

Environmental and Social Management Framework

Sri Lanka Landslide Mitigation Project
2018-2021

Prepared for:

Sri Lanka Landslide Mitigation Project
Asia Infrastructure Investment Bank
(AIIB)

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Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
DF	Department of Forest
DS	Divisional Secretary
DWLC	Department of Wild Life Conservation
ES	Environmental & Social
E & SU of PMU	Environmental & Social Unit of Project Management Unit
E & S & H & S unit of PMU	Environmental & Social & Health & Safety Unit of Project Management Unit
ESMF	Environmental and Social Management Framework
ESMP	Environmental Social Management Plan
SSE & SMP	Site Specific Environmental and Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological Survey & Mines Bureau
LRC	Land Reforms Commission
NBRO	National Building Research Organization
RDA	Road Development Authority

Chapter 1 - Introduction to the project

1.1 Project background

The government of Sri Lanka intends obtaining a loan from the Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying unstable slopes in high risk areas of 11 landslide prone districts of 06 provinces of the country. The project will implement mitigation measures to protect key infrastructures in the area such as roads, schools, high risk communities, rail track and service systems to ensure safety of communities, from the frequently occurring landslides.

The AIIB is planning to provide a loan to Government of Sri Lanka for the implementation of the project. The investment has three components,

- i. Component 1 - Civil works and associated designs and construction supervision and /management for landslide mitigation
- ii. Component 2 - Policy and regulation enhancement related to landslide management
- iii. Component 3 - Institutional capacity building

1.2 Environmental and social safeguards and mandates

The project requires to be implemented in accordance with environmental and social safeguards and mandates of the AIIB bank and that of Sri Lanka. Considering the nature of project actions and its implementation, AIIB requested a preparation of an **Environmental and Social Management Framework** by the borrower.

The purpose of the environmental and social assessment framework (ESMF) is to provide a guide for application of AIIB safeguards and national environmental and social mandates during the implementation of project actions. The project implementing agency (NBRO) is expected to ensure implementation of environmental and social management plans (prepared According the ESMF) during all phases of project implementation so that the impacts on the environment and community are minimum.

The ESMF will be applied to 147 sites of the component 1 of the project as well as the environmental and social management of subprojects that will be identified during the course of the project. The screening and assessment complied with AIIB environmental and social safeguard policies as well as the borrowing country's environmental social safeguards system (CSS).

1.3 Site specific environmental and social impact assessments and management plans

During the scoping exercise it was revealed that the environmental, social, and health & safety conditions are more site specific which should be addressed specific to site conditions. Therefore, the ESMF recommended site specific environmental and social assessments followed by **Site Specific Environmental and Social Management Plan (SSE&SMP)** for each site. The SSE&SMP gives planning, design, construction and operation phase environmental, social, and health & safety management measures to be considered in the project Implementation. The plans will be prepared for each site by an in-depth environmental and social assessment. The assessment will be used to,

- i. Identify sensitive environmental and social elements in the project influence area
- ii. Identify significant environmental and social impacts due to project actions
- iii. Identify project and site specific health and safety issues need to be mitigated
- iv. Propose environmental, social and health and safety mitigation measures for all significant impacts

- v. Decide appropriate environmental and social monitoring requirements specific to this project
- vi. Decide relevant environmental regulation and procedures to be followed during project implementation phase specific to the projects and sites

For all sites site specific environmental and social assessments will be carried out and site specific environmental and social management plans will be prepared based on the assessment. The ToR for site specific environmental and social assessment is given in Annexure I.

1.4 Current level of risk imposed by the landslides

Landslides have become a frequent natural hazard, and a pressing environmental problem in central highlands of Sri Lanka, that disturbs its life, property and constructed facilities, infrastructure and natural environment. Mountainous and hilly regions cover nearly 20% of the total land area of the country, where about 30% of the total population live. At present, twelve mountainous districts of Sri Lanka namely, Matale, Kandy, Badulla, Nuwara-Eliya, Kegalle, Ratnapura, Kalutara, Moneragala, Galle, Matara, Hambantota and Kurunegala are landslide prone. Fig 1 shows the distribution of landslide from 1947 to 2002, 2003 and 2007. According to the information Ratnapura is the most vulnerable district for landslide hazard. Other districts with high vulnerability to landslide hazard are Kalutara, Nuwara-Eliya, Badulla and Matara. The incidents of landslides in past 10 years show an increasing trend mainly due to anthropogenic activities and increased rainfall intensity due to climate change. Fig 2 shows no of deaths due to landslide form 1964 -2017.

