 %, Chinese 2.5 %, Mon 2 %, Kachin 1.5 % and other 135 small ethnic groups.
Religion (%)	Buddhism 74 %, Protestant 6 %, Islam 3%, Hinduism 2 %, other 11 % (2005)
Population by industry (%)	Primary 62.8 %, Secondary 11.9 %, Tertiary 25.3% (1998)
Land Use (%)	Agricultural Land 12 mil ha (18.7%), Forest 31,7 mil ha (48.6 %)
Export (2010): *92 hundred million USD*	Natural Gas 38.5%, Pearl 24.5 %, Beans 9.8 %, Timber 7.7 %, Cloths 4.4 % (to Thailand 41.7 %, Hong Kong 21.1 %, India 12.6 %, China 6.2 %, Singapore 3.6%)
Import (2010): *90 hundred million USD*	Oil 21.9 %, Machines 14.0 %, Iron & Steel 9.0 %, Textile 7.1 %, Electric Machine 5% (from China 27.1 %, Singapore 27.0 %, Thailand 11.4 %, S. Korea 6.1 %, Japan 5.3 %)

Source: Data book of the world 2014

1.3 Administrative System in Myanmar

The government body with primary responsibility for ensuring and promoting soundness of the environment in Myanmar is MOECAF (Ministry of Environmental Conservation and Forestry) although other Ministries such as the Ministry of Agriculture and Irrigation and the Ministry of Livestock, Fisheries and Rural Development also share certain level of responsibility. MOECAF was reformed in September 2011 from the Ministry of Forestry to be the focal point and coordinating agency for environmental management. While the role of MOECAF is not specified by law, responsibility of its predecessor (i.e. Ministry of Forestry) is stipulated in the Forest Policy (1995) as: forest land management; environmental protection; timber extraction; and forest policy in Myanmar. Since then, there has been only one modification to the structure of the Ministry, which is addition of ECD (Environmental Conservation Department) established in October 2012 based on Environmental Conservation Law. ECD is the department responsible for managing the EIA (Environmental Impact Assessment) process in Myanmar. The role of MOECAF in environmental conservation can therefore be considered greater than before. The Organization chart of MOECAF is as following figure.

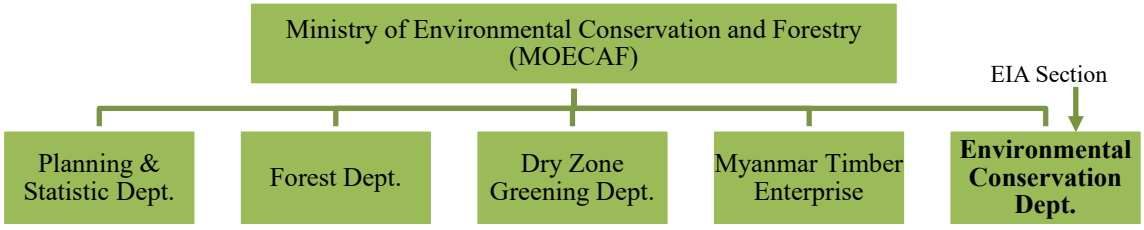


Figure 1. 4 the organization chart of MOECAF

The role of ECD is mainly preparation and formulation of policy and strategy framework, planning of national and regional environment management, environmental licensing, pollution control, and

monitoring of environmental impacts. Moreover, EDC also has the role of coordination and contribution for 1) integration of environmental issues into sector planning, 2) information management and awareness promotion, 3) economic and financing instruments for environment and 4) international environmental agreements/ protocols/conventions. It can be said that while MOECAF mainly takes the role of decision making in many cases, ECD's role is mainly for preparation and implementation of duties relating to all environmental conservation works.

Different responsibilities of ECD are mainly categorized as 1) planning and coordination with sector authorities and different stakeholders, 2) control of pollution and other environmental impacts – establishment and administration of EIA, prior permissions, IEE, EMP including SIA, 3) management of environmental emergencies, 4) dissemination of environmental awareness, 5) establishing economic instruments and financing environmental management, and 6) enforcement and sanction. (Ref: Needs assessment for the implementation of the Environmental Conservation Law, UNDP, 2016)

The Environmental Conservation Department (ECD) has up of 156 officers and 247 staffs (403 in total) in 2015, under the supervision of the Director General at the Head Office, Nay Pyi Taw and 14 states in regions mentioned in the following diagram.

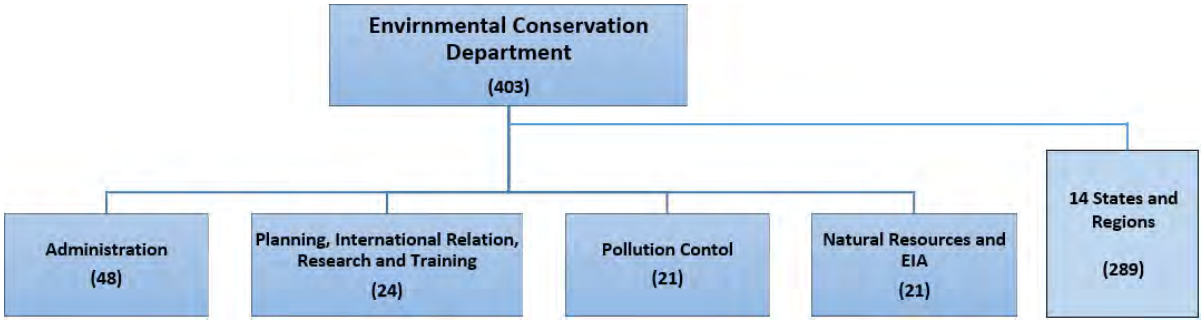


Figure 1. 5 The organizational chart of ECD

CHAPTER 2 Policies, Legislation and Institutional Framework

2.1 Related Law and Regulations

(1) Environmental Conservation Law (2012)

The principal law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March, 2012 (The Pyidaungsu Hluttow Law No. 9/20/2130rh). The law stipulates which government bodies are in charge of environmental conservation as well as their relevant roles and responsibilities. It touches on water, noise, vibration and solid waste qualities but does not provide specific standards to be met. It also mentions both environmental and social impact assessments. In the context of project development, it is important to note that the law adopts the notion of 'polluter/beneficiary pays principle' as it implies that the project promoters are responsible for covering all environmental and social costs generated by the project. The law serves as the basis for founding ECD under MOECAF, both of which will be explained later. Following the Environmental Conservation Law are two legal arrangements: Environmental Conservation Rules; and EIA Procedures.

(2) Environmental Conservation Rules

Environmental Conservation Rules have been promulgated in 2014 and provides a platform to bridge the Environmental Conservation Law with more specific and practical rules and guidelines including EIA Procedures and environmental quality standards. However detailed guidelines for each responsible organizations, detailed guidelines, environmental standards and criteria of EIA & IEE (Initial Environmental Examination) will be provided after 2015 in the “EIA Procedure”.

(3) Environmental Impact Assessment (EIA) Procedures

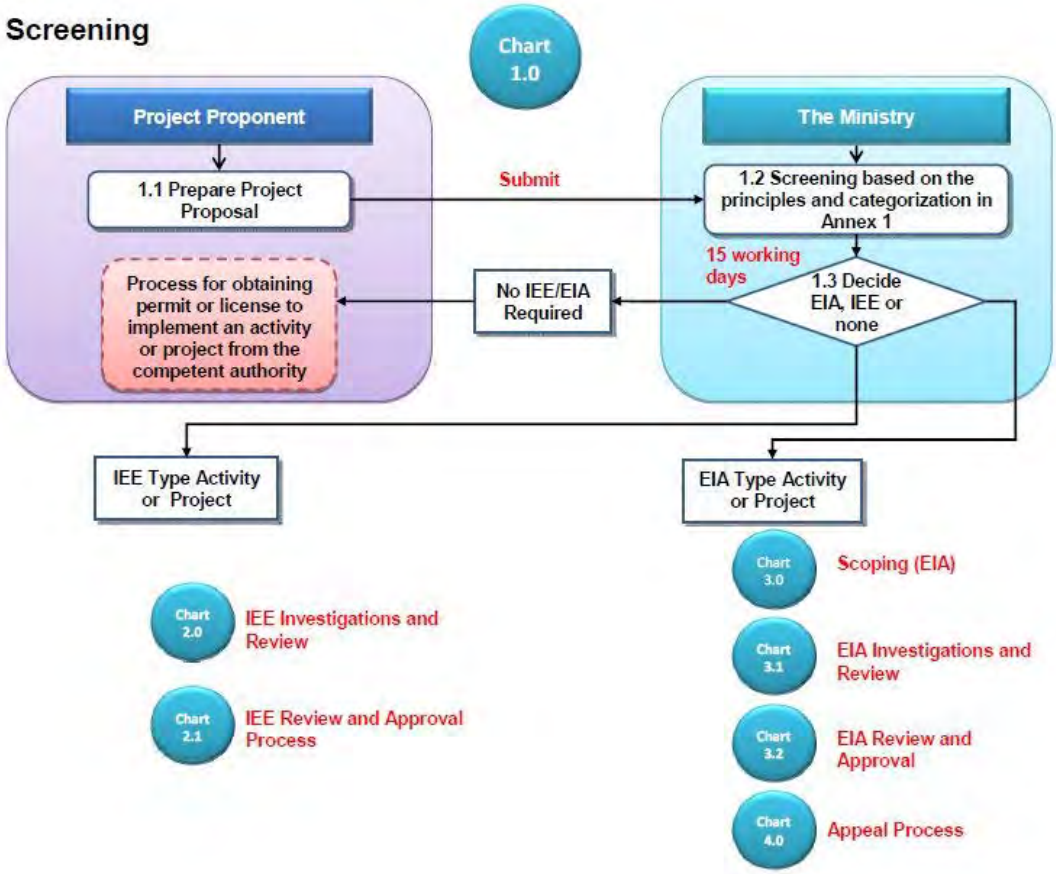
The EIA Procedures had been approved by cabinet in December 29, 2015. As of beginning of December, 2015, the Notification of EIA procedure was ongoing. It stipulates the conditions under which EIA is required and the steps to be followed in conducting and assessing the EIA. Under the Procedures, the Ministry, sets an Environmental Conservation Committee, is to give recommendations from an environmental point of view whether to approve the EIA reports or not. IEE and EIA include an Environmental Management Plan (EMP). The Procedures also include a clause for public participation in implementing the IEE, EIA, and EMP. It also mentions the notion of precautionary principle and touches on climate change, and also includes Strategic Environmental Assessment.

The Project Proponent should submit the Project Proposal to the Department (ECD) for Screening. ECD categorize the project as one of the following; 1) an EIA Type Project, or 2) an IEE Type Project or 3) neither an EIA Type Project nor an IEE Type Project, and therefore not required to undertake any environmental assessment.

Regarding IEE, prior to commencement of an IEE, the Project Proponent should inform to ECD in writing as to the identity of the organization(s) and/or person(s), who will undertake the IEE and reporting. The Project Proponent may carry out the IEE and reporting by itself or may appoint a

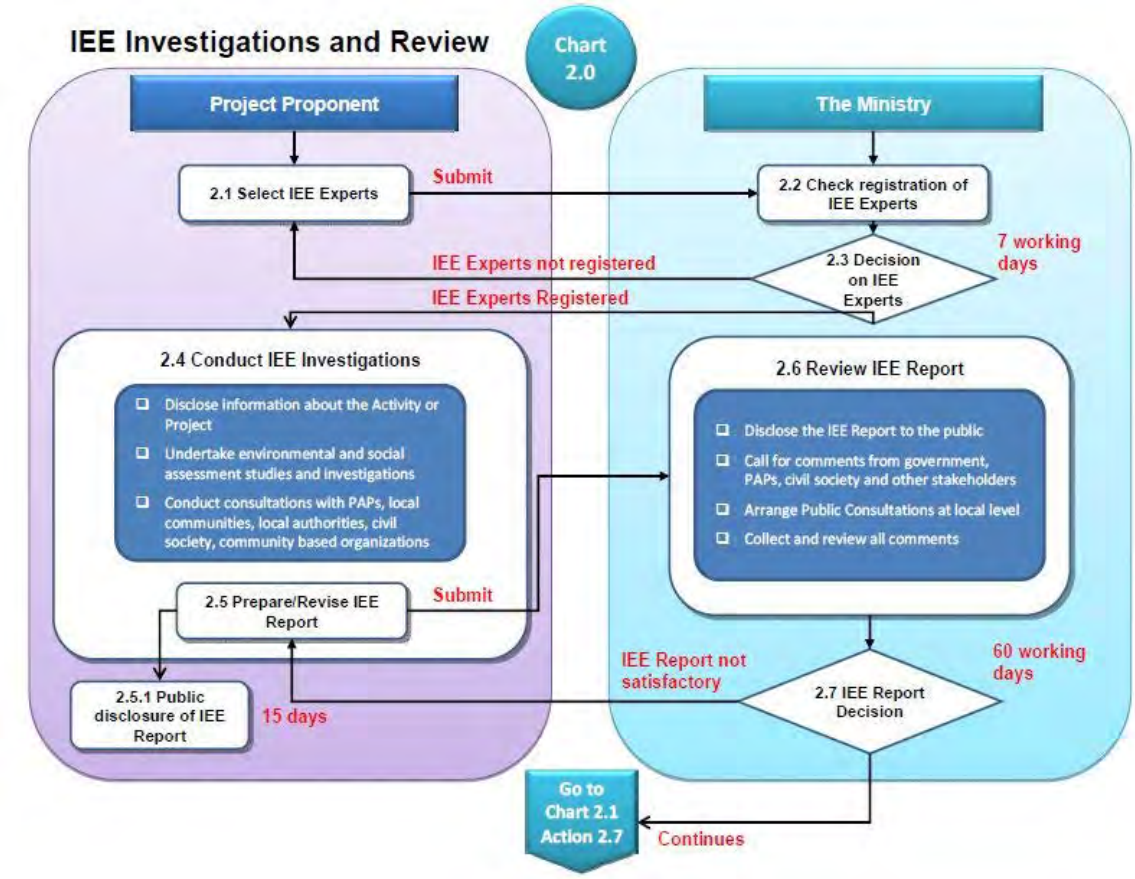
registered Consultant to do so. Within seven (7) working days of its receipt of information about the identity of any proposed organization(s) and/or person(s) selected by the Project Proponent to undertake the IEE, ECD will confirm whether such organization(s) and/or person(s) is/are in good standing with the Department. The Project Proponent should undertake the public consultation in regard to an IEE Type Project.

Screening and the IEE investigation and review process is as following figure;



Source: EIA Procedures 2015

Figure 2. 1 the Screening Process



Source: EIA Procedures 2015

Figure 2. 2 the IEE Investigation and review process

In regard to EIA, all EIA Type Projects should undergo Scoping. The Project Proponent shall be responsible to ensure that the Scoping and the preparation of the TOR for the EIA Report are undertaken in a professional manner. As part of the Scoping, the Project Proponent shall also ensure the public consultation and participation process is carried out.

Based on the Scoping, the Project Proponent shall prepare the TOR for the EIA investigations in accordance with applicable guidelines issued or adopted by the Ministry. The Project Proponent shall submit the completed Scoping Report and TOR to the ECD for review and approval.

The Project Proponent shall ensure that the EIA investigation properly addresses all Adverse Impacts and is undertaken in accordance with the TOR as approved by ECD. And EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities that may be affected by the Project during all project phase, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project. The investigations shall

include all necessary data collection, technical studies, modeling, field surveys, field sampling, laboratory analysis, engineering designs and calculations including alternative analysis. EIA procedure also stipulates the consultation process of EIA investigation.

2.2 Gap between JICA Guideline and Myanmar Legislation

Regarding policies for environmental and social considerations, those of JICA guidelines are basically same as those of World Bank and ADB. Table 2.1 shows results of comparison between the policies of Myanmar legislations including the EIA Procedures and those of JICA Guidelines. It is found that there are still considerable gaps between Myanmar legislations and JICA Guidelines.

Table 2. 1 Gaps between JICA Guidelines and Myanmar Legislation on EIA

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
(1) Underlying Principles		
1. Environmental impacts that may be caused by projects must be accessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types activities according to the defined thresholds. Article 35, 62 of the Procedures stipulates to analyze feasible alternatives as well as mitigation measures.
2. Such examinations must be endeavored to include an analysis of environment and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social and technical analyses of projects.	Procedures (A 36, 63)	Article 43, 69 of the Procedure stipulates to conduct in close harmony with the social and economic analysis of projects.
3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types to projects activities according to the defined thresholds. Article 35, 62 of the Procedure stipulates to analyze feasible alternatives as well as mitigation measures.
4. For projects that have a particularly high potential for adverse impacts or that are highly contentious, a committee of experts may be formed so that JICA may seed their opinions, in order to increase accountability.	Procedures (A 3)	Article 3 of the Procedures requires the establishment of Environmental Conservation Committee composed of at least five persons with necessary expertise. And the committee's duty is to recommend approval of the submitted IEE/EIA and EMP.
(2) Examination of Measures		
1. Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environment and social considerations. In the examination of measures, priority is to be given to avoidance of environmental impacts; when this is not possible, minimization and reduction of impacts must be considered next. Compensation measures must be examined only when impacts cannot be avoided by any of the aforementioned measures.	Procedures (A 35, 62)	Article 35, 62 of the Procedures stipulates to investigate of all potential environmental impacts including an analysis of feasible alternatives and mitigation measures. Conduct of compensation measure is not stipulated in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Appropriate follow-up plan and system, such as monitoring plans and environmental management plants, must be prepared; the costs of implementing such plans and systems, and the financial methods to find such costs, must be determined. Plans for projects with particularly large potential adverse impact must be accompanied by detailed environmental management plans.	Procedures (A 35,36,62,63)	Article 35, 62 of the Procedures stipulates to analyze feasible alternatives, mitigation measure as well as cost & benefit.
		Article 26, 63 of the Procedures requires the preparation of EMP for IEE/EIA required project.
(3) Scope of Impacts to Be Assessed		
1. The impacts to be accessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accident, water usage, climate change, ecosystem, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood , utilization of land and local resources, social institution such as social capital and local decision-making institution, existing social infrastructure and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. Items to be addressed in the specific project are narrowed down to the needed ones through the scoping process.	Procedures (A 56)	Article 56 of the Procedures stipulates that EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases including pre-construction, construction, operation, decommissioning, closure, and post-closure, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project.
2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project.	None	No laws were identified, which mentioned assessment and examination of derivative, secondary, and cumulative impacts as well as the impacts of projects which are indivisible from the project in a reasonable extent.
(4) Compliance with Laws, Standards, and Plans		
1. Projects must comply with the laws, ordinances, and standards related to environmental and social considerations established by the governments that have jurisdiction over project sites (including both national and local governments). They must also conform to the environmental and social consideration policies and plans of the governments that have such jurisdiction.	The Environmental Conservation Law 2012 (A 28, 29)	No law directly prescribes that projects must comply with the laws, ordinances, and standards related to environmental and social considerations.
		Article 28 of The Environmental Conservation Law prescribes that "No one shall, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under this Law"
		Article 29 of the law stipulated that "No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law."

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Projects must, in principle, be undertaken outside of protected areas that are specifically designated by laws or ordinances for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such areas). Projects are also not to impose significant adverse impacts on designated conservation areas.	The Protection and Preservation of Cultural Heritage Regions Law(Article 18)	This law stipulates that no person shall construct, extend, renovate a building or extend the boundary of ancient monumental zone or ancient site zone without prior permission granted under this law.
(5) Social Acceptability		
1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans.	Procedures (A 16,36)	Article 16 of the Procedures stipulates that EIA Review body shall have responsibility if EIA report comply with procedure (including public participation in conduct of IEE/ EIA and EMP.
		Article 36 of the Procedures stipulates that EIA report shall contain the results of the public consultation and public participation processes, recommendations received from the public, and the Project Proponent's written responses to comments received during that process.
2. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, and the poor and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.	Procedures (A 7)	Article 7 of the Procedures prescribes implementation of necessary actions for the project which potentially gives adverse impact on indigenous people and causes involuntary resettlement. However, the details of actions are not provided in the Procedures.
(6) Ecosystem and Biota		
1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests.	The Environmental Conservation Law 2012 (A 18)	The Environmental Conservation Law prescribes that relevant government departments/organizations shall carry out conservation, management, beneficial use, sustainable use and enhancement regional cooperation of environmental natural resources.
	The Forest Law 1992 (A 40)	Article 40 of the Forest Law (1992) prescribes that cause of any damage to reserved forest and its environment is prohibited and will be punished.
	The Protection of Wildlife and Conservation of Natural Areas Law 1994 (A 36)	Article 36 of The Protection of Wildlife and Conservation of Natural Areas Law prescribes that cause of any damage to protected areas is prohibited and will be punished.
2. Illegal logging of forests must be avoided. Project proponents etc. are encouraged to obtain certification by forest certification systems as a way to ensure the prevention of illegal logging	The Forest Law 1992 (A 17, 40)	The Law stipulates that forest produce may only be extracted after obtaining a permit.
(7) Involuntary Resettlement		
1. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impact on involuntary resettlement. However, the details of actions are not provided in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. Prior compensation, at full replacement cost, must be provided as much as possible. Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting means for an alternative sustainable livelihood, and providing the expenses necessary for the relocation and re-establishment of communities at resettlement sites.	Land Acquisition Act 1894 (A 3)	Article 3 of the Land Acquisition Act stipulates that a person who has right in land would be entitled to claim a compensation if the land were acquired under this Act.
	Farmland Rules 2012 (A 64)	Article 64 of Farmland Rules stipulates compensation in farmland acquisition for the interest of the State or public.
	Land Acquisition Act 1894 (A 23)	Article 23 of the Act stipulates that damages on standing crops and trees, on land, properties, incidental to relocate residence or business and losses of profits due to land acquisition are considered for compensation although it does not clearly state to support PAPs can improve or at least restore their standard of living. However, these laws do not clearly state any more details of compensation and supporting measures.
3. Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	Procedures (A 15)	Article 15 of the Procedures describes that relevant agencies, institutions, civil society organizations, and project-affected persons are invited as appropriate to provide comments and suggestions on the IEE/ EIA/ EMP reports. However, it does not describe grievance mechanism.
	Land Acquisition Act 1894 (A 5A, 18)	Article 5A of the Land Acquisition Act stipulates that any person whose land is affected (acquired) can claim the objection for the land acquisition within thirty
4. For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP4.12, Annex A.	None	No laws were specifically mentioned about the requirement of resettlement action plans for large-scale involuntary resettlement.
		According to GAD (General Administration Department) of MOHA (Ministry of Home Affairs), Land Acquisition and Resettlement Action Plan (LARAP) will be required for the large-scale developments and the GAD will approve it.
(8) Indigenous People		
1. Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous people for their losses.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. When projects may have adverse impacts on indigenous people, all of their rights in relation to land and resources must be respected in accordance with the spirit of relevant international declarations and treaties, including the United Nations Declaration on the Rights of indigenous Peoples. Efforts must be made to obtain the consent of indigenous peoples in a process of free, prior, and informed consultation.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.
3. Measures for the affected indigenous peoples must be prepared as an indigenous peoples plan (which may constitute a part of other documents for environmental and social consideration) and must be made public in compliance with the relevant laws and ordinances of the host country. In preparing the indigenous peoples plan, consultations must be made with the affected indigenous peoples based on sufficient information made available to them in advance. When consultations are held, it is desirable that explanations be given in a form, manner, and language that are understandable to the people concerned. It is desirable that the indigenous peoples plan include the elements laid out in the World Bank Safeguard Policy, OP4.10, Annex B.	Procedure (A7)	The procedure prescribes that project proponent shall additionally comply with separate procedure when Indigenous People might be affected.
(9) Monitoring		
1. After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results of such monitoring.	Procedures (A 3, 71-75)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
		Environmental Conservation Committee shall carry out monitoring of the implementation of the approved EMP by the project proponent although there was little information regarding the method or terms of the monitoring conduction.
2. In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans.	Procedures (A 3)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
3. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.	None	No laws were identified, which stated that project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.

Note: JICA - JICA Guidelines for Environmental and Social Considerations, WB - World Bank Safeguard Policy, Procedures - Environmental Impact Assessment Procedures (2015), A - Article.

Source: JICA Guidelines for Environmental and Social Considerations (2010.4) and World Bank OP 4.12 and relevant Myanmar legislation

2.3 Environmental Quality Standards

(1) Outline of Environmental Quality Standards

In Myanmar, MOECAF had been already stipulated the environmental quality standards for each specific parameters, in December 29 2016, according to the following statement in the Environmental Conservation Law (2012):

- The Ministry may, with the approval of the Union Government and the Committee, insert, modify and stipulate the environmental quality standards for the interests of the public in accord with the scientific and technological advances or requirement of work according to time and area.
- If any environmental quality standard stipulated by any Government department, Government organization under any existing law is more stringent than the quality standard stipulated by the Ministry, it shall remain in force; however if it is less stringent than such standard, only the standard stipulated by the Ministry shall be in force.

These national Environmental Quality (Emission) Guidelines had been already approved in Pyidaungsu Hluttaw (Union Parliament), on the purpose to provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

So, all the developers in Myanmar must be in compliance with those Guidelines, in which two main sectors were categorized – (1) General Guidelines and (2) Industrial-specific Guidelines. They must try not to exceed those emission and/or discharge standards and environmental standards classified in those Guidelines.

(2) Pollution control standards of General Guidelines

2.1 Air Emission

According to MOECAF (ECD – Environmental Conservation Department), Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that – (i) emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines for the most common pollutants as summarized below; and (ii) emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e. not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed. Table 2.2 shows general air quality standards.

Table 2. 2 Air Emission Standards of ECD

No	Parameter	Averaging Period	Guideline Value µg/m^3
1	Nitrogen dioxide (NO_2)	1-year	40
		1- hour	200
2	Ozone (O_3)	8-hour Daily maximum	100
3	Particulate Matter PM_{10}	1-year	20
		24-hour	50

No	Parameter	Averaging Period	Guideline Value µg/m^3
4	Particulate Matter $PM_{2.5}$	1- year 24- hour	10 25
5	Sulfur dioxide (SO_2)	24-hour 10-minute	20 500

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.2 Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Table xxx shows the standards for waste water discharges.

Table 2. 3 Standards for Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

No	Parameter	Unit	Guideline Value
1	5-day Biochemical oxygen demand	mg/l	50
2	Ammonia	mg/l	10
3	Arsenic	mg/l	0.1
4	Cadmium	mg/l	0.1
5	Chemical oxygen demand	mg/l	250
6	Chlorine (total residual)	mg/l	0.2
7	Chromium (hexavalent)	mg/l	0.1
8	Chromium (total)	mg/l	0.5
9	Copper	mg/l	0.5
10	Cyanide (free)	mg/l	0.1
11	Cyanide (total)	mg/l	1
12	Fluoride	mg/l	20
13	Heavy metals (total)	mg/l	10
14	Iron	mg/l	3.5
15	Lead	mg/l	0.1
16	Mercury	mg/l	0.01
17	Nickel	mg/l	0.5
18	Oil and grease	mg/l	10
19	pH	S.U	6-9
20	Phenols	mg/l	0.5

21	Selenium	mg/l	0.1
22	Silver	mg/l	0.5
23	Sulphide	mg/l	1
24	Temperature increase	˚C	< 3
25	Total coliform bacteria	100 ml	400
26	Total phosphorus	mg/l	2
27	Total suspended solids	mg/l	50
28	Zinc	mg/l	2

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.3 Regulation of Wastewater Discharge

Nobody shall be allowed to dispose and/ or flow sewage and wastewater from any activity, such as business, factory, into drainage, creeks and rivers without necessary treatment for compliance with standards, norms and criteria designated by MOECAF (ECD).

So, in addition to general and industry-specific wastewater guidelines applicable during project operations, MOECAF (ECD) had also stipulated the following guideline values to be applies during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

Table 2. 4 Standard for Site Runoff and Wastewater Discharges (Construction Phase)

No	Parameter	Unit	Maximum Concentration
1	Biological oxygen demand (BOD)	mg/l	30
2	Chemical oxygen demand (COD)	mg/l	125
3	Oil and grease	mg/l	10
4	pH	S.U	6-9
5	Total coliform bacteria	100 ml	400
6	Total nitrogen	mg/l	10
7	Total Phosphorus	mg/l	2
8	Total suspended solids	mg/l	50

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Water Quality Standards

With regard to the water quality, however, the guidelines proposed in the workshops in 1990 and 2011 (Draft), and the World Health Organization (WHO) Guidelines were compared in Table 2.5. Compared with 1990, the values for 2011 tended to be closer to the WHO Guideline. However, for copper and iron, the values are less strict than in the WHO Guidelines.

Table 2. 5 Water Quality Standards in Myanmar

No.	Parameters	Unit	Myanmar Standard		WHO Guideline
			1990	2011 (Draft)	
1	pH	-	6.5-9.2	6.5-8.5	Preferably<8.0
2	Turbidity	NTU	20	5	5
3	Color	Pt-unit	6.5-9.2	15	15
4	Aluminum (Al)	mg/l	0.2	0.2	0.2
5	Arsenic (As)	mg/l	0.05	0.05	0.01
6	Calcium (Ca)	mg/l	75-200	100	-
7	Chloride (Cl)	mg/l	200-600	250	250
8	Copper (Cu)	mg/l	1.0	2.0	1.0
9	Cyanide (CN)	mg/l	0.05	0.07	0.07
1	Hardness	mg/l	500	500	-
11	Iron (Fe)	mg/l	0.5-1.5	1	0.3
1	Manganese (Mn)	mg/l	0.3	0.3(0.1)	0.1
1	Lead (Pb)	mg/l	0.05	0.01	0.01
1	Magnesium (Mg)	mg/l	30-150	500	-
1	Nitrate (NO3)	mg/l	10(as N)	50	-
1	Sulfate	mg/l	400	250	250
1	Total dissolved	mg/l	1000	1000	1000
1	Zinc (Zn)	mg/l	5-15	3	3
1	Total Coliform	No/100ml	0	0	0
2	E.Coli	No/100ml	0	0	0

Source: The Study on the Improvement of Water Supply and Wastewater Treatment in Yangon (2012, METI, Japan)

2.5 Noise Level Standards

Noise level standards are stipulated by MOECAF (ECD) as in Table 2.6.

Table 2. 6 Noise Level Standards

No	Receptor	One Hour LAeq (dBA)	
		Daytime 07:00 – 22:00 (10:00 – 22:00 for Public holidays)	Nighttime 22:00 – 07:00 (22:00 – 10:00 for Public holidays)
1	Residential, Institutional, Educational	55	45
2	Industrial, Commercial	70	70

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Institutional Framework for Environmental Conservation

For implementation of Regional Development Projects for Poverty Reduction Phase II, related to the sub-projects of road sector, Implementing and Responsible Agency is MOC (Ministry of Construction), which control all environmental management and monitoring process of this project. To share the information between MOC and MOECAF (i.e. attend meeting among the related agencies regarding the environmental issue) and to prepare the Environmental Report (i.e. IEE.EIA), MOC allocated the contact person. Regarding the Power Supply Sector, implementing

and responsible agency is ESE (Electricity Supply Enterprise, Ministry of Electric Power) in case of On-grid, and DRD (Department of Rural Development, Ministry of Livestock, Fisheries and Rural Development) in case of Off-grid. DRD is also implementing and responsible agency related to the Water Supply Sector.

CHAPTER 3 Scope of the Study

3.1 Outline of the Project and its Components

(1) Outline of Project

Regarding the power sector, sub projects are divided into 2 groups; On-grid and Off-grid. Outline of On-grid sub projects are described as follows;

Table 3. 1 List of On-grid sub-projects of power sector

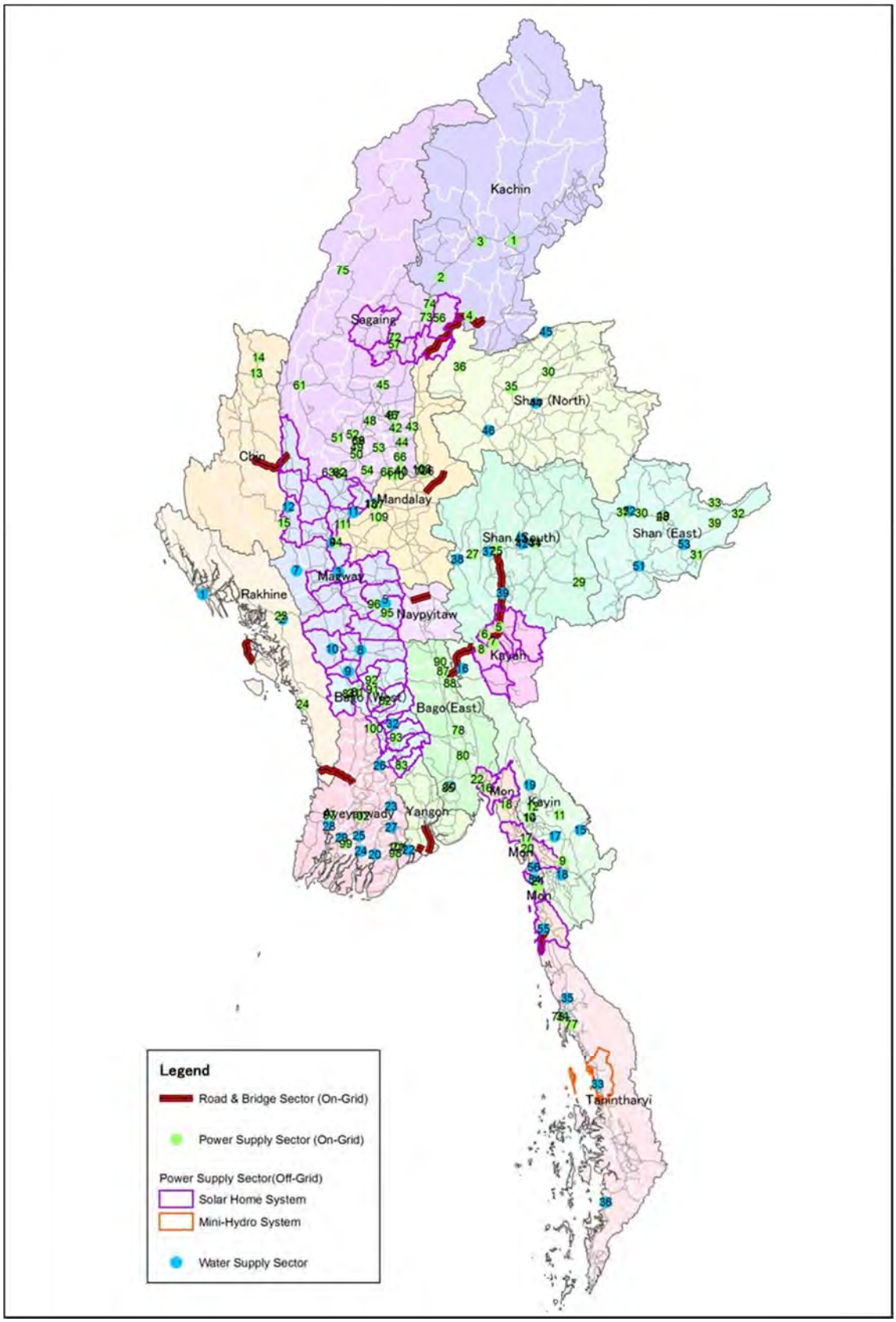
No	Code	State/Region	Name of subproject	Components
1	0101	Kachin	Waing Maw	66/33kV 10MVA S/s
2	0201	Kayah	Loikaw (ywartanshae)	33/11kV 10MVA S/s
3	0401	Chin	Teetain	11/0.4kV 100kVA S/s (8) Nos 11/0.4kV 50kVA S/s (1) Nos
4	0402	Chin	Htonzen	11/0.4kV 100kVA S/s (2) Nos
5	0501	Mon	Saung Naing Gyi (Kyaikhto)	33/11kV 5MVA S/s
6	0506	Mon	Mawlamyine (Khayon)	66/11kV 10MVA S/s
7	0601	Rakhine	Ann (Kazukain)	33/11kV 5MVA S/s
8	0602	Rakhine	Thandwe Kyaunkgyi	11/0.4kV 100kVA S/s (19) Nos 11/0.4kV 50kVA S/s (25) Nos
9	0701	Shan	Hopong (Pinpat)	33/0.4kV 200kVA S/s (3) Nos 11/0.4kV 200kVA S/s (4) Nos
10	0703	Shan	Kalaw (Heho)	66/11kV 5MVA S/s
11	0704	Shan	Kengtaung	33/11kV 5MVA S/s
12	0707	Shan	Talay	11/0.4kV 315kVA S/s (1) Nos 11/0.4kV 200kVA S/s (3)Nos
13	0801	Sagaing	Sagaing (Ywar Thit Kyi)	33/11kV 5MVA S/s
14	0802	Sagaing	Ohmtaw-Myinmu	-
15	0803	Sagaing	Shwebo (MyoHla)	33/11kV 5MVA S/s
16	0804	Sagaing	Kyauk Myaung	33/11kV 5MVA S/s
17	0805	Sagaing	Watlat (Saingnainkwe)	33/11kV 5MVA S/s
18	0806	Sagaing	Kanbalu (Malae)	33/11kV 5MVA S/s
19	0807	Sagaing	Khin Oo	33/11kV 5MA S/s
20	0808	Sagaing	Khin Oo (Chay Myint Kyin)	33/11kV 5MVA S/s
21	0809	Sagaing	Depayin (Myae)	33/11kV 5MVA S/s
22	0812	Sagaing	Kani	66/33kV 5MVA S/s
23	0813	Sagaing	Butalin (Maungtaung)	33/11kV 5MVA S/s

24	0815	Sagaing	Chaung Oo (Amyint)	33/11kV 5MVA S/s
25	0818	Sagaing	Kawlin	33/11kV 5MVA S/s
26	0819	Sagaing	Pinialbu (Gapwepalwe)	33/11kV 5MVA S/s
27	0820	Sagaing	Mawlight	11/0.4kV 200kVA (24) Nos
28	0822	Sagaing	Kalaywa	11/0.4kV 160kVA (3) Nos
29	0823	Sagaing	Pale	33/11kV 5MVA S/s
30	0825	Sagaing	Pale (Phalanpin)	33/11kV 5MVA S/s
31	0826	Sagaing	Myinmu	33/11kV 5MVA S/s
32	0901	Thanintharyi	Launglon (Zalot Village)	33/11kV 5MVA S/s
33	0902	Thanintharyi	Thayetchaung (Mindut)	33/11kV 5MVA S/s
34	1005	Bago	Hmattaing	33/11kV 5MVA S/s
35	1006	Bago	Tharyarwady	33/11kV 5MVA S/s
36	1008	Bago	No (4) Oakthar	33/11kV 5MVA S/s
37	1013	Bago	Yadashe (Myohla)	33/11kV 5MVA S/s
38	1101	Magway	Chauk (Gway Cho Village)	66/11kV 5MVA S/s
39	1102	Magway	Taungdwingyi (Satthwa)	66/11kV 5MVA S/s
40	1103	Magway	Taungdwingyi (Bakethano)	66/11kv 5MVA S/s
41	1201	Ayeyarwady	Pathein	33/11kV 10MVA S/s
42	1202	Ayeyarwady	Pyapon	66/33/11kV 10MVA S/s
43	1203	Ayeyarwady	Myaungmya (Pyin Village)	66/11kV 5MVA S/s
44	1206	Ayeyarwday	Einme	33/11kV 5MVA S/s
45	1305	Mandalay	Taungthar – Myingyan	66/33kV 30MVA S/s
46	1309	Mandalay	Nyung Oo	66/11kV 20MVA S/s

Source: JICA Preparatory Survey Team

Note: Detailed information for each sub-project components will be attached in ANNEX 3.

Figure 3.1 shows the location of 46 sub-projects all over the country.



Source: JICA Preparatory Survey Team

Figure 3. 1 Location Map of the Sub-projects

(2) Project Components (Sub-project design)

The outlines of standards of design and specifications for the facilities of Sub-Projects are described as follows. These are based on the existing ESE specifications and design in order to suit existing facilities.

1) 66kV/33kV and 66kV/11kV substations

There are two types of 66kV substation in the ESE, which are 66kV/33kV and 66kV/11kV. The standard type of 66kV substations is an air-insulated substation. Basically, the MEPE (Myanmar Electric Power Enterprise) constructs 66kV substations while the ESE operates and maintains them. However, small-scale 66kV substations are constructed by the ESE.

A Sample of 66/33/11 Sub-station

A Sample of 66/33KB Sub-station

2) 33kV/11kV substations

Figure 5-1-1 shows standard design of 33kV/11kV substation. A 33kV/11kV substation has one incoming transmission line, one set of switch bay and one transformer. Air insulated switchgears are applied for 33kV circuits and named switch bay. 11kV switchgear panels are installed in the control room. In the control room, a 33kV remote control panel for transformers, meters, relays are also installed. There are some Sub-Projects where a small-capacity transformer (such as 5MVA) installed by the ESE becomes overloaded due to load increase and then replaced and upgraded by a large-capacity one. In this case, the removed transformer is diverted to other substations.

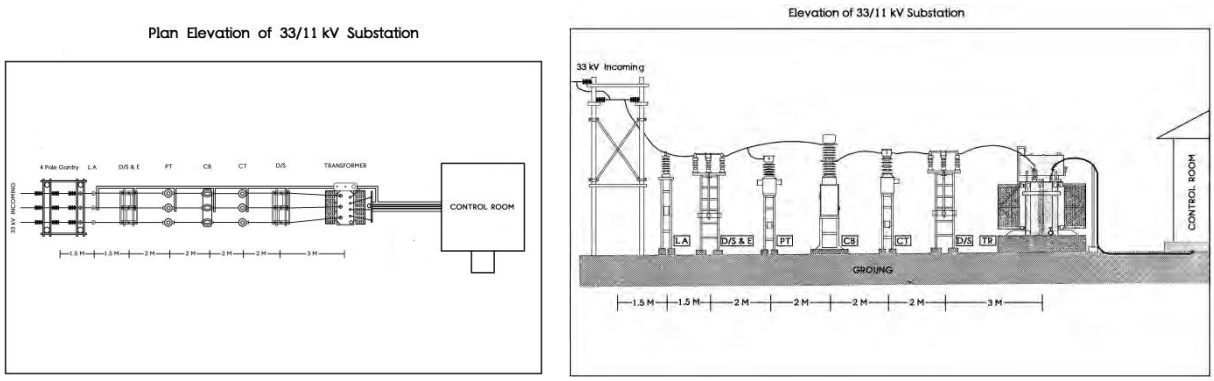


Figure 3. 2 33/11kV Substation Standard Layout

A Sample of 33/11 KV 5 MVA Sub-station

3) 66kV transmission lines

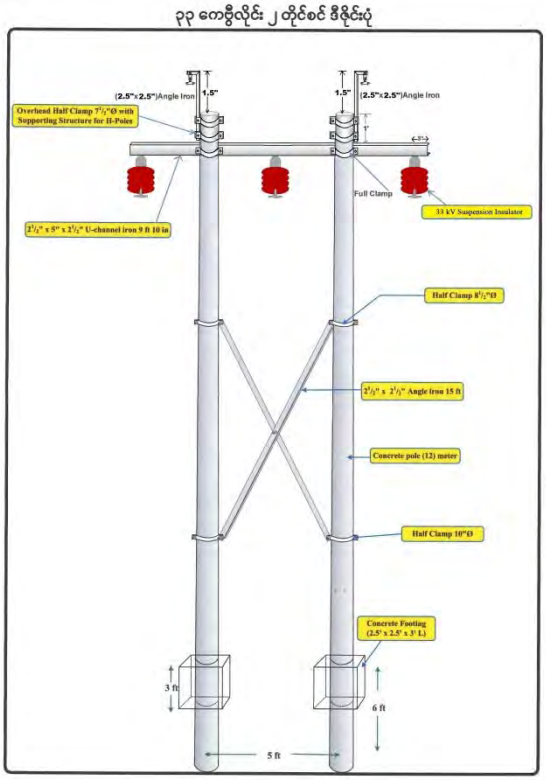
66kV transmission lines are overhead lines and consisted of Aluminium Conductor Steel Reinforced (ACSR) for conductors and concrete poles for supporting structure. The ACSR 185 mm^2 conductors and 15 meter concrete poles are commonly used as the ESE standard.

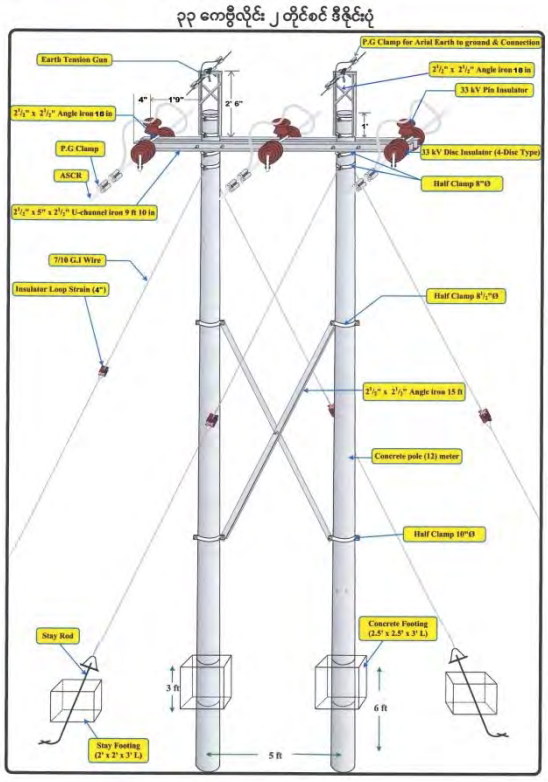
Samples of 66 KV Transmission Line

4) 33kV transmission lines

33kV transmission lines are overhead lines and consisted of ACSR for conductors and concrete poles for supporting structure. The ACSR 150 mm^2 conductors and 12 meter concrete poles are

commonly used as the ESE standard. Figure 3.2 shows the examples of the standard 33kV overhead line.





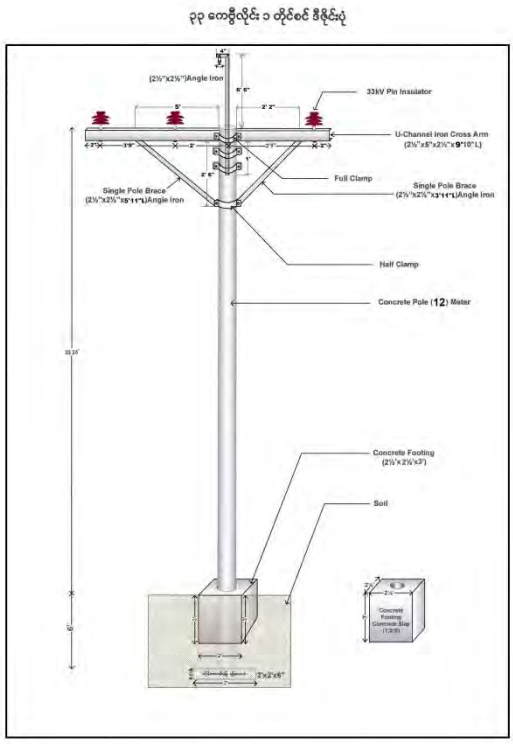


Figure 3. 3 Examples of pole design for 33kV transmission lines

5) 11kV distribution lines

11kV distribution lines are overhead lines and consisted of ACSR for conductors and concrete poles for supporting structure. The ACSR 95 mm^2 conductors and 10 meter concrete poles are applied for the ESE standard. Figure 3.3 shows examples of the standard 11kV overhead line.

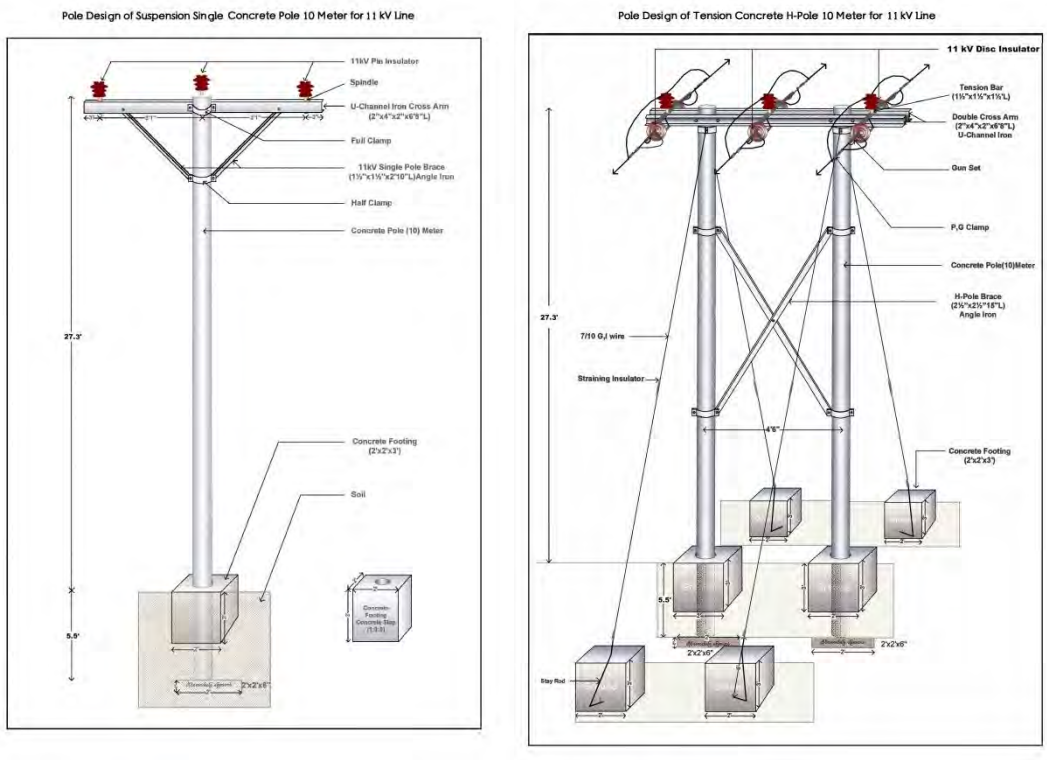


Figure 3. 4 Examples of pole design for 11kV distribution line

A Sample of combination of 11 KV and 0.4 KV distribution lines

6) 0.4kV distribution lines

Although Hard Drawn Bare Copper (HDBC) wire had been used for 400/230V distribution lines in the past, Aerial Bundled Cable (ABC) is widely used currently. The latter is a covered wire and compared to the HDBC, it has considerable advantages such as safety, less fault and reduction of non-technical loss. Figure 3.4 shows examples of the standard of low voltage line.

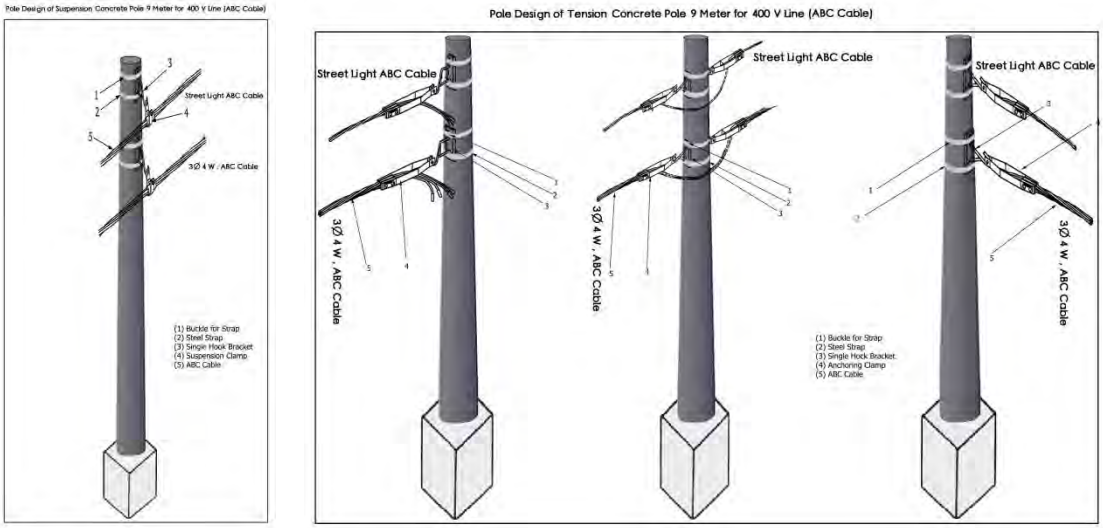
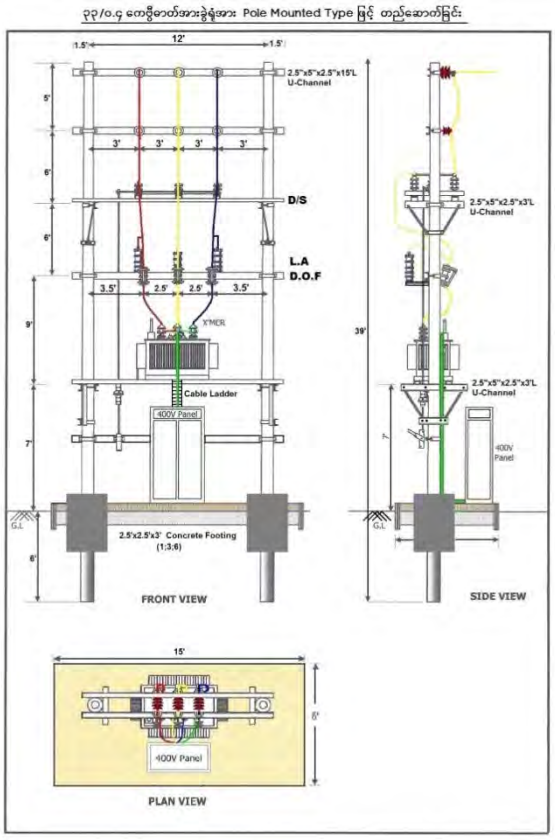
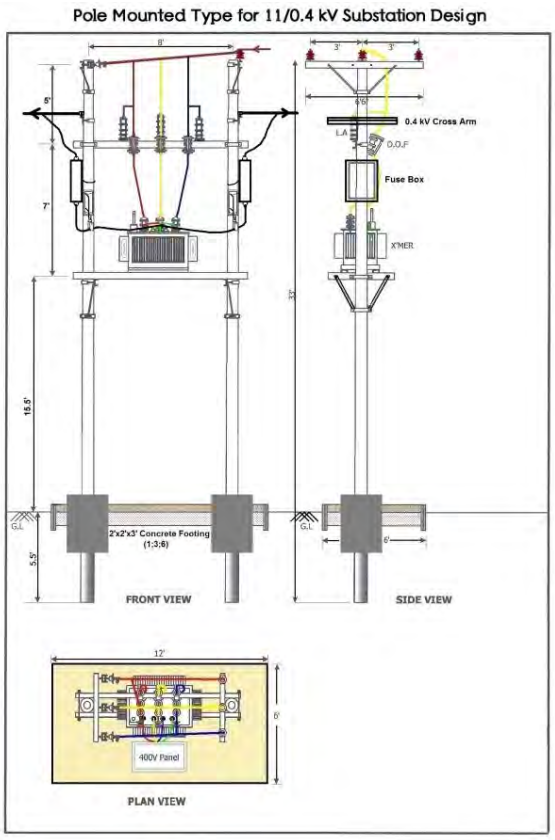


Figure 3. 5 Examples of pole design for 0.4kV distribution line

7) Distribution transformer

The ESE has 33kV/0.4kV distribution transformers and 11kV/0.4kV distribution transformers. Standard pole installation designs of pole-mounted transformer (for both 33kV/0.4kV and 11kV/0.4kV) are shown in Figure 3.5.





(33kV/0.4kV) (11kV/0.4kV)

Figure 3. 6 Examples of pole design for pole-mounted distribution transformers

Samples of 11/0.4 KV distribution transformers

(3) Administration for Power Supply Development and Organization for Implementation

(1) General

The ESE and the DRD are both in charge of implementing projects under the NEP, while only the ESE has been the implementation agency of the ongoing Phase-I project. The ESE and the DRD are different organizations because ESE is a government corporation (profit-making enterprise) whereas DRD is a governmental, non-profit-making organization. The Figure 3.1 shows the organization chart.

(2) Implementing Structure for On-Grid Electrification

The ESE holds approximately 14,000 personnel and all of them are engaged in the electricity distribution work. Thus, they are capable of implementing projects in a consistent way from installation to operation and maintenance, sharing and dividing the roles among the head office and regional offices. In the Phase-I project, the head office is in charge of procurement, cost estimation, tendering, contract, supervision of the contract and reimbursement, while regional offices are in charge of planning and designing, surveillance, operation and maintenance, and fare collection. In the Phase-II, this role sharing should be reconsidered for more effective implementation of Sub-Projects.

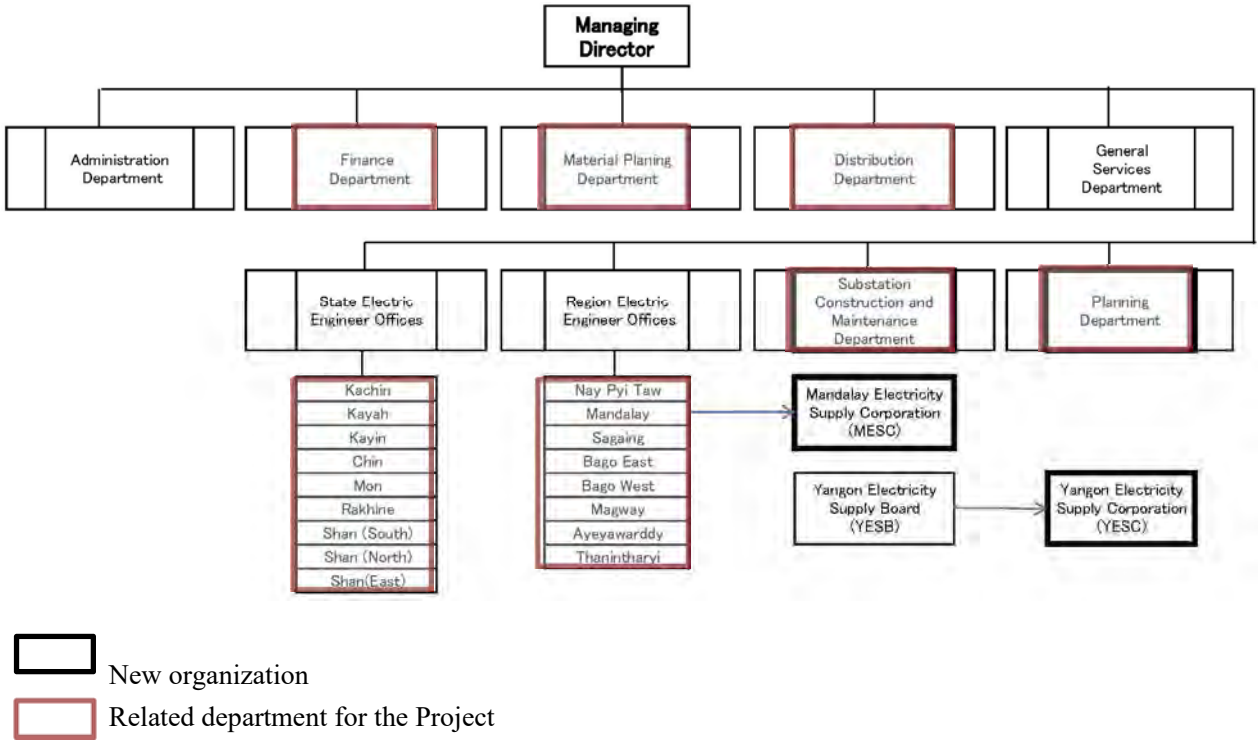


Figure 3. 7 Organization Chart of ESE

(3) Implementation Agency (ESE)

- Project Manager in the ESE's project office is to be assigned throughout the whole project period (He will also be a counterpart of the consultants.)
- Staff members from the ESE's related environment division, who monitor environmental measures taken by the contractors, are to be timely dispatched to the sites. Persons from the related States and Regions and/or districts may also monitor the situations.
- Overhead transmission line and Distribution line inspectors including persons from ESE: at least one civil work inspector throughout the Contractors' civil works and one inspector for cable installation. These inspectors should be responsible not only for the supervision of the Contractors' work but also for communication and negotiation with authorities on the matters over which ESE has responsibility.
- The Contractor may simultaneously execute the works of some sites. When necessary, ESE's inspectors will be lined up with one person for civil/building works and another one for electrical works per each site. OJT participants for the Operation and Maintenance (O/M) of each substation under the Project are separately assigned from the inspectors.
- The Contractor will construct distribution lines. ESE's inspectors will be lined up with one person for this installation works.
- In addition to the aforementioned inspection team and trainees, a procurement committee, project implementation unit, management committee and bid evaluation committee will be organized as a standard rule of the ESE in the course of project implementation, and they perform each duty for the Project. As per demanded, sections in the ESE concerning the customs of imported goods, payment procedures, and communications with other authorities will execute their duties for the Project.

3.2 Environmental Scoping of the Project

(1) Setting of Environmental Components and items

To grasp whole features of possible environmental impacts caused by the project, it is necessary to identify and evaluate environmental components and items, which compose of environmental and social considerations, one by one and to integrate the impacts. According to the JICA Guidelines for Environmental and Social Considerations, possible impacts to be assessed include those on human health and safety, as well as on the natural environment, which are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.

In addition to the direct and immediate impacts of projects, the derivative, secondary, and cumulative impacts as well as impacts associated with indivisible projects will also be assessed with regard to environmental and social considerations, so far as it is rational to do so.

In this examination by taking into consideration the JICA Guidelines, and relevant laws and regulations of Myanmar Government, together with environmental condition of the areas related to sub-project sites, four environmental components (pollution, natural environment, social environment and others) and 30 items (Pollution 8, Natural environment 4, Social Environment 16, and others 2) as indicators expressing environmental and social conditions.

(2) Categorization of IEE and EIA

The Categorization of IEE and EIA based on the EIA procedure is shown as following table;

According to the EIA Procedure 2015, categorization of IEE and EIA for power sector also is defined as Energy Sector Development activities (see table 3.2). Regarding On-Grid projects, it is not necessary to prepare IEE because capacity of power line is all under 115kV.
However, MOECAF (ECD) had confirmed that any sub-project will be necessary to prepare an Environment Management Plan (EMP) as a minimum requirement.

Table 3. 2 Categorization of IEE and EIA (Power Supply)

No	Type of investment project	Size of project which require IEE	Size of project which require EIA
11	Solar Power Plants	> 1MW but <5 MW	> 5MW and >100 ha
23	Electrical Power Transmission line ≥ 115kV<230kV	≥ 50 km	All activities where the Ministry requires that the Project shall undergo EIA
24	Electrical Power Transmission Line ≥ 230kV	All sizes	All activities where the Ministry requires that the Project shall undergo EIA
25	High Voltage transformer	10h > IEE Radius Size	10h < IEE Radius Size

No	Type of investment project	Size of project which require IEE	Size of project which require EIA
	substation		

Source: Environmental Impact Assessment Procedures (2015)

(3) Activities due to the Project

Activities due to the project by stage are shown in Table 3.3. Possible impacts are identified by using impact matrix comparison and the extent of the impacts are also evaluated one by one with rating against the above mentioned 30 environmental items.

Table 3. 3 Anticipated Activities due to the Project

Project Stage	Anticipated Activities by the Project
Planning Stage (I)	Securing land/space for sub-stations and related facilities
	Securing temporary land/space for construction work
	Change of utilization of land and local resources
Construction Stage (II)	Procurement of construction materials, equipment, plants, etc.
	Civil engineering works such as earth moving
	Operation of construction machines, vehicles, plants, etc.
	Installation of construction work offices worker's camps, storage sites, etc. Tube well construction.
	Construction of sub-stations (66kV, 33kV) and transmission lines and related facilities
Operation Stage (III)	Operation of sub-stations (66kV, 33kV)
	Spatial occupancy related facilities and structures

Source: JICA Preparatory Survey Team

(4) Method of Scoping

The scoping process is based on a literature review, interview surveys, and site observation, among which, site observation and interviews are the most informative. A description of the survey is summarized in Table 3.4.

Table 3. 4 Description of Environmental Condition Survey

Methodology
• Observation of the natural conditions at the proposed sites. • Collecting data from the ESE such as land owner.
Items Observed
• Environmental Pollution – 8 items (Air pollution, Water pollution, Soil contamination, Bottom sediment, Solid waste, Noise and Vibration, Ground Subsidence, Offensive odor) • Natural Environment – 4 items (Protected Area, Ecosystem, Hydrology, Topography and geology) • Social Environment –16 items (Involuntary resettlement, The poor, Indigenous and ethnic people, Local economy such as employment and livelihood, Utilization of land and local resources, Water usage, Existing social

infrastructures and services, Social institutions such as local decision making institution, Misdistribution of benefit and damage, Local conflict of interests, Cultural and historical heritage site, Landscape, Gender, Right of children, Infectious diseases such as HIV/AIDS, Land environment)

- Others –2 items
  (Accidents, Cross boundary impacts and climate change)

Source: JICA Preparatory Survey Team

3.3 Comparing Alternatives

Alternatives of each sub-project have not been considered. To compare the each sub-project, it will be evaluated by item such as purposiveness, cost benefit performance, needs urgency and feasibility.

Table 3. 5 Comparison of Alternatives

	With Project	Without Project
Pollution	-	+/-
Natural Environment	-	+/-
Social Environment	+	+/-

Note: Significant positive impact: + +, Moderate positive impact: +
Significant negative impact: - - , Moderate negative impact: - , Neutral: +/-

(1) Without Project

If the Project is not implemented, the environmental condition will not be drastically changed.

(2) With Project

One of the most beneficial advantages is the significant improvement of power supply to the target towns. Electricity can be delivered to the residence of town by the sub-projects. This will improve the standard of living. The implementation of Sub-Projects provides people with lights which are brighter and safer than the kerosene lamps etc., which is commonly used at the moment. This is expected to bring benefits to the lives of local people by securing children's longer study hours, which can then raise their education level, and also by making it more convenient for local people to work at night. In addition, an increased availability of, or an extended use of much needed home electronics such as television or stereo sets leads to the improved and diversified lifestyles. It should also be noted that the volume of quality information available through television networks are expected to contribute to higher living standard of households. Moreover, the user of mobile phones, which are now serving as the easiest communication tool, will benefit from the stable power supply for charging batteries. This effect appears to be considerable because mobile phones have absolute importance in offering the convenience for people in regional areas. Negative impact such as water pollution to the stream or paddy field caused by construction work of the sub-stations can be mitigated by ordinary countermeasures.

3.4 Results of Scoping

The result of scoping for sub-projects of road sector is shown as following table;

Table 3. 6 Scoping results

	No	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	

	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	C	D	**Construction phase:** Temporary limited impacts are expected on air quality due to using construction machines and equipment. **Operation phase:** No impacts are expected or expected impact is very limited because facilities size is small.
	2	Water pollution	D	D	**Construction and operation phase:** No impacts are expected.
	3	Waste	C	D	**Construction phase:** Domestic waste and night soil may be generated from construction base camp. **Operation phase:** No impacts are expected
	4	Soil contamination	D	D	**Construction and Operation phase:** No impacts are expected.
	5	Noise and vibration	C	D	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** No impacts are expected.
	6	Ground subsidence	D	D	**Construction and operation phase:** No impacts are expected since activities which cause ground subsidence not expected.
	7	Odor	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	**Construction and Operation phase:** No impacts are expected.
Natural environment	9	Protected area	D	D	**Construction phase:** No impacts are expected because of the project site locates inside of town/village. **Operation phase:** No impacts are expected.
	10	Ecosystem	D	D	**Construction and Operation phase:** No impacts are expected.
	11	Hydrology	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the river.
	12	Topography and geology	D	D	**Construction and operation phase:** No impacts are expected.
Social environment	13	Involuntary resettlement	B－	D	**Pre-Construction phase:** No resettlement is expected but land acquisition in some sites may be caused. **Operation phase:** No impact is expected
	14	The poor	B+	C	**Construction phase:** Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Improvement of life standard can be expected by the delivering the electricity.
	15	Indigenous and ethnic people	C	D	**Construction phase:** Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected by improvement of access
	16	Local economy such as employment and livelihood	B+	B＋	**Pre-construction phase:** Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected.
	17	Land use and utilization of local resources	C	D	**Pre-construction phase:** Few impacts are expected due to the land acquisition for agricultural land etc. **Operation phase:** No impacts are expected.
	18	Water usage	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected.
	19	Existing social infrastructures and services	D	B＋	**Construction phase:** No impacts are expected **Operation phase:** Few positive impacts are expected (ex. Improvement of access to social services etc.).
	20	Social institutions such as local decision making institutions	D	D	**Construction and operation phase:** Impacts are not expected, since local decision making institute represented by village, township and state will continue after the construction.
	21	Misdistribution of benefit and damage	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by this project is not expected.

	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
	22	Local conflict of interests	D	D	**Construction and operation phase:** Local conflict of interests caused by this project is not expected.
	23	Cultural heritage	D	D	**Pre-Construction, construction and operation phase:** Religious and cultural facility are not observed at the project site.
	24	Landscape	C	D	**Construction and operation phase:** Landscape change is expected but limited.
	25	Gender	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.
	26	Right of children	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	**Construction and operation phase:** No impacts are expected because all routes are domestic road not international corridor.
	28	Labor environment	D	D	**Construction and operation phase:** No impacts are expected.
Others	29	Accidents	C	C	**Construction phase:** Construction vehicles may use existing local road near residential areas, thus number of traffic accident may increase. **Operation phase:** Although the increased of travelling speed is expected, the alignment will be better.
	30	Cross boundary impacts and climate change	D	D	**Construction and operation phase:** No impacts are expected.

Note) Rating:

A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected.

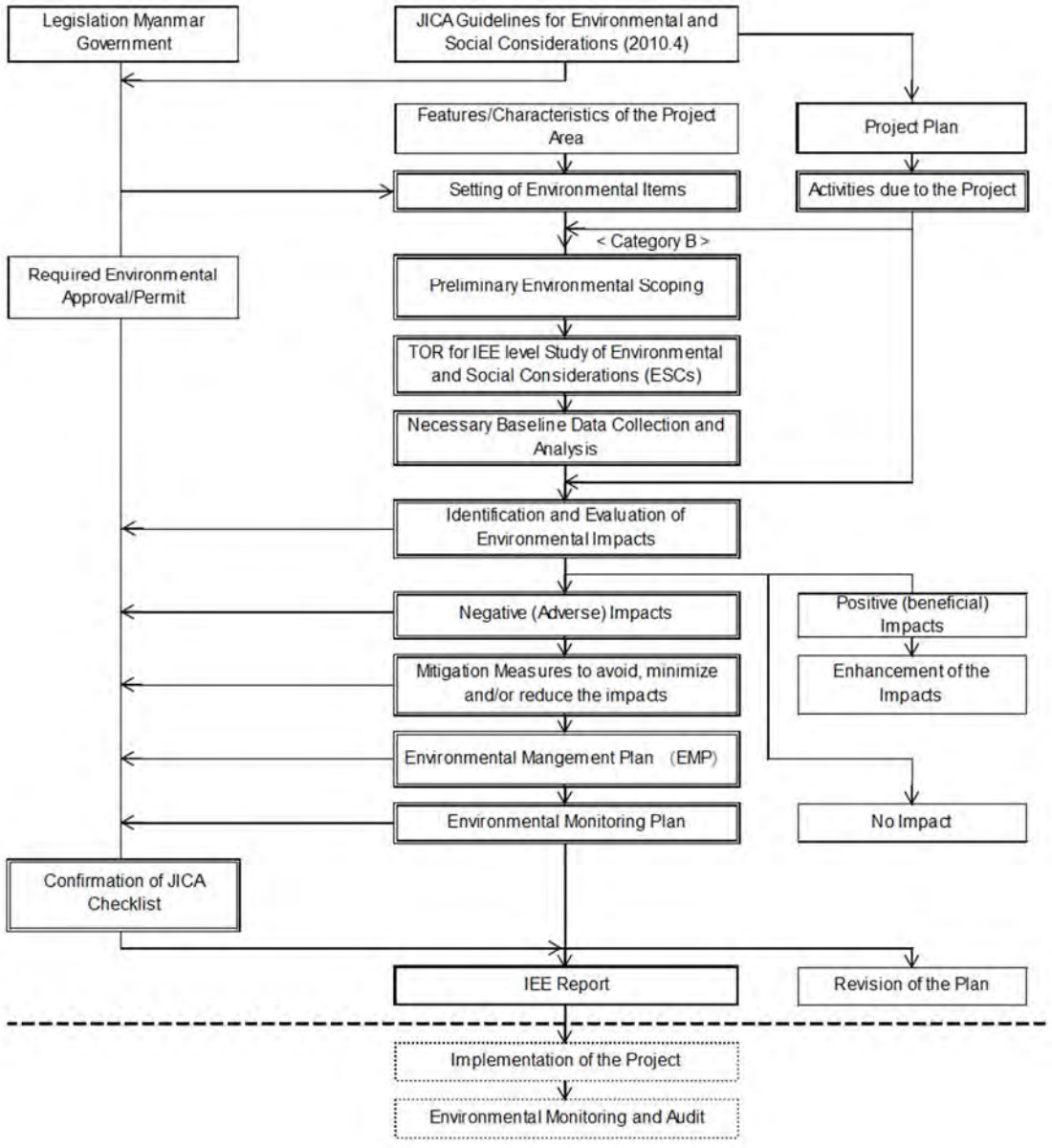
C: Extent of impact is unknown at this stage D: No impacts are expected.

Source: JICA Preparatory Survey Team

CHAPTER 4 Result of IEE

4.1 Procedure of IEE Level Study

Procedures of IEE level study for the sub-project are shown in Figure 3.1.



Source: JICA ESC Guideline

Figure 4. 1 Procedures of IEE level Study according to the JICA Guidelines

4.2 Terms of Reference for IEE

Table 4.1 shows a Terms of Reference on the IEE which was prepared based on the scoping outcome.

Table 4. 1 Terms of References for Initial Environmental Examination

No	Impacts	Item for Study	Methodology
1. Pollution			
	Air Pollution	✓ Collect information on present air quality ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant ✓ authorities, collect information on ✓ similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc. ✓ Confirm present environmental management system
	Water Pollution	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
	Waste	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase	✓ Collect existing information ✓ Hearing from relevant ✓ authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and location of construction worker's camp/office
	Soil Contamination	✓ Collect information on present management against soil contamination ✓ Impacts during an operation Phase	✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm present environmental management system
	Noise and Vibration	✓ Confirm ambient noise standard in Myanmar ✓ Confirm present condition in the project area	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project
2. Natural Environment			
	Protected Area	✓ Collect information on protected area in the project area	✓ Hearing from relevant authorities
	Ecosystem	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Hydrology	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Topography and Geographical Features	✓ Collect information in the project area ✓ Impacts during construction	✓ Hearing from relevant authorities, conduct field survey ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
3. Social Environment			
	Involuntary Resettlement	✓ Confirm scale of land acquisition and resettlement ✓ Prepare Resettlement Action Plan (RAP) in case of acquiring land or	✓ Collect legislations relevant to land acquisition and resettlement, conducting field survey to confirm the condition such as land usage and type of assets within ROW and proposed substation area and hearing from

No	Impacts	Item for Study	Methodology
		resettling assets and/or people resulting from the project	relevant authorities. ✓ Prepare RAP in complying with legislations in Myanmar as well as JICA guidelines
	Vulnerable(poor households, female headed households etc)	✓ Confirm vulnerability of affected people	✓ Collect legislations relevant to the vulnerability of affected people ✓ Collect information on similar project, Conduct hearing from relevant authorities and affected people
	Indigenous and Ethnic Minority	✓ Collect information on indigenous and ethnic minority	✓ Collect legislations relevant to the indigenous and ethnic minority, ✓ Conduct hearing from relevant authorities and affected people
	Land Use and Utilization of Local Resources	✓ Collect information on land usage in the project area	✓ Collect information on land usage from relevant authorities
	Existing Social Infrastructures and Services	✓ Impact during a construction phase	✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
	Cultural Heritage	✓ Collect information on cultural heritage in project area	✓ Hearing from relevant authority, conduct field survey
	Landscape	✓ Impact during a construction	✓ Confirm content, method, period, location, area on construction works
	Gender	✓ Collect information on the land acquisition procedures relevant to gender issues ✓ Confirm gender issues in the project area	✓ Collect information on the similar project in the past ✓ Collect information on gender issues at administrative body in the project area
	Communicable Diseases such as HIV/AIDS	✓ Impact during a construction phase	✓ Confirm information on similar Project
	Working Environment (includes work safety)	✓ Confirm legislations on working environment in Myanmar	✓ Collect relevant legislations, confirm information on similar project
4. Others			
	Accidents	✓ Impact during construction	✓ Confirm access road for construction vehicles and conditions around the area
	Cross boundary impacts and climate change	✓ Impact during a construction and operation	✓ Confirm information on similar Project

4.3 Prediction of Environmental Impact

The prediction of environmental impact based on the survey is shown in Table 4.2.

Table 4. 2 Prediction of environmental impact

	Items		Situation and Prediction
Pollution	1	Air Pollution	Machines and vehicles used during construction are likely to generate air pollution, most prominently in the form of dispersal of sandy dust. Normal measures can reduce the negative impacts.
	2	Water Contamination	For water bodies in sub-project, some streams and rivers are located close to the proposed sites. Agricultural land and forest land are located next to the streams and rivers. People take water mostly from the wells and some take from the river. No Only small civil work such as construction of foundation is planned, so no significant negative impact is expected. Nevertheless, the above areas should be kept

	Items		Situation and Prediction
			in mind so that construction works do not result in soil or water contamination.
	3	Waste	General wastes such like a pet bottle, plastics, kitchen wastes, are not significantly bad at project site. Waste condition is good enough so far. Waste from the construction workers and comps are likely to generate the waste to some extent, but due to relatively less population and poor economic activities no significant adverse impact is expected.
	4	Soil Pollution	No major work is planned for the construction of substations, transmission lines and distribution lines, so no significant negative impact is expected. Nevertheless, the above areas should be kept in mind so that construction works do not result in soil or water contamination.
	5	Noise and Vibration	Noise and vibration level could temporarily be higher during construction due to operation of vehicles and use of construction equipment. In the operation phase, no impact of the noise is expected.
	6	Ground subsidence	There was no such case in record. No serious ground subsidence is expected since the substation construction work is small scale.
	7	Odor	The sub-project sites are an environmentally sound area. There is no work causing a bad odor during the construction. Therefore, no other significant negative impact is expected.
	8	Bottom Sediment	No major work is planned for using bottom sediment, so no significant negative impact is expected.
Natural Environment	9	Protection Area	The transmission lines and distribution lines, such as ESE 0401, 0402, 0602, 0807, 0809, 0812, 0813, 0820 etc., may pass through the reserved forests and public protected forest, which will affect some area in the reserved forests and public protected forest. However, the subproject is expected to affect the environment not very significantly, because these lines occupy the very small area within the ROW (right of way). Therefore, no notable impact is expected
	10	Ecosystem	No wildlife or tree species that require special attention/ protection has been identified either within the sub-project site. But there are many forest plantations (both government and private) and natural forests along the project site. Construction works could affect those plantations and natural forests. But it is a few trees and plants.
	11	Hydraulic Situation	Some rivers and streams are located close to the sib-project sites.
	12	Topography and Geology	Nearly 70 % of sub-project sites are located in the low land central dry zone area and the remaining 30% spread throughout the country. ESE 0501, 0506, 0901 and 0901 in located in southern part, coastal region to Andaman Sea. ESE 1201, 1202, 1203 and 1206 are in Ayeyarwaddy Delta region. ESE 0701, 0703, 0704 and 0707 are in Shan Plateau, and of them 0707 is located near the border to LAOS. ESE 0401 and 0402 are located in Chin State mountain ranges. The soil types mainly found in the site are (1) Clay and clay swampy soils, (2) Swampy soils, (3) lateritic soils, and (4) Yellow brown forest soils. Since all the sub-projects are just small scale of civil work, no large-scale land alteration is expected due to construction work.
Social Environment	13	Involuntary Resettlement	No involuntary resettlement is expected, but land acquisition is needed for substation construction in some sub-projects.
	14	Poor	Some of the people living in the sub-projected area have very low income from traditional agriculture business. It is expected after the completion of sub-project; they will get access to electricity and get better life (eg. light and electrical instrument) and benefit from the improvement of standard of living, better health care, and other socio-economic improvements.
	15	Indigenous or Ethnic	Chin, Mon and Shan people are major, especially living near the project sites.

	Items		Situation and Prediction
		people	
	16	Local Economies, such as employment, livelihood	Economy in the areas is largely dependent on agriculture (i.e. rice, corn, banana, sugar cane, bean, chilly, different garden fruits, etc.) and some businesses (e.g. sugar milling and rice milling) and shop/store management to which, no -alteration is expected. During construction, some people are likely to be employed as a work force for water treatment plant and distribution of pipe line construction. Food & drink shops are also expected to benefit from an increase in demand.
	17	Land use and utilization of local resources	Paddy fields, Banana and Sugar Cane farms, Reserved Forests and Public Protected Forests occupy the area in the sub-project sites. No significant change of land use is expected to the current state since it is a small scale civil construction project.
	18	Usage of water and water Right	People take water mainly from the wells and some villages from the river. No water Right issue is found in the sub-project sites. Neither any change nor any negative impact is expected by the sub-project.
	19	Existing social infrastructure and services	Through the implementation of the Project, it is expected that medical facilities will improve their service levels due to the accelerated introduction of advanced medical facilities and personal computers. Ensuring a stable power supply is indispensable at hospitals and medical centers, especially for night-time medical treatment of patients and for those who are pregnant. It becomes possible to prevent the degradation of medicine or vaccines with the stable power supplied to refrigerators used as storage. Considering the above circumstances, the beneficial effects brought in by the implementation of the Project to medical facilities is significant. Un-electrified schools have many problems. For example, without stable electric lighting, teachers find it difficult to prepare educational materials during early hours in the morning before sunrise. In addition, the introduction of electrical facilities essential for education of recent years - such as computers, projectors, photocopy machines and lightings - are also expected to enhance the education system in the country. Therefore, significant positive impact is expected by the sub-projects
	20	Social Institution such as local decision making institution	Not such kind of strong institutions are identified in the project site.
	21	Misdistribution of benefits and damages	It is not likely to happen the misdistribution of benefits and damages between local communities or regional institutions.
	22	Local conflict of interest	Most of sub-project sites are all located within the municipal areas of the towns, so it won't be big problem. If any, extra cautions to these area will be given for implementation and monitoring of the sub-project works.
	23	Cultural Heritage	There is a national cultural heritage site, known as Conservation Area of Beikthano Ancient City, exists near ESE 1103. But power line installation does not cross that area. So any negative impact is not expected by the sub-project. No cultural Heritage is identified in other project sites.
	24	Landscape	As it is small scale of construction work, the sub-projects do not expected to negatively affect the beauty of existing landscape (crops and farmlands, river, natural forests and forest plantations, forest mountains and rock mountains),.
	25	Gender	According to normal measures in compliance with JICA guidelines, it is not likely to happen gender inequality in the sub-project implementation works.
	26	Children's Right	According to normal measures in compliance with JICA guidelines, it is not expected to affect the Children' Right in the sub-project implementation works.
	27	Infection diseases such as HIV/AIDS	It is not also expected to induce the infection of diseases such as HIV/AIDS by the sub-project.
	28	Work Environment	According to normal measures in compliance with JICA guidelines, it is not expected to cause any notable damage to the work environment.
Oth	29	Accident	Increase of accident is not expected by sub-projects.

	Items		Situation and Prediction
	30	Global Warming	As a small scale of civil work, the impacts by the sub-project are not expected to contribute any significant damages to or increase in Global Warming.

Source: JICA Preparatory Survey Team

4.4 Evaluation of Environmental Impact

(1) Results of evaluation of environmental impact

Possible impacts are identified and the extent of the impacts is also evaluated one by one with rating against the 30 environmental items (pollution, natural environment and social environment). Results are shown together with the results of scoping in Table 4.3.