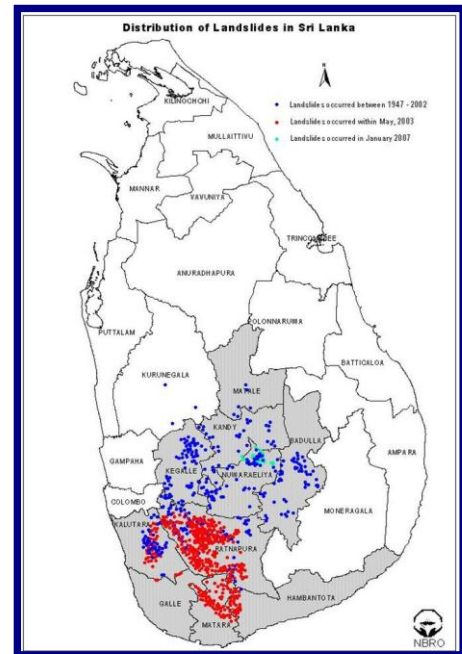


Figure 1: Landslide distribution map of Sri Lanka; Source: NBRO

1.4.1 Damage to transport infrastructure

The transport infrastructure is the worst damaged by the landslides and unstable slopes. During seasonal rains the roads in the hill country are unsafe for travelling due to landslides and slope failures. The road network at many locations become obstructed by moving debris and boulders resulting periodic closure of roads, restricting the traffic flow, regular maintenance of the roads to clear debris and boulders. According NBRO statistics, at present, about 15km of roads length in total is affected by the landslides/slope failures.

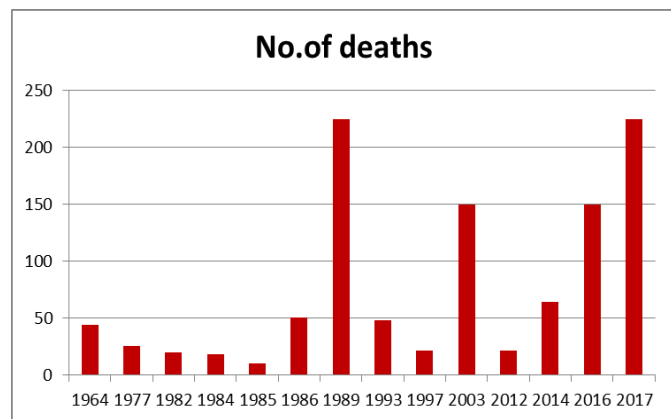


Figure 2: Chronology of deaths due to landslides; Source: NBRO

1.5 National programs on landslide hazard risk management

The National Building Research Organization (NBRO) is the national focal point for management of landslide disaster risk. Once NBRO has been identified as the key agency for landslide hazard risk management, several projects were initiated aiming mitigation of hazard risk.

1.5.1 Landslide Hazard Zonation Mapping Project (LHMP)

The aim of Landslide Hazard Zonation Mapping Project (LHMP) is to study and identify the distribution of landslide potential in the central highlands. The zonation criteria developed by NBRO with extensive expert inputs categorizes landslide under 4 categories: cat-1: *Landslides not likely to occur*, cat-2: *modest level of landslide hazard exist*, cat-3: *landslides to be expected*, cat-4: *landslides most likely to occur*.

Presently, 1:50,000 scale hazard zonation maps developed based on this categorization are available for all landslide prone districts in the country. These maps are used in evaluating the distribution of landslide susceptibility at national/district/divisional level, and also in managing landslide hazard risk. The fig 3 shows the spatial distribution of landslide hazard zones in landslide prone districts of the country.

From landslide hazard zonation mapping NBRO has estimated levels of risk in lands within landslide hazard prone districts.

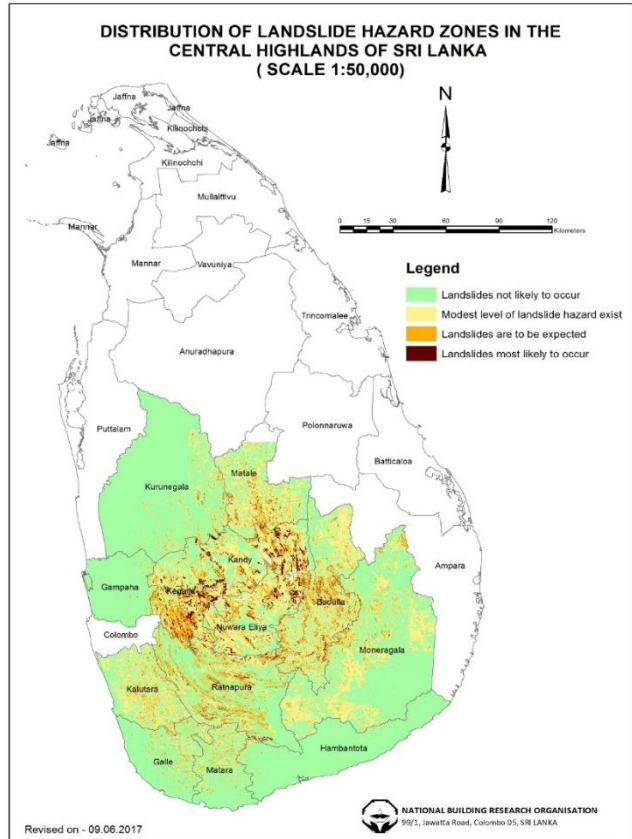


Figure 3: Landslide hazard zonation map of Sri Lanka; Source: NBRO

1.5.2 Extent and percentage of land areas fallen into different hazard categories in landslide prone district

The table below shows the land area under different levels of landslide hazard. According to the depicted information a higher percentage of lands in Badulla, Ratnapura, Kegalle, Kandy, Nuwara-Eliya, Kalutara and Matale are categorized as modest to higher level of landslide hazard risk. However, the land area under very high hazard risk (4) is less than 10% in all the districts.

Table 1: Area under landslide hazard risk (Source: NBRO)

	Range	1 (Landslides not likely to occur)		2 (Modest level of landslide hazard exist)		3 (Landslides are to be expected)		4 (Landslides most likely to occur)	
	District	Area (km ²)	%	Area (km ²)	%	Area (km ²)	%	Area (km ²)	%
1	Badulla	677.00	29.00	1063.00	47.00	441.00	19.00	77.00	3.00
2	Ratnapura	1812.00	55.00	799.00	24.00	568.00	17.00	91.00	2.00
3	Kegalle	469.00	27.00	604.00	35.00	460.00	27.00	157.00	9.00
4	Kandy	552.00	29.00	825.00	43.00	315.00	16.00	182.00	9.00
5	Nuwara-Eliya	473.00	27.00	849.00	50.00	268.00	15.00	103.00	6.00
6	Matara	992.00	75.00	232.00	17.00	81.00	6.00	4.00	0.36
7	Hambantota	2568.00	97.00	42.00	1.00	11.00	0.42	0.57	0.02
8	Kalutara	737.00	44.00	755.00	45.00	153.00	9.00	9.00	0.54
9	Matale	791.00	41.00	883.00	46.00	199.00	10.00	23.00	1.00
10	Galle	1306.00	80.81	210.00	13.00	95.00	5.87	5.00	0.32
11	Kurunagala	4453.00	90.35	388.00	7.86	83.00	1.62	8.00	0.17
12	Monaragala	3836.00	66.25	1705.00	29.50	234.00	4.00	14.00	0.25
13	Gampaha	1359.00	95.77	41.00	2.90	17.00	1.26	1.00	0.07

1.5.3 Issuance of landslide clearance for construction in landslide prone areas

A circular issued in 2010 empowered NBRO with issuing clearance certificates for all development activities in 10 landslide prone districts in the country while declaring Kandy, Matale, Nuwara-Eliya, Badulla, Kegalle, Ratnapura, Kalutara, Galle, Matara, and Hambantota as landslide prone. Under this circular, all construction activities in these ten (10) districts need to obtain NBRO's clearance (there are some exceptions for lands in coastal areas). The objectives of obtaining NBRO clearance for constructions in landslide prone areas are to minimize the landslide disaster risk and to increase the safety of life and property from future slope instabilities.

Obtaining clearance for lands and development activities in landslide prone districts applies only to new developments. The process does not apply to already developed lands and structures which are yet a large majority. Further, many new developments (specially housing) do not obtain the NBRO clearance. Although, several awareness, educational and training programs have been held for different stakeholders (local authorities, urban development authorities etc) to mainstream the landslide Disaster Risk Reduction (DRR) appear to be marginal.

Several other lapses too observed in the implementation process such as i) development works without any form of approval, ii) planning committees approve projects without NBRO clearance, iii) the recommendations of NBRO are not followed in the development process, iv) some sites are complex in nature and hence clearance process require resource intensive expert inputs. v) The personnel with required level of expertise and competence are limited to provide advisories in a given timeframe, vi) the cost of the process is higher than affordability by the developers and etc. The organizational resource constrains in terms staff competence, and other required technological interventions pertinent to the process is a concern. Weaknesses in the current legislative process has a strong influence on the poor enforcement of process effectively to attain required level of DRR.