Table 4. 3 Evaluation of Environmental Impact

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	C	D	D	D	**Construction phase:** Temporary negative impacts are expected on air quality due to construction machines and equipment but it is minor. **Operation phase:** No Impacts are expected.
	2	Water pollution	D	D	D	D	**Construction phase:** Turbid water may be generated by earth works and excavation work and building of water treatment plant are planned. Additionally Organic polluted water may be discharged from base camp. **Operation phase:** No serious impacts are expected
	3	Waste	C	D	D	D	**Construction phase:** Construction waste such as waste soil and cutting trees are expected. Additionally domestic waste and night soil may be generated from construction base camp. **Operation phase:** No serious impacts are expected
	4	Soil contamination	D	D	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected
	5	Noise and vibration	C	D	D	D	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** Noise may generate during operation of treatment plant. However, the expected impact is very limited.
	6	Ground subsidence	D	D	D	D-	**Construction and operation phase:** No Serious impact of ground subsidence is expected.
	7	Odor	D	D	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	D	D	**Construction phase:** No impacts are expected since there are not any polluted lands nearby project area. **Operation phase:** Water facility operation which causes impacts on sediment quality is not expected.
Natural environment	9	Protected area	D	D	D	D	**Construction phase:** There is no protected area in the sub-project area. Cutting many trees will not be expected but some negative impact is expected. **Operation phase:** No impacts are expected during operation.
	10	Ecosystem	D	D	D	D	**Construction and Operation phase:** Any designated protected areas and considerable species habitats have not been identified in the sub-project area.

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
	11	Hydrology	D	D	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the rivers.
	12	Topography and geology	D	D	D	D	**Construction and operation phase:** Cutting land is expected. However, considerable topography and geological sites are not located in the project area and the impact is limited.
Social environment	13	Involuntary resettlement	B-	D	B-	D	**Pre-Construction phase:** No resettlement is expected. But land acquisition of some area may be caused. **Operation phase:** No impact is expected
	14	The poor	B+	C	B+	D	**Pre-Construction phase:** Few positive impacts are expected such as working opportunity.. **Operation phase:** Few positive impacts are expected by improvement of power supply.
	15	Indigenous and ethnic people	C	D	D	D	**Pre-Construction phase:** There are indigenous or ethnic people at the sub-project site. But no serious impact is expected. **Operation phase:** No obvious impacts are expected
	16	Local economy such as employment and livelihood	C	B+	D	B+	**Pre-construction phase:** No obvious impacts are expected. **Operation phase:** Few positive impacts are expected by the improvement of power supply condition in target area
	17	Land use and utilization of local resources	C	D	D	D	**Pre-construction phase:** Few impacts are expected. **Operation phase:** No impact is expected
	18	Water usage	D	D	D	D	**Construction phase:** No impact is expected. **Operation phase:** No impact is expected.
	19	Existing social infrastructures and services	D	B+	D	B+	**Pre-Construction and Construction phase:** No impact is expected. **Operation phase:** Few positive impacts are expected since power supply can improve the social facilities.
	20	Social institutions such as local decision making institutions	D	D	D	D	**Construction and operation phase:** No impacts are expected, since local decision making institute represented by village, township and state will continue after the construction.
	21	Misdistributio n of benefit and damage	D	D	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by the water facility construction is not expected.
	22	Local conflict of interests	D	D	D	D	**Construction phase:** No impact is expected. **Operation phase:** No impact is expected
	23	Cultural heritage	D	D	D	D	**Pre-Construction and Construction Phase:** Religious and cultural facility are not observed at the project site. **Operation phase:** No impact is expected
	24	Landscape	D	D	D	D	**Construction phase:** Few impact is expected **Operation phase:** There are no law-based designated landscape areas around project area.
	25	Gender	D	D	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
	26	Right of children	D	D	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	D	D	**Construction phase:** Few impacts are expected. **Operation phase:** Operation which causes infectious diseases is not expected.
	28	Labor environment	D	D	D	D	**Construction phase:** Construction work environment needs to be considered in accordance with relevant laws and regulations. **Operation phase:** No impact is expected.
Others	29	Accidents	D	D	D	D	**Construction phase:** No serious impact is expected.. **Operation phase:** No impact is expected.
	30	Cross boundary impacts and climate change	D	D	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected.

Note) Rating:
A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected.
C: Extent of impact is unknown at this stage D: No impacts are expected.
Source: JICA Preparatory Survey Team

(2) Categorization of sub-project

Among the results of identification and evaluation anticipated impacts shown in Table 4.2, items affected with rating (A-), which means significant negative impact is not identified, and items affected with rating (B-), which means not significant but considerable negative impacts and with rating (D) which means negligible or no negative impacts are identified for most of the items. According to the JICA Guidelines any project is classified into four categories, i.e., Category A, B, C and FI by the extent of environmental and social impacts, taking into account of an outline of the project, scale, site condition etc.

The proposed project is classified into Category B due to following reasons:

(i) The sub-projects do not belong to (1) water supply, sewage, and wastewater treatment that have sensitive characteristics or that are located in sensitive areas or in their vicinity (2) sensitive characteristics such as large-scale involuntary resettlement of more than 200 PAPs and (3) large-scale groundwater pumping as listed in Appendix 3 of the JICA Guidelines.

(ii) Results of identification and evaluation of expected environmental and social impacts indicate that there is no item affected with rating of (A-), which means negative (adverse) impact and other affected items are classified into rating (B-), which means not significant but some negative impact, or rating (D), which means no or negligible negative impact as shown in Table 4.2.

(3) Major negative impacts

Major negative impacts with rating (B-) are described with corresponding stage as follow:

1) Planning stage

a) Social Environment

(i) Involuntary Resettlement –

- There is no resettlement is expected. However land acquisition in some area may be needed in the planning stage.
- The project is corresponding to "category B", which means number of PAPs is less than 200 in terms of resettlement. Thus, Abbreviated Resettlement Action Plan (A-RAP) must be prepared and necessary compensation and support of resettlement assistance for these PAUs and PAPs should be provided by ESE after identification of eligibility of each PAU and PAP and consultation with each PAU and A-PAP.
- Detailed features are described in the Abbreviated Resettlement Action Plan (A-RAP)

2) Construction Stage

There is no major negative impact with rating (B-).

3) Operation Stage

There is no major negative impact with rating (B-).

(4) Major positive impacts

On the other hand, major positive impacts with rating (B+) are as follows:

1) Construction Stage

a) Social Environment

(i)The poor: (B+)

- The project may create employment opportunity of vulnerable group such as the poor and women for construction work.

2) Operation Stage

a) Social Environment

(i) Local economy such as employment of local resources: (B+)

- By the improvement of electrical situation, increase of working opportunity is expected since it is possible to work in night by obtaining the light.

(ii) Existing social infrastructures and services: (B+)

- Social facilities such as schools and hospital can be improved by delivering the electricity.

4.5 Mitigation Measure

Mitigation measures, which may avoid, minimize, eliminate and/or reduce above mentioned negative impacts, were examined for respective items in planning, construction and operation stage as well as whole stages in order that the project can achieve intended objectives with minimizing accompanied environmental impacts. In addition, Environmental Management Plan (EMP) was prepared by incorporating mitigation measures and monitoring as well as the roles of implementing, responsible and supervising organizations as shown in Table 4.4.

Table 4. 4 Mitigation Measure against Negative Impact and Environmental Management Plan

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
Pollution	1	Air pollution	[Dust] ✓ Water sprinkling near residential area ✓ 20 kph speed limit for construction machines at construction sites adjacent to settlement areas ✓ Law emission construction machinery shall be used to avid high emission of exhaust gases	Not required	Contractor	ESE
	2	Water pollution	[Turbid water and other items] ✓ Discharge through sedimentation pond and silt fence ✓ Installation of portable toilet for workers ✓ Appropriate waste and construction machines management ✓ Appropriate explanation and response shall be given to affected fishermen, if necessary	Not required	Contractor	ESE
	3	Waste	[Construction waste (trees and waste soil)] ✓ After considering the possibility of reuse, construction waste is disposed at disposal site [Garbage from base camp] ✓ Garbage at workers camp and waste oil shall be brought to disposal site or facility [Night soil] ✓ Temporary sanitation facility such as septic tank shall be introduced to the workers camp.	✓ Demolished waste concrete shall be reused and/or disposed in designated disposal site.	[Const.] Contractor [Operation] ESE	ESE
	5	Noise and vibration	[Construction noise] ✓ Installing noise barrier and selecting low-noise equipment. ✓ Avoiding works of heavy equipment during night time. ✓ Informing the construction schedule to surrounding communities to obtain their consensus.	Not required	Contractor	ESE
Natural environment	10	Ecosystem	✓ Construction development area shall be marked and not be disturbed. ✓ Hazardous waste material should be stored properly before final disposal. ✓ Planting trees, vegetation, sodding in the public space. ✓ Installation of sediment to ponds, silt fence and portable toilet not to disturb habitats of aquatic lives.	✓ Appropriate land use management not to develop natural area along the road ✓ Setting up sign boards where animals crossing the road from the view of natural conservation	[Const.] Contractor [Operation] Local government,	ESE

	№	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
	11	Hydrology	✓ Designing of sub-stations and power lines with sufficient capacity ✓ Installation of sufficient drainage facilities ✓ Secure waterways in construction area	Not required	Contractor	ESE
Social environment	13	Involuntary resettlement	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	Settlement & Land Record Department (SLRD under MOAI), ESE, GAD	ESE
	14	The poor	✓ Appropriate social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, ESE, GAD	TDC
	16	Local economy such as employment and livelihood	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, ESE, GAD	ESE
	17	Land use and utilization of local resources	✓ Appropriate land acquisition and compensation for agricultural area ✓ Assistance of establishment of land use map in every township	✓ Management of appropriate land use in accordance with approved established new land use plan in every township and village	[Const.] SLRD, MOAI, consultants [Operation] Local government	ESE
	18	Water usage	✓ Drainage facility, sedimentation pond and sheet are prepared to prevent turbid water generated by earth work in accordance with the site condition. ✓ Domestic waste and other construction waste will be collected properly and disposed to designated dumping site. ✓ Installation of portable toilet.	Not required	[Const.] Contractor	ESE
	19	Existing social infrastructures and services	✓ Construction of diversion road and existing community road will be connected with new bypass, if necessary	Not required	Contractor	ESE
	22	Local conflict of interests	✓ Local workforce is prioritized for construction work ✓ Implementation of appropriate education for hired workers from other area	Not required	Contractor	ESE
	27	Infectious diseases such as dengue and HIV/AIDS	✓ Installation of sufficient drainage facilities not to provide habitat for vector おいおｋ mosquito ✓ Provision of adequate	Not required	Contractor	ESE

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
			temporary sanitation facilities ✓ Enforcement of medical screening and periodical medical check-up ✓ In order to prevent spread of infectious diseases such as HIV/AIDS, awareness of the labors is promoted			
Others	29	Accidents	✓ Deploying flagman at the gate and crossing points of the construction vehicles ✓ Installation of safety sign board ✓ Installing fence around the construction site to keep out local people such as children ✓ Installation of lightning in the night time ✓ Installation of parking for idling construction machines ✓ Restricting mobilization speed in the construction site ✓ Safety trainings for Construction Work and Trainings for Electrical Safety Basics, as necessary ✓ Safety patrol at the construction site by supervisors ✓ Using enough PPEs (Personal Protective Equipment), such as boots, helmets, gloves, etc., relating to Electrical Safety ✓ Using enough Fall Protection Equipment whenever necessary ✓ Ensuring good control of hazardous energy (Log out/ Tag out – safeguard the workers from unexpected energization or startup of machinery or equipment, or the release of hazardous energy during service or maintenance service)	✓ Awareness and Trainings for Electrical Safety Basics, as necessary ✓ Ensuring good control of hazardous energy (Log out/ Tag out – safeguard the workers from unexpected energization or startup of machinery or equipment, or the release of hazardous energy during service or maintenance service)	[Const.] Contractor [Operation] ESE	ESE

Source: JICA Preparatory Survey Team

4.6 Environmental Monitoring Plan

The environmental monitoring of the rural electrification will be undertaken by the Ministry of Electric Power, Electricity Supply Enterprise (ESE) to ensure the compliance of the Contractor with each mitigation measure specified in the Project Environmental Management Plan during the construction period. The compliance of the Contractor could be presented in tabulated form by presenting each mitigation measure, corresponding level of compliance (Yes, No, Partial), and remarks explaining why compliance level is "No" or "Partial". The corrective actions are presented in matrix form with the following details: (i) non-compliance/implementation of mitigation measures, (ii) issues and concerns, (iii) responsibility for implementation of recommendation action.

The environmental monitoring is designed to:

i. Determine whether the contractor is carrying out the subproject in conformity with environmental standards and agreements if any;
ii. Identify problems as they arise during implementation and recommend means to resolve them;
iii. Recommend changes in subproject concept/design, as appropriate, as the subproject evolves or circumstances change; and
iv. Identify the key risks to subproject sustainability and recommend appropriate risk management strategies;
v. Ensure that environmental monitoring activities undertaken based on direct or indirect indicators of emissions (NO_2, SO_2 and PM (dust particulates);
vi. Waste and garbage disposal are followed as required by the management authority;
vii. Ensure that construction workers have received environment, health and safety (EHS) orientation;
viii. Report incidents of accidents and needed emergency action to the to their supervisor;
ix. Ensure that access to the project sites is permitted and that monitoring is undertaken;
x. Ensure approval of environmental permits, as necessary, (i.e. waste management and disposal; erosion control; etc.

If deemed necessary conduct brief consultation with beneficiaries and affected communities to assess impacts of the sub-project.

Table 4. 5 Environmental Monitoring Plan

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
(I) Planning Stage								
1) Approval/ permission etc.	Permission of Project Implementation and Environmental Clearance Certificate	1) Permission procedures of projects for public purpose 2) Environmental Clearance Certificate by MOECAF	FERD, MOEP, ESE, MOECAF	Before commencement of construction work	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules and Regulations (2015) 3) JICA Guidelines	ESE	FERD, MOEP, ESE, MOECAF	ESE
2) Social Environment	Implementation of compensation and resettlement assistance to PAPs, and resulting existing living condition and livelihood of PAPs	Interview survey on PAPs and PAUs	PAPs and PAUs in all project areas	Before commencement of construction work	1) Land related legislation of Myanmar, 2) JICA Guidelines	ESE	ESE, GAD	ESE
	Securing necessary land clearance for the project site	Site observation,	Areas to be secured	Before commencement of construction work	Land related legislation of Myanmar	ESE	ESE, GAD	ESE

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
	Designs and Specifications adaptable to Climate Change	Verify designs and specifications	ESE	Before commencement of construction work	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules (2015) 3) JICA Guidelines	ESE	Consultants and ESE	ESE
	Stakeholders' Meetings and Information Disclosures	Explanation of project plans and getting public's opinions relating to their concerns, suggestions and requests	All project sites	Before commencement of construction work	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules and Regulations (2015) 3) JICA Guidelines	ESE	Consultants and ESE	ESE
(II) Construction Stage								
1) Social Environment	Safety, Public health and Sanitation	1) Assign full time HSE officers 2) Safety plan, fire protection plan, control of hazardous materials, PPEs 3) warning signs 4) Sanitary toilets, garbage bins, runoff controls, waste management in camps	Construction sites and surroundings	Symptom of workers and inhabitants within and around construction site	Health Law, Labour Safety Law	CT	CT, ESE, GAD, MC, Consultants	CT
	Implementation of construction mitigation measures	Compliance to construction specifications	Construction sites	Daily	1) Environmental Conservation Rules and regulations (2015) 2) JICA Guidelines	CT	CT, ESE, GAD, MC, Consultants	CT
	Working condition	1)Medical check and symptom of workers 2)First Aid Cases	Construction sites and surroundings	As required	Labour Safety Law	CT	CT, ESE, GAD, MC, Consultants	CT
	Natural disaster/risks	Records of natural disaster and hazards in the project area	Construction sites and surroundings	Daily	Disaster Prevention Law	CT	CT, ESE, GAD, MC, Consultants	CT

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implementation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
	Accident	Records of accidents in the project area	Construction sites and surroundings	Daily	Labour Law, Labour Safety Law	CT	CT, ESE, GAD, MC, Consultants	CT
	Social issues	1)Collection of complaints, requests 2)Hearing	Construction sites and surroundings	As required	-	CT	CT, ESE, GAD, MC, Consultants	CT
	Infectious Diseases such as HIV/AIDS	Medical examination of construction workers and peoples making contact with HIV/AIDS sufferers, if any	Construction sites and surroundings	Before and after construction stage as required	Health Law, Labour Safety Law, Prevention of HIV/AIDS Law	CT	CT, ESE, GAD, MC, Consultants	CT
2) Natural Environment	Replanting trees	1) Physical observation, 2) Hearing	Construction sites and surroundings	As required	-	CT	CT, ESE, GAD, MC, Consultants	CT
3) Environmental Pollution	Air pollution	1) Complaints, 2) Physical observation, 3) Dust Control 4) Air quality measurement (SO_2, NO_2, PM10)	Construction sites and surroundings;	1) & 2) Daily , 3) & 4) as required	Community perception	CT, ESE, Consultants	CT, ESE, GAD, MC, Consultants	CT
	Water pollution	1) Complaints, 2) Physical observation, 3) Wastewater analysis (pH, BOD, COD, TS, SS)	1) & 2) Construction sites and surroundings; 3) Wastewater analysis (critical areas)	1) Daily (physical observation), 2) wastewater analysis (as required)	Community perception	CT, ESE, Consultants	CT, ESE, GAD, MC, Consultants	
	Soil Contamination	Physical observation	Construction sites and surroundings	Daily	Community perception	CT	CT, ESE, GAD, MC, Consultants	CT
	Sold waste management	Record of collection, transportation and disposal	Construction sites and surroundings	Daily	Community perception	CT	CT, ESE, GAD, MC, Consultants	CT

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislation	Implement ation org.	Responsible and/or supervising org.	Responsible Agency for monitoring Cost
	Noise	1) Complaints, 2) Physical observation, 3) Noise level measurement	Construction sites and surroundings;	1) & 2) Daily; 3) as required	Community perception	CT	CT, ESE, GAD, MC, Consultants	CT
(III) Operation Stage								
1) Social Environment	Electric Hazards (Electrical Shocks/ burns, fire, explosion, etc.)	1) Complaints 2) Physical Observation	Project areas	1) all times 2) monthly	1) Community perception 2) MOEP Guidelines	ESE	ESE	ESE
2) Environmental pollution	Water pollution and waste management	1) Complaints, 2) Physical observation, 3) Wastewater analysis (pH, BOD, COD, SS, TS)	Sub-station areas	1) & 2) all times 3) as required	Environmental Emission Standards (2015) of Myanmar Government, WHO and Japan Standards	ESE	ESE	ESE

Source: JICA Preparatory Survey Team

Note 1: Monitoring cost in the Construction Stage will be covered by the Constructors (CT). In case of measuring the air quality and water quality parameters, the cost is estimated as USD 3,000 per each sub-project.

Note 2: Implementing Organizations/ Responsible and supervising organizations - CT: Contractor, MOEP – Ministry of Electric Power, ESE – Electricity Supply Enterprise, FERD - Foreign Economic Relations Department, GAD- General Administration Department, MOECAF - Ministry of Environmental Conservation and Forestry, MC – Monitoring Committee which will be formed by ESE, GAD, and Community Elders (honourable persons).

4.7 Cost, Financial Source and Framework

Implementation frame works, cost and financial sources for the environmental management and the monitoring during construction and operation are presented below. Environmental management and monitoring organization is shown in which shows concerned agencies by construction stage and their functions. All planed mitigation measures are carried out by the contractor and reported to ESE, the supervision consultants and the Project Management Unit (PMU). The monitoring results are reviewed and conducted corrective and preventive action, if necessary. The name of organization which conducts monitoring and environmental management and responsibility is shown in Table 4.6.

Table 4. 6 Environmental Management and Monitoring Organization

Stage	Name of Organization	Role and Responsibility
Pre-Construction and during Construction Pre-Construction and Construction Phases	Land Acquisition Team (ESE, Land Record Department, and Detailed design consultant)	• Overseeing the updating of the Abbreviated Resettlement Action Plan (A-RAP) after the Detailed design • Monitoring actual payments of compensation to affected landowners, structure owners, and crops/trees owners; • Other necessary roles upon finalization of the A-RAP during the Detailed design
	The Construction Supervision Consultant	• Inspection of mitigation measures and environmental monitoring conducted by the contractor based on the approved IEE • Report the monitoring result to ESE and donor (JICA) on monthly report

Stage	Name of Organization	Role and Responsibility
	Electrification Facility Construction Committee or Project Monitoring Committee (ESE, Local Government, contractor, supervision consultant, local NGO, religious group, peace group and political group etc.)	• Overseeing the implementation of the EMP by the Contractor • Evaluation of result of environmental monthly report and respond necessary action • Validate project compliance with the conditions stipulated in the IEE and A-RAP; • Receive complaints, gather relevant information to facilitate determination of validity of complaints or concerns about the project and timely transmit to the ESE recommended measures to address the complaint; • Prepare, integrate and disseminate simplified validation reports to community stakeholders; and • Compile monitoring data gathered by the Contractors and supervise preparation of semi-annual monitoring reports to be submitted to ESE
	The Contractor	• Implementation of mitigation measures and monitoring based on the approved EMP on EIS and A-RAP • Submission of report for all conducted mitigation measures and monitoring
Operation	ESE. and Local Government	• ESE. shall conduct monitoring on the approved IEE and A-RAP, and report to ECD and Local Government Environmental Section • The result of monitoring shall be disclosed at ESE and Local Government office • Regular inspection and maintenance of the Power Supply Facilities • The monitoring is carried out for two (2) years after construction of the Power Supply Facilities.

Source: JICA Preparatory Survey Team

Financial sources for the environmental management and monitoring works at the construction and operation phases are shown below.

Table 4. 7 Cost and Financial Sources

Stage	Name of Organization	Cost and Financial Sources
Pre-Construction and during Construction	Land Acquisition Team (ESE, SLRD and Detailed design consultant)	• Part of ESE/SLRD project preparation (minimal cost) • Part of consultants task
	The Construction Supervision Consultant	• Part of construction supervision contract
	Construction Committee or Project Monitoring Committee	• Minimal cost to ESE, Local Government • Part of construction supervision contract • Part of contraction cost
	The Contractor	• Part of cost of contract (EMP is included in tender and contract documents)
Operation	ESE. and Local Government	• Minimal cost since it is only visual inspection and record verification

Source: JICA Preparatory Survey Team

The contract documents will contain a provision allocating part of construction cost for the implementation of the environmental management such as mitigation measures. This is estimated at 0.5-2.0 % of total contract budget.

CHAPTER 5 Results of Stakeholders' Meeting and Information Disclosure

Stakeholders meetings were held on purpose – 1) to inform all the stakeholders of the Sub-project, its potential negative and positive impacts on them, 2) to understand and take into account stakeholders' views, concerns and values in the project design, and 3) to improve transparency and accountability in order to reduce conflicts and ensure smooth implementation of the Sub-projects.
Stakeholder meetings for Regional Electrification Sub-projects were held two times:

1) First stakeholder meeting was held in Myaungmya Township, Ayeyarwaddy Region, on February 27, 2016, with participation of 200 attendants including community elders, government organization, non-government organization, etc. ESE and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.
2) Second stakeholder meeting was held in Thayetchaung Township, Taninthari Region, on March 4, 2016, with participation of 92 attendants including Government Organization, Non Government Organization and community elders, etc. In the meeting ESE and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.

The Report of Initial Environmental Examination (IEE)

FOR

REGIONAL DEVELOPMENT PROJECT FOR POVERT REDUCTION PHASE II

REGIONAL WATER SUPPLY SECTOR

IN

THE REPUBLIC OF THE UNION OF MYANMAR

May 2016

Yachiyo Engineering Co., Ltd.

Oriental Consultants Global Co., Ltd

Abbreviations

JICA	Japan International Cooperation Agency
ADB	Asian Development Bank
WB	World Bank
WHO	World Health Organization
ASEAN	Association of South East Asian Nations
MOECAF	Ministry of Environmental Conservation and Forestry
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MOAI	Ministry of Agriculture and Irrigation
FERD	Foreign Economic Relations Department
ECD	Environmental Conservation Department
GAD	General Administration Department
DRD	Department of Rural Development
SLRD	Settlement and Land Record Department
ESE	Electricity Supply Enterprise
PMU	Project Management Unit
EIA	Environmental Impact Assessment
IEE	Initial Environmental Examination
EMP	Environmental Management Plan
ARAP	Abbreviated Resettlement Action Plan
RAP	Resettlement Action Plan
MC	Monitoring Committee
TOR	Terms of Reference
WTP	Water Treatment Plant
PAP	Project Affected Person
PAU	Project Affected Unit
CT	Contractor
ODA	Official Development Assistant

UNITS

$\mu g/m^3$	Microgram per Cubic Meter
m^3/day	Cubic Meter per Day
G/Day	Gallon per Day
mg/l	Milligram Per Liter
$^{\circ}C$	Degree Centigrade
ml	Milliliter
km^2	Square Kilometer

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CHAPTER 1 Introduction

1.1 Purpose of IEE

The purpose of this study is

・ To inquiry the existing baseline data that describe all relevant physical, biological, social, cultural and economic characteristics of the potential project affected area through second source reviews and field investigation

・ To evaluate the significance of potential adverse and beneficial impacts which could affect to the proposed project area by project activities of transmission line and substations construction and operation of the project

・ To understand the past and current history of lands to be acquired and identify the loss of assets by projects activities

・ To adopt effective mitigation measures that could avoid or mitigate the potential impacts to a level deemed as acceptable

・ To define the appropriate environmental and social management and monitoring mechanism to be implemented throughout the life of project cycle

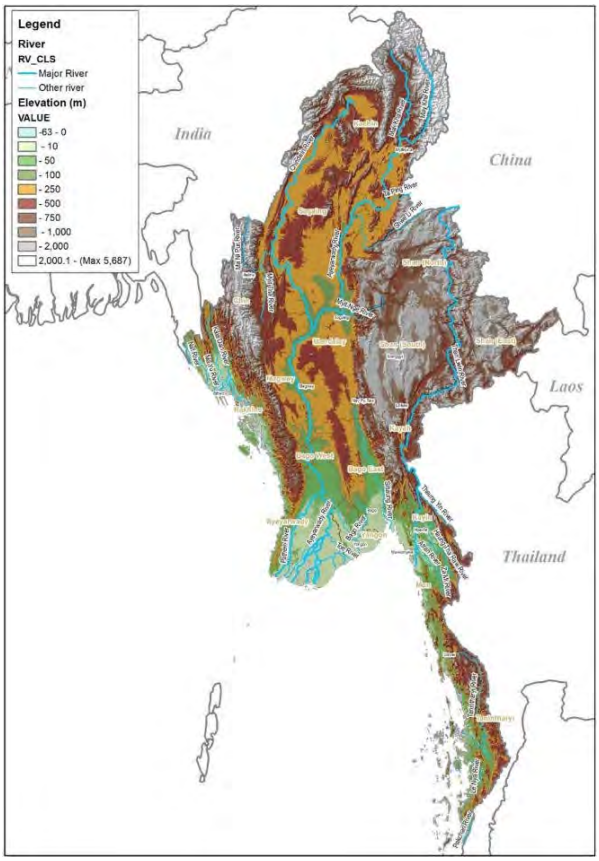
1.2 Outline of Environmental and Social Consideration

(1) Natural Condition

➢ *Physical Feature*: The topography of Myanmar can roughly be divided into three parts: the Western Hills Region, the Central Valley Region and the Eastern Hill Region.

➢ *Topography, Geology and Hydrology*: Myanmar is characterized by topographic features including mountain ranges in the north, east and west, and a long coastal strip in the south. Steep mountainous ranges traverse the entire western border of Myanmar with India and Bangladesh. Their average elevation is approximately 1,800 meters and the highest point is the top of Mt. Hkakaborazi reaching 5,881 meters above sea level. Myanmar has five main rivers: Ayeyarwady, Chindwin, Salween, Sittaung and Tenasserim, the longest of which being Ayeyarwady River, which is approximately 2,170 kilometers long, running through the country into the Gulf of Martaban. The East-West Economic Corridors passes Sittaung River, Salween River, Attran River, Gyaing River, Than Lwin River and Salween River.

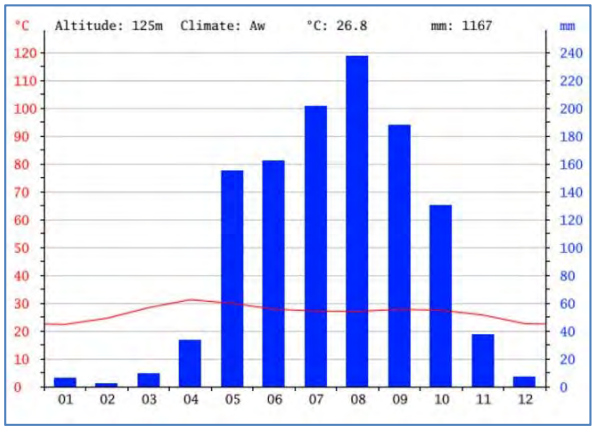
➢ *Climate*: The climate of Myanmar is roughly divided into three seasons: summer, rainy season



Source: SRTM and Agricultural Atlas

Figure 1. 1 Topographic and Hydrological Feature

and cold season. From March to mid-May are summer months; the rain falls from mid-May to the end of October and the cold season starts in November and ends in the end of February. Generally, Myanmar enjoys a tropical monsoon climate. However, climatic conditions differ widely from place to place due to widely differing topographical situations. For instance, Central Myanmar has an annual rainfall of less than 40 inches while the Rakhine coast gets about 200 inches. Besides, the average highest temperature in Central Myanmar during the summer months March and April is above 43.3 C° while in Northern Myanmar, it is about 36.1 C° and on the Shan Plateau between 29.4 C° and 35 C°. Temperature of towns varies according to their location and elevation. The average monthly temperature and precipitation of Nay Pyi Taw are shown as figure 1.2.

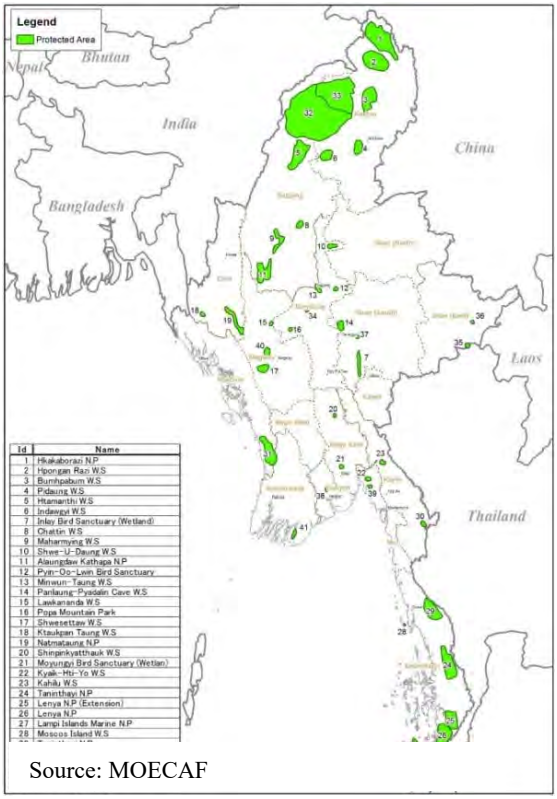


Source: Climate Data Org.

Figure 1. 2 Temperature and Rainfall in Nay Pyi Taw

- *Flora and Fauna*: Myanmar is endowed with a rich diversity of habitat types arising largely from its unusual ecological diversity. It is home to nearly 300 known mammal species, 300 reptiles, and about 100 bird species. The country is also a haven for about 7000 species of plant life. The potential worth of plant species in Myanmar is considerable. Since Myanmar considers such a rich pool of biodiversity as an important national asset, the government of the Union of Myanmar has drawn up strict regulations to protect its reservoir of biodiversity and biological resources.

- *Protected Area*: There are around 33 protected areas in Myanmar. These conservation zones are declared by laws as national parks, watershed reserves, wildlife preserves and sanctuaries.



Source: MOECAF

Figure 1. 3 Protected Areas in Myanmar

(2) Social Condition

Myanmar has an estimated population of 51.4 million, consisting of diverse ethnic groups speaking over 100 languages and dialects. It is ranked 150 out of 187 countries on the Human Development Index. Economic growth has averaged 5 percent in recent years with a per capita income of USD$702. Socio-economic characteristic in Myanmar is shown as table 1.1.

Table 1. 1 Outline of Socio economic characteristic in Myanmar

Item	Description
Area (km^2) / Population (mil)	676,578 km^2 / 51.4 million people
Rural Population (%)	70 % (2015)
Poverty Rate (%)	26 % (2015)
Ethnic groups (%)	Burma 68%, Shan 9%, Kayin 7 %, Rakhine 3.5 %, Chinese 2.5 %, Mon 2 %, Kachin 1.5 % and other 135 small ethnic groups.
Religion (%)	Buddhism 74 %, Protestant 6 %, Islam 3%, Hinduism 2 %, other 11 % (2005)
Population by industry (%)	Primary 62.8 %, Secondary 11.9 %, Tertiary 25.3% (1998)
Land Use (%)	Agricultural Land 12 mil ha (18.7%), Forest 31,7 mil ha (48.6 %)
Export (2010): *92 hundred million USD*	Natural Gas 38.5%, Pearl 24.5 %, Beans 9.8 %, Timber 7.7 %, Cloths 4.4 % (to Thailand 41.7 %, Hong Kong 21.1 %, India 12.6 %, China 6.2 %, Singapore 3.6%)
Import (2010): *90 hundred million USD*	Oil 21.9 %, Machines 14.0 %, Iron & Steel 9.0 %, Textile 7.1 %, Electric Machine 5% (from China 27.1 %, Singapore 27.0 %, Thailand 11.4 %, S. Korea 6.1 %, Japan 5.3 %)

Source: Data book of the world 2014

1.3 Administrative System in Myanmar

The government body with primary responsibility for ensuring and promoting soundness of the environment in Myanmar is MOECAF (Ministry of Environmental Conservation and Forestry) although other Ministries such as the Ministry of Agriculture and Irrigation and the Ministry of Livestock, Fisheries and Rural Development also share certain level of responsibility. MOECAF was reformed in September 2011 from the Ministry of Forestry to be the focal point and coordinating agency for environmental management. While the role of MOECAF is not specified by law, responsibility of its predecessor (i.e. Ministry of Forestry) is stipulated in the Forest Policy (1995) as: forest land management; environmental protection; timber extraction; and forest policy in Myanmar. Since then, there has been only one modification to the structure of the Ministry, which is addition of ECD (Environmental Conservation Department) established in October 2012 based on Environmental Conservation Law. ECD is the department responsible for managing the EIA (Environmental Impact Assessment) process in Myanmar. The role of MOECAF in environmental conservation can therefore be considered greater than before. The Organization chart of MOECAF is as following figure.

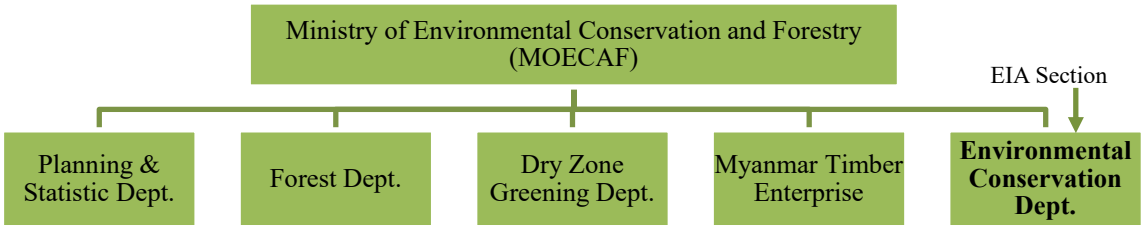


Figure 1. 4 the organization chart of MOECAF

The role of ECD is mainly preparation and formulation of policy and strategy framework, planning of national and regional environment management, environmental licensing, pollution control, and monitoring of environmental impacts. Moreover, EDC also has the role of coordination and

contribution for 1) integration of environmental issues into sector planning, 2) information management and awareness promotion, 3) economic and financing instruments for environment and 4) international environmental agreements/ protocols/conventions. It can be said that while MOECAF mainly takes the role of decision making in many cases, ECD's role is mainly for preparation and implementation of duties relating to all environmental conservation works.

Different responsibilities of ECD are mainly categorized as 1) planning and coordination with sector authorities and different stakeholders, 2) control of pollution and other environmental impacts – establishment and administration of EIA, prior permissions, IEE, EMP including SIA, 3) management of environmental emergencies, 4) dissemination of environmental awareness, 5) establishing economic instruments and financing environmental management, and 6) enforcement and sanction. (Ref: Needs assessment for the implementation of the Environmental Conservation Law, UNDP, 2016)

The Environmental Conservation Department (ECD) has up of 156 officers and 247 staffs (403 in total) in 2015, under the supervision of the Director General at the Head Office, Nay Pyi Taw and 14 states in regions mentioned in the following diagram.

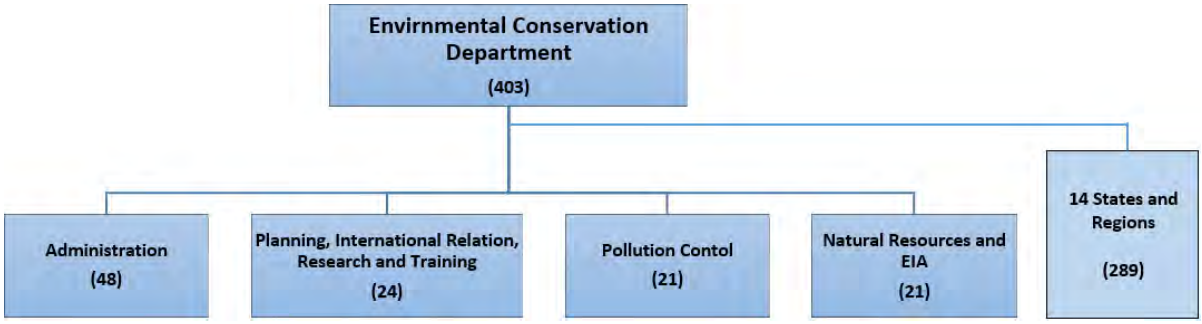


Figure 1. 5 The organizational chart of ECD

CHAPTER 2 Policies, Legislation and Institutional Framework

2.1 Related Law and Regulations

(1) Environmental Conservation Law (2012)

The principal law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March, 2012 (The Pyidaungsu Hluttow Law No. 9/20/2130rh). The law stipulates which government bodies are in charge of environmental conservation as well as their relevant roles and responsibilities. It touches on water, noise, vibration and solid waste qualities but does not provide specific standards to be met. It also mentions both environmental and social impact assessments. In the context of project development, it is important to note that the law adopts the notion of 'polluter/beneficiary pays principle' as it implies that the project promoters are responsible for covering all environmental and social costs generated by the project. The law serves as the basis for founding ECD under MOECAF, both of which will be explained later. Following the Environmental Conservation Law are two legal arrangements: Environmental Conservation Rules; and EIA Procedures.

(2) Environmental Conservation Rules

Environmental Conservation Rules have been promulgated in 2014 and provides a platform to bridge the Environmental Conservation Law with more specific and practical rules and guidelines including EIA Procedures and environmental quality standards. However detailed guidelines for each responsible organizations, detailed guidelines, environmental standards and criteria of EIA & IEE (Initial Environmental Examination) will be provided after 2015 in the “EIA Procedure”.

(3) Environmental Impact Assessment (EIA) Procedures

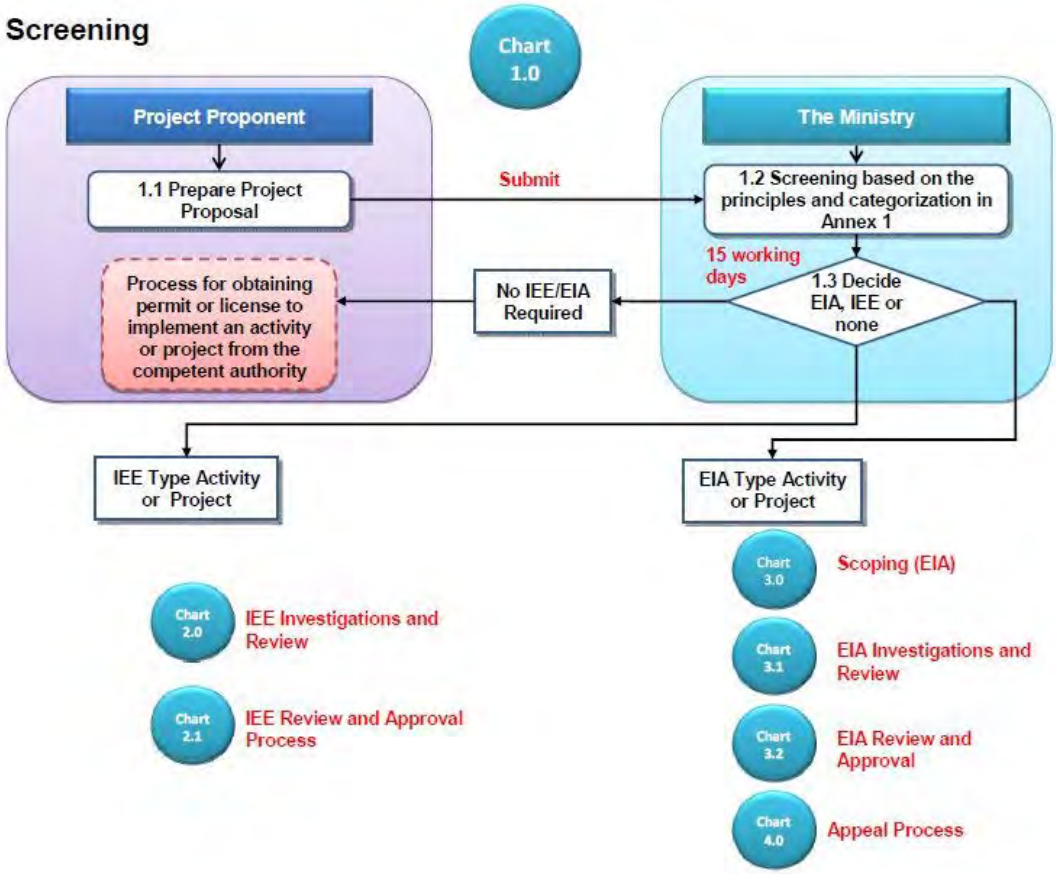
The EIA Procedures has approved by cabinet in January 2016. As of beginning of December, the Notification of EIA procedure is ongoing. It stipulates the conditions under which EIA is required and the steps to be followed in conducting and assessing the EIA. Under the Procedures, the Ministry, sets an Environmental Conservation Committee, is to give recommendations from an environmental point of view whether to approve the EIA reports or not. IEE and EIA include an Environmental Management Plan (EMP). The Procedures also include a clause for public participation in implementing the IEE, EIA, and EMP. It also mentions the notion of precautionary principle and touches on climate change, and also includes Strategic Environmental Assessment.

The Project Proponent should submit the Project Proposal to the Department (ECD) for Screening. ECD categorize the project as one of the following; 1) an EIA Type Project, or 2) an IEE Type Project or 3) neither an EIA Type Project nor an IEE Type Project, and therefore not required to undertake any environmental assessment.

Regarding IEE, prior to commencement of an IEE, the Project Proponent should inform to ECD in writing as to the identity of the organization(s) and/or person(s), who will undertake the IEE and reporting. The Project Proponent may carry out the IEE and reporting by itself or may appoint a

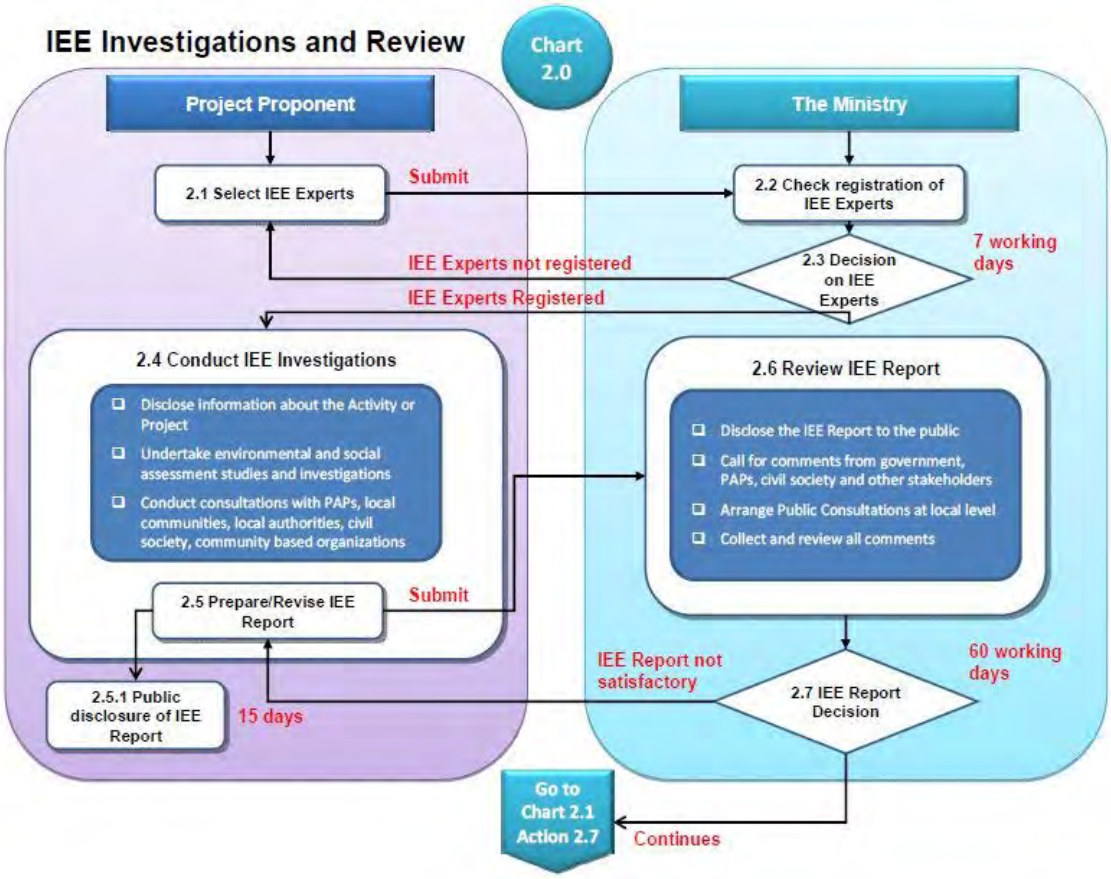
registered Consultant to do so. Within seven (7) working days of its receipt of information about the identity of any proposed organization(s) and/or person(s) selected by the Project Proponent to undertake the IEE, ECD will confirm whether such organization(s) and/or person(s) is/are in good standing with the Department. The Project Proponent should undertake the public consultation in regard to an IEE Type Project.

Screening and the IEE investigation and review process is as following figure;



Source: EIA Procedures 2015

Figure 2. 1 the Screening Process



Source: EIA Procedures 2015

Figure 2. 2 the IEE Investigation and review process

In regard to EIA, all EIA Type Projects should undergo Scoping. The Project Proponent shall be responsible to ensure that the Scoping and the preparation of the TOR for the EIA Report are undertaken in a professional manner. As part of the Scoping, the Project Proponent shall also ensure the public consultation and participation process is carried out.

Based on the Scoping, the Project Proponent shall prepare the TOR for the EIA investigations in accordance with applicable guidelines issued or adopted by the Ministry. The Project Proponent shall submit the completed Scoping Report and TOR to the ECD for review and approval.

The Project Proponent shall ensure that the EIA investigation properly addresses all Adverse Impacts and is undertaken in accordance with the TOR as approved by ECD. And EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities that may be affected by the Project during all project phase, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project. The investigations shall

include all necessary data collection, technical studies, modeling, field surveys, field sampling, laboratory analysis, engineering designs and calculations including alternative analysis. EIA procedure also stipulates the consultation process of EIA investigation.

2.2 Gap between JICA Guideline and Myanmar Legislation

Regarding policies for environmental and social considerations, those of JICA guidelines are basically same as those of World Bank and ADB. Table 2.1 shows results of comparison between the policies of Myanmar legislations including the EIA Procedures and those of JICA Guidelines. It is found that there are still considerable gaps between Myanmar legislations and JICA Guidelines.

Table 2. 1 Gaps between JICA Guidelines and Myanmar Legislation on EIA

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
(1) Underlying Principles		
1. Environmental impacts that may be caused by projects must be accessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types activities according to the defined thresholds. Article 35, 62 of the Procedures stipulates to analyze feasible alternatives as well as mitigation measures.
2. Such examinations must be endeavored to include an analysis of environment and social costs and benefits in the most quantitative terms possible, as well as a qualitative analysis; these must be conducted in close harmony with the economic, financial, institutional, social and technical analyses of projects.	Procedures (A 36, 63)	Article 43, 69 of the Procedure stipulates to conduct in close harmony with the social and economic analysis of projects.
3. The findings of the examination of environmental and social considerations must include alternatives and mitigation measures, and must be recorded as separate documents or as a part of other documents. EIA reports must be produced for projects in which there is a reasonable expectation of particularly large adverse environmental impacts.	Procedures (A 9, 35, 62)	Article 9 of the Procedures requires IEE or EIA for proposed projects based on types to projects activities according to the defined thresholds. Article 35, 62 of the Procedure stipulates to analyze feasible alternatives as well as mitigation measures.
4. For projects that have a particularly high potential for adverse impacts or that are highly contentious, a committee of experts may be formed so that JICA may seed their opinions, in order to increase accountability.	Procedures (A 3)	Article 3 of the Procedures requires the establishment of Environmental Conservation Committee composed of at least five persons with necessary expertise. And the committee's duty is to recommend approval of the submitted IEE/EIA and EMP.
(2) Examination of Measures		
1. Multiple alternatives must be examined in order to avoid or minimize adverse impacts and to choose better project options in terms of environment and social considerations. In the examination of measures, priority is to be given to avoidance of environmental impacts; when this is not possible, minimization and reduction of impacts must be considered next. Compensation measures must be examined only when impacts cannot be avoided by any of the aforementioned measures.	Procedures (A 35, 62)	Article 35, 62 of the Procedures stipulates to investigate of all potential environmental impacts including an analysis of feasible alternatives and mitigation measures. Conduct of compensation measure is not stipulated in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Appropriate follow-up plan and system, such as monitoring plans and environmental management plants, must be prepared; the costs of implementing such plans and systems, and the financial methods to find such costs, must be determined. Plans for projects with particularly large potential adverse impact must be accompanied by detailed environmental management plans.	Procedures (A 35,36,62,63)	Article 35, 62 of the Procedures stipulates to analyze feasible alternatives, mitigation measure as well as cost & benefit.
		Article 26, 63 of the Procedures requires the preparation of EMP for IEE/EIA required project.
(3) Scope of Impacts to Be Assessed		
1. The impacts to be accessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accident, water usage, climate change, ecosystem, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood , utilization of land and local resources, social institution such as social capital and local decision-making institution, existing social infrastructure and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. Items to be addressed in the specific project are narrowed down to the needed ones through the scoping process.	Procedures (A 56)	Article 56 of the Procedures stipulates that EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the study area, together with all pertinent legal matters relating to the environment, people and communities (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases including pre-construction, construction, operation, decommissioning, closure, and post-closure, and shall identify and assess all Adverse Impacts, risks, Cumulative Impacts and Residual Impacts for environment, social and, if relevant, health that potentially could arise from the Project.
2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project.	None	No laws were identified, which mentioned assessment and examination of derivative, secondary, and cumulative impacts as well as the impacts of projects which are indivisible from the project in a reasonable extent.
(4) Compliance with Laws, Standards, and Plans		
1. Projects must comply with the laws, ordinances, and standards related to environmental and social considerations established by the governments that have jurisdiction over project sites (including both national and local governments). They must also conform to the environmental and social consideration policies and plans of the governments that have such jurisdiction.	The Environmental Conservation Law 2012 (A 28, 29)	No law directly prescribes that projects must comply with the laws, ordinances, and standards related to environmental and social considerations.
		Article 28 of The Environmental Conservation Law prescribes that "No one shall, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under this Law"
		Article 29 of the law stipulated that "No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law."

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. Projects must, in principle, be undertaken outside of protected areas that are specifically designated by laws or ordinances for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such areas). Projects are also not to impose significant adverse impacts on designated conservation areas.	The Protection and Preservation of Cultural Heritage Regions Law(Article 18)	This law stipulates that no person shall construct, extend, renovate a building or extend the boundary of ancient monumental zone or ancient site zone without prior permission granted under this law.
(5) Social Acceptability		
1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans.	Procedures (A 16,36)	Article 16 of the Procedures stipulates that EIA Review body shall have responsibility if EIA report comply with procedure (including public participation in conduct of IEE/ EIA and EMP.
		Article 36 of the Procedures stipulates that EIA report shall contain the results of the public consultation and public participation processes, recommendations received from the public, and the Project Proponent's written responses to comments received during that process.
2. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, and the poor and ethnic minorities, all members of which are susceptible to environmental and social impacts and may have little access to decision-making processes within society.	Procedures (A 7)	Article 7 of the Procedures prescribes implementation of necessary actions for the project which potentially gives adverse impact on indigenous people and causes involuntary resettlement. However, the details of actions are not provided in the Procedures.
(6) Ecosystem and Biota		
1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests.	The Environmental Conservation Law 2012 (A 18)	The Environmental Conservation Law prescribes that relevant government departments/organizations shall carry out conservation, management, beneficial use, sustainable use and enhancement regional cooperation of environmental natural resources.
	The Forest Law 1992 (A 40)	Article 40 of the Forest Law (1992) prescribes that cause of any damage to reserved forest and its environment is prohibited and will be punished.
	The Protection of Wildlife and Conservation of Natural Areas Law 1994 (A 36)	Article 36 of The Protection of Wildlife and Conservation of Natural Areas Law prescribes that cause of any damage to protected areas is prohibited and will be punished.
2. Illegal logging of forests must be avoided. Project proponents etc. are encouraged to obtain certification by forest certification systems as a way to ensure the prevention of illegal logging	The Forest Law 1992 (A 17, 40)	The Law stipulates that forest produce may only be extracted after obtaining a permit.
(7) Involuntary Resettlement		
1. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impact on involuntary resettlement. However, the details of actions are not provided in the Procedures.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents etc. in a timely manner. Prior compensation, at full replacement cost, must be provided as much as possible. Host countries must make efforts to enable people affected by projects and to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting means for an alternative sustainable livelihood, and providing the expenses necessary for the relocation and re-establishment of communities at resettlement sites.	Land Acquisition Act 1894 (A 3)	Article 3 of the Land Acquisition Act stipulates that a person who has right in land would be entitled to claim a compensation if the land were acquired under this Act.
	Farmland Rules 2012 (A 64)	Article 64 of Farmland Rules stipulates compensation in farmland acquisition for the interest of the State or public.
	Land Acquisition Act 1894 (A 23)	Article 23 of the Act stipulates that damages on standing crops and trees, on land, properties, incidental to relocate residence or business and losses of profits due to land acquisition are considered for compensation although it does not clearly state to support PAPs can improve or at least restore their standard of living. However, these laws do not clearly state any more details of compensation and supporting measures.
3. Appropriate participation by affected people and their communities must be promoted in the planning, implementation, and monitoring of resettlement action plans and measures to prevent the loss of their means of livelihood. In addition, appropriate and accessible grievance mechanisms must be established for the affected people and their communities.	Procedures (A 15)	Article 15 of the Procedures describes that relevant agencies, institutions, civil society organizations, and project-affected persons are invited as appropriate to provide comments and suggestions on the IEE/ EIA/ EMP reports. However, it does not describe grievance mechanism.
	Land Acquisition Act 1894 (A 5A, 18)	Article 5A of the Land Acquisition Act stipulates that any person whose land is affected (acquired) can claim the objection for the land acquisition within thirty
4. For projects that will result in large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP4.12, Annex A.	None	No laws were specifically mentioned about the requirement of resettlement action plans for large-scale involuntary resettlement.
		According to GAD (General Administration Department) of MOHA (Ministry of Home Affairs), Land Acquisition and Resettlement Action Plan (LARAP) will be required for the large-scale developments and the GAD will approve it.
(8) Indigenous People		
1. Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous people for their losses.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.

JICA Guidelines/WB OP4.12	Legislation of Myanmar	Gaps between JICA Guidelines/WB OP4.12 and Myanmar Legislation
2. When projects may have adverse impacts on indigenous people, all of their rights in relation to land and resources must be respected in accordance with the spirit of relevant international declarations and treaties, including the United Nations Declaration on the Rights of indigenous Peoples. Efforts must be made to obtain the consent of indigenous peoples in a process of free, prior, and informed consultation.	Procedures (A 7)	The Procedures prescribes implementation of necessary actions for the project which potentially gives impacts on indigenous people without the details.
3. Measures for the affected indigenous peoples must be prepared as an indigenous peoples plan (which may constitute a part of other documents for environmental and social consideration) and must be made public in compliance with the relevant laws and ordinances of the host country. In preparing the indigenous peoples plan, consultations must be made with the affected indigenous peoples based on sufficient information made available to them in advance. When consultations are held, it is desirable that explanations be given in a form, manner, and language that are understandable to the people concerned. It is desirable that the indigenous peoples plan include the elements laid out in the World Bank Safeguard Policy, OP4.10, Annex B.	Procedure (A7)	The procedure prescribes that project proponent shall additionally comply with separate procedure when Indigenous People might be affected.
(9) Monitoring		
1. After projects begin, project proponents etc. monitor whether any unforeseeable situations occur and whether the performance and effectiveness of mitigation measures are consistent with the assessment's prediction. They then take appropriate measures based on the results of such monitoring.	Procedures (A 3, 71-75)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
		Environmental Conservation Committee shall carry out monitoring of the implementation of the approved EMP by the project proponent although there was little information regarding the method or terms of the monitoring conduction.
2. In cases where sufficient monitoring is deemed essential for appropriate environmental and social considerations, such as projects for which mitigation measures should be implemented while monitoring their effectiveness, project proponents etc. must ensure that project plans include feasible monitoring plans.	Procedures (A 3)	The Procedures prescribes that a project proponent shall prepare and submit an EMP with the IEE/ EIA reports.
3. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.	None	No laws were identified, which stated that project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders.

Note: JICA - JICA Guidelines for Environmental and Social Considerations, WB - World Bank Safeguard Policy, Procedures - Environmental Impact Assessment Procedures (2015), A - Article.

Source: JICA Guidelines for Environmental and Social Considerations (2010.4) and World Bank OP 4.12 and relevant Myanmar legislation

2.3 Environmental Quality Standards

(1) Outline of Environmental Quality Standards

In Myanmar, MOECAF had been already stipulated the environmental quality standards for each specific parameters, in December 29 2016, according to the following statement in the Environmental Conservation Law (2012):

- The Ministry may, with the approval of the Union Government and the Committee, insert, modify and stipulate the environmental quality standards for the interests of the public in accord with the scientific and technological advances or requirement of work according to time and area.
- If any environmental quality standard stipulated by any Government department, Government organization under any existing law is more stringent than the quality standard stipulated by the Ministry, it shall remain in force; however if it is less stringent than such standard, only the standard stipulated by the Ministry shall be in force.

These national Environmental Quality (Emission) Guidelines had been already approved in Pyidaungsu Hluttaw (Union Parliament), on the purpose to provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

So, all the developers in Myanmar must be in compliance with those Guidelines, in which two main sectors were categorized – (1) General Guidelines and (2) Industrial-specific Guidelines. They must try not to exceed those emission and/or discharge standards and environmental standards classified in those Guidelines.

(2) Pollution control standards of General Guidelines

2.1 Air Emission

According to MOECAF (ECD – Environmental Conservation Department), Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that – (i) emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines for the most common pollutants as summarized below; and (ii) emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e. not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed. Table 2.2 shows general air quality standards.

Table 2. 2 Air Emission Standards of ECD

No	Parameter	Averaging Period	Guideline Value µg/m^3
1	Nitrogen dioxide (NO_2)	1-year 1- hour	40 200
2	Ozone (O_3)	8-hour Daily maximum	100
3	Particulate Matter PM_{10}	1-year 24-hour	20 50
4	Particulate Matter $PM_{2.5}$	1- year	10

No	Parameter	Averaging Period	Guideline Value µg/m^3
		24- hour	25
5	Sulfur dioxide (SO_2)	24-hour 10-minute	20 500

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.2 Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Table xxx shows the standards for waste water discharges.

Table 2. 3 Standards for Wastewater, Storm, Water Runoff, Effluent and Sanitary Discharges

No	Parameter	Unit	Guideline Value
1	5-day Biochemical oxygen demand	mg/l	50
2	Ammonia	mg/l	10
3	Arsenic	mg/l	0.1
4	Cadmium	mg/l	0.1
5	Chemical oxygen demand	mg/l	250
6	Chlorine (total residual)	mg/l	0.2
7	Chromium (hexavalent)	mg/l	0.1
8	Chromium (total)	mg/l	0.5
9	Copper	mg/l	0.5
10	Cyanide (free)	mg/l	0.1
11	Cyanide (total)	mg/l	1
12	Fluoride	mg/l	20
13	Heavy metals (total)	mg/l	10
14	Iron	mg/l	3.5
15	Lead	mg/l	0.1
16	Mercury	mg/l	0.01
17	Nickel	mg/l	0.5
18	Oil and grease	mg/l	10
19	pH	S.U	6-9
20	Phenols	mg/l	0.5
21	Selenium	mg/l	0.1
22	Silver	mg/l	0.5
23	Sulphide	mg/l	1
24	Temperature increase	˚C	< 3
25	Total coliform bacteria	100 ml	400
26	Total phosphorus	mg/l	2
27	Total suspended solids	mg/l	50

28	Zinc	mg/l	2

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.3 Regulation of Wastewater Discharge

Nobody shall be allowed to dispose and/ or flow sewage and wastewater from any activity, such as business, factory, into drainage, creeks and rivers without necessary treatment for compliance with standards, norms and criteria designated by MOECAF (ECD).

So, in addition to general and industry-specific wastewater guidelines applicable during project operations, MOECAF (ECD) had also stipulated the following guideline values to be applied during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

Table 2. 4 Standard for Site Runoff and Wastewater Discharges (Construction Phase)

No	Parameter	Unit	Maximum Concentration
1	Biological oxygen demand (BOD)	mg/l	30
2	Chemical oxygen demand (COD)	mg/l	125
3	Oil and grease	mg/l	10
4	pH	S.U	6-9
5	Total coliform bacteria	100 ml	400
6	Total nitrogen	mg/l	10
7	Total Phosphorus	mg/l	2
8	Total suspended solids	mg/l	50

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Water Quality Standards

With regard to the water quality, however, the guidelines proposed in the workshops in 1990 and 2011 (Draft), and the World Health Organization (WHO) Guidelines were compared in Table 2.5. Compared with 1990, the values for 2011 tended to be closer to the WHO Guideline. However, for copper and iron, the values are less strict than in the WHO Guidelines.

Table 2. 5 Drinking Water Quality Standards in Myanmar

No.	Parameters	Unit	Myanmar Standard		WHO Guideline
			1990	2011 (Draft)	
1	pH	-	6.5-9.2	6.5-8.5	Preferably<8.0
2	Turbidity	NTU	20	5	5
3	Color	Pt-unit	6.5-9.2	15	15
4	Aluminum (Al)	mg/l	0.2	0.2	0.2
5	Arsenic (As)	mg/l	0.05	0.05	0.01
6	Calcium (Ca)	mg/l	75-200	100	-
7	Chloride (Cl)	mg/l	200-600	250	250
8	Copper (Cu)	mg/l	1.0	2.0	1.0
9	Cyanide (CN)	mg/l	0.05	0.07	0.07
1	Hardness	mg/l	500	500	-

11	Iron (Fe)	mg/l	0.5-1.5	1	0.3
1	Manganese (Mn)	mg/l	0.3	0.3(0.1)	0.1
1	Lead (Pb)	mg/l	0.05	0.01	0.01
1	Magnesium (Mg)	mg/l	30-150	500	-
1	Nitrate (NO3)	mg/l	10(as N)	50	-
1	Sulfate	mg/l	400	250	250
1	Total dissolved	mg/l	1000	1000	1000
1	Zinc (Zn)	mg/l	5-15	3	3
1	Total Coliform	No/100ml	0	0	0
2	E.Coli	No/100ml	0	0	0

Source: The Study on the Improvement of Water Supply and Wastewater Treatment in Yangon (2012, METI, Japan)

2.5 Noise Level Standards

Noise level standards are stipulated by MOECAF (ECD) as in Table 2.6.

Table 2. 6 Noise Level Standards

No	Receptor	One Hour LAeq (dBA)	
		Daytime 07:00 – 22:00 (10:00 – 22:00 for Public holidays)	Nighttime 22:00 – 07:00 (22:00 – 10:00 for Public holidays)
1	Residential, Institutional, Educational	55	45
2	Industrial, Commercial	70	70

Source: Myanmar National Environmental Quality (Emission) Guidelines (2015)

2.4 Institutional Framework for Environmental Conservation

For implementation of Regional Development Projects for Poverty Reduction Phase II, related to the sub-projects of road sector, Implementing and Responsible Agency is TDCs (Township Development Committee) through Department of Rural Development (DRD) under Ministry of Livestock, Fisheries and Rural Development (MLFRD), which control all environmental management and monitoring process of this project. To share the information between TDC (DRD) and MOECAF (i.e. attend meeting among the related agencies regarding the environmental issue) and to prepare the Environmental Report (i.e. IEE.EIA), DRD allocated the contact person for coordination to TDCs. Regarding the Power Supply Sector, implementing and responsible agency is ESE (Electricity Supply Enterprise, Ministry of Electric Power) in case of On-grid, and DRD (Department of Rural Development, Ministry of Livestock, Fisheries and Rural Development) in case of Off-grid. DRD is also implementing and responsible agency related to the Water Supply Sector.

CHAPTER 3 Scope of the Study

3.1 Outline of the Project and its Components

(1) Outline of Sub-projects

The outline of sub-projects of water supply sector is shown in the following table;

Table 3. 1 Outline of sub-project of water supply sector

Outline of project	States or Region (amount of Township/villages)
- Water Treatment Plant (WTP) (including Slow Sand filter/Rapid Sand Filter, Chlorine facility) - Water Pipe Line Water Conveyance line, Water Transmission line Water Distribution line - Transformer 400V electrical line - Pump, Pump House, Pump Station - Pontoon - Tube Well (Deep well, Dug well) - Intake facility / Weir	Rakhine (1), Magway (6), Kayin (4), Ayeyarwaddy (6), Bago (2), Tanintharyi (2), Shan (8), Mon (3), Mandalay (1) TOTAL 33 sub-projects

Source: JICA Preparatory Survey Team

Gravel filling work (Phase 1 project)	Pressure tank (Phase 1 project)
	

(2) Project Components

Table 3. 2 Project Components

	Project No	State/Region	Town	Component
1	TDC-1	Rakhine	Sittwe	Extension (1200000 G/day)
2	TDC-4	Magway	Chauk	Extension (750000 G/day)
3	TDC-5	Magway	Taungdwingyi	Extension (500000 G/day)
4	TDC-6	Magway	Minbu	Extension (950000 G/day)
5	TDC-8	Magway	Thayet	Extension (168000 G/day)
6	TDC-9	Magway	Kamma	Extension (96000 G/day)
7	TDC-11	Magway	Pakokku	Extension (6000 G/day)
8	TDC-14	Kayin	Phaan	Extension (1600000G/day)

9	TDC-16	Kayin	Than Daung Gyi	Extension (60000 G/day)
10	TDC-18	Kayin	Kyainseikgyi	New (25000 G/day)
11	TDC-19	Kayin	Kamarmaung	New (12500 G/day)
12	TDC-20	Ayeyarwady	Bogale	New (3000 G/day)
13	TDC-21	Ayeyawaddy	Kyaiklat	New (1000000 G/day)
14	TDC-24	Ayeyarwady	Mawlamyinegyun	New (1425000 G/day)
15	TDC-25	Ayeyarwady	Wakema	New (0 G/day)
16	TDC-28	Ayeyarwady	Pathein	New (0 G/day)
17	TDC-29	Ayeyarwady	Myaungmya	New (0 G/day)
18	TDC-30	Bago	Bago	Extension (1064000 G/day)
19	TDC-32	Bago	Gyobingauk	Extension (39500 G/day)
20	TDC-34	Tanintharyi	Launglon	Extension (0 G/day)
21	TDC-36	Tanintharyi	Bokpyin	Extension (0 G/day)
22	TDC-37	Shan	Taunggyi	Extension (947000 G/day)
23	TDC-38	Shan	Aungpan	Extension (900000 G/day)
24	TDC-41	Shan	Nansang	Extension (600000 G/day)
25	TDC-42	Shan	Loilen	Extension (100000G/day)
26	TDC-43	Shan	Ping Long	Extension (600000 G/day)
27	TDC-44	Shan	Lashio	Extension (2900000 G/day)
28	TDC-46	Shan	Kyaukme	Extension (257500 G/day)
29	TDC-49	Shan	Keng Tung	Extension (600000 G/day)
30	TDC-54	Mon	Thanbyuzayat	Extension (16000 G/day)
31	TDC-55	Mon	Ye	Extension (G/day)
32	TDC-56	Mon	Ka Mar Wet	Extension (200000 G/day)
33	TDC-57	Mandalay	Meiktila	Extension (2900000 G/day)

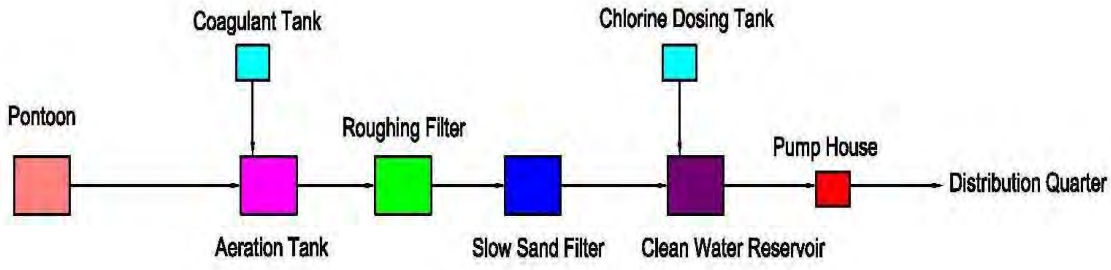
Source: JICA Preparatory Survey Team

(2) Project Components (Sub-project design)

The outlines of standards of design and specifications for the facilities of Sub-Projects are described as follows. Based on the existing TDC specifications and design in order to suit existing facilities, there are two types depending on water source types

1) Type I - River Water Source

The sub-projects with river water source have the following design including from water source (pontoon in the river) to clean water tank or reservoir with chlorine dosing system, as in Figure 3.1. Following pictures are put to get a general understanding on construction of each component.



Source: JICA Preparatory Survey Team

Figure 3. 1 Typical Design for River Water Source

Pontoon

Sedimentation Tank

Slow Sand Filter

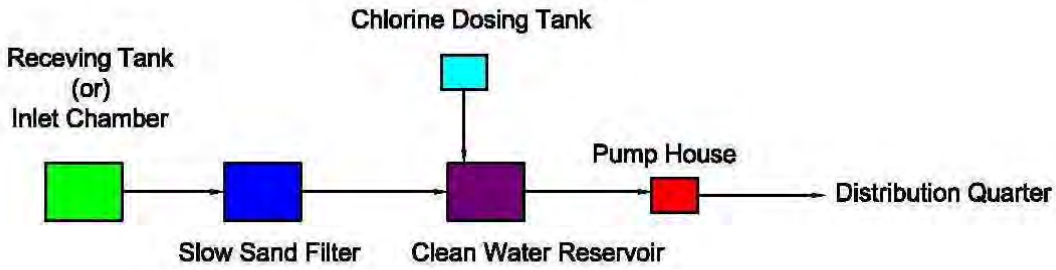
Clean Water Reservoir

Pump House

Pipe Line Installation

2) Type II (Tube Well or Dam or Lake or Spillway Water Source)

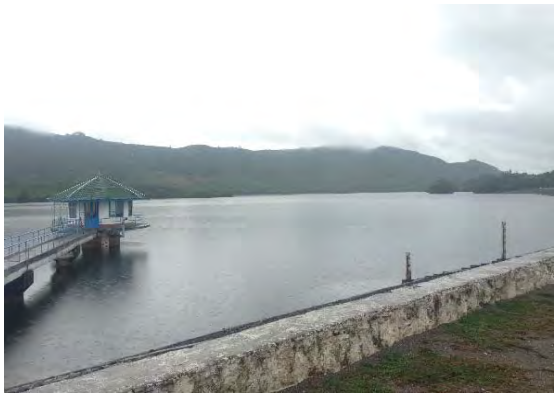
The sub-projects with other water sources such as tube well, dam, lake or spillway, have the following design including the construction of receiving tank (inlet chamber) to clean water tank or reservoir with chlorine dosing system, as in Figure 3.2. Following pictures are put to get a general understanding on construction of each component.



Source: JICA Preparatory Survey Team

Figure 3. 2 Typical Design for water sources such as Tube Well, Dam, Lake or Spillway

Water Source (Stream for Spillway)



Sample for Dam and Lake Water Sources

Chlorine Dosing Filter

Clean Water Reservoir

Pump House

Transmission Pipe Line

A Sample of Construction Stage

A Sample of Construction Stage

(3) Administration for Water Supply Development and Organization for Implementation

In Myanmar, there is no organization at the government-level to control town water supply. Therefore, the DRD, which is responsible only for rural water supply, but not for town water supply, is expected to become the executing agency of the Phase-II. The organization chart of DRD is shown in the Figure 3.3 below.

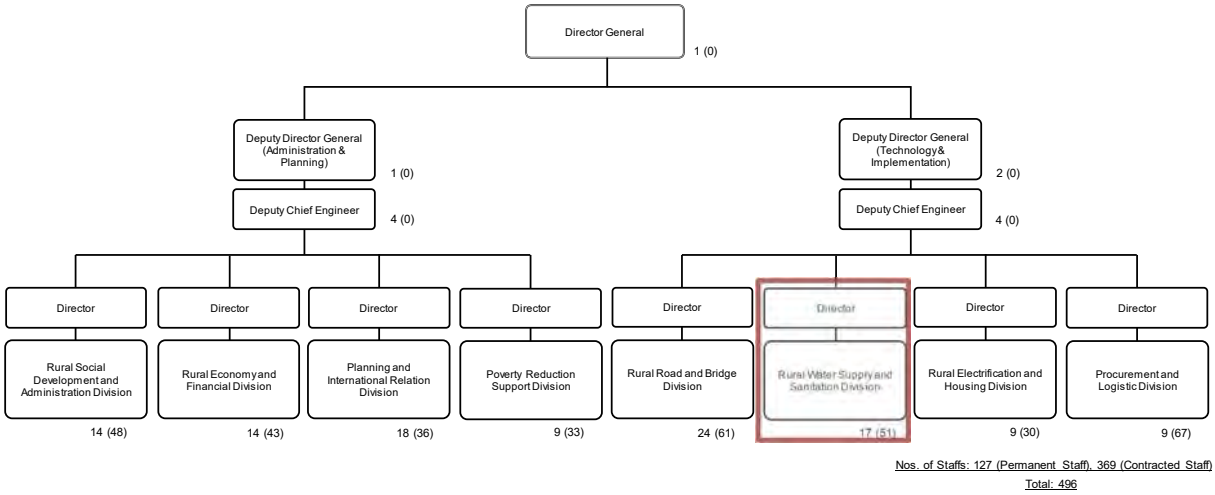


Figure 3. 3 Organization Chart of Department of Rural Development (DRD), Ministry of Livestock, Fisheries and Rural Development

The organization for implementing Water Supply project is as follows; this is the same as the Phase-I.

Table 3. 3 Related Organization and Role of Water Supply Sector Project

Organization	Position	Role
DRD	Implementation Agency	To monitor progress of Sub-Projects, To secure administration budget
SDC/RDC	Supervisor	To monitor and evaluate implementation of Sub-Project, To provide necessary assistance as timely for the smooth implementation and efficiency of Sub-Projects To participate in procurement team set by DRD as a member for the procurement
TDC	Owner	To plan and design Sub-Projects To supervise construction works To monitor social and environment impacts and handle issues To conduct operation and maintenance of the implemented project To prepare regular progress/situation reports to DRD Being owner of the facility, keeping all relevant documents and manage day to day activities after completion of the project

Source: Loan Agreement of Phase-I

In addition to the roles of DRD noted in above Table, it is recommended that DRD, as well as SDC/RDC arrange Sub-Project data and provide support on planning and designing to Development Committees as Implementation Agency.

3.2 Environmental Scoping of the Project

(1) Setting of Environmental Components and items

To grasp whole features of possible environmental impacts caused by the project, it is necessary to identify and evaluate environmental components and items, which compose of environmental and social considerations, one by one and to integrate the impacts. According to the JICA Guidelines for Environmental and Social Considerations, possible impacts to be assessed include those on human health and safety, as well as on the natural environment, which are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety.

In addition to the direct and immediate impacts of projects, the derivative, secondary, and cumulative impacts as well as impacts associated with indivisible projects will also be assessed with regard to environmental and social considerations, so far as it is rational to do so.

In this examination by taking into consideration the JICA Guidelines, and relevant laws and regulations of Myanmar Government, together with environmental condition of the areas related to sub-project sites, four environmental components (pollution, natural environment, social environment and others) and 30 items (Pollution 8, Natural environment 4, Social Environment 16, and others 2) as indicators expressing environmental and social conditions.

(2) Categorization of IEE and EIA

The Categorization of IEE and EIA based on the EIA procedure is shown as following table;

Table 3. 4 Categorization of IEE and EIA (Water Supply)

No	Type of investment project	Size of project which require IEE	Size of project which require EIA
111	Groundwater Development for industrial, agricultural or urban water supply	< 4,500 m^3/day	> 4,500 m^3/day

Source: Environmental Impact Assessment Procedure (2015)

Note: 4500 m^3 is equivalent to 985,500 gallon.

In case of regional water supply sector, only above type of project is mentioned on EIA Procedure. On the other hand, according to the opinion by Director of MOECAF, MOECAF will decide the category of other type of project after submitting the proposal if it is necessary IEE or EIA or not any, based on the Article 26 of EIA procedure. Article 26 of EIA procedure is described as follows:

- *Notwithstanding any categorization set forth in Annex 1 'Categorization of Economic Activities for Assessment Purposes', the Department reserves the right, if the Department determines that special circumstances so warrant: (i) to require a project or activity that would otherwise be required to complete and submit an IEE to complete and submit an EIA*

instead, (ii) to allow a project or activity that would otherwise be required to complete and submit an EIA to complete and submit an IEE instead, and (iii) to exempt from completing any IEE or EIA assessment a project or activity that would otherwise be required to complete and submit such an assessment.

However, MOECAF (ECD) had confirmed that any sub-project will be necessary to prepare an Environment Management Plan (EMP) as a minimum requirement.

(3) Activities due to the Project

Activities due to the project by stage are shown in Table 3.5. Possible impacts are identified by using impact matrix comparison and the extent of the impacts are also evaluated one by one with rating against the above mentioned 30 environmental items.

Table 3. 5 Anticipated Activities due to the Project

Project Stage	Anticipated Activities by the Project
Planning Stage (I)	Securing land/space for water treatment plant and related facilities such as water tanks
	Securing temporary land/space for construction work
	Change of utilization of land and local resources
Construction Stage (II)	Procurement of construction materials, equipment, plants, etc.
	Civil engineering works such as earth moving
	Operation of construction machines, vehicles, plants, etc.
	Installation of construction work offices worker's camps, storage sites, etc. Tube well construction.
	Construction of water treatment plant , distribution pipeline, water tanks and related facilities
Operation Stage (III)	Operation related facilities and structures
	Spatial occupancy related facilities and structures

Source: JICA Preparatory Survey Team

(4) Method of Scoping

The scoping process is based on a literature review, interview surveys, and site observation, among which, site observation and interviews are the most informative. A description of the survey is summarized in Table 3.6.

Table 3. 6 Description of Environmental Condition Survey

Methodology
• Observation of the natural conditions at the proposed sites. • Collecting river water and groundwater quality data • Collecting data about groundwater usage by private and industrial tube wells around the sites.
Items Observed

- Environmental Pollution – 8 items
  (Air pollution, Water pollution, Soil contamination, Bottom sediment, Solid waste, Noise and Vibration, Ground Subsidence, Offensive odor)
- Natural Environment – 4 items
  (Protected Area, Ecosystem, Hydrology, Topography and geology)
- Social Environment –16 items
  (Involuntary resettlement, The poor, Indigenous and ethnic people, Local economy such as employment and livelihood, Utilization of land and local resources, Water usage, Existing social infrastructures and services, Social institutions such as local decision making institution, Misdistribution of benefit and damage, Local conflict of interests, Cultural and historical heritage site, Landscape, Gender, Right of children, Infectious diseases such as HIV/AIDS, Land environment)
- Others –2 items
  (Accidents, Cross boundary impacts and climate change)

3.3 Comparing Alternatives

Alternatives of each sub-project have not been considered. To compare the each sub-project, it will be evaluated by item such as purposiveness, cost benefit performance, needs urgency and feasibility.

Table 3. 7 Comparison of Alternatives

	With Project	Without Project
Pollution	-	+/-
Natural Environment	-	+/-
Social Environment	+	+/-

Note: Significant positive impact: + +, Moderate positive impact: +
Significant negative impact: - - , Moderate negative impact: - , Neutral: +/-

(1) Without Project

If the Project is not implemented, the environmental condition will not be drastically changed.

(2) With Project

One of the most beneficial advantages is the significant improvement of drinking water supply to the target towns. From the water quality and quantity points of view, safe drinking water which meets WHO standard can be delivered to the residence of town with affordable price. This also can be reduced the number of water related diseases in the towns. During construction stage, river water pollution can be mitigated by ordinary countermeasures.

3.4 Results of Scoping

The result of scoping for sub-projects of water supply sector is shown as following table;

Table 3. 8 Scoping results

	No	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	B－	D	**Construction phase:** Temporary negative impacts are expected on air quality due to using construction machines and equipment. **Operation phase:** No impacts are expected
	2	Water pollution	C	D	**Construction phase:** Extent of impact is unknown at this stage. Turbid water may be generated by earth works and excavation.

	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
					Operation phase: No impacts are expected
	3	Waste	B－	D	**Construction phase:** Construction waste such as waste soil and cutting trees are expected. Additionally domestic waste and night soil may be generated from construction base camp. **Operation phase:** No impacts are expected
	4	Soil contamination	D	D	**Construction and Operation phase:** No impacts are expected.
	5	Noise and vibration	B－	C	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** No impacts are expected.
	6	Ground subsidence	D	B-	**Construction and operation phase:** No impacts are expected during construction stage. However due to continuous pumping groundwater by tube well may cause groundwater subsidence as a long term effect.
	7	Odor	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	**Construction and Operation phase:** No impacts are expected.
Natural environment	9	Protected area	D	D	**Construction phase:** All project sites are not in protected area. Therefore no impacts are expected. **Operation phase:** No impacts are expected.
	10	Ecosystem	D	D	**Construction and Operation phase:** No impacts are expected.
	11	Hydrology	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the river.
	12	Topography and geology	D	D	**Construction and operation phase:** No activities give negative impact to topography and geology.
Social environment	13	Involuntary resettlement	B－	D	**Pre-Construction phase:** No resettlement is expected but land acquisition in some sub-projects may be caused. **Operation phase:** No impact is expected
	14	The poor	C	B＋	**Construction phase:** Expected impact is unknown at this stage. Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few positive impacts are expected by improvement of access to safe drinking water.
	15	Indigenous and ethnic people	C	B＋	**Construction phase:** Expected impact is unknown at this stage. Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected by improvement of water supply
	16	Local economy such as employment and livelihood	D	B＋	**Pre-construction phase:** Expected impact is unknown at this stage. Few positive impacts (ex. increasing working opportunities) are expected. **Operation phase:** Few impacts are expected.
	17	Land use and utilization of local resources	C	D	**Pre-construction phase:** Few impacts are expected due to the land acquisition for agricultural land etc. **Operation phase:** No impacts are expected.
	18	Water usage	D	B＋	**Construction phase:** No impacts are expected. **Operation phase:** By construction and installment of water supply facilities, people can use water without any limited. Positive impact is expected.
	19	Existing social infrastructures and services	D	B＋	**Pre-Construction and Construction phase:** Traffic restriction might give impact on the access to such as emergency services and social infrastructure (ex. School, hospital etc.). **Operation phase:** Few positive impacts are expected (ex. Improvement of access to water facilities etc.).
	20	Social institutions such as local decision making institutions	D	D	**Construction and operation phase:** Impacts are not expected, since local decision making institute represented by village, township and state will continue after the construction.