1.5.4 Establishment of landslide early warning center at NBRO

With the financial support of government and the UNDP, NBRO has implemented installation of automated rain gauges in 12 landslide prone districts; Matale, Kandy, Nuwara-Eliya, Kegalle, Ratnapura, Kalutara, Badulla and some vulnerable parts in Matara, Galle, Hambantota, Monaragala and Kurunegala. The installed system delivers rainfall data every 30 minutes to a single base, installed at NBRO Head office. Real-time rainfall data from 105 automated rain-gauges are currently being collected and used to issue

early warning alerts to vulnerable communities when rainfall intensities reach certain threshold levels. The warning levels considered are rainfall 75 mm, 100 mm and 150mm. The center is operated 24 hrs round the clock and warnings are issued under three alert levels.

1.5.5 Structural Mitigation Projects

Technical Cooperation for Landslide Mitigation Project (TCLMP)

In the year 2013, 04 landslide affected sites out of the 16 landslides were prioritized for Integrated Landslide Mitigation Project (ILMP), and selected by JICA for the mitigation. As a result, the Technical Cooperation for Landslide Mitigation Project (TCLMP) was commenced on October 01, 2014. Under the TCLMP, two natural landslides in Udamadura in Nuwara Eliya District, and in Badulusirigama in Badulla District and a rock-fall threat in Alagumale in Matale District were selected as pilot sites. The advanced technologies practiced in Japan and other developed countries were used in the proposed mitigation activities. From the three sites, Udamadura and Alagumale were handed over after successful completion of mitigation work in March 2017 while post-monitoring activities are being carried out at the Badulusirigama site.

Climate Resilience Improvement Project (CRIP)

School landslide protection program

In the year 2013, funding arrangements with the World Bank were negotiated by the Government of Sri Lanka, and as a result, mitigation of landslides in 18 landslide affected schools in Kandy District was implemented under the World Bank funded Climate Resilience Improvement Project (CRIP). The 18 landslide affected schools were selected out of the 30 landslide affected schools listed in Integrated Landslide Risk Management Project tabled in the year 2012. The School Protection Program is a \$7 million investment on 18 schools from Kandy district identified to be highly vulnerable to landslides threat (benefiting approx. 30,000 students). Currently, construction works at many schools are completed.

Road landslide mitigation project

At present landslide mitigation work are being carried out at several road sections such as ; rectification of landslides in Kandy - Mahiyangana Road, rectification work in Hakgala, Rectification of landslides in Ginigathhena.

1.6 The level of landslide disaster risk reduction under current landslide management strategies

Currently, the areas where these unstable slopes are located, are covered by NBRO Landslide Early Warning System. Under this, real-time rainfall based warning at three alert-action levels are issued to Disaster Management Center (DMC) as well as to local agencies for people be alert or to evacuate at very high risk. However, the system has a risk with some uncertainty and poor accuracy in exacting location specific risk. Therefore, the overall level of risk imposed on these sites are considered high while the protection given to vulnerable communities are marginal. Therefore, location specific structural mitigation measures were merited over other despite its high capital investment.

The locations considered in the project are sites posing high risk on human lives and hence no-project alternative will be considered high risk. Therefore, upon potential slope failure, remediation and recovery cost of damage and the cost of temporary loss of services and economic activities as well as the living with continued psychological stress will continue to be very high. **Hence, a major investment was considered imperative to reduce current level of landslide risk in landslide prone districts.**

1.7 Sri Lanka landslide mitigation project financed by AIIB

The proposed investment project includes structural mitigation of 147 landslide prone locations and unstable slopes in 11 landslide prone districts in the country under its component 1. The component 1 is

the main component that involves structural mitigation of landslides currently posing threat to life of commuters, pedestrians, occupants in houses, damage to roads, service facilities and other facilities. The risk has become increasingly high due to extreme weather events while posing life threats, deprivation to economy and the development activities in these areas. The proposed mitigations are series of civil construction works targeting to bring the hazard risk to practical minimum. The state of the art engineering technology is expected be used in the design and construction to ensure long-term stability of slopes while reducing the risk to a level with minimum threat to inhabitants life and property.

Mitigation of landslides will directly reduce the national expenditure on repair and reconstruction of damaged public buildings & infrastructure facilities, resettlement, and expenditure on disaster relief services and emergency operation services. Further, it will create disaster resilient built environment by ensuring safety of inhabitants, commuters and pedestrians on the road, will reduce the road traffic congestion, and will certainly have over all positive significant impact on boosting specially agriculture, cash crops, plantation sector and tourism sector economies in the hill country.

1.7.1 Project implementation mechanism

The project will be implemented by the NBRO which is currently the national focal point for landslide disaster management. A separate Project Management Unit (PMU) headed by a Project Director (PD) staffed with key staff will be established under the subject ministry for overall coordination of the project. A special unit under project manager will be established for the implementation of environmental and social management framework. PMU will interact with stakeholder institutions for the implementation of project actions. The structural mitigation designs and civil construction works will be carried out by competent structural design engineering experts and companies with specialized knowledge in slope stabilization technology. They will be contracted to the project through national and international bidding process.

Chapter 2 - General environmental and social baseline of the project area

2.1 General environmental setting

2.1.1 Topography and terrain morphology

All landslide prone districts in the country fall fully or partly in the hill country. The hill country fall largely into wet zone of Sri Lanka characteristic with undulating mountain terrains forming a mosaic of land forms. The Proposed AIB project will be implemented in 11 hill country districts of Sri Lanka; Badulla, Kandy, Matale, Kegalle, Nuwara-Eliya, Kalutara and Ratnapura and hilly terrains of Matara, Hambantota, Kurunegala, and Moneragala districts.

The hilly region, also known as central highlands, is defined broadly as the terrain from the elevation of 185m above mean sea level up to the highest peak Pidurutalagala at 2717m MSL (fig 4). The terrains consist of steep, moderate and gentle mountain slopes to form a dendritic pattern of hydrological network. The ground morphology in these districts are with highly fractured and folded basement rock overlain by residual soil and colluvium deposits of varying thicknesses. Topographically steep slopes and geologically weak strata are the main natural factors contributing to landslides in these areas.

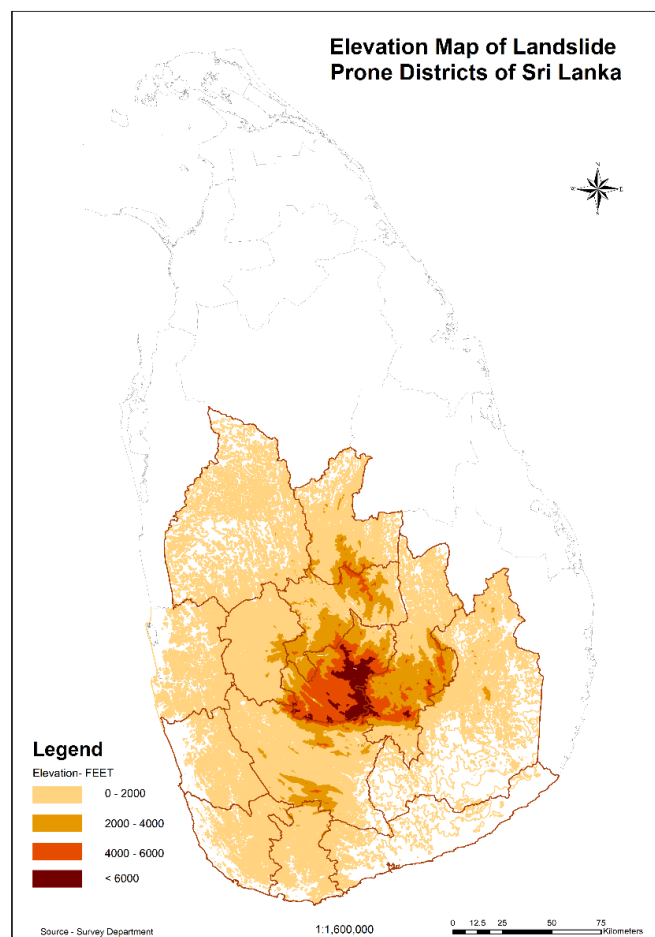


Figure 4: Elevation map of landslide prone districts of Sri Lanka

2.1.2 Climate

The climate of many landslide prone districts in the country largely represents Sri Lanka's long-term mean annual temperature in the low and midlands which is arounds 27 °C while it is around 15 °C in the districts of Central Highland (Nuwara-Eliya:1,895 meters above mean sea level). Mean annual precipitation ranges from about 1,000 mm in the northwestern and southeastern areas to over 5,000 mm in the western slopes of the Central Highlands. Many landslide prone districts are located on the western slopes of the country experiencing very high rainfall. The spatial pattern of precipitation is strongly influenced by topography and there are two seasonal wind regimes. The Southwest monsoon (SWM) is from May to September and the Northeast monsoon (NEM) from December to February. There are two inter monsoonal periods from March to April (First inter-monsoon and from October to November Second inter-monsoon). The southwest monsoon is the critical period where many landslide have occurred in the recent past in Kalutara, Kegalle, Ratnapura, Galle and Matara Districts. Sri Lankas' Climate change analysis shows extreme precipitation events especially during SWM on the Western slope districts. Therefore, trends of landslides and floods are expected to be on the increasing trend.