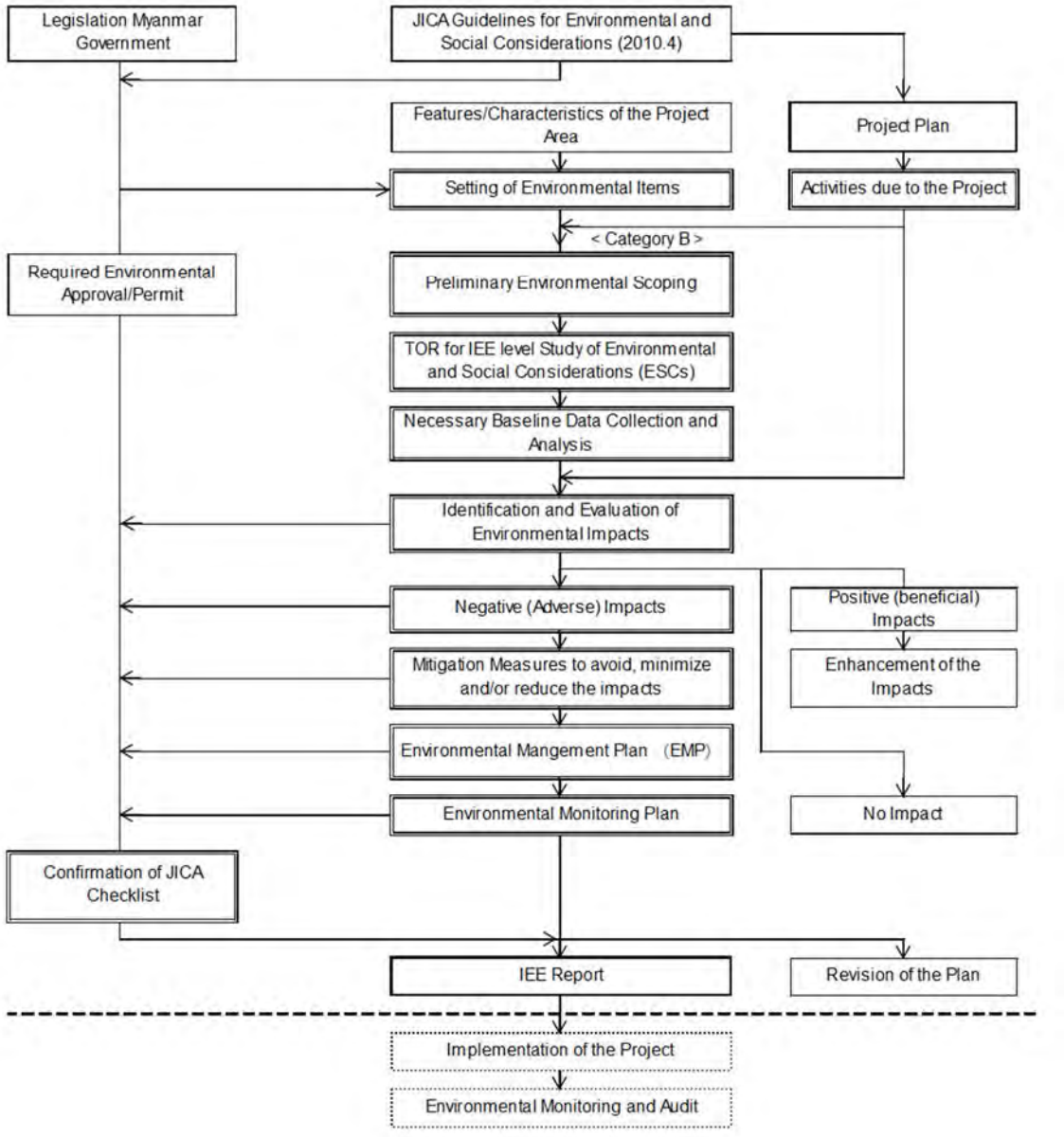
	№	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/ During Construction	Operation Phase	
	21	Misdistribution of benefit and damage	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by this project is not expected.
	22	Local conflict of interests	D	D	**Construction and operation phase:** Local conflict of interests caused by this project is not expected.
	23	Cultural heritage	D	D	**Pre-Construction, construction and operation phase:** Religious and cultural facility are not observed at the project site.
	24	Landscape	D	D	**Construction and operation phase:** No impacts are expected because those projects are improvement for existing road.
	25	Gender	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.
	26	Right of children	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	**Construction and operation phase:** No impacts are expected because all routes are domestic road not international corridor.
	28	Labor environment	D	D	**Construction and operation phase:** No impacts are expected.
Others	29	Accidents	D	D	**Construction and operation phase:** No impacts are expected
	30	Cross boundary impacts and climate change	D	D	**Construction and operation phase:** No impacts are expected.

Note) Rating:
A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected.
C: Extent of impact is unknown at this stage D: Few impacts are expected.
Source: JICA Preparatory Survey Team

CHAPTER 4 Result of IEE

4.1 Procedure of IEE Level Study

Procedures of IEE level study for the sub-project are shown in Figure 4.1.



Source: JICA ESC Guidelines

Figure 4. 1 Procedures of IEE level Study according to the JICA Guidelines

4.2 Terms of Reference for IEE

Table 4.1 shows a Terms of Reference on the IEE which was prepared based on the scoping outcome.

Table 4. 1 Terms of References for Initial Environmental Examination

No	Impacts	Item for Study	Methodology
1. Pollution			
	Air Pollution	✓ Collect information on present air quality ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant ✓ authorities, collect information on ✓ similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc. ✓ Confirm present environmental management system
	Water Pollution	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase ✓ Impacts during an operation phase	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
	Waste	✓ Collect information on present water management ✓ Confirm present condition in the project area ✓ Impacts during a construction phase	✓ Collect existing information ✓ Hearing from relevant ✓ authorities, collect information on similar project ✓ Confirm content, method, period, location, area on construction works and location of construction worker's camp/office
	Soil Contamination	✓ Collect information on present management against soil contamination ✓ Impacts during an operation Phase	✓ Hearing from relevant authorities, collect information on similar project ✓ Confirm present environmental management system
	Noise and Vibration	✓ Confirm ambient noise standard in Myanmar ✓ Confirm present condition in the project area	✓ Collect existing information ✓ Hearing from relevant authorities, collect information on similar project
2. Natural Environment			
	Protected Area	✓ Collect information on protected area in the project area	✓ Hearing from relevant authorities
	Ecosystem	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Hydrology	✓ Collect information in the project Area	✓ Hearing from relevant authorities, conduct field survey
	Topography and Geographical Features	✓ Collect information in the project area ✓ Impacts during construction	✓ Hearing from relevant authorities, conduct field survey ✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
3. Social Environment			
	Involuntary Resettlement	✓ Confirm scale of land acquisition and resettlement ✓ Prepare Resettlement Action Plan (RAP) in case of acquiring land or	✓ Collect legislations relevant to land acquisition and resettlement, conducting field survey to confirm the condition such as land usage and type of assets within ROW and proposed substation area and hearing from

No	Impacts	Item for Study	Methodology
		resettling assets and/or people resulting from the project	relevant authorities. ✓ Prepare RAP in complying with legislations in Myanmar as well as JICA guidelines
	Vulnerable(poor households, female headed households etc)	✓ Confirm vulnerability of affected people	✓ Collect legislations relevant to the vulnerability of affected people ✓ Collect information on similar project, Conduct hearing from relevant authorities and affected people
	Indigenous and Ethnic Minority	✓ Collect information on indigenous and ethnic minority	✓ Collect legislations relevant to the indigenous and ethnic minority, ✓ Conduct hearing from relevant authorities and affected people
	Land Use and Utilization of Local Resources	✓ Collect information on land usage in the project area	✓ Collect information on land usage from relevant authorities
	Existing Social Infrastructures and Services	✓ Impact during a construction phase	✓ Confirm content, method, period, location, area on construction works and access road for construction vehicles etc.
	Cultural Heritage	✓ Collect information on cultural heritage in project area	✓ Hearing from relevant authority, conduct field survey
	Landscape	✓ Impact during a construction	✓ Confirm content, method, period, location, area on construction works
	Gender	✓ Collect information on the land acquisition procedures relevant to gender issues ✓ Confirm gender issues in the project area	✓ Collect information on the similar project in the past ✓ Collect information on gender issues at administrative body in the project area
	Communicable Diseases such as HIV/AIDS	✓ Impact during a construction phase	✓ Confirm information on similar Project
	Working Environment (includes work safety)	✓ Confirm legislations on working environment in Myanmar	✓ Collect relevant legislations, confirm information on similar project
4. Others			
	Accidents	✓ Impact during construction	✓ Confirm access road for construction vehicles and conditions around the area
	Cross boundary impacts and climate change	✓ Impact during a construction and operation	✓ Confirm information on similar Project

4.3 Prediction of Environmental Impact

(1) Prediction of Environmental Impact in General

The prediction of environmental impact based on the survey is shown in Table 4.2.;

Table 4. 2 Prediction of environmental impact

	Items		Situation and Prediction
Pollution	1	Air Pollution	Machines and vehicles used during construction are likely to generate air pollution, most prominently in the form of dispersal of sandy dust. Normal measures can reduce the negative impacts.

	Items		Situation and Prediction
	2	Water Contamination	Some water treatment plants will be constructed near rivers. Thus river water contamination may happen temporarily during the construction work. No major construction work is planned for the treatment plan (i.e. water reservoirs and/or pumping stations), so no significant negative impact is expected. Nevertheless, the above areas should be kept in mind so that construction works do not result in soil or water contamination.
	3	Waste	General wastes such like a pet bottle, plastics, kitchen wastes, are not significantly bad at project site. Waste condition is good enough so far. Waste from the construction workers and comps are likely to generate the waste to some extent, but due to relatively less population and poor economic activities no significant adverse impact is expected.
	4	Soil Pollution	No major work to use the toxic chemicals into ground is planned. so no significant negative impact is expected. Nevertheless, the above areas should be kept in mind so that construction works do not result in soil or water contamination.
	5	Noise and Vibration	Noise and vibration level could temporarily be higher during construction due to operation of vehicles and use of construction equipment. In the operation phase, impact of the noise could be accelerated due to an increase in the frequency and speed of vehicles.
	6	Ground subsidence	In some sub-project, groundwater will be used as a water source. Continuous pumping groundwater may cause ground subsidence in some area. But does not expect serious subsidence.
	7	Odor	The sub-project sites are an environmentally sound area. Although some bad odor from asphalt pavement works during the construction may temporarily affect the people, no other significant negative impact is expected.
	8	Bottom Sediment	No major work is planned for ground foundation and embankment works, so no significant negative impact is expected.
Natural Environment	9	Protection Area	There is no protected area in sub-project sites, although some water sources of sub-projects such as TDC 37, 38, 42, 43, 44, 49 are springs located near the natural forested areas. But no major construction works will be implemented in those forested areas. Therefore, no notable impact is expected.
	10	Ecosystem	No wildlife or tree species that require special attention/ protection has been identified either within the sub-project site. But there are some trees needed to cut in the sub-project sites.
	11	Hydraulic Situation	Most of the sub-project sites are located close to the lakes/Dams/Reservoir/Rivers. TDC 4, 8, and 9 are very close to Ayeyarwaddy River. TDC 20,21, 24, 25, 28 and 29 are located in the Ayeyarwaddy Delta Region in which a large number of creeks, streams and rivers are present. TDC 14 and 19 are also close to Thanlwin River. TDC 30 and 32 are close to Bago River, and TDC 34 and 36 are close to the Andaman Sea. But as all the sub-projects are not large-scaled projects, no significant changes are expected.
	12	Topography and Geology	TDC 1 and 2 are located in western part of the country, the famous Rakhine Yoma (i.e., Ranges). TDC 4, 5, 6, 8, 9, 11, and 12 are located in the low land central dry zone area. TDC 37, 38, 41, 42, 43, 44, 46, and 49 are located in eastern part of the Country (Shan Plateau). TDC 20, 21, 24, 25, 28 and 29 are located in the Ayeyarwaddy Delta Region. TDC 54, 55, 56, 34, and 36 are located in southern part, coastal region to Andaman Sea. TDC 14, 16, 18, and 19 are located in high land area of Kayin State which is part of the Shan Plateau. The soil types mainly found in the sites are (1) Clay and clay swampy soils, (2) Swampy soils, (3) lateritic soils, and (4) Yellow brown forest soils. No large-scale land alteration is expected due to construction work.

	Items		Situation and Prediction
Social Environment	13	Involuntary Resettlement	No involuntary resettlement is expected.
	14	Poor	It is expected after the sub-project, that they will get better access to safe drinking water and benefit from improved water supply system, better health, and other socio-economic improvements.
	15	Indigenous or Ethnic people	Shan, Kayin, and Mon people are major indigenous, There is some sub-projects in Shan state.
	16	Local Economies, such as employment, livelihood	Economy in the areas is largely dependent on agriculture (i.e. rice, corn, banana, sugar cane, bean, chilly, different garden fruits, etc.) and some businesses (e.g. sugar milling and rice milling) and shop/store management to which, no -alteration is expected. During construction, some people are likely to be employed as a work force for water treatment plant and distribution of pipe line construction. Food & drink shops are also expected to benefit from an increase in demand.
	17	Land use and utilization of local resources	Many of proposed lands for the construction are not in-used. Only a few lands are used for paddy field, No change is expected to the current state since majority of the land is not used.
	18	Usage of water and water Right	People take water mainly from the private tube wells and some villages from the river or streams. No water Right issue is found in the sub-project sites. Neither any change nor any negative impact is expected by the sub-project.
	19	Existing social infrastructure and services	There are social infrastructures near the site, such as public hospital, primary schools; Buddhist Monasteries and Pagodas. It is not expected to affect those social infrastructures by the sub-projects
	20	Social Institution such as local decision making institution	Not such kind of strong institutions are identified in the project site.
	21	Misdistribution of benefits and damages	It is not likely to happen the misdistribution of benefits and damages between local communities or regional institutions.
	22	Local conflict of interest	All sub-project sites are all located within the municipal areas of the towns, so it won't be big problem. Extra cautions to these area will be given for implementation and monitoring of the sub-project works.
	23	Cultural Heritage	No cultural Heritage is identified in the project site.
	24	Landscape	The sub-project is not expected to negatively affect the beauty of existing landscape (crops and farmlands, river, natural forests and forest plantations, forest mountains and rock mountains), because all the sub-projects are not large-scale projects.
	25	Gender	According to normal measures in compliance with JICA guidelines, it is not likely to happen gender inequality in the sub-project implementation works.
	26	Children's Right	According to normal measures in compliance with JICA guidelines, it is not expected to affect the Children' Right in the sub-project implementation works.
	27	Infection diseases such as HIV/AIDS	It is not also expected to induce the infection of diseases such as HIV/AIDS by the sub-project.
	28	Work Environment	According to normal measures in compliance with JICA guidelines, it is not expected to cause any notable damage to the work environment.
Others	29	Accident	According to normal measures in compliance with JICA guidelines, it is not expected to cause any notable accidents in the sub-project implementation works.
	30	Global Warming	As a water supply project, the impacts by the sub-project are not expected to contribute any significant damages to or increase in Global Warming.

(2) Prediction of Environmental Impact by Groundwater Development

Water supply projects which involve the groundwater abstraction (<4,500m3/day) need IEE in Myanmar according to the EIA procedure (2015). Threre are 6 sub-projects which use groundwater as a water resourse. Impacts by groundwater abstraction at those sub-projects can be

small and may not cause land subsidence since pumpig rate of those wells is small. However the lowering groundwaer level vicinity of the constration wells may influnece the private wells. Therefore, monitoring of groundwater level must be measured during constraction and operation.

4.4 Evaluation of Environmental Impact

(1) Results of evaluation of environmental impact

Possible impacts are identified and the extent of the impacts is also evaluated one by one with rating against the 30 environmental items (pollution, natural environment and social environment). Results are shown together with the results of scoping in Table 4.3.

Table 4. 3 Evaluation of Environmental Impact

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
Pollution	1	Air pollution	B-	D	B-	D	**Construction phase:** Temporary negative impacts are expected on air quality due to construction machines and equipment. **Operation phase:** No Impacts are expected.
	2	Water pollution	C	D	B-	D	**Construction phase:** Turbid water may be generated by earth works and excavation work and building of water treatment plant are planned. Additionally Organic polluted water may be discharged from base camp. **Operation phase:** No serious impacts are expected
	3	Waste	B-	D	B-	D	**Construction phase:** Construction waste such as waste soil and cutting trees are expected. Additionally domestic waste and night soil may be generated from construction base camp. **Operation phase:** No serious impacts are expected
	4	Soil contamination	D	D	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected
	5	Noise and vibration	B-	C	B-	D	**Construction phase:** Noise generation is expected due to works of construction machines and equipment. **Operation phase:** No serious impacts are expected
	6	Ground subsidence	D	B-	D	B-	**Construction and operation phase:** Impact by groundwater extraction is unknown. There is a possibility of ground subsidence due to groundwater pumping by tube wells.
	7	Odor	D	D	D	D	**Construction and operation phase:** No impacts are expected since activities which cause odor are not expected.
	8	Bottom Sediment	D	D	D	D	**Construction phase:** No impacts are expected since there are not any polluted lands nearby project area. **Operation phase:** Sub-station operation which causes impacts on sediment quality is not expected.
Natural environment	9	Protected area	D	D	D	D	**Construction phase:** There is no protected area in the sub-project area. Cutting many trees will not be expected but some negative impact is expected. **Operation phase:** No impacts are expected during operation.

	No	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
	10	Ecosystem	D	D	D	D	**Construction and Operation phase:** Any designated protected areas and considerable species habitats have not been identified in the sub-project area.
	11	Hydrology	D	D	D	D	**Construction and Operation phase:** No activities give negative impact to hydrological situation of the rivers.
	12	Topography and geology	D	D	D	D	**Construction and operation phase:** Cutting land is expected. However, considerable topography and geological sites are not located in the project area and the impact is limited.
Social environment	13	Involuntary resettlement	B-	D	B-	D	**Pre-Construction phase:** No resettlement is expected. But land acquisition of only one area may be caused. **Operation phase:** No impact is expected
	14	The poor	C	B+	D	D	**Pre-Construction phase:** Few positive impacts are expected such as working opportunity.. **Operation phase:** Few positive impacts are expected by improvement of water quality.
	15	Indigenous and ethnic people	D	B+	D	D	**Pre-Construction phase:** There are indigenous or ethnic people at the sub-project site. But no serious impact is expected.. **Operation phase:** No obvious impacts are expected
	16	Local economy such as employment and livelihood	D	B+	D	D	**Pre-construction phase:** No obvious impacts are expected. **Operation phase:** Few impacts are expected by the improvement of drinking water quality.
	17	Land use and utilization of local resources	C	D	D	D	**Pre-construction phase:** No impact is expected **Operation phase:** No impact is expected
	18	Water usage	D	B+	D	B+	**Construction phase:** No impact is expected. **Operation phase:** Distribution of safe drinking water by new water treatment plant can give positive impact for water usage.
	19	Existing social infrastructures and services	D	B+	D	B+	**Pre-Construction and Construction phase:** No impact is expected. **Operation phase:** Few positive impacts are expected
	20	Social institutions such as local decision making institutions	D	D	D	D	**Construction and operation phase:** No impacts are expected, since local decision making institute represented by village, township and state will continue after the construction.
	21	Misdistributio n of benefit and damage	D	D	D	D	**Construction and operation phase:** Misdistribution of benefit and damage caused by the water facility construction is not expected.
	22	Local conflict of interests	D	D	D	D	**Construction phase:** No impact is expected. **Operation phase:** No impact is expected
	23	Cultural heritage	D	D	D	D	**Pre-Construction and Construction Phase:** Religious and cultural facility are not observed at the project site. **Operation phase:** No impact is expected
	24	Landscape	D	D	D	D	**Construction phase:** Few impact is expected

	№	Impacted Item on JICA Guidelines	Scoping Result		Evaluation		Reasons of Evaluation
			Pre/ During Construction	Operation Phase	Pre/ During Construction	Operation Phase	
							Operation phase: There are no law-based designated landscape areas around project area.
	25	Gender	D	D	D	D	**Construction and operation phase:** Negative impacts specified for women are not expected.
	26	Right of children	D	D	D	D	**Construction and operation phase:** Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	D	D	D	D	**Construction phase:** Few impacts are expected. **Operation phase:** Operation which causes infectious diseases is not expected.
	28	Labor environment	D	D	D	D	**Construction phase:** Construction work environment needs to be considered in accordance with relevant laws and regulations. **Operation phase:** No impact is expected.
Others	29	Accidents	D	D	D	D	**Construction phase:** Construction vehicles may use existing local road near residential areas, thus number of traffic accident may increase but not serious.. **Operation phase:** No impact is expected.
	30	Cross boundary impacts and climate change	D	D	D	D	**Construction phase:** No impacts are expected. **Operation phase:** No impacts are expected.

Note) Rating:
A+/-: Significant positive/negative impact is expected. B+/-: Some positive/negative impact is expected.
C: Extent of impact is unknown at this stage D: Few impacts are expected.
Source: JICA Preparatory Survey Team

(2) Categorization of sub-project

Among the results of identification and evaluation anticipated impacts shown in Table 4.2, items affected with rating (A-), which means significant negative impact is not identified, and items affected with rating (B-), which means not significant but considerable negative impacts and with rating (D) which means negligible or no negative impacts are identified for most of the items. According to the JICA Guidelines any project is classified into four categories, i.e., Category A, B, C and FI by the extent of environmental and social impacts, taking into account of an outline of the project, scale, site condition etc.

The proposed project is classified into Category B due to following reasons:

(i) The project does not belong to (1) water supply, sewage, and wastewater treatment that have sensitive characteristics or that are located in sensitive areas or in their vicinity (2) sensitive characteristics such as large-scale involuntary resettlement of more than 200 PAPs and (3) large-scale groundwater pumping as listed in Appendix 3 of the JICA Guidelines.

(ii) Results of identification and evaluation of expected environmental and social impacts indicate that there is no item affected with rating of (A-), which means negative (adverse) impact and other affected items are classified into rating (B-), which means not significant but some negative impact, or rating (D), which means no or negligible negative impact as shown in Table 4.3.

(3) Major negative impacts

Major negative impacts with rating (B-) are described with corresponding stage as follow:

1) Planning stage

a) Social Environment

(i) Involuntary Resettlement –

- There is no resettlement expected. However land acquisition in some area may be needed in the planning stage.
- The project is corresponding to "category B", which means number of PAPs is less than 200 in terms of resettlement. Thus, Abbreviated Resettlement Action Plan (A-RAP) must be prepared and necessary compensation and support of resettlement assistance for these PAUs and PAPs should be provided by TDC, SDC after identification of eligibility of each PAU and PAP and consultation with each PAU and PAP.
- Detailed features are described in the Abbreviated Resettlement Action Plan (A-RAP)

2) Construction Stage

a) Environmental Pollution

(i) Air pollution

- Air pollutants emission such as PM and NOx from construction vehicles, machines, and earth-moving and construction work may deteriorate air quality temporarily.

(ii)Water pollution

- Water pollution is expected due to following pollutant generation from construction work, although temporarily: (a) Run-off of dirty water including soils from cutting, filling and excavation of earthmoving work. (b) Wastewater from worker' camps and construction office. (c) Spilling over of toxic materials such as oil and lubricants.

(iii)Noise and vibration

- Generation of noise and vibration from construction machines and vehicles is expected, although ambient noise and vibration standards were not established in Myanmar.

b) Social Environment

(i) Existing social infrastructures and services

- Construction works may cause further traffic congestion and nuisance to road users and surrounding communities.

3) Operation Stage

There is no major negative impact with rating (B-).

(4) Major positive impacts

On the other hand, major positive impacts with rating (B+) are as follows:

1) Operation Stage

a) Social Environment

(i)Water Usage: (B+)

- More water usage in water distribution area can expected. Safe drinking water which meets a WHO quality standard can be delivered to the towns.

(ii)Existing social infrastructures and services: (B+)

- Water from the new treatment plant is more convenience and comfort as well as affordable cost of water and making easier access to safe water. Improvement of existing social infrastructure can be expected by safe drinking water supply.

4.5 Mitigation Measure against Negative Impact and Environmental Management Plan

Mitigation measures, which may avoid, minimize, eliminate and/or reduce above mentioned negative impacts, were examined for respective items in planning, construction and operation stage as well as whole stages in order that the project can achieve intended objectives with minimizing accompanied environmental impacts. In addition, Environmental Management Plan (EMP) was prepared by incorporating mitigation measures and monitoring as well as the roles of implementing, responsible and supervising organizations as shown in Table 4.4

Table 4. 4 Mitigation Measure against Negative Impact and Environmental Management Plan

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
Pollution	1	Air pollution	[Dust] ✓ Water sprinkling near residential area ✓ 20 kph speed limit for construction machines at construction sites adjacent to settlement areas ✓ Law emission construction machinery shall be used to avid high emission of exhaust gases	Not required	Contractor	TDC
	2	Water pollution	[Turbid water and other items] ✓ Discharge through sedimentation pond and silt fence ✓ Installation of portable toilet for workers ✓ Appropriate waste and construction machines management ✓ Appropriate explanation and response shall be given to affected fishermen, if necessary	Not required	Contractor	TDC
	3	Waste	[Construction waste (trees and waste soil)] ✓ After considering the possibility of reuse, construction waste is disposed at disposal site [Garbage from base camp] ✓ Garbage at workers camp and waste oil shall be brought to disposal site or facility [Night soil] ✓ Temporary sanitation facility such as septic tank shall be introduced to the workers camp.	✓ Demolished waste concrete shall be reused and/or disposed in designated disposal site.	[Const.] Contractor [Operation] TDC	TDC

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
	5	Noise and vibration	[Construction noise] ✓ Installing noise barrier and selecting low-noise equipment. ✓ Avoiding works of heavy equipment during night time. ✓ Informing the construction schedule to surrounding communities to obtain their consensus.	Not required	Contractor	TDC
Natural environment	10	Ecosystem	✓ Construction development area shall be marked and not be disturbed. ✓ Hazardous waste material should be stored properly before final disposal. ✓ Planting trees, vegetation, sodding in the public space. ✓ Installation of sediment to ponds, silt fence and portable toilet not to disturb habitats of aquatic lives.	✓ Appropriate land use management not to develop natural area along the road ✓ Setting up sign boards where animals crossing the road from the view of natural conservation	[Const.] Contractor [Operation] Local government,	TDC
	11	Hydrology	✓ Installation of sufficient drainage facilities ✓ Secure waterways in construction area	Not required	Contractor	TDC
Social environment	13	Involuntary resettlement	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	Settlement & Land Record Department (SLRD under MOAI), TDC, GAD	TDC
	14	The poor	✓ Appropriate social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, TDC GAD	TDC
	16	Local economy such as employment and livelihood	✓ Appropriate compensation and social assistance in accordance with A-RAP	✓ Assessing whether resettlement have been met, particularly with regards to livelihood and restoration and/or enhancement of living standards in accordance with A-RAP	SLRD, TDC, GAD	TDC
	17	Land use and utilization of local resources	✓ Appropriate land acquisition and compensation for agricultural area ✓ Assistance of establishment of land use map in every township	✓ Management of appropriate land use in accordance with approved established new land use plan in every township and village	[Const.] SLRD, MOAI, consultants [Operation] Local government	TDC
	18	Water usage and right	✓ For water usage only, Drainage facility, sedimentation pond and sheet are prepared to prevent turbid water generated by earth work in accordance with the site condition. ✓ Domestic waste and other	✓ For water right only, Consultations with Beneficiaries and other water users	[Const.] Contractor	TDC

	No	Impacted Item on JICA Guidelines	Major Mitigation Measures		Responsibility	
			Pre and During Construction phase	Operation phase	Implementation Agency	Responsible Agency
			construction waste will be collected properly and disposed to designated dumping site. ✓ Installation of portable toilet.			
	19	Existing social infrastructures and services	✓ Construction of diversion road and existing community road will be connected with new bypass if necessary	Not required	Contractor	TDC
	22	Local conflict of interests	✓ Local workforce is prioritized for construction works ✓ Implementation of appropriate education for hired workers from other area	Not required	Contractor	TDC
	27	Infectious diseases such as dengue and HIV/AIDS	✓ Installation of sufficient drainage facilities not to provide habitat for vector mosquito ✓ Provision of adequate temporary sanitation facilities ✓ Enforcement of medical screening and periodical medical check-up ✓ In order to prevent spread of infectious diseases such as HIV/AIDS, awareness of the labors is promoted	Not required	Contractor	TDC
Others	29	Accidents	✓ Deploying flagman at the gate and crossing points of the construction vehicles ✓ Installation of safety sign board ✓ Installing fence around the construction site to keep out local people such as children ✓ Installation of lightning in the night time ✓ Installation of parking for idling construction machines ✓ Restricting mobilization speed in the construction site ✓ Safety training for the workers ✓ Safety patrol at the construction site by supervisors	Not required	Contractor	TDC

4.6 Environmental Monitoring Plan

The environmental monitoring of the Regional Water Supply will be undertaken by TDC to ensure the compliance of the Contractor with each mitigation measure specified in the Project Environmental Management Plan during the construction period. The compliance of the Contractor could be presented in tabulated form by presenting each mitigation measure, corresponding level of compliance (Yes, No, Partial), and remarks explaining why compliance level is “No” or “Partial”. The corrective actions are presented in matrix form with the following details: (i) non-compliance/implementation of mitigation measures, (ii) issues and concerns, (iii) responsibility for implementation of recommendation action.

The environmental monitoring is designed to:

i. Determine whether the contractor is carrying out the subproject in conformity with environmental standards and agreements if any;
ii. Identify problems as they arise during implementation and recommend means to resolve them;
iii. Recommend changes in subproject concept/design, as appropriate, as the subproject evolves or circumstances change; and
iv. Identify the key risks to subproject sustainability and recommend appropriate risk management strategies;
v. Ensure that environmental monitoring activities undertaken based on direct or indirect indicators of emissions (NO_2, SO_2 and PM (dust particulates);
vi. Waste and garbage disposal are followed as required by the management authority;
vii. Ensure that construction workers have received environment, health and safety (EHS) orientation;
viii. Report incidents of accidents and needed emergency action to the to their supervisor;
ix. Ensure that access to the project sites is permitted and that monitoring is undertaken;
x. Ensure approval of environmental permits, as necessary, (i.e. waste management and disposal; erosion control; etc.

If deemed necessary conduct brief consultation with beneficiaries and affected communities to assess impacts of the sub-project.

Table 4. 5 Environmental Monitoring Plan

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislations	Implementation Org.	Responsible/ Supervising org.	Responsible Organization for Monitoring Cost
Design & Pre-construction Phase								
Water pollution	pH, biological oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), & Total Coliform	Collection of samples and laboratory analysis	Selected sample sites in the project area	1 month prior to construction Quarterly	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules and Regulations (2015) 3) JICA Guidelines	TDC	TDC and Independent Monitoring agency	TDC
Adequacy of quantity of water supply	Opinions of Beneficiaries and other water users	Consultations with Beneficiaries and other water users	Project area	1x during design	Community Perception	TDC	TDC	TDC
Construction Phase								

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislations	Implementation Org.	Responsible/ Supervising org.	Responsible Organization for Monitoring Cost
Contamination of pathogens of the water source	pH, biological oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), & Total Coliform	Collection of samples and laboratory analysis	Selected sample sites in the project area	Start and end of construction		TDC, CT	TDC, CT and Independent Monitoring agency	CT
Implementation of construction mitigation measures detailed in the EMP	Design and Construction Specifications	Compliance to design and Construction Specifications	All work sites	1x per week	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules and Regulation (2015) 3) JICA Guidelines	CT	TDC, CT	CT
Safety, health and welfare of workers and the public	Health, Safety and Environmental Guidelines	Compliance to Health, Safety and Environmental Guidelines	All work sites, workers' Camp	1x per week	Health Law, Labour Safety Law, Prevention of HIV/AIDS Law	CT	TDC, CT	CT
Operation Phase								
Contamination of water supply	pH, biological oxy-gen demand (BOD); chemical oxygen demand (COD); Total Coliform	Collection of samples and laboratory analysis	Selected sample sites in the command area	1x per year	1) Environmental Conservation Law (2012), 2) Environmental Conservation Rules and Regulations (2015) 3) JICA Guidelines	TDC	TDC and Independent monitoring agency	TDC
Adequacy and efficiency of the of water supply	Opinions/ complains of all water users; Changes as perceived by the users	Consultations with Beneficiaries and other water users	Project area	2x per year	Community Perception	TDC	TDC	TDC

Groundwater development at the sub-projects may influence the existing private wells near the project sites and cause groundwater quality problem, lowering groundwater level and reducing pumping rate. Therefore, in addition to the above monitoring plan, the additional environmental monitoring will be carried out at the sub-projects which contain groundwater development.

Table 4. 6 Additional Environmental Monitoring for Groundwater Development sites

Category	Item	Method of Monitoring	Monitoring Place/Point	Frequency (Period)	Referable Standards and Legislations	Implementation Org.	Responsible/ Supervising org.	Responsible Organization for Monitoring Cost
Design & Pre-construction Phase								
Influence of groundwater development	Water quality and water level of existing wells	Collection of samples and laboratory analysis	Selected sample sites in the project area	Before and after construction	Community Perception if problems arise	TDC	TDC and Independent Monitoring agency	TDC
Operation Phase								
Influence of groundwater development	Water quality and water level of monitoring wells	Collection of samples and laboratory analysis	Selected private wells and monitoring wells on the site	Water quality (once in a year) Water level (Every month)	Comparing with baseline data	TDC	TDC and Independent monitoring agency	TDC

4.7 Cost, Financial Source and Framework

Implementation frame works, cost and financial sources for the environmental management and the monitoring during construction and operation are presented below. Environmental management and monitoring organization is shown in which shows concerned agencies by construction stage and their functions. All planned mitigation measures are carried out by the contractor and reported to TDC, the supervision consultants and the Project Management Unit (PMU). The monitoring results are reviewed and conducted corrective and preventive action, if necessary. The name of organization which conducts monitoring and environmental management and responsibility is shown in Table 4.7.

Table 4. 7 Environmental Management and Monitoring Organization

Stage	Name of Organization	Role and Responsibility
Pre-Construction and during Construction	Land Acquisition Team (TDC Land Record Department-Detailed design consultant)	• Overseeing the updating of the Abbreviated Resettlement Action Plan (A-RAP) after the Detailed design • Monitoring actual payments of compensation to affected landowners, structure owners, and crops/trees owners; • Other necessary roles upon finalization of the A-RAP during the Detailed design
	The Construction Supervision Consultant	• Inspection of mitigation measures and environmental monitoring conducted by the contractor based on the approved IEE • Report the monitoring result to TDC and donor (JICA) on monthly report

Stage	Name of Organization	Role and Responsibility
	Water Supply Facility Construction Committee (TDC, Local Government, contractor, supervision consultant, local NGO, religious group, peace group and political group etc.)	• Overseeing the implementation of the EMP by the Contractor • Evaluation of result of environmental monthly report and respond necessary action • Validate project compliance with the conditions stipulated in the IEE and A-RAP; • Receive complaints, gather relevant information to facilitate determination of validity of complaints or concerns about the project and timely transmit to the TDC recommended measures to address the complaint; • Prepare, integrate and disseminate simplified validation reports to community stakeholders; and • Compile monitoring data gathered by the Contractors and supervise preparation of semi-annual monitoring reports to be submitted to TDC
	The Contractor	• Implementation of mitigation measures and monitoring based on the approved EMP on EIS and A-RAP • Submission of report for all conducted mitigation measures and monitoring
Operation	TDC. and Local Government	• TDC. shall conduct monitoring on the approved IEE and A-RAP, and report to ECD and Local Government Environmental Section • The result of monitoring shall be disclosed at TDC and Local Government office • Regular inspection and maintenance of the Water Supply Facilities • The monitoring is carried out for two (2) years after construction of the Water Supply Facilities.

Source: JICA Preparatory Team

Financial sources for the environmental management and monitoring works at the construction and operation phases are shown below.

Table 4. 8 Cost and Financial Sources for Environmental Management Work

Stage	Name of Organization	Cost and Financial Sources
Pre-Construction and during Construction	Land Acquisition Team (TDC, SLRD and Detailed design consultant)	• Part of TDC/SLRD project preparation (minimal cost) • Part of consultants task
	The Construction Supervision Consultant	• Part of construction supervision contract
	Water Supply Facility Construction Committee	• Minimal cost to TDC, Local Government • Part of construction supervision contract • Part of contraction cost
	The Contractor	• Part of cost of contract (EMP is included in tender and contract documents)
Operation	TDC. and Local Government	• Minimal cost since it is only visual inspection and record verification

Source: JICA Preparatory Survey Team

The contract documents will contain a provision allocating part of construction cost for the implementation of the environmental management such as mitigation measures. This is estimated at about 0.5-2.0 % of total contract budget.

CHAPTER 5 Results of Stakeholders' Meeting and Information Disclosure

Stakeholders meetings were held on purpose – 1) to inform all the stakeholders of the Sub-project, its potential negative and positive impacts on them, 2) to understand and take into account stakeholders' views, concerns and values in the project design, and 3) to improve transparency and accountability in order to reduce conflicts and ensure smooth implementation of the Sub-projects.
Stakeholder meetings for Regional Water Supply Upgrading Sub-projects, were held two times:

1) First stakeholder meeting was held in Pathein Township, Ayeyarwaddy Region, on February 26, 2016, with participation of 60 attendants including community elders, government organization, non-government organization, etc. TDC and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.
2) Second stakeholder meeting was held in Launglon Twonship, Taninthari Region, on March 3, 2016, with participation of 51 attendants including Government Organization, Non Government Organization and community elders, etc. In the meeting TDC and JICA Project Team explained an outline of project plan and answered to questions and comments from the stakeholders.

The ABBREVIATED RESETTLEMENT ACTION PLAN

(A-RAP)

FOR

REGIONAL DEVELOPMENT PROJECT FOR

POVERTY REDUCTION (PHASE 2)

IN

THE REPUBLIC OF THE UNION OF MYANMAR



July 2016

Yachiyo Engineering Co., Ltd

Oriental Consultants Global Co., Ltd

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CHAPTER 1 Introduction

1.1 Background

The Republic of the Union of Myanmar (hereinafter referred to as Myanmar) under the President Thein Sein administration since its establishment in March, 2011 has been actively implementing democratic reforms of the country through revitalizing its economy, democratization, peace agreement and other efforts. After the release from economic sanctions by Western countries (except financial sanction by the US), which also delivered large expansion of international trades and investments, economic growth of Myanmar in the year 2014 and 2015 is expected to reach 7.8%, according to the ADB financial analysis.

Myanmar, on the other hand, is still considered as "developing" country in both social and economic state, and the estimated Gross Domestic Products (GDP) in 2014 and 2015 period is 1,270 US dollar per capita. Therefore, Myanmar is categorized as the least developed country (LDC). Besides, poverty rate indicated 26% in 2010 according to the data record of UNDP, although there has been slight improvement observed in the last few years. Since the previous military administration had concentrated on development in urban areas for major infrastructure installations, countryside or regional areas could not gain much of investment. Thus, infrastructure development in countryside and regional areas faced major delay for long time, and this has resulted serious disparity in poverty rate between regions in the country.

Under such circumstances in Myanmar, Yen-loan agreement has been signed in June, 2013 for the "Regional Development Project for Poverty Reduction (Phase-I)" in order to bring the national development in more balanced manner as highly comprehensive regional development projects are demanded. This Phase-I project today is considered to be reducing the disparity in poverty rate effectively across the areas of Myanmar. Following the positive impact the Phase-I project is bringing about, the government of Myanmar has been expecting the continuous assistance by the Japanese government and lately requested for the Regional Development Project for Poverty Reduction (Phase-II) implementation. Thus, the Japanese government has decided the implementation of the Preparatory Survey for the Yen-loan project in March, 2015.

1.2 Outline of the Project

As same as Phase 1, project covers 3 sectors; Road and Bridge, Power supply and Water supply. Project proponent of Myanmar Government for each sector is as following;

- ✓ **Road and Bridge Sector**: Department of Highways (DoH) and Department of Bridge (DoB); Ministry of Construction (MoC)
- ✓ **Power Sector (On-grid)**: Electricity Supply Enterprise (ESE), Ministry of Electric Power and Madalay Electrical Supply Corporation (MESC).
- ✓ **Water Supply Sector**: Department of Rural Development (DRD), Ministry of Livestock, Fisheries and Rural Development. State Development Committee (SDC), Regional Development Committee (RDC) and Township Development Committee (TDC)

Location of sub projects for 3 sectors is as shown following map;

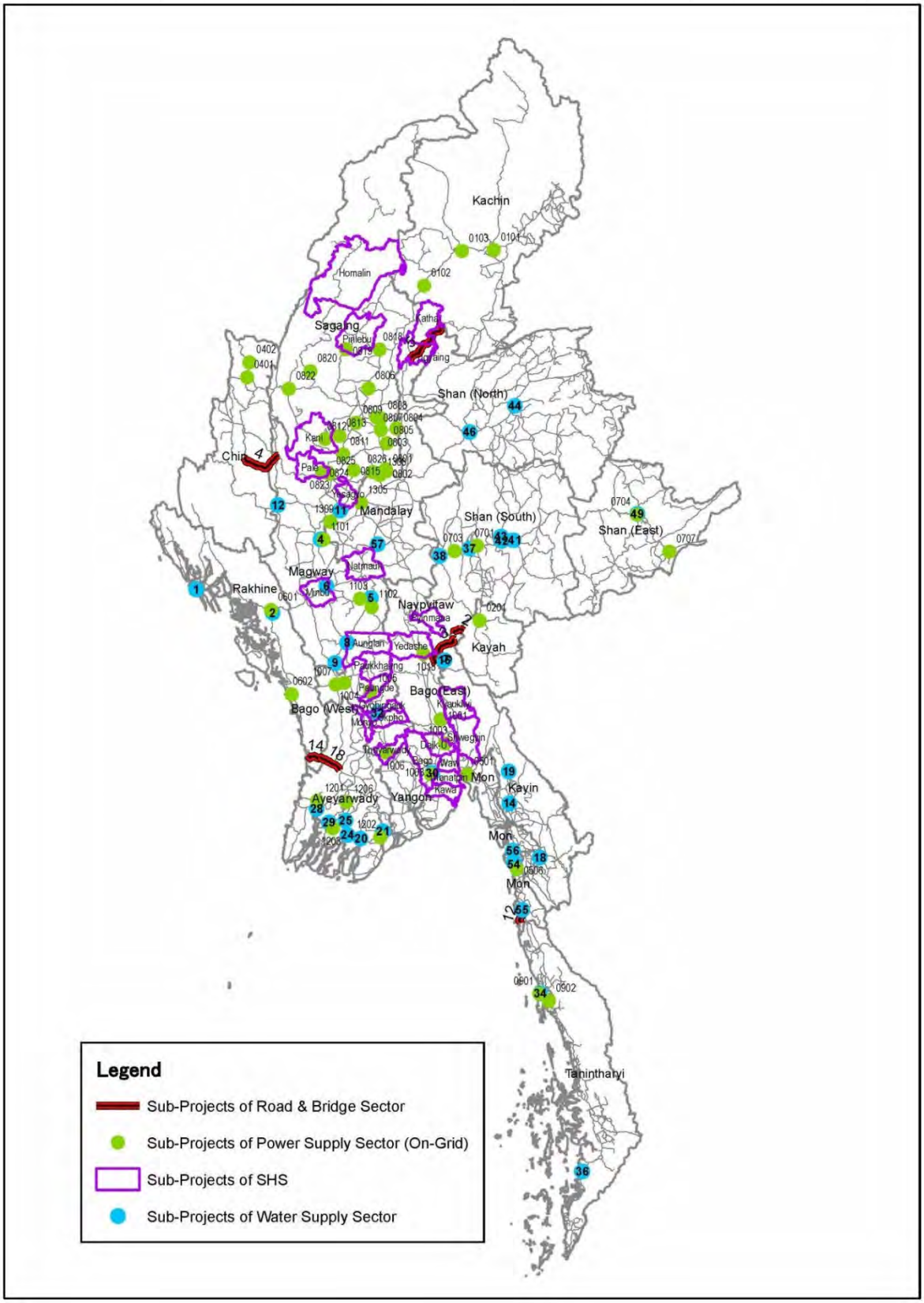


Figure 1. 1 Map of Sub Project for 3 sector (Long List)

MoC has set around 22 sub projects around the country. Then 7 sub projects have been selected as Short List of Road and Bridge Sector as shown in following table. Project component of Road and Bridge sector are Road improvement, Box Culvert Construction, Bridge Construction and Renovation, Reinforced Bridge Construction.