2.1.3 Land use features in the landslide prone districts

Tea, rubber, home gardens, and spice crops are the major terrestrial land uses in these districts. Tea plantations are the main crop in Nuwara-Eliya and Badulla and Ratnapura districts. The agriculture in upcountry consist mainly of paddy and commercial vegetable cultivation (Kandy, Nuwara-Eliya and Badulla districts). As most of the districts are upper watersheds of the country, a considerable fraction of lands is still covered with natural forests and forest like vegetation. Terrains which are either flat or gentle have been developed for settlements (mainly rural) and as town centers and villages. In some districts the home gardens (having cash crops) resembles forest like vegetation with at least three canopy layers (eg: Kegalle, Kandy and Matale districts). Haphazard development, clearing forest cover, land degradation, soil erosion, water pollution from anthropogenic waste disposal, (solid and liquid waste), and pollution from agrochemicals are the common environmental issues prevalent in all the districts.

2.1.4 Natural vegetation and forest cover

Substantial area of land still remain as forest in Matale, Nuwara-Eliya, Ratnapura, Badulla, Monaragala and Hambantota districts. The forest cover in these districts contribute largely to the remaining lands under forest in the country (Fig 5).

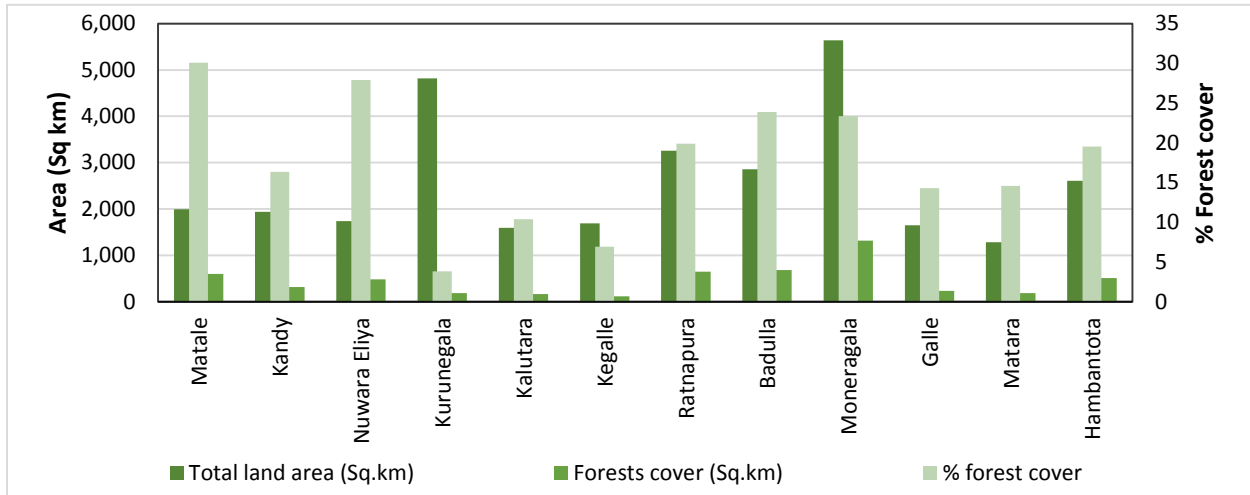


Figure 5: Distribution of forest cover in landslide prone districts of Sri Lanka (Source: Central Bank of Sri Lanka-2016)

2.1.5 Environmentally sensitive areas

The hilly terrains of all districts, specially Nuwara-Eliya, Kandy, Kegalle, Matale, Badulla and Ratnapura are considered environmentally sensitive due to number of reasons. The radially distributed river network of the country is replenished by the forested mountain terrains in these districts. The upper watersheds of the major perennial rivers such as Mahaweli, Kelani, Kalu, Deduru oya, Ma oya, Gin river and Nilwala occupy the hilly terrains of the these districts. The low land rainforest, forest like home gardens, sub montane and montane forest ecosystems of these watersheds possess many IUCN red list species and endemic fauna and flora. However, the natural ecosystems in these watersheds are currently under severe threat of degradation due to felling of trees for timber, clearing land for cultivation and etc. Erosion due to land degradation is common in all watersheds of these districts.

The fig 6 shows the distribution of forest cover in Sri Lanka as at 2010 (Source: Forest Department of Sri Lanka). The

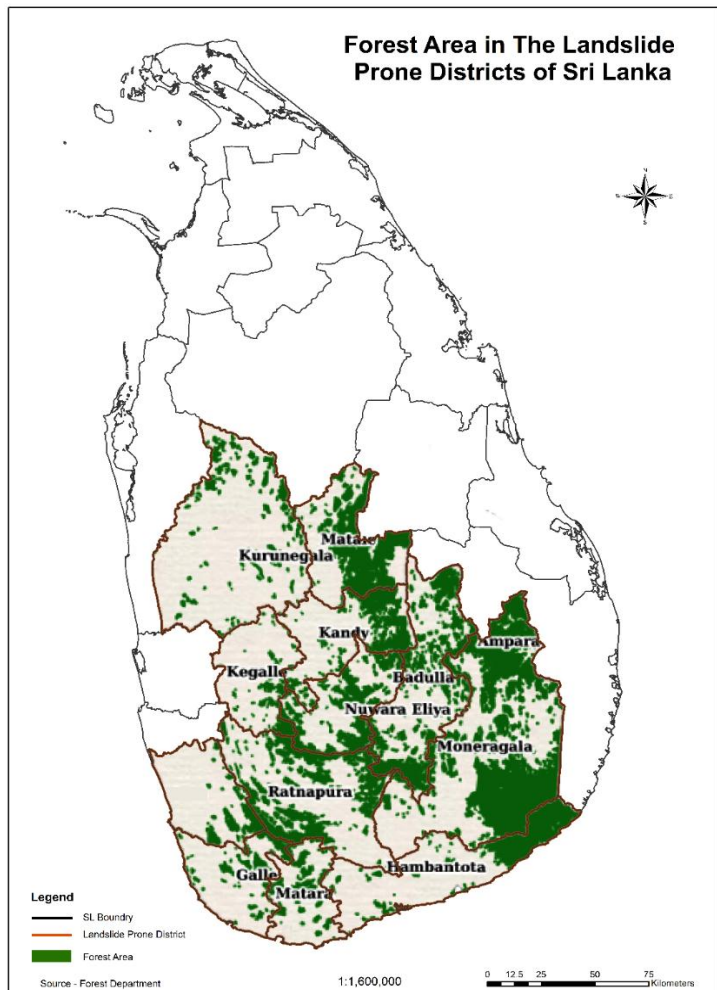


Figure 6: Forest cover distribution in landslide prone districts of Sri Lanka year 2010; Source: Department of Forest

forests include reservations under National Heritage wilderness areas, conservation forest, reserved forests, and wildlife boundaries. Among these Sinharaja Forest Reserve (hectare – 12,163.4 (a virgin forest)) and, Peak Wilderness Sanctuary (Area hectare – 21,360.6) and Horton plains are important natural reserves with unique ecology. They are mainly located in Ranapura and Nuwara-Eliya districts.

2.2 Socio-economic setup

2.2.1 Demographic characteristics

As per the census of Sri Lanka 2012, in landslide prone districts the highest population live in the Kurunegala District, which is 1.6 million. Other districts such as Kandy, Kalutara, Galle and Ratnapura the total population exceeds 1 million people (fig 7). In all districts the female population is slightly higher or equal to male population. The ethnic population in landslide prone districts are mainly Sinhalese, Sri Lankan Tamil, Indian Tamil and Sri Lankan Muslim. In all landslide prone districts except Nuwara-Eliya over 70% of the population is Sinhalese. The other population mainly living in these districts are Indian Tamils. They commonly occupy estate housing provided by regional plantation sector.