Table 1. 1 Outline of Sub project of Road and Bridge Sector

	No	State/Region	Sub Project Name	Length
1	MOC-03	Kayin	Taungoo – Leiktho – YarDo – Loikaw – Hopong Road	77.76 km
2	MOC-05	Sagaing	Mandalay – Dagaung – Bhamaw Road	52.96 km
3	MOC-06	Bago	Taungoo – Leiktho – YarDo – Loikaw – Hopong Road	16.64 km
4	MOC-07	Magway	Gan Gaw – AiKa Road	14.72 km
5	MOC-17	Shan	Taungoo – Leiktho – YarDo – Loikaw – Hopong Road	39.20 km
6	MOC-18	Ayeyarwaddy	NgaThine Chaung – Gwa Road	35.82 km
7	MOC-22	Shan	Han Myintmo-Aung Pan Road	14.68 km

Site condition for each sub project

MOC-03 (Kayin)

MOC-05 (Sagaing)

MOC-07 (Magway)

MOC-17 (Shan)

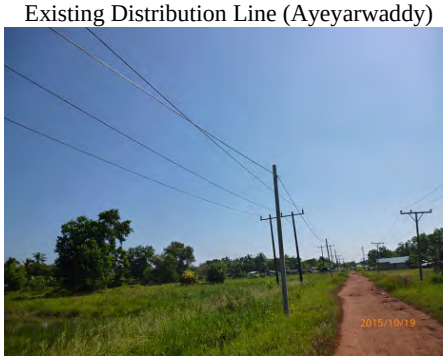
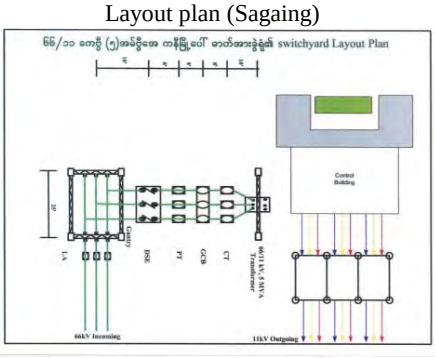
MOC-18 (Ayeyarwaddy)

MOC-22 (Shan)

Source: JICA Study team

Regarding the Power Supply Sector, There are around 32 sub projects of Power Supply sector (On-grid) at 12 States and Division. The Outline of Power supply Sector is as following Table;

Table 1. 2 Outline of Sub Project of Power Sector

Group	Outline of project	States or Region (amount of Township/villages)
On-Grid	☐ 66kV/33kV & 66kV/11kV substations ☐ 33kV/11kV substations ☐ 66kV transmission lines ☐ 33kV transmission lines ☐ 11kV distribution lines ☐ 0.4kV distribution lines ☐ Distribution transformer	Kachin (1), Kayin (1), Chin (1), Mon (1), Rakhine (1), Shan (1), Sagaing (7), Tanintharyi (2), Bago (6), Magway (2), Ayeyarwaddy (2), Mandalay (7) TOTAL 32 sub-projects
Existing 33/11kV,10MVA Substation (Ayeyarwaddy) 		Candidate site near Substation (Ayeyarwaddy) 
Candidate site for 33/11kV,10MVA Substation (Rakhaine) 		
Existing Distribution Line (Ayeyarwaddy) 		Layout plan (Sagaing) 

Source: JICA Study team

Regarding the Water Supply sector, the outline of sub projects is described as following table. As of end of June 2016, 22 sub projects at 9 States and Division are under consideration.

Table 1. 3 Outline of Sub Project of Water Supply Sector

Outline of project	States or Region (amount of Township/villages)
- Water Treatment Plant: WTP(including Slow Sand filter/Rapid Sand Filter, Chlorine facility) - Water Pipe Line / Water Conveyance line / Water Transmission line / Water Distribution line - Transformer 400V electrical line - Pump, Pump House, Pump Station, Pontoon - Tube Well (Deep well, Dug well), Intake facility / Weir - Reservoir / Clean Water Tank	Rakhine (1), Magway (5), Mandalay (2), Kayin (2), Ayeyarwaddy (3), Bago (2), Tanintharyi (2), Shan (3), Mon (2) TOTAL 22 sub-projects

Existing WTP of Phase 1 project (Shan) 	Existing WTP and candidate site for Phase 2 (Shan) 
Intake Location (Tanintharyi) 	Pressure tank (Phase 1 project) 
Existing Tank at Thayet, Magway 	Existing Well at Sittwe, Rakhine 

Source: JICA Study team

CHAPTER 2 Purpose of Preparation of Abbreviated Resettlement Action Plan (A-RAP)

According to the JICA Guidelines, if the occurrence of involuntary resettlement, namely land acquisition and/or resettlement is anticipated, Resettlement Action Plan (RAP) or Abbreviated Resettlement Action Plan (A-RAP) should be prepared by the Project's Implementation Agencies depending on the number of Project Affected Persons (PAPs) to be resettled.

Based on the preliminary analysis, the number of anticipated PAPs to be resettled is expected to be less than 200. Therefore, the preparation of an A-RAP is required by the project proponent. The A-RAP should be prepared for MoC, ESE and DRD and a reference for concerned local governments with regard to the resettlement activities under the existing laws and regulations in Myanmar.

Objectives of the A-RAP are summarized as follows:

- To protect communities and peoples from possible losses and other disadvantages caused by the Project
- To establish Compensation Policies for the sake of PAPs based on their existing socio-economic conditions
- To arrange necessary budget of MoC, ESE and DRD for the resettlement and other associated activities
- To provide guidance with PAPs and the concerned local governments in arranging the resettlement, helping the execution of a series of necessary treatments for the PAPs in a fair and facilitated manner with transparency

CHAPTER 3 Necessity of Land Acquisition and Resettlement

3.1 Anticipated Land Acquisition and Resettlement

In case of Road and Bridge Sector, Right of Way (ROW) is set at 150 feet[1] for Rural Road and Divisional Road. Thus, all the lands are public land and no land acquisition is required for the project. However, there are some buildings such as houses and shops along the roads of some Sub-Project sites, and can be affected by the project.

Regarding Power Supply sector and Water Supply sector, ESE and DRD (TDC) have tried to find sites for Sub-Project at their own land first. However, it is difficult to install all facilities in their land because ESE and DRD (TDC) do not own their land for some Sub-Projects and it is better to use other land considering the length of power line, distance to target townships, access to water resource, etc. Using private land is expected within some Sub-Projects. In addition, land donation by Ministry of Natural Resources and Environment Conservation (MONREC), Ministry of Agriculture and Irrigation (MOAI), Ministry of Electrical and Power (MOEE), monasteries and villages are also expected for Sub-Projects of both Power Supply sector and Water Supply sector.

Therefore, the occurrence of involuntary resettlement and generation of Project Affected Persons (PAPs) are anticipated due to the project. Accordingly, some losses of structures, assets, business activities are expected, and thus appropriate compensation and resettlement assistance for Project Affected Units (PAUs) and PAPs are required with respect to extent and kind of the losses.

[1] Source: Notice of setting road boundaries of the roads development by Department of Highways, Ministry of Construction. Width of road boundary for Region/State connecting roads (2 or 4 lanes) and District/Township connecting roads (2 lanes) is 150ft (45.75m), and Township/village connection roads (1 lane) is 100ft (30.5m).

3.2 Initial Efforts to avoid or minimize resettlement and land acquisition

To avoid and minimize involuntary resettlement and land acquisition, MoC, ESE and DRD are considering the following measures;

- ✓ In order to reduce the amount of resettlement or land acquisition, the width of road has been changed to 18 feet (1.5 lanes), although the initial request from MoC was 24 feet (2 lanes). The change is made in the places where a lot of resettlement and land acquisition are expected, and is already agreed by MoC.
- ✓ ESE and DRD (TDC) are trying to find their own land or public land for donation about all Sub Projects at first.
- ✓ If it is difficult to find public land, ESE and DRD (TDC) will try to find private land considering compensation for them.
- ✓ ESE and DRD (TDC) will consider the design for Substation or Water Treatment Plant (WTP) which will not cause negative effect in a large scale.
- ✓ If an owner doesn't agree to sell his/her private land for the use of a Sub-Project, ESE and DRD (TDC) will try to find another place for the Sub-Project site, or continue to negotiate with the owner until agreement is reached.

CHAPTER 4 Legal and Policy Framework for Land Acquisition and Resettlement in Myanmar

4.1 Laws and Regulation of Myanmar related to Land Acquisition and Resettlement

There are many significant laws which govern land issues, land administration and land ownership in Myanmar such as Land Nationalization Act (1953), Disposal of Tenancies Law (1963), Land Acquisition Act (1894), Forest Law (1992), Farm Land Law (2012), and so on. Among them, the Land Acquisition Act (1894) is the core law of land acquisition.

The Land Acquisition Act 1894 promulgated in the British Colonial Era is even now the core law for land acquisition and resettlement in Myanmar. A new effectual system has not been established until the end of 2015. Ministry of Home Affairs, Settlement and Land Record Department and Forest Department are expected to update a better system in near future. The flow of Land Acquisition under Myanmar Legislation is shown in Figure 4.1 as follows. The process is summarized as the following 5 steps;

(1) Preliminary investigation,
A notification is publicized in gazette and the substance of public notice is given at convenient places. Preliminary investigations are conducted, which include surveys, digging/boring, delineation of the land boundaries.

(2) Hearing about objections,
Objections to land acquisition are collected in writing within 30 days from the notification. The Collector[2] examines the objections and makes consensus over the issue. A report containing recommendations on the objections is submitted to the President of Union for the decision, if the Collector finds necessary to do so.

(3) Declaration of intended acquisition,
The declaration of land acquisition is publicized in the gazette, and stated at the district or other territorial division in which the land situates. The declaration includes the purposes, approximate size of the area, location and plan.

(4) Enquiry into measurements, value and claims, and award by the collector
1) The Collector marks out and measures the land, and give the public notice at convenient places near the land. The notice is also provided to persons known or believed to be interested in the land.

2) Examination of Award (Area of Land and Compensation)
The Collector proceeds to inquire into objections to the measurement, the value of the land at the date of the publication of the notification, the respective eligibilities to claim the compensation and examines an award. The award is examined based on the area of the land, compensation including opinions of PAPs and the apportionment of compensation among PAPs. The award is filed for conclusive evidence between the Collector and the persons interested in the land. The Collector immediately notices the awards to the persons who are not presented or their representatives when the award made. The Collector makes any efforts to fix enquiry.

3) Grievance
If deliberation reaches agreement, Award Committee issues the decision concerning the type and amount of compensation. The deliberation is continued until agreement is reached between the affected people and Award Committee, but GAD can intermediate in case they cannot conclude alone.

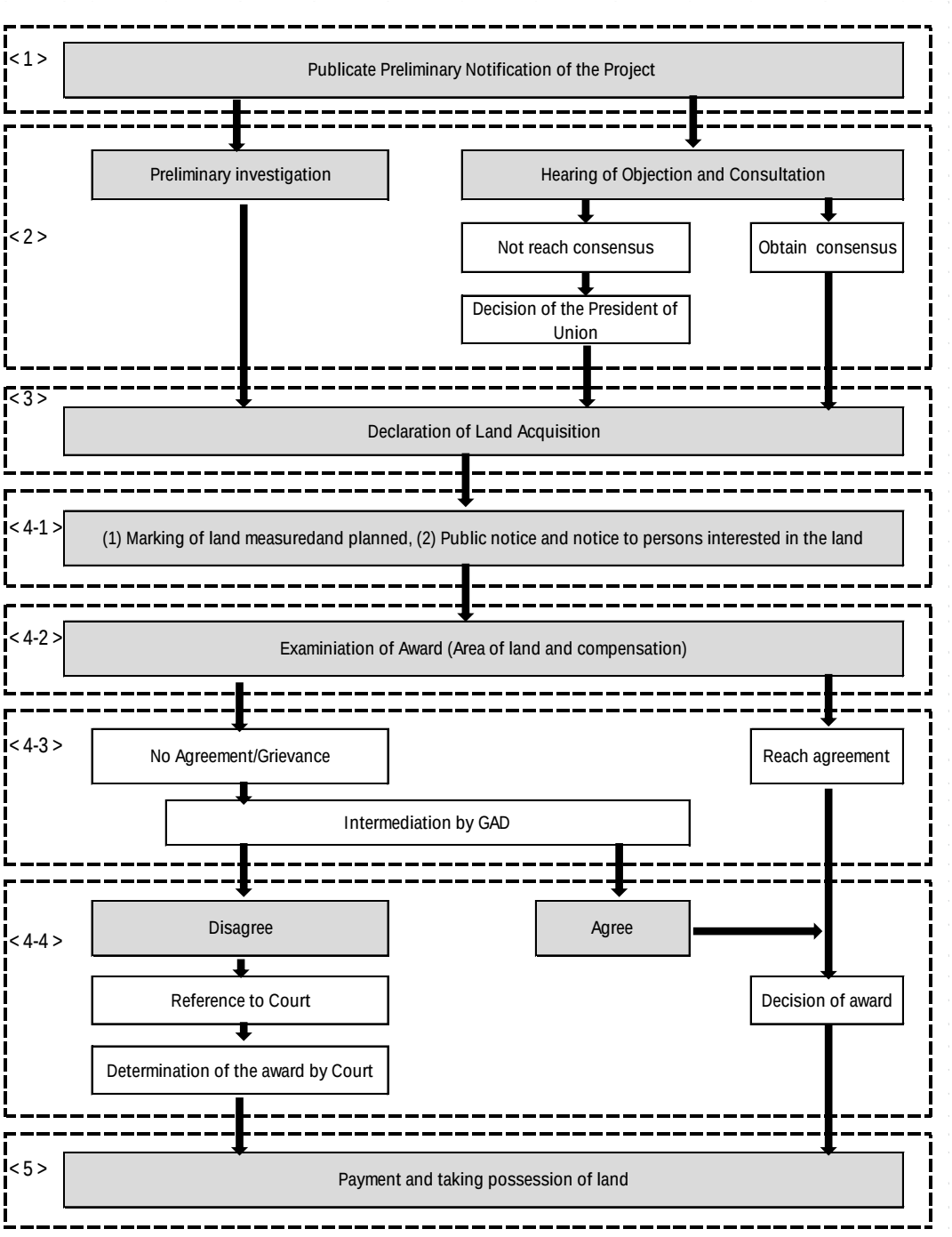
[2] the expression "Collector" includes any officer specially appointed by the President of the Union to perform the functions of a Collector under this Act (Part1: Preliminary, Land Acquisition Act 1894)

4) Reference to Court

Any person interested in the land who do not accept the award can require that the matter be referred by the Collector for the determination of the Court with written application, whether the objection to the measurement of the land, the amount of the compensation, the person to whom it is payable, or the apportionment of the compensation among the persons interested are appropriate. If the persons agree to the compensation, the particular are specified in the award for the conclusive evidence. If any dispute arises, the Collector may refer the disputes to the decisions of the Court.

(5) Payment and Taking possession of land

The Collector pays compensation and takes possession of the land. The Collector gives the persons sufficient time to remove their property without inconvenience before taking possession.



Source: JICA Study Team

Figure 4. 1 Flow of Land Acquisition under Myanmar Legislation

4.2 JICA Guidelines Policy

According to JICA Guidelines, the key principles of JICA's policy on involuntary resettlement and land acquisition are as below.

a) *Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.*

b) *When, population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken*

c) *People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.*

d) *Compensation must be based on the full replacement cost as much as possible.*

e) *Compensation and other kinds of assistance must be provided prior to displacement.*

f) *For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.*

g) *In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.*

h) *Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.*

i) *Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.*

j) *Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits.*

k) *Eligibility of Benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.*

l) *Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.*

m) *Provide support for the transition period (between displacement and livelihood restoration.*

n) *Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.*

o) *For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.*

In addition to the core principles above, JICA's guideline also lays emphasis on a detailed resettlement policy inclusive of all the following points; project specific resettlement plan; institutional framework for implementation; monitoring and evaluation mechanism; time schedule for implementation and detailed Financial Plan etc.

4.3 Comparison with JICA's Guidelines and Myanmar Legislation

Table 4.1 shows the comparison of the JICA guidelines and Myanmar legislation and measures for gaps.

Table 4. 1 Comparison of the JICA guidelines and Myanmar Legislation

No	JICA Guidelines	Laws and Guidelines in Myanmar	Gap relative to JICA GL	Project Policy
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	Not applicable	There is no regulation which mentions or requests to avoid or minimize involuntary resettlement and loss of livelihood means.	Follow JICA GL
2	When, population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	Compensation or indemnity is provided for farmland acquisition for the interest of the State or public (Farmland Law (2012) Art. 26, Farmland Rules (2012) Art. 64).	There is no difference.	Same as JICA GL
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Damages to standing crops/trees, lands, movable/immovable properties, relocation cost, economic activities are requested to compensate. (Land Acquisition Act (1894) Art. 23, Farmland Rules (2012) Art. 67)	There is no stipulation of improving or at least restoring living standard, income opportunities, and production levels to pre-project levels in the Myanmar legal framework.	The project considers the assistance to improve or restore the livelihood.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Compensation at three times of the value calculated based on the average production of crops in the current market price of that area is provided. (Farmland Rules (2012) Art. 67)	There is no significant difference.	Same as JICA GL
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	When compensation is not paid on or before land acquisition, compensation amount awarded with interest rate must be paid.	There is no clear indication about timing of compensation payment in the Myanmar legal framework.	The project supports the compensation process so that the compensation and other kinds of assistance to be provided prior to displacement.
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Not applicable	There is no regulation requesting to prepare resettlement action plan.	The project prepares abbreviated resettlement action plan and make available to the public.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	Not applicable	There is no regulation requesting to organize consultations with PAPs.	The project holds the consultations with the affected people and their communities on sufficient information made available to them in advance.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Not applicable	Ditto	The project considers appropriate explanation when consultations are holds.

No	JICA Guidelines	Laws and Guidelines in Myanmar	Gap relative to JICA GL	Project Policy
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Not applicable	There is no regulation requesting participation of PAPs into planning, implementation, and monitoring of resettlement action plans.	The project considers the appropriate participation of affected people.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	1) Notice of compensation amount to PAPs directly: appeal to the court within 6 weeks from the date of compensation award 2) Notice of compensation amount to representatives of PAPs: i) within 6 weeks of receipt of compensation notice, or ii) within 6 months from the from the date of compensation award, whichever period shall be first expire (Land Acquisition Act (1894) Art. 18)	The procedure of grievance in the Myanmar context is direct settlement at the court, which is not necessarily easy or accessible to PAPs	The project considers the grievance redress mechanism by utilizing the existing administration system to be convenient for PAPs.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP 4.12 Para. 6)	A notification of land acquisition or public purposes is published in the Gazette, which is also published at the convenient place in the concerned municipality. (Land Acquisition Act (1894) Article 4)	There is no specific description of identifying affected people as early as possible in the national law.	The project identifies and records the affected people at the project identification stage.
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	Occupiers/stakeholders of lands to be acquired are explained about acquisition and claims to compensations. (Land Acquisition Act (1894) Article 9)	Detail procedures as well as eligibility criteria are not clearly defined. Also there is no specific indication about displaced persons without titles.	The project considers eligibility for assistance to all households whose income sources or assets are confirmed as affected due to project implementation.
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP 4.12 Para. 11)	Not Applicable	There is no regulation stipulating to give land-based resettlement strategies.	The project considers the land-based resettlement strategies.
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4. 12, para.6)	Not Applicable	There is no regulation stipulating to provide support for the transition period.	The project considers the support for the transition period.

No	JICA Guidelines	Laws and Guidelines in Myanmar	Gap relative to JICA GL	Project Policy
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP 4.12 Para. 8)	Not Applicable	There is no regulation stipulating to provide particular attention to the vulnerable groups.	The project pays particular attention to vulnerable groups if needed.
16	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Not Applicable	There is no regulation stipulating to develop an A-RAP for a project with involuntary resettlement of fewer than 200 people.	Same as JICA GL

Source: Land Acquisition Act (1894), Farmland Rules (2012), Farm Land Law (2012), JICA Guidelines (2010.4) and World Bank OP 4.12

4.4 Institutional Framework for Land Acquisition and Resettlement

In general, issues of land acquisition and resettlement are complicated in Myanmar due to the issues such as entangled legislation and divided administrative structures. Roles and functions of organizations for implementing land acquisition and resettlement are shown in the following table.

Table 4. 2 Role of Organization for Implementing Land Acquisition and Resettlement

Organization	Role and Function
Land Administration Department (LAD)	1) For non-agricultural land, LAD at township level investigates land use, area size, landownership and tenant, and prepares necessary documents and maps for land acquisition. 2) The LAD routinely handles transfer of land titles or subdivisions of plots, etc. and prepares land lease certificates.
Settlement and Land Record Department (SLRD)	1) For agricultural lands, the SLRD under the MOAI at township level investigates area size and land ownership, prepares necessary documents and maps for land acquisition. 2) The SLRD surveys market prices of lands, buildings, crops and trees for compensation.
Award Committee	The Award Committee chaired by the respective Township Administrators is established to examine the award (entitlement, amount of compensation).
District Administrator	The District Administrator issues land lease grant for land not exceeding one (1) acre (The Lower Burma Town and Village Lands Manual, 1899).
General Administration Department (GAD), Ministry of Home Affairs (MOHA)	The GAD issues land lease grant for land exceeding five (5) acres (The Lower Burma Town and Village Lands Manual, 1899)

Source: JICA Study Team

4.5 Resettlement Policy

1) General Considerations

The policy regarding the replacement of structures and resettlement caused by the project implementation needs to take both the JICA guidelines and the Myanmar Legislation into consideration. However, considering that the gaps existing between the JICA guidelines and the Myanmar Legislation as shown in Table 4.1, and that the former is comparatively comprehensive, the policy for this particular project shall be primarily based on the JICA guidelines (2010).

2) Replacement Costs

The compensation to the PAPs who have the eligibility, namely, those who meet the cut-off date, shall be made based on the principles as stated below. A necessary compensation amount for the replacement, which is needed to replace the affected assets without depreciation and deduction for taxes and/or costs of transaction, is calculated before the displacement.

(a) Productive Land (agricultural, aquaculture, garden and forest): based on the actual current market prices that reflect recent land sales in the area, and in the absence of such recent sales, based on the recent sales in comparable locations with comparable attributes; fees and taxes; or in the absence of such sales, based on the productive value.
(b) Residential Land: based on the actual current market prices that reflect recent land sales, and in the absence of such recent land sales, based on the prices of recent sales in comparable locations with comparable attributes; fees and taxes.
(c) Existing regulations of local government regarding the calculation of compensation for building, crops and trees shall be used wherever available.
(d) Houses and other related structures: based on the actual current market prices of affected materials.
(e) Annual crops: cash compensation for the replacement should be in line with local government regulations if available or equivalent to the current market value of crops at the time of compensation.
(f) Perennial crops: cash compensation for the replacement should be in line with local government regulations if available, or equivalent to the current market value of crops at the time of compensation
(g) For timber trees: cash compensation for the replacement should be in line with local government regulations if available, or equivalent to the current market value. Value is decided by type, age and relevant productive value at the time of compensation based on the diameter at breast height of each tree

3) Complementary Compensation

MoC, ESE and DRD and the responsible agencies are requested to follow the JICA's guidelines as well as the existing laws and regulations in the country in making compensation for the losses of PAPs in this particular project. In the case that an amount of compensation does not meet the JICA's requirement, all the relevant agencies are requested to prepare complementary compensation.

4) Eligibility Cut-off-date for land acquisition

A cut-off date is set to identify and differentiate genuine eligible PAPs from non-eligible people, thereby reducing possible conflict. For this project, the cut-off date has been set to be the time of social survey implementation based on the agreement among expected affected people, Implementation Agencies (DoH, ESE or TDC) and the General Administrative Department (GAD) at each Township. The basic environmental conditions - including land-use, socio-economic situation, and wildlife, the proximity to protected areas, reserved forests, sensitive receptors, and water resources were explained at that time.

The period of social survey for 3 sectors (Road and Bridge, Power Supply and Water Supply) is as follow. Explanation about cut-off date during the social survey has been completed.

- Road and Bridge: from 25 January 2016 to 28 January 2016 (4days)
- Power Supply: from 9 February 2016 to 26 February 2016 (4days)
- Water Supply: from 2 February 2016 to 26 February 2016 (10days)

In addition, with the purpose of explaining and letting the local people know about the project including the cut-off date, Stakeholders Meetings have been held in 6 Township for all sectors. The date and places of the Stakeholder Meetings are the following;

- Road and Bridge: 11th March at Leiktho (Kayin), 12th March at Seebu (Shan)
- Water Supply: 26th February at Pathein (Ayeyarwaddy), 3rd March at Langlon (Tanintharyi)
- Power Supply: 27th February at Myaungmya (Ayeyarwaddy), 4th March at Thayetchanung (Tanintharyi)

Figure 4.3 Stakeholders Meeting (SHM) at Pathein (26-Feb) and Document for SHM

CHAPTER 5 Scope of Land Acquisition and Resettlement

5.1 Summary of Land Ownership for Sub projects

The Land Ownership for Sub-Projects is shown in the following Table 5.1. A-RAP Study (i.e. census, asset and socio-economic study, etc.) has been conducted for Sub-Projects which are expected to involve the acquisition of private land. In addition to this, it is necessary to confirm the situations in accordance with World Bank Operational Policy regarding the Sub-Projects which are expected to involve land donation from village or monastery.

Table 5. 1 Summary of Name of Owner and Agencies

	No	Project No.	Region/State	Township	Condition, Name of Owner or Agencies
ROAD	1	MOC-03	Kayin	Mat Thalay Chaung village	Affected 2 shops
	2	MOC-05	Sagaing	Mandalay-Mytkyina	No expect land acquisition & resettlement
	3	MOC-06	Bago	Htone Bo Gyi village	Affected 1 shop
	3	MOC-06	Bago	(Non-village Area)	Affected 1 shop
	4	MOC-07	Magway	GanGaw- Aika	No expect land acquisition & resettlement
	5	MOC-17	Shan	(Non-village Area)	Affected 1 house
	5	MOC-17	Shan	BC Kone village	Affected 1 shop
	5	MOC-17	Shan	Thar Yu village	Affected 1 house
	5	MOC-17	Shan	Ka Fu Village	Affected 1 store
	6	MOC-18	Ayeyarwaddy	Out of village (7/6-7/7)	Affected 1 temporary house
	6	MOC-18	Ayeyarwaddy	Out of village (18/0-18/1)	Affected 2 temporary houses
	6	MOC-18	Ayeyarwaddy	Out of village (18/7-19/0)	Affected 4 temporary houses and 1 house
	7	MOC-22	Shan	Han Myintmo-Aung Pan Road	No expect land acquisition & resettlement
POWER	1	ESE-0101	Kachin	Waing Maw	ESE land
	2	ESE-0303	Kayin	Pinekyon	ESE land
	3	ESE-0401	Chin	Teetain	ESE land
	4	ESE-0501	Mon	Saung Naung Gyi (Kyaikhto)	Private land
	5	ESE-0601	Rakhine	Ann (Kazukain)	Private land
	6	ESE-0602	Rakhine	Thandwe Kyaunkgyi	ESE land
	7	ESE-0703	Shan	Kalaw (Heho)	ESE land
	8	ESE-0802	Sagaing	Ohmtaw-Myinmu	ESE land
	9	ESE-0805	Sagaing	Watlat (Saingnaingkwe)	Village land (Donation)
	10	ESE-0808	Sagaing	Khin Oo (Chay Myint Kyin)	Private land
	11	ESE-0809	Sagaing	Depayin (Myae)	Monastery land (Donation)
	12	ESE-0812	Sagaing	Kani	ESE land
	13	ESE-0813	Sagaing	Butalin (Maungtaung)	ESE land
	14	ESE-0901	Tanintharyi	Launglon (Zalot Village)	Private land
	15	ESE-0902	Tanintharyi	Thayeychaung (Mindut Village)	Private land
	16	ESE-1006	Bago	Tharyarwady	Private land
	17	ESE-1008	Bago	No (4) Oakthar	ESE land
	18	ESE-1011	Bago	Htantabin (Zayatgyi)	ESE land
	19	ESE-1013	Bago	Yadashe (Myohla)	ESE land
	20	ESE-1014	Bago	Sinmeeswe	ESE land
	21	ESE-1016	Bago	Othegon	ESE land
	22	ESE-1101	Magway	Chauk (Gway Cho Village)	Private land
	23	ESE-1102	Magway	Taungdwingyi (Satthwa)	Village land (Donation)
	24	ESE-1201	Ayeyarwaddy	Pathein	Private land
	25	ESE-1206	Ayeyarwaddy	Einme	ESE land
	26	ESE-1305	Mandalay	Taungthar – Myingyan	MESC
	27	ESE-1309	Mandalay	Nyaung Oo	MESC
	28	ESE-1317	Mandalay	PyinOoLwin	MESC
	29	ESE-1318	Mandalay	Mcik Htilar	MESC
	30	ESE-1319	Mandalay	Thar Si	MESC
	31	ESE-1321	Mandalay	Kyauk Pa Taung	MESC
	32	ESE-1322	Mandalay	TharSi T/S (Myoma S/S)	MESC
	1	TDC-1	Rakhine	Sittwe	Private land
	2	TDC-4	Magway	Chauk	TDC land
	3	TDC-5	Magway	Taungdwingyi	TDC land
	4	TDC-6	Magway	Minbu	TDC land

	No	Project No.	Region/State	Township	Condition, Name of Owner or Agencies
WATER	5	TDC-8	Magway	Thayet	TDC land
	6	TDC-11	Magway	Pokokku	TDC land
	7	TDC-13	Mandalay	Myingyan	TDC land
	8	TDC-16	Kayin	Than Daung Gyi	MONREC
	9	TDC-18	Kayin	Kyainseikgyi	TDC land
	10	TDC-25	Ayeyarwaddy	Wakema	TDC land
	11	TDC-28	Ayeyarwaddy	Pathein	TDC, Monastery & Private (Donation)
	12	TDC-29	Ayeyarwaddy	Myaungmya	MONREC and TDC land
	13	TDC-30	Bago	Bago	Ministry land (MOAI)
	14	TDC-32	Bago	Gyobingauk	TDC land
	15	TDC-34	Tanintharyi	Launglon	TDC & Monastery land (Donation)
	16	TDC-36	Tanintharyi	Bokpyin	TDC land
	17	TDC-37	Shan	Taunggyi	TDC land
	18	TDC-38	Shan	Aungpan	TDC land
	19	TDC-44	Shan	Lashio	TDC and MONREC land
	20	TDC-54	Mon	Thanbyuzayat	MOAI & MONREC land
	21	TDC-57	Mandalay	Meikhtila	TDC land
	22	TDC-58	Mon	Mawlamyine	TDC land
14 sub projects			Required Private Land and include in A-RAP as PAPs.		
5 sub projects			Required Land Donation from monastery or villages.		

Note: Regarding Road Sector, note only affected area, no mention about ownership for all routes.
Source: JICA Study team

5.2 Project Affected Persons and Project Affected Units

Table 5.2 shows the number of PAUs and PAPs. There are twenty-six (26) households for fourteen (14) sub projects of 3 sectors in total.

Table 5. 2 Expected PAPs and Affected Units (PAUs) and the Land Sizes

Sectors	Affected HHs	Project Affected Persons	PAUs					
			No. of Buildings	No. of land plots	Total Land Area (m^2)	No. of Tube wells	No. of Dug wells	No. of Valuable Trees
Road & Bridge	15	57	17	-	388	-	-	-
Power Supply	9	35	-	8	44,951	-	-	-
Water Supply	2	8	1	2	4,067	1	1	15

Source: JICA Study Team
Note: Refer to Attachment 1 related to the Land Area

The corresponding number of Project Affected Persons (PAPs) is enumerated by the census survey carried out from January, 2016 to July, 2016 by the Preparatory Survey Team. It should be noted that some trees, electric poles and mountain-side areas in Road and Bridge project sites are supposed to be removed and/or replaced by this Project. The DoH, the proponent, needs to obtain approval from the concerned agencies (i.e. GADs, Forest Department in MONREC and ESE in MOEE, etc.) to do such works before the construction.

According to the evaluation criteria of the JICA's guidelines for Environmental and Social Considerations (2010), the Project can be categorized as "Category B"; meaning that the number of expected PAPs is less than 200 and the adverse impacts are expected to some extent but not so significant. The following table (Table 5.3, 5.4 and 5.5) shows the brief account on the PAPs and PAPs for each sector. More detailed information about each PAU is shown in the attachment of this report (Attachment 1: List of Affected Land and Unit).

Table 5. 3 PAUs and PAPs in Road Sector

Table 5. 4 PAUs and PAPs in Power Supply Sector

Table 5. 5 PAUs and PAPs in Water Supply sectors

5.3 Socio-Economic Situation of Project Affected Persons

The census survey conducted by the Preparatory Survey Team from January to July 2016 includes interviewing with 26 respondents (household heads). The socio-economic situation of the PAPs will be evaluated based on the information obtained from these interviews, whose results are briefly outlined in the following tables.

Table 5. 6 Age of family members and gender (Road)

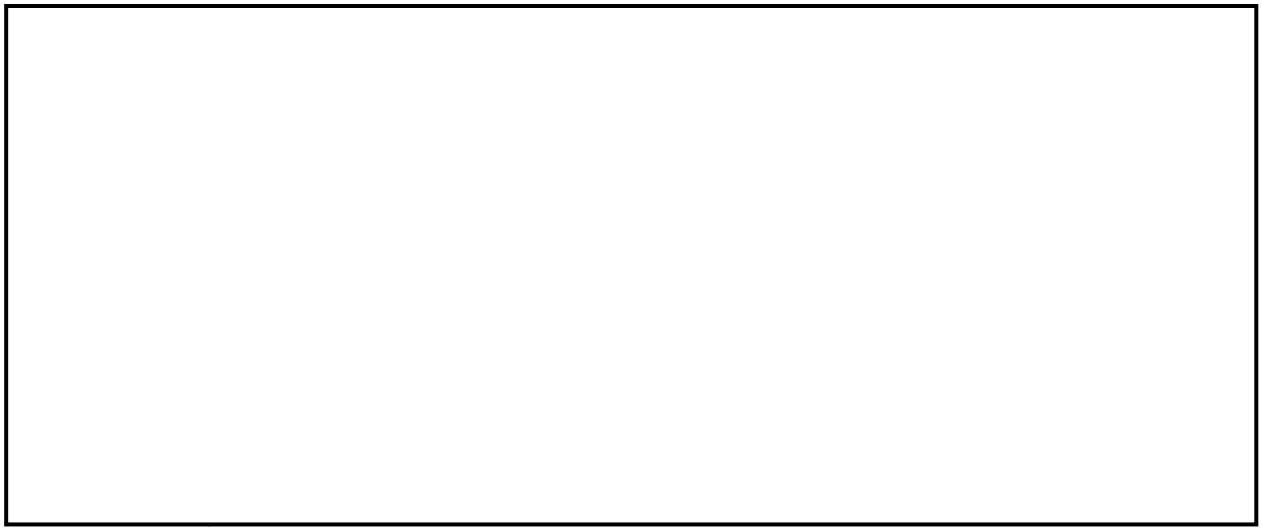


Table 5. 7 Age of family members and gender (Power Supply)

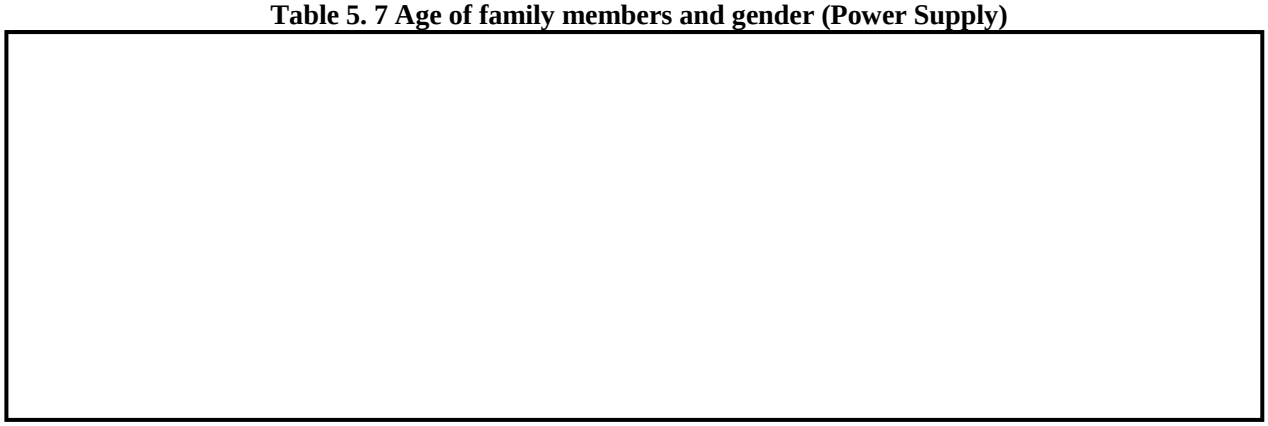


Table 5. 8 Age of family members and gender (Water Supply)

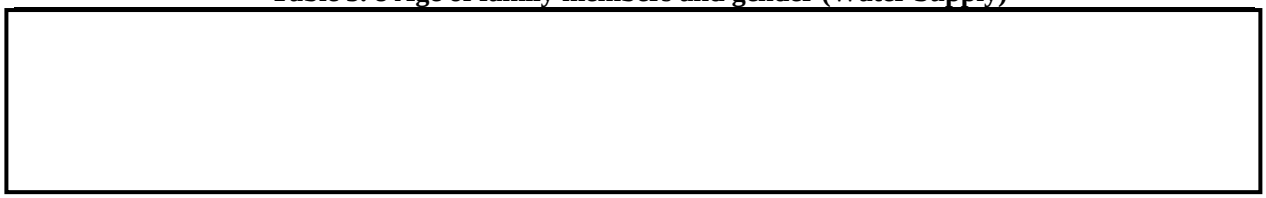


Table 5. 9 Occupation, Income and Expenditure of the PAPs (Road)

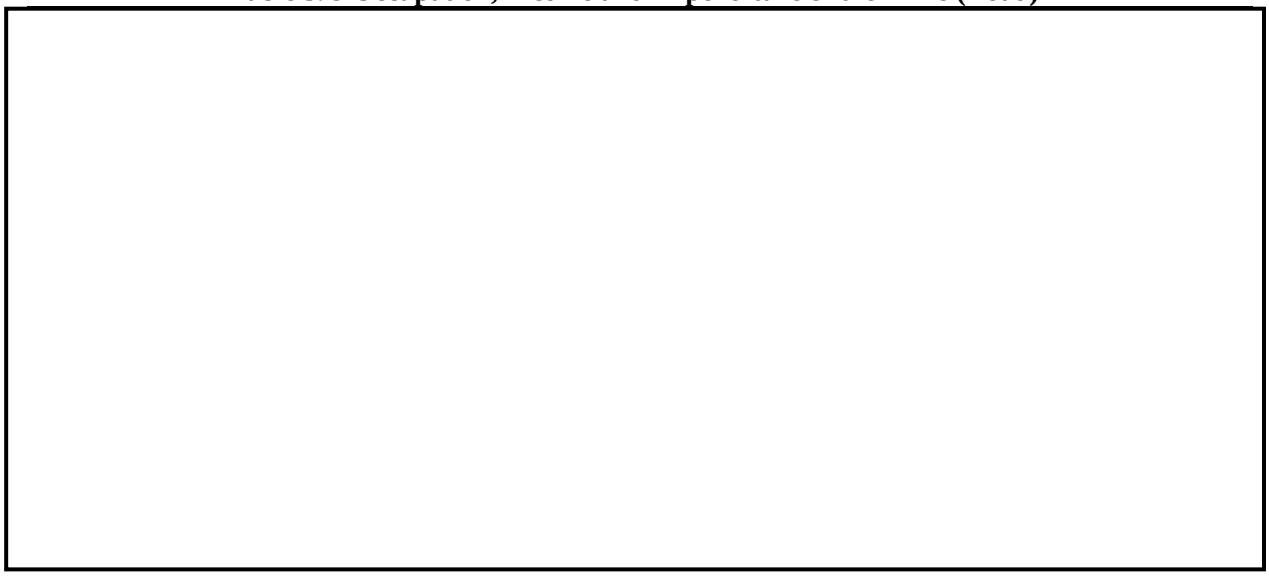


Table 5. 10 Occupation, Income and Expenditure of the PAPs (Power Supply)

Table 5. 11 Occupation, Income and Expenditure of the PAPs (Water Supply)

Ethnicity, Religion, Education level, and means of transportation of the PAPs are shown in following table.

Table 5. 12 Ethnicity, Religion, Education and Transportation of PAPs for 3 sectors

	 Measuring the distance of house from road (MatThalayChang)
 Petroleum stall within the Road Formation Width	 House within the Road Formation Width (Lay Eain Su)
	 House within the Road Formation Width (Htone Bo Gyi)

Figure 5. 1 Photo Records of the PAUs and PAPs

5.4 Voluntary Land Donation

There are 7 Sub-Projects in Power Supply and Water Supply sectors which are expected to involve land donation from villages (public area) and monastery. These Sub-Projects are shown in the following table.

Table 5. 13 Donation List (Power and Water Supply Sector)

Project No.	Region	Township	Owner Name
ESE-0805	Sagaing	Watlat (Saingnaingkwe)	Village land (Donation)
ESE-0809	Sagaing	Depayin (Myae)	Monastery land (Donation)
ESE-1102	Magway	Taungdwingyi (Satthwa)	Village land (Donation)
TDC-28	Ayeyarwaddy	Pathein	TDC, Monastery & Private (Donation)
TDC-34	Thanintharyi	Launglon	TDC & Monastery land (Donation)

Source: JICA Study Team

It is necessary to confirm the conditions of the land, owner and procedure etc., according to the World Bank Guideline[3], even if the donations are voluntary. If determining informed consent can be difficult, the following criteria are suggested as guidelines;

WB-1: The infrastructure must not be site specific.

WB-2: The impacts must be minor, that is, involve no more than 10 percent of the area of any holding and require no physical relocation.

WB-3: The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities (nonetheless, technical authorities can help ensure that the land is appropriate for project purposes and that the project will produce no health or environmental safety hazards).

WB-4: The land in question must be free of squatters, encroachers, or other claims or encumbrances.

WB-5: Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from *each* person donating land.

WB-6: If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised mitigatory measures must be obtained from those expected to be adversely affected.

WB-7: If community services are to be provided under the project, land title must be vested in the community, or appropriate guarantees of public access to services must be given by the private titleholder.

WB-8: Grievance mechanisms must be available.

More information about condition of donation for each subproject has been described in the attached document (Attachment 2: Donation List).

[3] P22-23, Involuntary Resettlement Source Book, Planning and Implementation in Development Project, The World Bank

5.5 Entitlement Matrix

An entitlement matrix serves as a tool for evaluating the possible losses caused by the Project, namely it identifies eligibility of PAPs and provides a basis for necessary compensation and resettlement assistance with the PAPs. Table 5.14 summarizes the Entitlement Matrix designed for this Project.

In the case that the gaps exist between the JICA Guidelines and the Myanmar Legislation about the way of setting eligibility or identifying eligible persons, this entitlement matrix should be used according to the JICA Guidelines.

Table 5. 14 Entitlement Matrix

Type of Loss	Eligible Entity	Compensation Policy	Responsible Organization
Immovable Assets (e.g. fixed assets such as houses, structures, buildings, wells, etc.)	Owners of the Assets	Cash compensation worth either the value of the assets lost or twice their value measured in market price as replacement cost.	DoH and MoC, ESE and MOEE, and TDC, in cooperation with local and Regional/ State Governments
Movable Assets (e.g. transportation cost)	Owners of the Assets	Movable assets are not subject to compensation in principle. However, if costs for transporting the assets are required, such transportation costs or transportation mode to transfer the assets shall be provided.	DoH and MoC, ESE and MOEE, and TDC, in cooperation with local and Regional/ State Governments
Private Land (e.g. farmland, residential land, commercial land)	Owners of the Assets	Cash compensation worth the value of the assets measured in market price as replacement cost.	DoH and MoC, ESE and MOEE, and TDC in cooperation with SLRD, local and Regional/ State Government
Crops, and Valuable Plants/Trees	Owners of the Assets	Cash compensation that is worth three years the expected earnings accrued from farming measured in market price as replacement cost.	DoH and MoC, ESE and MOEE, and TDC, in cooperation with local and Regional/ State Governments
Job Opportunity	Labors, Traders such as vendors, stallers, shop keepers	• Support in finding new jobs, restarting existing businesses and so on through measures such as micro credit and subsidies • Provision of prioritized employment opportunity in construction-related works of the project	DoH, ESE, TDC, in cooperation with local and Regional/ State Governments

Source: JICA Study Team

5.6 Estimation of Compensation

The following tables show the initial estimate of the cost required for compensation for all three concerned sectors.

1) Estimation of compensation amount for ROAD Sector

Table 5. 15 Estimation of the Budget of DoH for Structures Replacement and Resettlement

The type of each affected house is as shown following Table 5.16. And the estimation of unit price for immovable assets based on the replacement cost is shown in following tables. The condition of a typical affected house is one story, size 20 feet x 20 feet (6 m x 6 m = 36 m^2), with wood column, GI sheet roofing, others made by bamboo, or made by bamboo only.

Table 5. 16 House Type

Therefore total size of land for each unit is follows; Type I is 114 m^2, Type II is 40 m^2, Type III is 189 $m^2$and Type IV is 45 m^2.

Table 5. 17 Estimated Value of a Typical Affected House (Type I)

Table 5. 18 Estimated Value of a Typical Affected house (Type II)

Table 5. 19 Estimated Value of a Typical Affected house (Type III)

Table 5. 20 Estimated Value of a Typical Affected house (Type IV)

2) Estimation of compensation amount for POWER Sector

Table 5. 21 Estimation of the Budget of ESE for Land, Structures Replacement and Resettlement

3) Estimation of compensation amount for WATER SUPPLY Sector

Table 5. 22 Estimation of the Budget of TDCs for Land, Structures Replacement and Resettlement

Table 5. 23 Estimated Value of a typical Tube Well

Table 5. 24 Estimated Value of a Typical Dug Well

5.7 Arrangement for Implementation of A-RAP

For A-RAP implementation, DoH, ESE and TDC should build up the A-RAP task force team and assign the following personnel.

(a) Supervising manager: to supervises overall implementation process of A-RAP.
(b) Task management officer: to ensure the smooth and timely implementation of A-RAP and to manage and support the tasks in DoH relating to A-RAP.
(c) Grievance redress officer: to ensure good relations with both the PAPs and community-based organizations for adequate response to grievance from PAPs.
(d) Accounting officer: to manage compensation payment process and the expense in A-RAP implementation

5.8 Concerned Organizations

Anticipated major organizations concerned with implementation of the A-RAP are shown in Table 5.25-Table 5.27

Table 5. 25 Concerned Organizations with the Implementation of the A-RAP (Road)

Organization	Role	Responsibility and Duty
MoC (Ministry of Construction)	Role as the line Ministry of DoH and DoB (Department of Bridges)	Approval of Structures removing and Resettlement in the sub-project
DoH (Department of Highways) DoB (Department of Bridges)	Role as the proponent	1) Identifying data of structures removing and resettlement 2) Forming and managing CFC (Compensation Fixation Committee) 3) Close communication with PAPs, GAD, State/Regional Government etc. 4) Negotiation, payment and making agreement with PAPs for process and cost of respective compensation and resettlement assistance 5) Adequate Response for grievance from PAPs with ongoing interaction 6) Support of livelihood of PAPs during transition period 7) Internal monitoring of A-RAP implementation

Organization	Role	Responsibility and Duty
GAD (General Administration Department)	Role as the lead authority of Land Acquisition Act	1) Guide or recommendations for the procedures of Structures removing and Resettlement in the Project, based on the Land Acquisition act and case experiences in GAD. 2) Support to arrange relocation or reconstruction place 3) Support to determine compensation rate 4) In the case that PAPs and DoH cannot reach agreement, GAD will intermediate between them.
Other organizations - Settlement and Land Record Department (SLRD), Department of Human Settlement and Housing Development (DHSHD), NGOs, etc.	Support and consultation for DoH	Support and consultation for DoH

Note: Organizations making up the CFC will be concerned in addition to those shown above.
Source: JICA Study Team

Table 5. 26 Concerned Organizations with the Implementation of the A-RAP (Power Supply)

Organization	Role	Responsibility and Duty
MOEE (Ministry of Electric Power)	Role as the line Ministry of ESE (Electricity Supply Enterprise)	Approval of Structures removing and Resettlement in the sub-project
ESE (Electricity Supply Enterprise) (MESC)	Role as the proponent	1) Identifying data of structures removing and resettlement 2) Forming and managing CFC (Compensation Fixation Committee) 3) Close communication with PAPs, GAD, State/Regional Government etc. 4) Negotiation, payment and making agreement with PAPs for process and cost of respective compensation and resettlement assistance 5) Adequate Response for grievance from PAPs with ongoing interaction 6) Support of livelihood of PAPs during transition period 7) Internal monitoring of A-RAP implementation
GAD (General Administration Department)	Role as the lead authority of Land Acquisition Act	1) Guide or recommendations for the procedures of Structures removing and Resettlement in the Project, based on the Land Acquisition act and case experiences in GAD. 2) Support to arrange relocation or reconstruction place 3) Support to determine compensation rate 4) In the case that PAPs and ESE cannot reach agreement, GAD will intermediate between them.
Other organizations - Settlement and Land Record Department (SLRD), Department of Human Settlement and Housing Development (DHSHD), NGOs, etc.	Support and consultation for ESE	Support and consultation for ESE

Note: Organizations making up the CFC will be concerned in addition to those shown above.
Source: JICA Study Team

Table 5. 27 Concerned Organizations with the Implementation of the A-RAP (Water Supply)

Organization	Role	Responsibility and Duty
MOLFRD (Livestock, Fishery and Rural Development) DRD (Department of Rural Development)	Role as the line Ministry of TDC (Township Development Committee)	Approval of Structures removing and Resettlement in the sub-project
TDC (Township Development Committee)	Role as the proponent	1) Identifying data of structures removing and resettlement 2) Forming and managing CFC (Compensation Fixation Committee) 3) Close communication with PAPs, GAD, State/Regional Government etc. 4) Negotiation, payment and making agreement with PAPs for process and cost of respective compensation and resettlement assistance 5) Adequate Response for grievance from PAPs with ongoing interaction 6) Support of livelihood of PAPs during transition period 7) Internal monitoring of A-RAP implementation
GAD (General Administration Department)	Role as the lead authority of Land Acquisition Act	5) Guide or recommendations for the procedures of Structures removing and Resettlement in the Project, based on the Land Acquisition act and case experiences in GAD. 6) Support to arrange relocation or reconstruction place 7) Support to determine compensation rate 8) In the case that PAPs and TDC cannot reach agreement, GAD will intermediate between them.
Other organizations - Settlement and Land Record Department (SLRD), Department of Human Settlement and Housing Development (DHSHD), NGOs, etc.	Support and consultation for TDC	Support and consultation for ESE

Note: Organizations making up the CFC will be concerned in addition to those shown above.
Source: JICA Study Team

5.9 Grievance Redress Mechanism

Disputes may inevitably happen during the implementation of A-RAP. It is therefore important to establish a clear grievance procedure for PAPs so that concerns and disagreements regarding the resettlement process and compensation can be addressed satisfactorily. The success of a grievance mechanism is dependent on how swiftly such issues are resolved.

PAPs should be notified (e.g. handed a letter of notification that is explained to those who cannot read by a trusted intermediary) about the grievance mechanism. In addition, the grievance redress officer should be responsible for receiving and processing grievance complaints from PAPs. The name and contact information for this person should be given to the all relevant PAPs.

Under this grievance mechanism, if a PAP is dissatisfied with a resettlement or compensation measure or the delivery of entitlements, he/she must lodge a complaint in first instance to the grievance redress officer, and the grievance redress officer must answer no later than 7 days (one week) after receiving the complaint. All complains and respective actions must be recorded.

If a dispute cannot be resolved within a stated period of fourteen (14) days, it should be referred to the ARAP Implementation Team Manager, and he/she, in cooperation with other team members of the A-RAP Task Force, must answer within another established period of twenty-one (21) days. Compensation will be paid upon resolution of the grievance or dispute.

In case the complaint is not satisfied with the decision made by A-RAP Implementation Team Manager, the PAP(s) has a right to lodge the complaint to the Court. The grievance procedure should not replace the existing legal processes, but will provide a consensus-based grievance mechanism that would seek to resolve issues rapidly in order to expedite the receipt of compensation without expensive and time consuming legal options.

A possible scheme for grievance redress mechanism is illustrated in Figure 5.2.

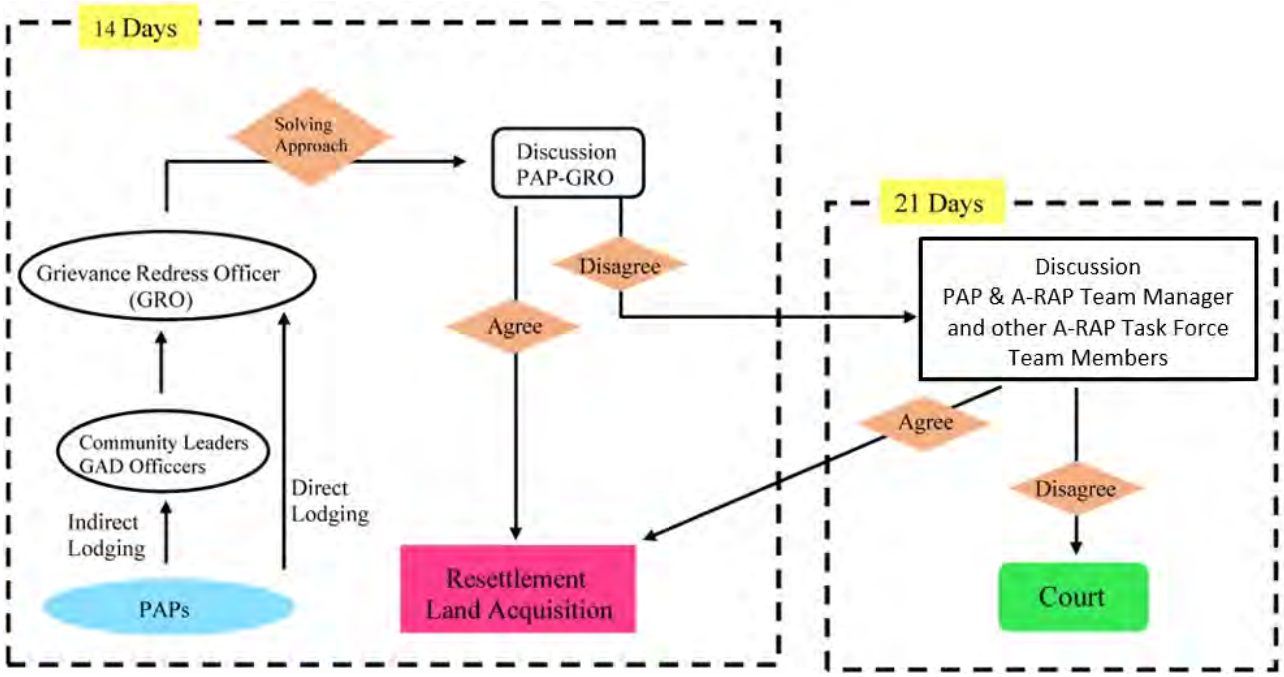


Figure 5. 2 Scheme for Grievance Redress Mechanism (Proposed)

5.10 Monitoring System

It is required to monitor the implementation of the A-RAP from stage of consultation and agreement with PAPs for compensation and resettlement assistance to the stage after implementation. Monitoring will be implemented to investigate, analyze and evaluate the resettlement activities in a fair and facilitated manner with transparency. The aforementioned organizations shall resolve arising problems that will be identified through the monitoring activities. Consequently activities ahead shall be improved.

It is necessary that project proponents (DoH, ESE, and TDC) together with State/Regional Governments, and their ministries (MONPED – PD/FERD, MoC, MOEE, MOLFRD - DRD), establish special task force teams in order to monitor the resettlement activities. Those teams shall be a single window to respond to problems with regard to the resettlement activities of the project, and is expected to report the progress of the resettlement activities to the project proponents and concerned authorities such as State/Regional Governments. NGOs can also be involved as the third party in the monitoring activities as per necessary. A flow chart for proposed monitoring system is illustrated in Figure 5.3.

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It is necessary that project proponents (DoH, ESE, and TDC) together with State/Regional Governments, and the all concerned ministries of the Project (MoNPED - PD/FERD, MoC, MOEE, MoLFRD - DRD), establish special task force teams in order to monitor the resettlement activities. Those teams shall be a single window to respond to problems with regard to the resettlement activities of the Project, and is expected to report the progress of the resettlement activities to the project proponents and concerned authorities such as State/Regional Governments.

NGOs can also be involved as the third party in the monitoring activities as per necessity. A flow chart for proposed monitoring system is illustrated in Figure 5.3. For a reference, Resettlement Monitoring

Sheet used for the precedent Phase-I Project is shown Table 5.28.

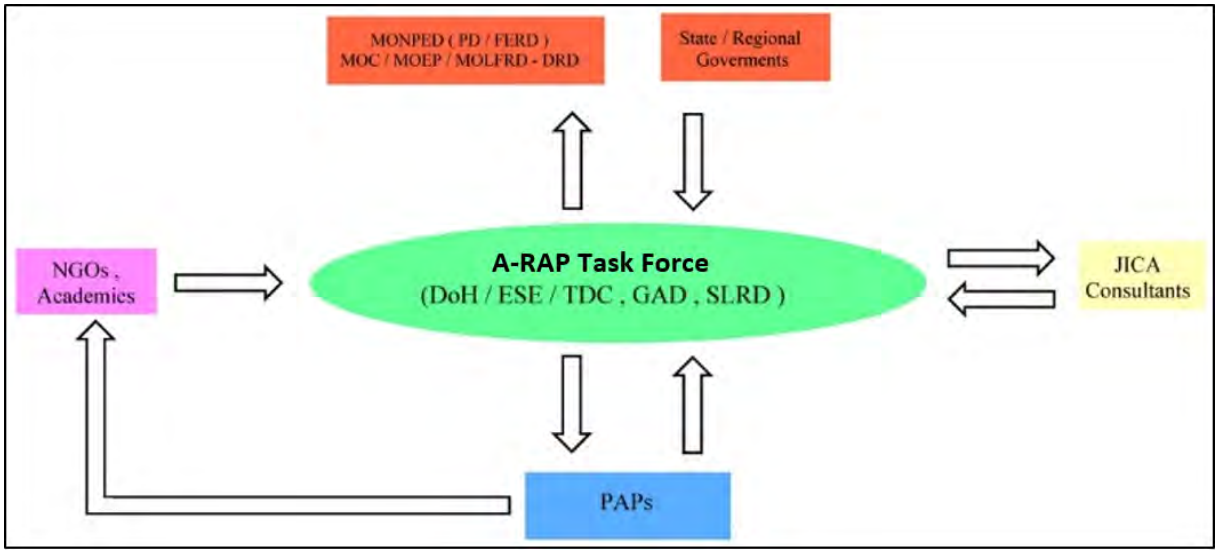


Figure 5. 3 A-RAP Monitoring System

Table 5. 28 Resettlement Monitoring Sheet (Sample)

Resettlement Monitoring Sheet

Name of HH Head : _____

1. Progress of Resettlement

Progress	Date	Checked	Remark
Official Notice			
Confirmation on result of census survey			
Survey relocation if any			
Negotiation 1st time 2nd time 3rd time 4th time 5th time			
Agreement on compensation and relocation			
Securing of Land			

2. Post Resettlement Monitoring

Date	Location	Occupation (if changed)	Income Level	Perception	Remarks

Note: 2 times in the first year and 1 time in the second year after relocation.

3. Record of Grievance / Perception and Redress

Date	Grievance	Redress	Results	Checked by independent Org. (if any)

5.11 Cost and Budget

The estimated RAP implementation budget for sub-projects is summarized in Table5.29. DoH, ESE and DRD are responsible for providing adequate funds for land acquisition and resettlement related to the project. It is important to note that these figures need to update during updating of the RAP in the detailed engineering stage.

Table 5. 29 RAP Implementation Budget

5.12 Implementation Schedule

A draft implementation schedule of A-RAP is summarized in Table 5.30. A series of environmental and social impact study, including the census survey on PAPs will complete in April, 2016. Stakeholders meetings (SHMs), in which the PAPs, concerned local governments, parliament members and other interest persons were invited, were held twice for each sector in February and March, 2016. The public notification of Sub-Projects and the official cut-off date have been made between from November, 2015 to April, 2016. Compensation committees will be established in November or December, 2016 for each sector. The operation of the committee will start accordingly until completion of the Project in 2019/2020.

Table 5. 30 Implementation Schedule (tentative)

No.	Implementation Schedule / years	2015			2016					2016	2017	2018	2019	2020
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun - Dec				
Construction of the Sub-Projects														
1	Environmental and Social Impact Surveys (including census surveys)													
2	Stakeholder Meeting (PAPs are invited.)													
3	Establish A-RAP Implementation System in Ministries (MoC, MOEE, MOFLRD), as initiation of action													
4	Public Notification of the Sub-Projects Public Notification of Cut-Off Date													
5	Finalize A-RAP report by DoH, ESE, and TDCs, and Submission to JICA													
6	Establish a Compensation Committee													
7	Operation of the committee grievance redress													
8	Establishment of Policy and procedures for compensation													
9	Estimation of compensation amount for each PAP Conduct supplementary surveys if necessary													
10	Clarify with PAPs													
11	Fix compensation (cash and assistance) and agreement with PAPs													
12	Cash Disbursement to PAPs													
13	Removal of Structures, and Construction at Relocation Sites, as necessary													
14	Completion of A-RAP Process													
15	Monitoring of PAPs													

Source: prepared by the Preparatory Survey Team

5.13 Public Consultations

For Road and Bridge sector, public consultations were held in villages along Tuangoo – Laiktho – Yado – Loikaw - Hopone road (MOC 06+02+03+17) and Gangaw-Aika road (MOC 04+07). The purpose of those public consultations is to disclose the information about the Sub-Projects up to the grass-root level communities.

As for MOC 06+02+03+17, public consultations were held on the 26th and 27th of January, 2016 in some villages of three townships along the road - Phae Khon Township (South Shan State), Than Daung Gyi Township (Kayin State) and Taungoo Township (Bago Region). Five local members of the Preparatory Survey Team, in cooperation with DoH officers, have met village administrators, PAPs and other key persons as shown in Table 5.31.

Table 5. 31 Participant List of Public Consultation (1st time)

The Survey members and DoH officers have explained the Sub-Project's designs, schedules and public monitoring system, possible environmental and social impacts as well as the measures to reduce them.

Common Opinions and Suggestions by local community people

- Community people welcome this road-upgrading project. They agreed that the road was to be improved necessarily for many reasons – transportations, easy access to township, livelihood enhancement, improved local economy.
- Most of the administrators requested that DoH or the contractor inform them in advance about the place for earth disposal into the downside cliffs, because there would be many private farmland and garden areas along the road.
- Village administrators responded that they would support the project as much as they could. And they also said that DoH or contractors would need to use warning signboard or crash barrier in some places of the road because there were curves and hidden corners in many places.
- Job opportunity for local people is also one of their concerns. Community people wanted the contractors to give chances to them.

For MOC 04+07, public consultations were held on the 22nd and 23rd of January, 2016, in some villages of two townships along the road - Gangaw Township (Magaw Region) and Matupi Township (Chin State). Five local members of the Preparatory Survey Team, in cooperation with DoH officers, have met village administrators and other key persons as shown in Table 5.32.

Table 5. 32 Participant list of Public Consultation (2nd Time)

The Survey members and DoH officers have explained the Sub-Project's designs, schedules and public monitoring system, possible environmental and social impacts as well as the measures to reduce them.

Common Opinions and Suggestions by local community people

- Community people welcome this road-upgrading project. They agreed that the road was to be improved necessarily for many reasons – transportations, easy access to township, livelihood enhancement, improved local economy.
- One of the village administrators suggested that if the existing road would be upgraded, the drainage system would be needed especially in the village areas. He also requested that DoH would need to use warning signboard within the villages.
- Village administrator from Chin state said that he would like to request that DoH or contractor would make sure the quality of the road and good drainage system beside the road. Their village is located on the edge of the Matupi Township so they would expect a high quality good road which provides easy access to township
- Village administrator of the Aika village said that they would be very thankful for the road upgrading project in their region and they would support in that project as much as they could. They had big difficulties before, such as landslides and the loss of access to the nearest town even for a few months. So they would like to request that DoH or contractor would do their best in road widening, construction of retaining walls and box culverts.

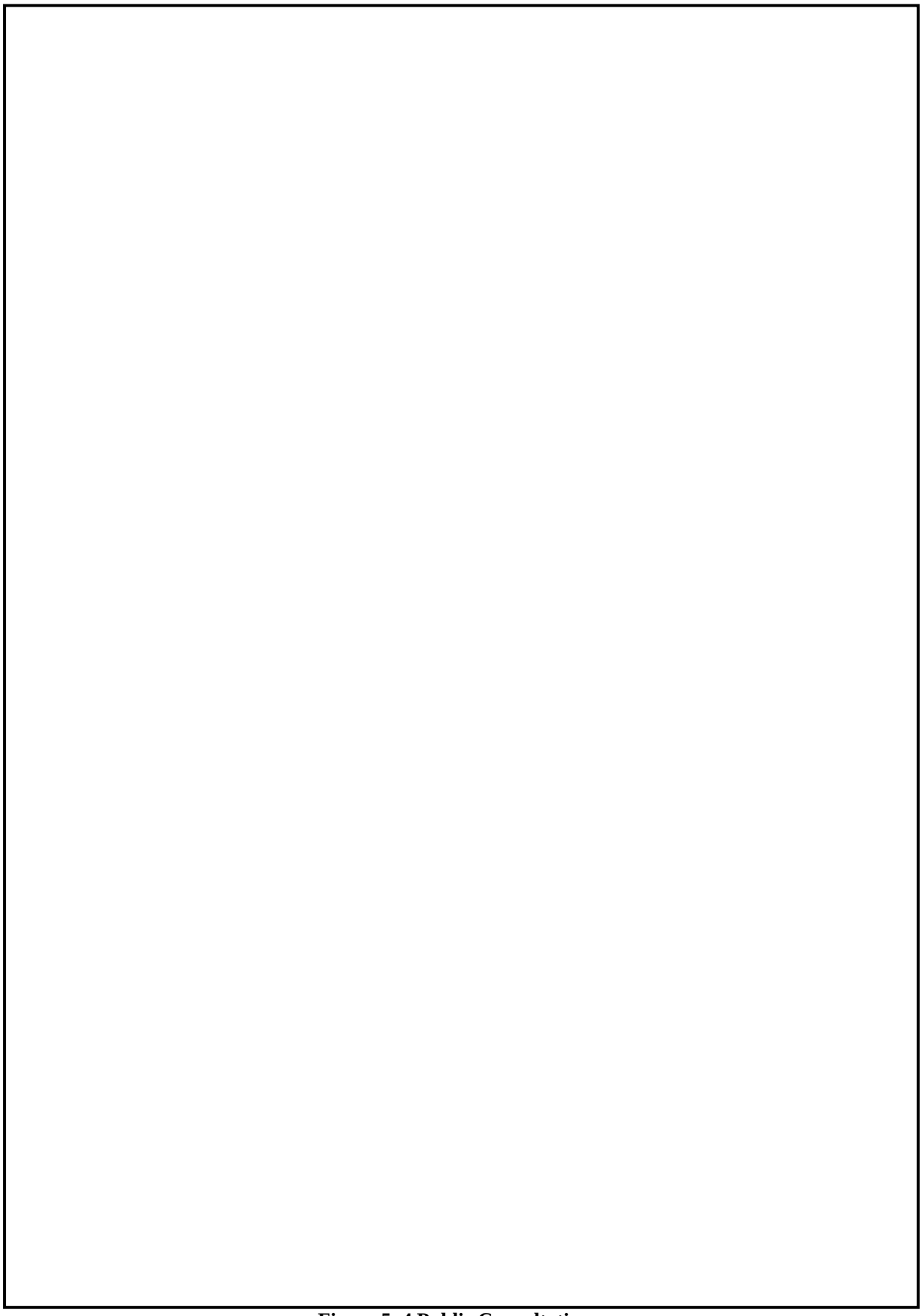
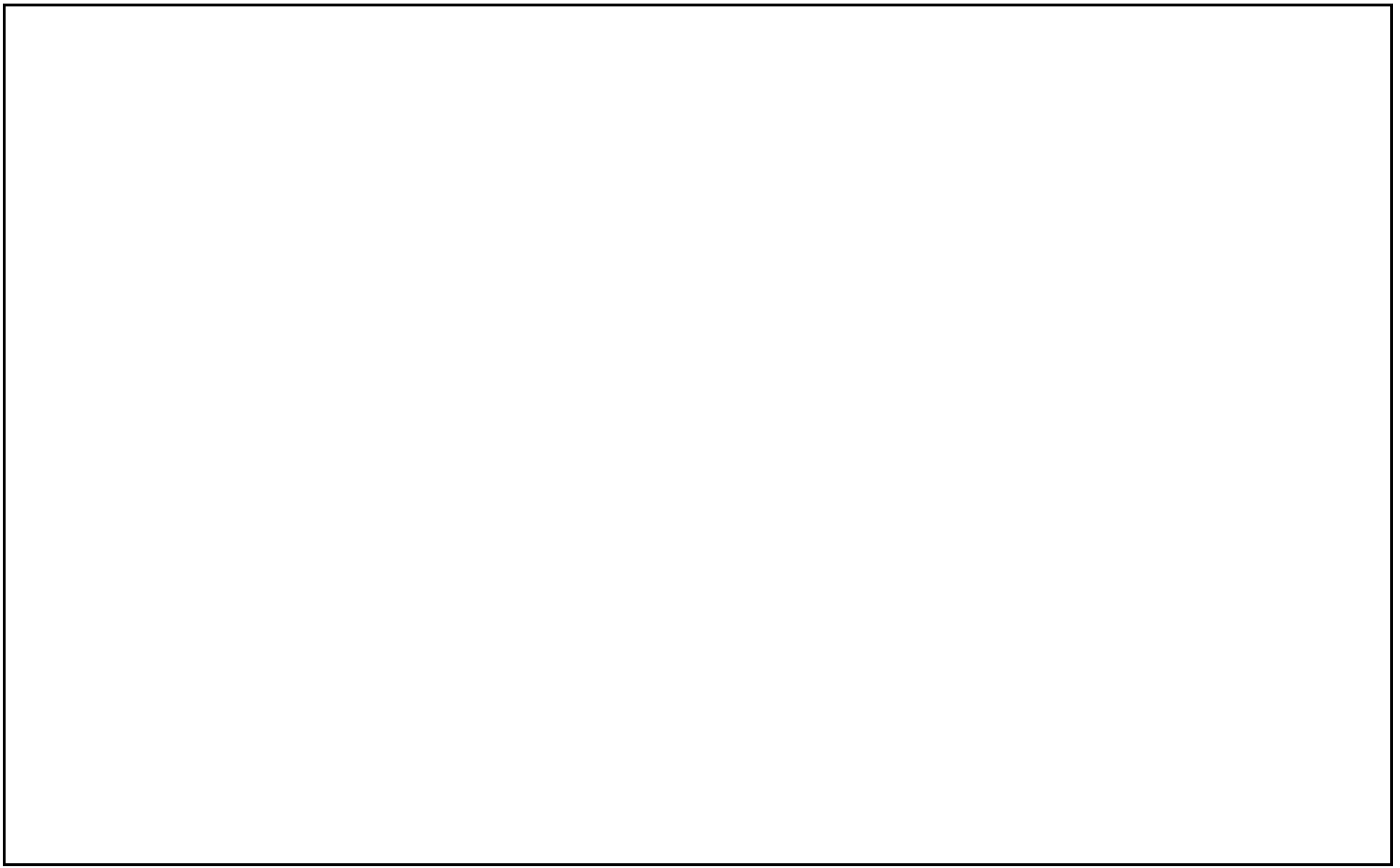
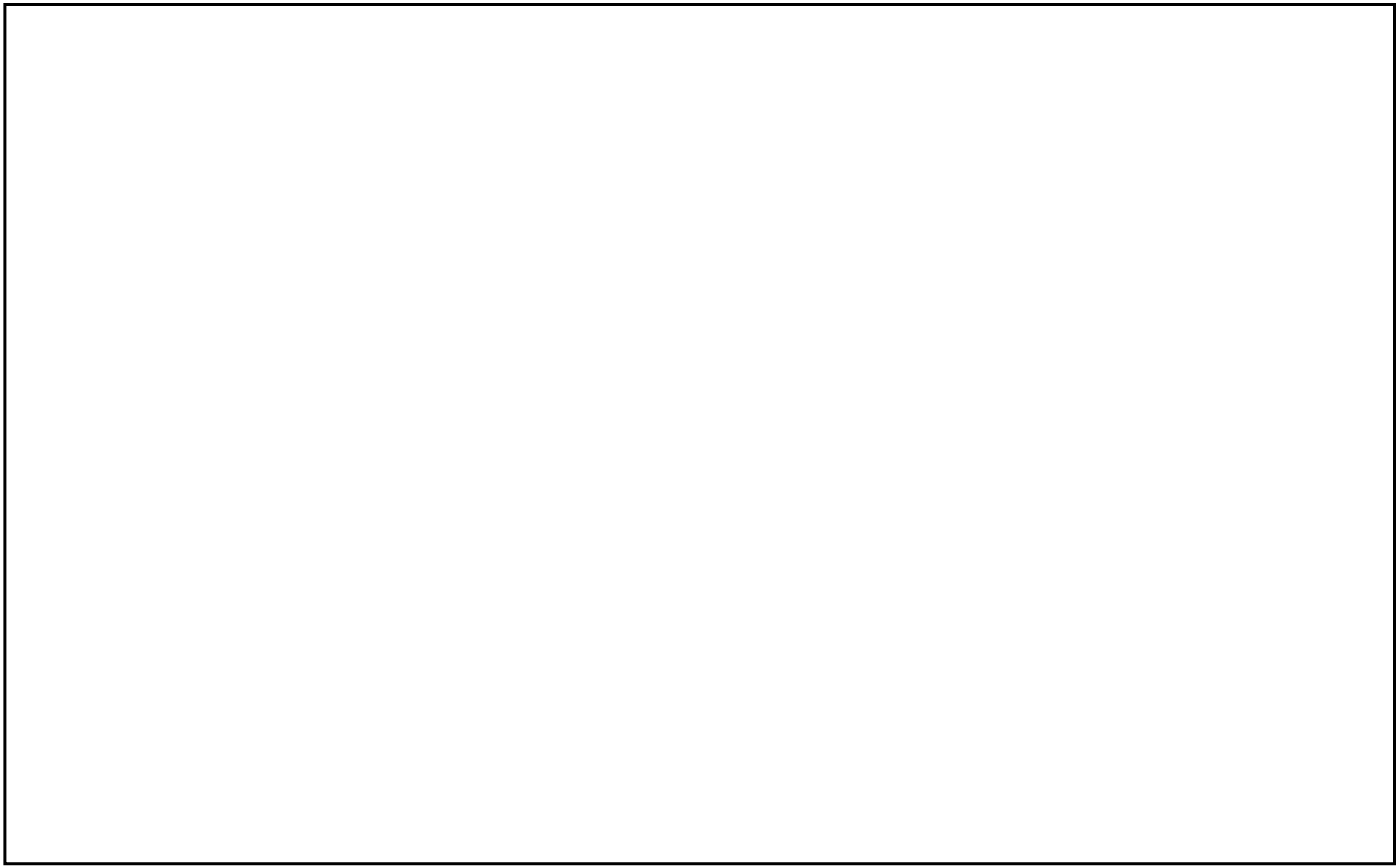
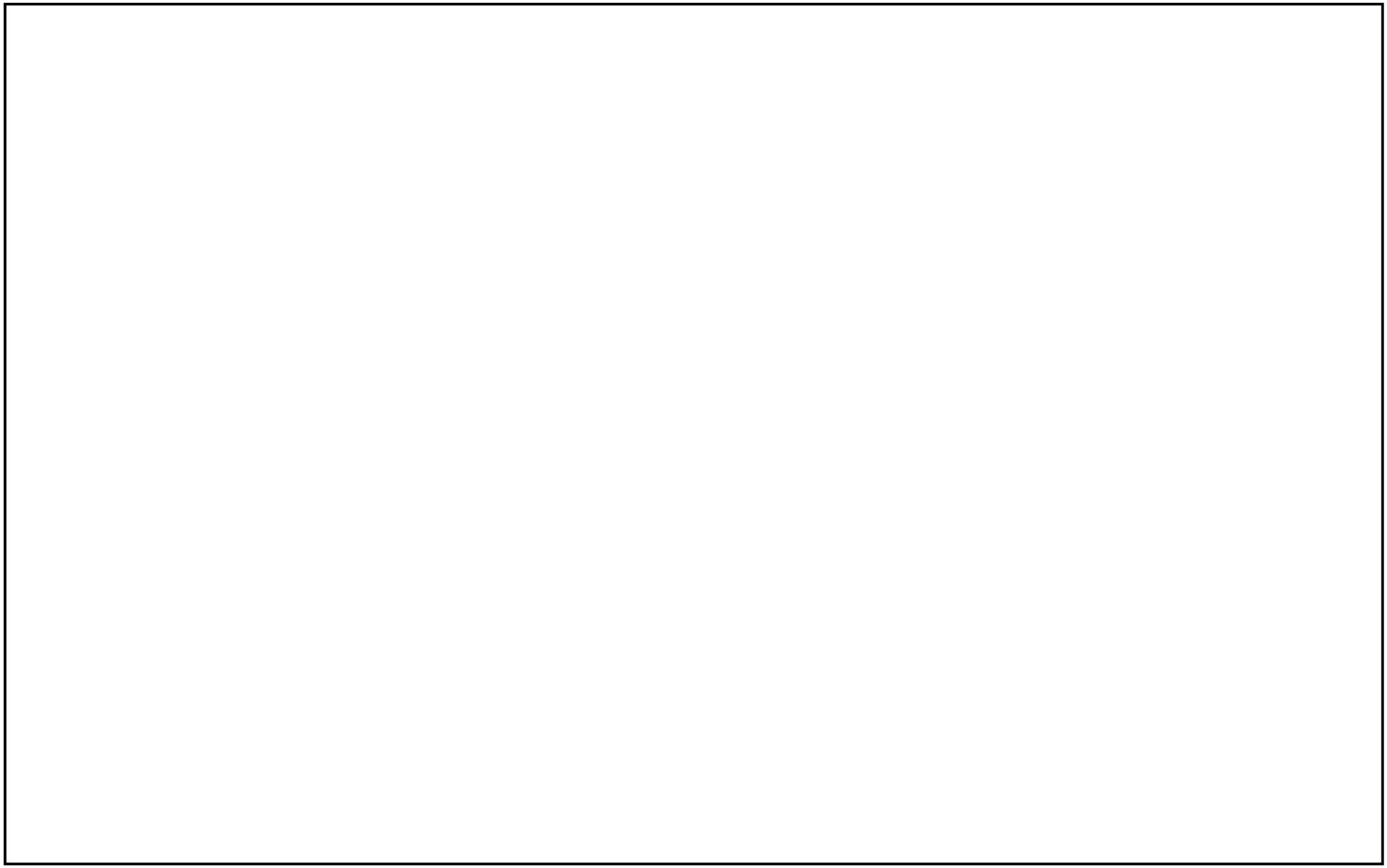


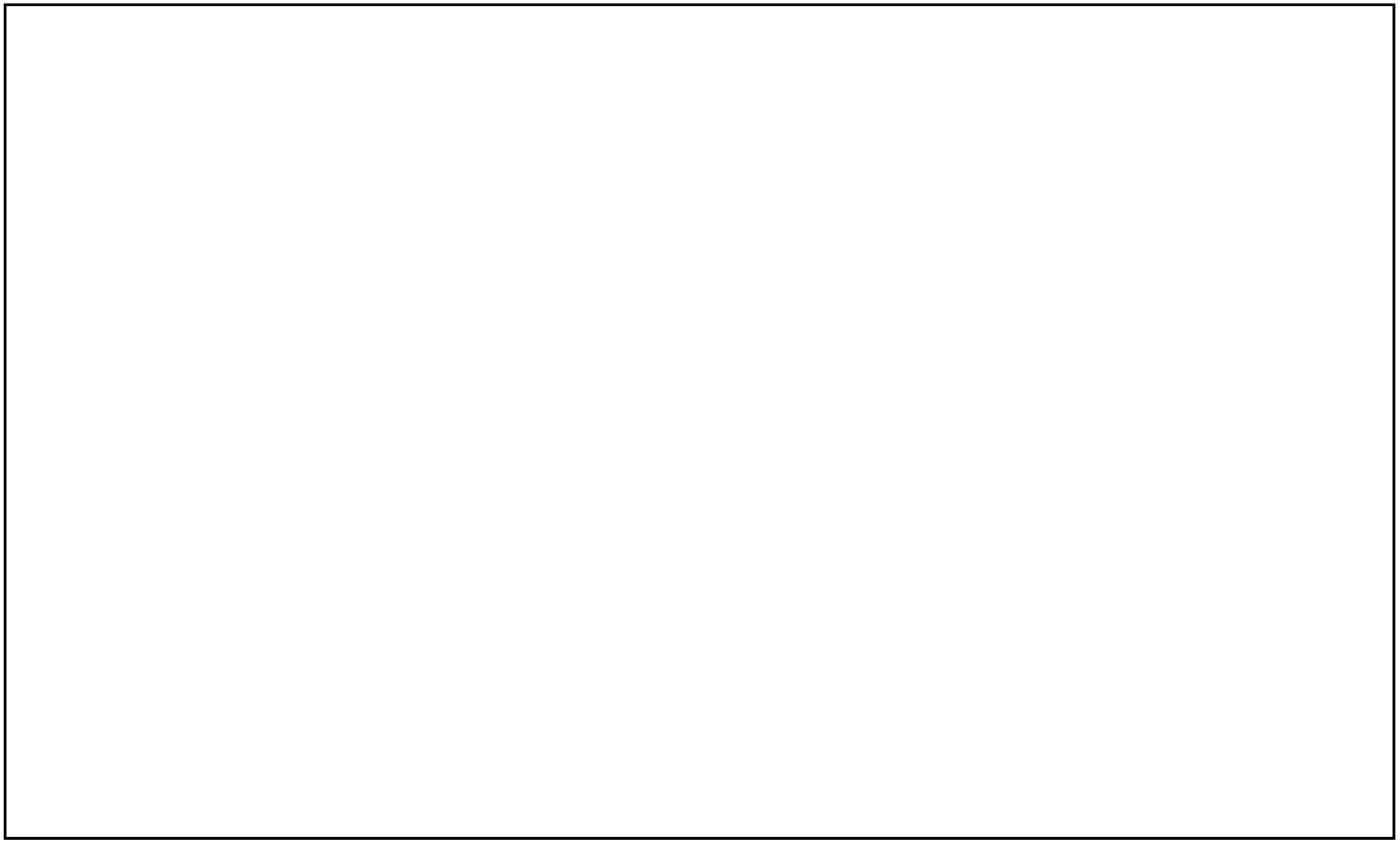
Figure 5. 4 Public Consultation

Attachment 1: List of Affected Land and Unit









Attachment 2: Donation List (Power and Water Supply Sector)

1. The list of sub project required land donation

Project No.	Region	Type
ESE-0805	SAGAING Watlat (Saingnaingkwe)	Village
ESE-0809	SAGAING Depayin (Myae)	Monestry
ESE-1102	MAGWAY Taungdwingyi	Village
TDC-28	AYEYARWADY Pathein	Monestry
TDC-34	TANINTHARYI Langlon	Monestry

2. The criteria of World Bank for Voluntary Land Donations for Community Projects

WB-1: The infrastructure must not be site specific.

WB-2: The impacts must be minor, that is, involve no more than 10 percent of the area of any holding and require no physical relocation.

WB-3: The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities (nonetheless, technical authorities can help ensure that the land is appropriate for project purposes and that the project will produce no health or environmental safety hazards).

WB-4: The land in question must be free of squatters, encroachers, or other claims or encumbrances.

WB-5: Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from *each* person donating land.

WB-6: If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised mitigatory measures must be obtained from those expected to be adversely affected.

WB-7: If community services are to be provided under the project, land title must be vested in the community, or appropriate guarantees of public access to services must be given by the private titleholder.

WB-8: Grievance mechanisms must be available.

Source: Involuntary Resettlement Source Book (World Bank)

Project No. & Name	**(ESE-0805) 33/11kV, 5MVA Substation**
Location	Saing Naing Kwe Village, Watlet Township, SAGAING
Date for site visit	20th November 2015
Surveyor/Confirmed by	Mr. Junya Shinohara, Mr. San Maung Maung, Mr. Aung San and ESE Township Engineer and Township Administrator of Watlet Township
Land Type and Owner	Private Land (U Myint Aung)
Required Land Size	Around 1 Acre

WB-1	This is not location-specific infrastructure project.
WB-2	Candidate area for this project is the rice field. The local business people invest the money (10 million kyat) and bought this land to donate our project. The previous farm owner will move to another farm after the harvest time.
WB-3	The purpose of this project is to extend the National Grid and provide the electricity to the rural area. The local residents believe that after our project they will receive the electricity and they can start running new business like rice mill by using electricity. So that they can have more job opportunities and the project area can develop rapidly.
WB-4	There are no squatters, encroachers, or other claim or encumbrances.
WB-5	The Township Engineer and Administrator verified the ownership of the land and they already have an agreement with land owner to donate this land for 33/11kV 5MVA Substation project.
WB-6	It is not expected loss of income or physical displacement. The previous land owner agreed to move to another place after the harvest time because he already sold the land willingly to U Myint Aung for 33/11kV 5MVA Substation Project.
WB-7	Land titles will be changed to ESE according to the procedure of Settlement of Land Record Department (SLRD) in Myanmar.
WB-8	See attached document.

Sub Project Site

Location (22°26'21.7"N 95°40'26.7"E)

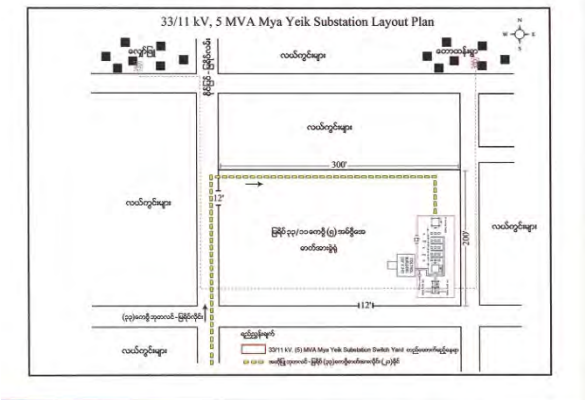
Project No. & Name	**(ESE-0809) 33/11kV, 5MVA Substation**
Location	Myae Village, Depayin Township, SAGAING
Date for site visit	19th November 2015
Surveyor/Confirmed by	Mr. Junya Shinohara, Mr. San Maung Maung, Mr. Aung San and ESE Township Engineer and Land Owner "Batdanta Khay Mar Saryar Bi Won Tha"
Land Type and Owner	Private/Monastery Land (Owner : Batdanta Khay Mar Saryar Bi Won Tha)
Required Land Size	Around 2 Acre

WB-1	This is not location-specific infrastructure project.
WB-2	Candidate area for this project is the Monastery Area, not expected to physical relocation. Currently the land is not using for any business purpose and nobody is living on that land.
WB-3	The purpose of this project is to extend the National Grid and provide the electricity to the rural area.
WB-4	There are no squatters, encroachers, or other claim or encumbrances.
WB-5	The Township Engineer and Administrator verified the ownership of the land and they already have an agreement with land owner to donate this land for 33/11kV 5MVA Substation project.
WB-6	It is not expected loss of income or physical displacement. The project area is currently not using by anyone for any purpose.
WB-7	Land titles will be changed to ESE according to the procedure of Settlement of Land Record Department (SLRD) in Myanmar.
WB-8	See attached document.

Sub Project site

Location (22°30'32.6"N 95°20'31.4"E)

Layout plan

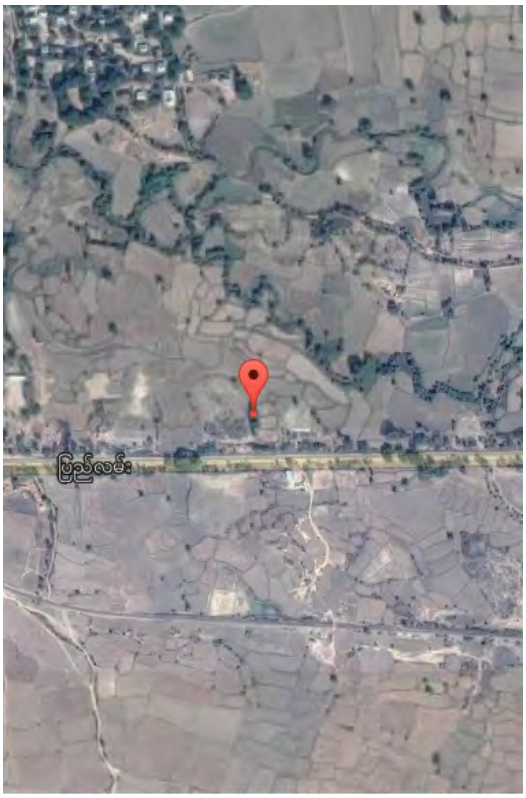


Project No. & Name	**(ESE-1102) 66/11kV, 5MVA Substation**
Location	Satthwa Village, Taungdwingyi Township, MAGWAY Region
Date for site visit	18th November 2015
Surveyor/Confirmed by	Mr. Junya Shinohara, Mr. San Maung Maung, Mr. Aung San and ESE Township Engineer and Village Chief
Land Type and Owner	Private Land (Land Owner : U Pite Pite Village Chief)
Required Land Size	Around 2 Acre

WB-1	This is not location-specific infrastructure project.
WB-2	Candidate area for this project is Private area owned by Village Chief, not expected to physical relocation. Currently the land is not using for any business purpose and nobody is living on that land.
WB-3	The purpose of this project is to extend the National Grid and provide the electricity to the rural area.
WB-4	There are no squatters, encroachers, or other claim or encumbrances.
WB-5	The Township Engineer and Administrator verified the ownership of the land and they already have an agreement with land owner (Village Chief) to donate this land (2Acre) for 33/11kV 5MVA Substation project.
WB-6	It is not expected loss of income or physical displacement. The project area is currently not using by anyone for any purpose.
WB-7	Land titles will be changed to ESE according to the procedure of Settlement of Land Record Department (SLRD) in Myanmar.
WB-8	See attached document.

Sub Project Site

Location (19°52'08.2"N 95°32'47.5"E)



Project No. & Name	**(TDC-28) New Construction**
Location	Pathein Township, AYEYARWADY Division
Date for site visit	23rd November 2015 / 28th February 2016
Surveyor/Confirmed by	Mr. Katsumi Fujii, Mr. Hein Htet Linn and TDC staff from Pathein
Land Type and Owner	Monastery land (Monastery name: **Kuthein Nayone Pagota**)
Required Land Size	Around 50ft*60ft(15m*18m=270 m^2) for Ground Tank 3

WB-1	This is not location-specific infrastructure project.
WB-2	Candidate area for this project occupies less than 10% of total Monastery area, and not expected physical relocation.
WB-3	The purpose of this project is poverty reduction for rural communities in Myanmar. The project criteria such as size of facilities and target area are considering based on the discussion between communities and TDC. And monastery side has agreed to use their space.
WB-4	There are no squatters, encroachers, or other claim or encumbrances.
WB-5	TDC has asked Monastery to prepare the agreement on 28th February, and Monastery has agreed to prepare it.
WB-6	It is not expected loss of income or physical displacement because project site locate in Monastery land.
WB-7	Land titles remain in this Monastery.
WB-8	See Attached document.

Kuthein Nayone Pagota

A part of the land of Pagota

Project No. & Name	**(TDC-34) Extension**
Location	Langlon Township, TANINTHARYI Division
Date for site visit	11th February 2016 / 2nd March and 3rd March 2016
Surveyor/Confirmed by	<Monastery 1> Mr. Ye Soe Oo, Mr. Khun Set Thar, Mr. Htet Thu Soe, and TDC staff from Launglon (11 February) <Monastery 2> Mr. Seigo Goto, Mr. Aung Aung, TDC staff from Langlon (3 March) Ms. Mitsue Umiguchi, Mr. Bo Bo Han, Mr. Ye Soe Oo, Mr. Ye Wing Aung (2 March)
Land Type and Owner	Monastery Land (2 Place) Monastery name 1: Aung Tha Pyay Monastery / 2: Htain Thit
Required Land Size	Monastery1: around 1 acre for reservoir and WTP Monastery2: around 1 acre for reservoir and WTP

WB-1	This is not location-specific infrastructure project.
WB-2	Candidate area for this project occupy less than 10% of total Monastery area, and not expected physical relocation but it may be necessary to cut some trees.
WB-3	The purpose of this project is poverty reduction for rural communities in Myanmar. The project criteria such as size of facilities and target area are considering based on the discussion between communities and TDC. And both monasteries side have agreed to use their space.
WB-4	There are no squatters, encroachers, or other claim or encumbrances.
WB-5	TDC has asked both Monasteries to prepare the agreement on 11 February and 3 March, and Monasteries have agreed to prepare it.
WB-6	It is not expected loss of income or physical displacement because both project sites locate in Monasteries.
WB-7	Land titles remain in both Monasteries.
WB-8	See Attached document.

Attachment 3: Format for Donation Agreement

Donation Agreement on Land Using for …….. Sub-project

This Agreement dated the ---------- Day of ----------, is made between

……., ……...…… Township, ……
State/Region (hereinafter called the 'First Party' or '……')

AND

U/Daw ……., on address of ……..……..…..……
Township, ……. State/Region (hereinafter called the 'Second Party').

WHEREAS

…….. , with ODA loan from Japan (JICA), is planning to conduct a …… sub- project in …….. Township, as part of the Regional Development Project for Poverty Reduction Phase II. In this case, for constructing a ……..…….., the …..…… needs to use the land owned by the Second Party and addressed on ……
……..

IN WITNESS WHEREOF

Both Parties hereby acknowledged and agreed to the followings:

1. The Second Party agrees to donate or give up the land to the First Party (area and location map attached), required for constructing of ……., for the sake of the Public.

2. For this agreement, the …… shall not be necessary to make any payment or compensation to the Second Party, for who the donated area of land is less than 10% of the total land ownership.

3. This Agreement shall be governed by the laws of the Republic of the Union of Myanmar.

4. Any dispute arising from this Agreement shall be resolved through constructive discussion between the two Parties.

5. In case the dispute cannot be resolved, it should be referred to arbitration by Single Arbitration agreed upon by both Parties and his/her decision shall be final.

6. This Agreement shall be consented to/witnessed by relevant leaders/officials as deemed appropriate by the Parties.

7. This Agreement shall become effective on the date first above written.

8. All the foregoing is clearly understood by both Parties.

The First Party:

1.

U/Daw …… Signature Date

Position ……, ……..

Address

2.

U/Daw…… Signature Date

Position ……, ……..

Address

The Second Party:

U/Daw …….. NRC No. Signature Date

Note: to use the official stamps of both parties.

Witnessed by:

I/We confirm that the content of this Agreement has been read and explained to me/us in a way that is clearly understandable. We have freely signed this Agreement without any duress whatsoever.

1.

U …… Signature Date

Position

Address

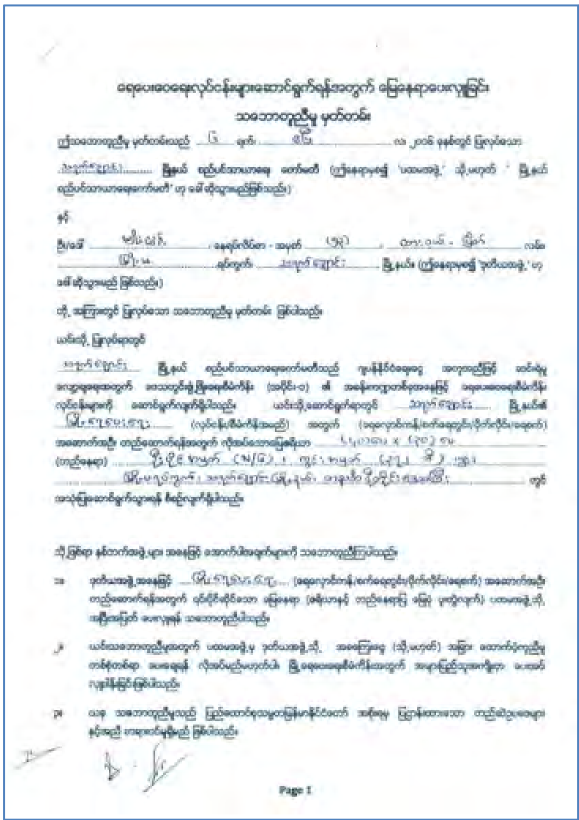
2.

U …… Signature Date

Position

Address

Attachment 4: Sample of Donation Agreement (Phase 1 case)



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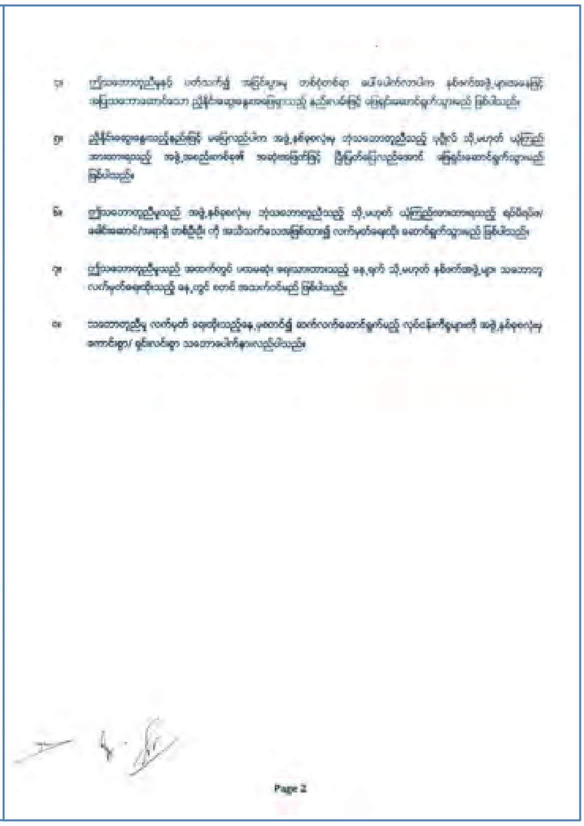

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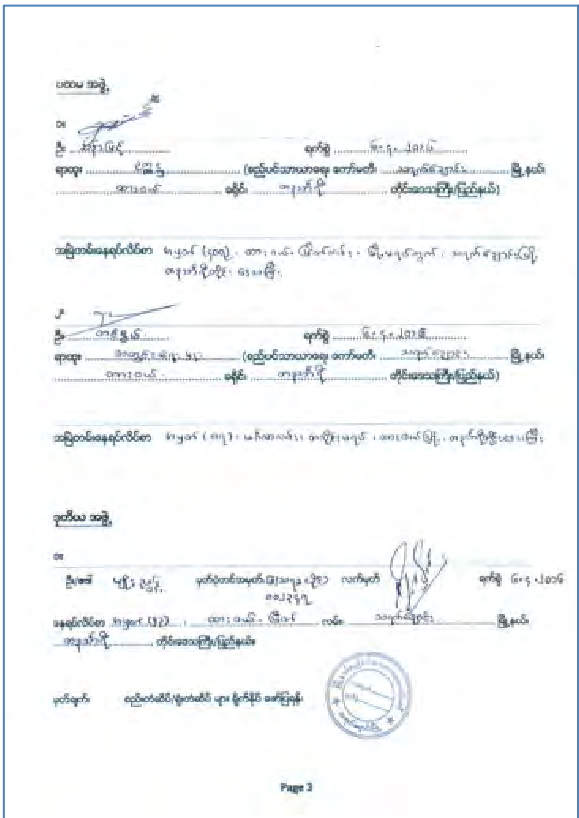

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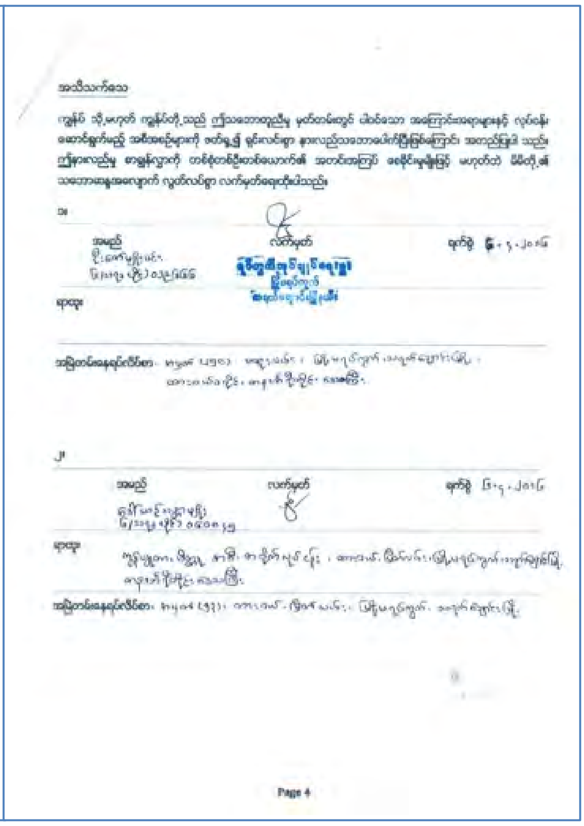

Page 4

Attachment 5: List of Sub Project required the land from Ministries

No	Project No	Region/State	Township	Item	Ministry	Size
1	TDC-16	Kayin	Than Daung Gyi	Extension (60000 G/day)	Ministry of Environmental Conservation and Forestry (MONREC)	100 m^2 and 200 m^2 (2 Pump House)
2	TDC-29	Ayeyarwady	Mayungmya	New (0 G/day)	Ministry of Environmental Conservation and Forestry and Ministry of Electrical Power (MONREC & MOEE)	1.7 Acre(MONREC) 0.7 Acre (MOEE)
3	TDC-30	Bago	Bago	Extension (1064000 G/day)	Ministry of Agriculture and Irrigation (MOAI)	1.5 Acre
4	TDC-44	Shan	Lashio	Extension (2900000 G/day)	Ministry of Environmental Conservation and Forestry (MONREC)	1 Acre
5	TDC-54	Mon	Thanbyuzayut	Extension (16000 G/day)	Ministry of Environmental Conservation and Forestry & Ministry of Agriculture and Irrigation (MONREC & MOAI)	200′ *300′ (WTP) MOAI (Intake)

Attachment 6: Questionnaire Form used in the Socio-Economic Survey

Questionnaire for Environmental and Social Survey
On Project-affected Units and Affected People, the Losses, Income and Livelihood of the Affected People

This questionnaire is about the environmental works in upgrading the …….. Road / installation of …… sub-project, in which the detailed information about the project-affected units, affected people, the losses, income and livelihood of those affected people, existing in the **road width** (……..… feet) or the sub-project area, are to be collected through field discussions, individual or group meetings.

The following two main subjects are focused in this questionnaire.

Part (A) Analysis on Project-affected Units (PAUs), Project-affected People (PAPs), and the Losses
Part (B) Survey on Income and Livelihood of the Affected People

Survey Sr. Number _____ Survey Date: _____

Enumerator Signature _____ Name _____ Position/Org. _____

Inspector Signature _____ Name _____ Position/Org. _____

Survey No. _____ Name of Household Head/Asset Owner _____

Village _____ Village Tract_____ Location/Mile Post _____

Township_____ District _____ Region / State _____

Part (A) Analysis on Project-affected Units (PAUs), Project-affected People (PAPs), and the Losses

1. Affected Units in the road width

No.	Affected Unit	No. of Unit	Legal Status	Size of the Land (Sq. Feet)	Housing Structure			Remark
					No. Story	Roof	Post/ Beam	
1	House 1							
2	House 2							
3	Shop							
4	Stall							
5	Community owned Building							
6	Religious Building							
7	Tree (Type 1)							
8	Tree (Type 2)							
9	Tree (Type 3)							
10	Power Pole							
11	Farm Land							
12	Housing Land							
13	Commercial Land							
14	Religious Land							
15	Other							

NOTE: In the Remark column, put the specific name and significant information, if they are different form the former descriptions.

- Legal Status (a) Legal (b) Illegal
- No. of Story (a) One Story (b) Two Story
- Roof (a) Bamboo /Leaf /Tarpaulin (b) Zinc Sheet (c) Brick Roofing
- Post /Beam (a) Bamboo (b) Wood (c) Brick

Part (B) Survey on Income and Livelihood of the Affected People

1. Information of the Respondents and Household Head

Respondent		Household Head/ Asset Owner	
Name	_____	Name	_____
NRC No.	_____	NRC No.	_____
Age	_____	Age	_____
Sex	_____	Sex	_____
Education	_____	Education	_____
Relation to Household Head	_____	Occupation	_____
Ethnicity	_____	Ethnicity	_____
Religion	_____	Religion	_____

2. Household Structure

- To collect only the people who are actually living at the present time.

1. No. of Household Member	2. Sex	3. Age	4. Relation to Household Head	5.Education	6. Occupation
M 1					
M 2					
M 3					
M 4					
M 5					
M 6					
M 7					
Total HH Member =					

Sex : (a) Male (b) Female
Age : (a) 5 yr and below (b) from 6 yr to 17 yr (c) from 18 yr to 60 yr (d) 61 yr and above
Relation to HH Head : (a) HH Head (b) Spouse (c) Son/Daughter and those in law (d) Parent © Uncle/Aunty (f) Nephew (g) Grand-son/daughters (h) Others
Education : (a) Monastery Education (b) Primary School (c) Middle School (d) High School (e) University (f) Graduate
Occupation : (a) Total Dependent (b) Student (c) Assistant to HH Head (d) Casual Labor © Skilled Labor (f) Shop Owner (g) farmer (h) Livestock/Fishery (i) Garden/Rubber Plantation (j) Gov. Staff (k) Company or Other Staff (l) Others

3. Household Assets

(3.1) Ownership of a house in other place ---------- [(a) No (b) Yes] , if Yes,

3.1.1 Location ---------- (a) near or in the same village (b) in other village or township

3.1.2 No. of Story ---------- (a) One Story (b) Two Story

3.1.3 Roof ----------(a) Bamboo /Leaf /Tarpaulin (b) Zinc Sheet (c) Brick Roofing

3.1.4 Post /Beam---------- (a) Bamboo (b) Wood (c) Brick

(3.2) Ownership of livestock animals ---------- [(a) No (b) Yes] , if Yes,

Kind of Livestock animals	(1) Chicken	(2) Duck/Goose	(3) Pig	(4) Sheep	(5) Goat	(6) Buffalo	(7) Cow/Ox	(8) Others
Number								

(3.3) Ownership of Transportation

Kinds of HH Facilities	(1) Bicycle	(2) Motorbike	(3) Car
Nmumber			

(3.4) Situation in Using the Toilet ---------- [(a) Not using the Toilet (b) Shared Toilet (c) HH owned Toilet]

Electricity]

(3.5) Situation in Using the Electricity ------- [(a) No Electricity (b) Shared Electricity (c) Own Generator (d) Gov.

4. Transportation

(4.1) Means of Transportation to Township ……

[(a) On foot / Walking (b) Bicycle (c) Motorbike (d) Bus/ Ferry (e) Others] , if the answer is others, pls note ……

(4.2) Frequency of trip to Township (per month) ……[(a) Nil (b) Between 1 and 3 (c) Between 4 and 9 (d) 10 and above]

(4.3) Accessibility ---------- [(a) Very Easy (b) Easy (c) Normal (d) Difficult (e) Very Difficult]

5. Household Income

To discuss about the **monthly average** income during the last 12 months.

No.	Type of Occupation	Unit	Rate	Quantity	Amount	Remark
5.1	Shop Owner					
5.2	Stall Owner					
5.3	Casual Labor					
5.4	Skilled Labor					
5.5	Farmer					
5.6	Livestock Farmer/Fishery					
5.7	Garden/Rubber Plantation					
5.8	Government Staff					
5.9	Company or Other Staff					
5.10	Totally Dependent / No Job					
5.11	Others					
	Total					

6. Monthly Expenditure**s** during the last 12 months (at least) ----------Kyat.

7. Remark or opinion on the impacts and benefits after this road project has successfully implemented.

Impact Type	(1) Not so good	(2) Good a little	(3) Good enough	(4) Very Good	(5) Cannot guess
Your Household					
Regional Development					

Attachment 7: Document for Stakeholders Meeting (Road Sector)

Preparatory Survey for Regional Development Project for Poverty Reduction Phase - II

လမ်းတံတားကဏ္ဍအဆောင်ပြုခြင်တင်ရေးလိုင်ရာကိစ္စရပ်များအား

ပြည်သူလူထုထံမှ စတွေ့ဆုံရှင်းလင်းပွဲ

MaC-02/03/06/17

ဇောင်ဦး - လိပ်သို - ယာဒို - လွိုင်ကော် - ဟိုပုံးလမ်း

၂၀၁၆ ခုနှစ်၊ မတ်လ (၁၀)ရက် - ဆီတူး၊ ဖယ်ဆိုပြို့နယ်၊ ရွှမ်းပြည်နယ် (ဇောင်ဦး)
၂၀၁၆ ခုနှစ်၊ မတ်လ (၀၂)ရက် - လိပ်သိုပြို့နယ်ခွဲ၊ သံတောင်ကြီး၊ ကရင်ပြည်နယ်

1

၂။ စီမံကိန်း လျာထားအစီအစဉ်များ

စီမံကိန်း နောက်ခံသဘောပြင်း

ကျေးလက်နေပြည်သူများ သယ်ဆဲ့ရန်ကုန်
ကာလကြာမြင့်စွာ ခံစားခဲ့ခြင်းနှင့်
မြို့မြေနှင့်တန်းတူညီမျှသည့်
အခွင့်အလမ်းဓာတ်များ နည်းပါးခဲ့ခြင်း။

ကျေးလက်ဒေသတွင် လူမှုအဖြေဖိ
အဆောက်အဦးများ ဖွဲ့ဖြိုးတိုးတက်မှု နေးကွေးခြင်း။

ကျေးလက်နှင့်မြို့ပြ သင်းချိုမှုသာကွာဟမှု မြင့်မားလာခြင်း။

စီမံကိန်း ရည်ရွယ်ချက်

- အခြေခံအဆောက်အဦးများ တိုးတက်ဖွံ့ဖြိုးရန်။ (လမ်းတံတား ဆောင်းမွန်ခရေး၊ လျှပ်စစ်ဓာတ်အားတိုးမြှင့်ရရှိရေး နှင့် သောက်သုံးရေရေးပေးဝေရေးလုပ်ငန်းများ)
- ကျေးလက်ဒေသရှိ ပြည်သူလူထုဘဝ တိုးတက်မြင့်မားရန်။

4

အခမ်းအနား အစီအစဉ်

၁။ အဖွင့်အမှာစကားပြောကြားခြင်း
၂။ စီမံကိန်း လျာထားအစီအစဉ်များ
၃။ လိုက်နာဆောင်ရွက်သွားမည့် တည်ဆဲဥပဒေများ၊ လမ်းညွှန်ချက်များ
၄။ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (ဆိုးကျိုးသက်ရောက်မှု ပမာဏ)
၅။ လေ့လာပြင်ဆင်မှု အချိန်ဇယား လျာထားချက်
၆။ ထွေးနွေးမေ့မြန်းခြင်းနှင့် ပြန်လည်ဖြေကြားခြင်းအစီအစဉ်
၇။ အခမ်းအနားပိုးဆုံးကြောင်းကြေညာခြင်း

5

၂။ စီမံကိန်း လျာထားအစီအစဉ်များ

စီမံကိန်းများ

လမ်းတံတားကဏ္ဍ စီမံကိန်း (၁၁) ခု	လျှပ်စစ်ကဏ္ဍ စီမံကိန်း (၅၆) ခု	သောက်သုံးရေ ပေးဝေရေးကဏ္ဍ (၂၉) ခု

ဆက်စပ်နေသော ဝန်ကြီးဌာနများ၊ ဦးစီးဌာနများ၊ အဖွဲ့အစည်းများ

- နိုင်ငံခြားစီးပွားဆက်ဆံရေးဦးစီးဌာန၊ အမျိုးသားစီမံကိန်းနှင့်စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာန
- လမ်းမီးစီးဌာန၊ ဆောက်လုပ်ရေးဝန်ကြီးဌာန
- တံတားဦးစီးဌာန၊ ဆောက်လုပ်ရေးဝန်ကြီးဌာန
- လျှပ်စစ်ဓာတ်အားဖြန့်ဖြူးရေးလုပ်ငန်း၊ လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန
- ပြည်နယ် /တိုင်း /မြို့နယ် စည်ပင်သာယာရေးအဖွဲ့များ၊ ကျေးလက်ဒေသဖွံ့ဖြိုးရေးဦးစီးဌာန၊ ဓမ္မမြို့ရေး၊ ရေလုပ်ငန်းနှင့်ကျေးလက်ဒေသဖွံ့ဖြိုးရေးဝန်ကြီးဌာန

6

၁။အဖွင့်အမှာစကားပြောကြားခြင်း

၂။ စီမံကိန်း လျာထားအစီအစဉ်များ

လမ်း/တံတား စီမံကိန်းစာရင်း

စီမံကိန်း အမှတ်	ပြည်နယ်/တိုင်း ဒေသကြီး	စီမံကိန်းအမည်
MaC-02	**ကယား**	**ဇောင်ဦး - လိပ်သို - ယာဒို - လွိုင်ကော် - ဟိုပုံးလမ်း**
MaC-03	**တနင်္သာရီ**	**ဇောင်ဦး - လိပ်သို - ယာဒို - လွိုင်ကော် - ဟိုပုံးလမ်း**
MaC-04	ချင်း	ဂန့်ဂေါ - အိုက်ကားလမ်း
MaC-05	စစ်ကိုင်း	မြန်မလး - တာကော်း - ဝန်းမော် - မြစ်ကြီးနားလမ်း
MaC-06	**ပဲခူး**	**ဇောင်ဦး - လိပ်သို - ယာဒို - လွိုင်ကော် - ဟိုပုံးလမ်း**
MaC-07	မကွေး	ဂန့်ဂေါ - အိုက်ကားလမ်း
MaC-12	မွန်	ကလော့ - ဓလိဈလမ်း
MaC-14	ရှမ်းပိုင်	ဝေဘိုးချောင်း - ဝွလမ်း
MaC-17	**ရှမ်း**	**ဇောင်ဦး - လိပ်သို - ယာဒို - လွိုင်ကော် - ဟိုပုံးလမ်း**
MaC-18	ရောဝတီ	ဝေဘိုးချောင်း - ဝွလမ်း
ဗုဒ္ဓဖေါင်း - စီမံကိန်း (၁၀)ခု		

၂။ စီမံကိန်း လျာထားအစီအစဉ်များ

စီမံကိန်းအတွက်လျာထားသည့် အကြမ်းဖျင်း ဘီဇိုင်း

ပြည်နယ်/တိုင်းဒေသကြီး	လမ်းပိုင်းတည်နေရာ		လျာထားသည့် လုပ်ငန်းများ
	မှ	သို့	
ပဲခူး	၇/၆	၁၈/၂	လမ်းအကျယ် – ၃၀ ပေ ကတ္တရာလမ်းသား - ၁၈ ပေ အမာခံလမ်းပခုံး – ၅ ပေ (နှစ်ဘက်စလုံး) ရေစီးမြောင်း လိုအပ်သည့်နေရာများတွင် တံတားကြီး ငယ်များ တည်ဆောက်သွားမည်။
ကရင်	၂၀/၂	၆၉/၀	
ချင်း	၇၅/၀	၉၉/၅	
ကယား	၉၉/၅	၁၁၈/၄	အထက်ပါလမ်းပိုင်းနှင့် ပုံစံတူဖြစ်သော်လည်း ကတ္တရာလမ်းသားအကျယ် – ၂၄ ပေ နီးပါး သို့မဟုတ် ၇ မီတာခန့် ဆောင်ရွက်သွားရန် စီစဉ်လျက်ရှိပါသည်။

မှတ်ချက်။ ။ လမ်းတစ်လျှောက်တွင်တည်ရှိသော အချို့ကျေးရွာများအတွင်း လမ်းပိုင်းနေရာများမှာ လမ်းဧရိယာ သီသီသာသာ ကျဉ်းမြောင်းနေသည်ကို တွေ့ရှိရပါသည်။ ကျေးရွာအလိုက် လမ်းအကျယ် ၃၄ ပေ၊ ၉ ပေ ၃၀၊ အချို့ကျေးရွာများ ၂၆ ပေခန့်အထိ ကျဉ်းမြောင်းသည်ကို တွေ့ရပါသည်။ လမ်းအကျယ်ကို လမ်းတစ်လျှောက်လုံး တစ်ပြေးညီဆောင်ရွက်ပါက ဒေသခံပြည်သူအမြောက်အများအား ထိခိုက်သက်ရောက်မှု လွန်စွာကြီးမားမည် ဖြစ်ပါသည်။ အချို့ကျေးရွာများတွင် တစ်ရွာလုံးရှိအိမ်ခြေများအားလုံးနီးပါး ပယ်ရှားရွှေ့ပြောင်းရမည့်အခြေအနေမျိုး ဖြစ်ပါသည်။ ထို့ကြောင့် ၎င်းကျေးရွာများအတွင်း လမ်းဧရိယာချဲ့ထွင်မှုကို ယခုစီမံကိန်းအနေဖြင့် ဆောင်ရွက်မည်မဟုတ်ဘဲ ချန်လှပ်သွားမည်ဖြစ်ပါသည်။

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၃။ လိုက်နာဆောင်ရွက်ရမည့် ဥပဒေများနှင့် လမ်းညွှန်ချက်များ

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၁၄)
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆိုင်ရာလုပ်ထုံးလုပ်နည်းများ (၂၀၁၆)
- လယ်ယာမြေသိမ်းယူခြင်းအက်ဥပဒေ (၁၈၉၄)
- လယ်ယာမြေဥပဒေ (၂၀၁၂)
- လယ်ယာမြေနည်းဥပဒေများ (၂၀၁၂)
- JICA အဖွဲ့အစည်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာ လမ်းညွှန်ချက်များ (၂၀၁၀)
- ကမ္ဘာ့ဘဏ်အသုံးပြုသောမူဝါဒများ

10

၂။ ကရင်ပြည်နယ်အတွင်း စီမံကိန်းငယ်များ ပြင်ဆင်ထားရှိမှု

စီမံကိန်းအမှတ်	စီမံကိန်းအမည်
MoC-03	ဆောက်ရှု - လိႈင်းဘွဲ - ဘားအံ - ကျိုက်မရော - ဝိုင်ကံ
TDC-14	သာဆည်
TDC-16	သံတောင်ကြီး
TDC-18	ကြာအင်းဆိပ်ကြီး
TDC-19	ကော့ကရိတ်

8

၄။ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း (ဆိုးကျိုးသက်ရောက်မှု ပမာဏ)

<u>ယခုစီမံကိန်းသည် ခ အဆင့်စီမံကိန်းအတန်းအစား ဖြစ်သောကြောင့် အခြေခံအားဖြင့် ဆိုးကျိုးသက်ရောက်မှု ကြီးမားမည်မဟုတ်ပါ။</u>

ပတ်ဝန်းကျင်ညစ်ညမ်းမှု

- စီမံကိန်းဆောင်ရွက်စဉ်ကာလအတွင်း စက်ယန္တရားကြီးများ လုပ်ငန်းဆောင်ရွက်မှုကြောင့် ဖုန်မှုန့်များပျံ့လွင့်မှု ဖြစ်ပေါ်စေနိုင်ပါသည်။
- နေ့အချိန်တွင် ဆောက်လုပ်ရေးလုပ်ငန်းဧရိယာအတွင်း ဆူညံသံနှင့် တုန်ခါမှုများ ခံစားရနိုင်ပါသည်။
- ဆောက်လုပ်ရေးလုပ်ငန်းနှင့် စီးဆိုရောင်သုံးပစ္စည်းများမှ အညစ်အကြေးများ ဖြစ်ပေါ်လာနိုင်ပါသည်။

သဘာဝပတ်ဝန်းကျင်

- စီမံကိန်းဧရိယာအတွင်း လုပ်ငန်းလိုအပ်ချက်အရ ရှင်းလင်းရာတွင် သစ်ပင်ကြီးငယ်များ ခုတ်လှဲခံရနိုင်ခြင်း။

လူမှုပတ်ဝန်းကျင်

- စီမံကိန်းမြေရယူခြင်း။
- စက်ယန္တရားကြီးများဖြင့်လုပ်ငန်းဆောင်ရွက်နေစဉ်အတွင်း ယဉ်မတော်မဆမှုများ ဖြစ်ပွားနိုင်ခြင်း။

11

၂။ ရှမ်းပြည်နယ်အတွင်း စီမံကိန်းငယ်များ ပြင်ဆင်ထားရှိမှု

စီမံကိန်းအမှတ်	စီမံကိန်းအမည်
MoC-17	ဆောက်ရှု - လိႈင်းဘွဲ - ဘားအံ - ကျိုက်မရော - ဟိုပုံးကာမ်း
ESE-0701	ဟိုပုံး (ပင်လောင်)
ESE-0703	တာမလေ (ဖယ်ခုံ)
ESE-0704	ကျိုင်းတောင်း
ESE-0707	တာမလေ
TDC-37	တောင်ကြီး
TDC-38	ဆောင်ဝန်း
TDC-41	နမ့်ဝန်
TDC-42	ကျိုင်းလတ်
TDC-43	ပင်လောင်း
TDC-44	လားရှိုး
TDC-46	ကျောက်မဲ
TDC-49	ကျိုင်းတောင်း

9

၅။ လေ့လာပြင်ဆင်မှု အချိန်ဇယား လျာထားချက်

- ကြိုတင်ပြင်ဆင်မှုများ (၂၀၁၅ ခုနှစ်၊ နိုဝင်ဘာလ မှ ဒီဇင်ဘာလ အထိ)
- ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (၂၀၁၆ ခုနှစ်၊ ဇန်နဝါရီလ မှ စက်တင်ဘာလ အထိ)

နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း၊ အကဲဖြတ်ဆန်းစစ်ခြင်း၊ ထိခိုက်မှုလျော့ချရေး နည်းလမ်းများ စသည်တို့ ပါဝင်ပါသည်။

- ပြန်လည်နေရာချထားခြင်းအတွက် လေ့လာပြင်ဆင်မှု (၂၀၁၆ ဇန်နဝါရီ - ၂၀၁၆ မေ)
  - စီမံကိန်းစတင်ကြောင်း ပိုင်းခြားသတ်မှတ်သည့်နေ့အား ကြေညာခြင်း
  - စီမံကိန်းကြောင့်ထိခိုက်နစ်နာသူများအား လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်း
- ပြည်သူလူထုတွေ့ဆုံရှင်းလင်းပွဲ
  - ၂၀၁၆ ခုနှစ်၊ ဖေဖော်ဝါရီလ ၂၆ - ၂၇ ရက် (ရေနံပေးဝေရေးနှင့် လျှပ်စစ်ကဏ္ဍ၊ ဧရာဝတီတိုင်းဒေသကြီး)
  - ၂၀၁၆ ခုနှစ်၊ မတ်လ ၃ - ၄ ရက် (ရေနံပေးဝေရေးနှင့် လျှပ်စစ်ကဏ္ဍ၊ တနင်္သာရီတိုင်းဒေသကြီး)
  - ၂၀၁၆ ခုနှစ်၊ မတ်လ ၁၁ - ၁၂ ရက် (လမ်းတံတားကဏ္ဍ၊ ကရင်ပြည်နယ် နှင့် ရှမ်းပြည်နယ်)
- စီမံကိန်းအဆိုပြုချက်များကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနသို့ တင်သွင်းခြင်း (၂၀၁၆ ခုနှစ်၊ .... လ)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာနမှ စီမံကိန်း အတန်းအစား ဆုံးဖြတ်ခြင်း (၂၀၁၆ ခုနှစ်၊ .... လ)
- ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာ နှင့် ပြန်လည်နေရာချထားခြင်းအစီအစဉ်ကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနသို့ တင်သွင်းခြင်း (၂၀၁၆ ခုနှစ်၊ အောက်တိုဘာလ)

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၆။ ဆွေးနွေးဖေးမြန်းခြင်းနှင့် ပြန်လည်ဖြေကြားခြင်းအစီအစဉ်

၇။ အခမ်းအနားပြီးဆုံးကြောင်း ကြေညာခြင်း

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ကျေးဇူးတင်ပါသည်။