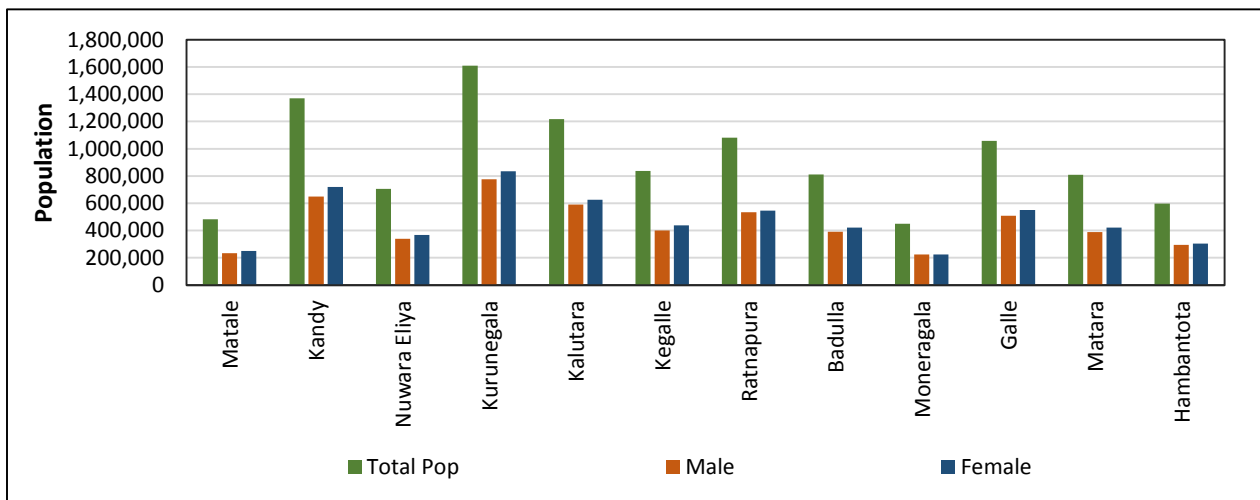


Figure 7: Population and gender distribution in landslide prone districts of Sri Lanka (Source: Census of Sri Lanka)

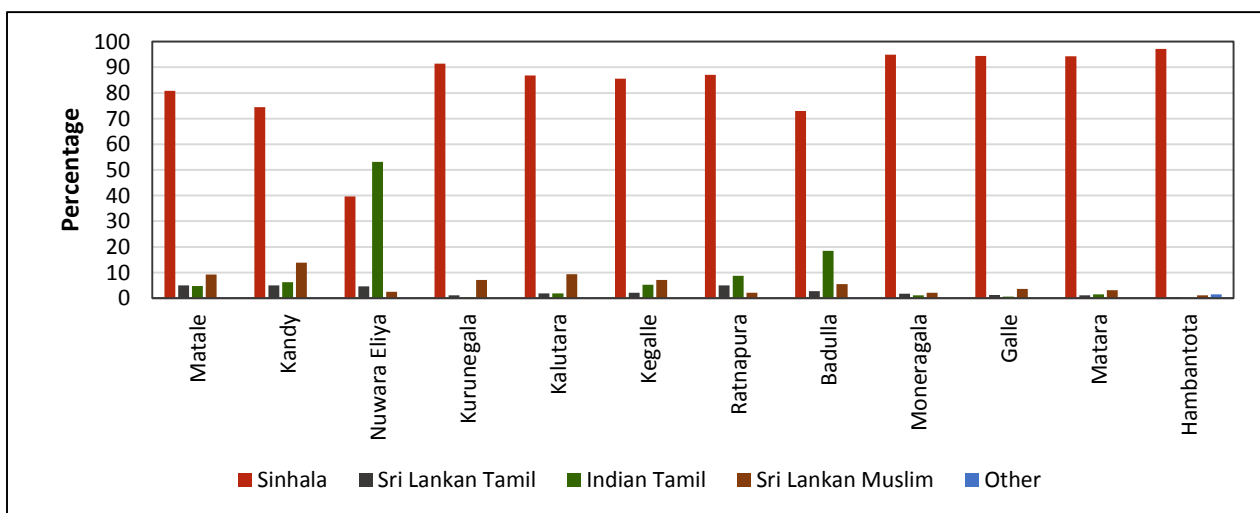


Figure 8: Percentage of Ethnic population distribution in landslide prone districts of Sri Lanka (Source: Census,

2.2.2 Population density by sector based population distribution

Among the landslide prone districts higher population density occur in Kandy, Kalutara, Galle and Matara. In all other districts the population density is relatively low due to number of reasons such as use of land for tea and rubber plantations, low development of infrastructure and services such as water, roads, access to services such as education, health, low income generation opportunities and etc. Mountainous terrains, un-habitable slopes and deadly disasters such as landslides too contribute substantially to low

Population density in these districts. In almost all districts except Nuwara-Eliya, over 70% of the population is rural. In Nuwara-Eliya and Badulla estate sector population represent 53% and 19% of the total population respectively (fig 9).

Although low income status, poor population, poverty, poor development and infrastructure facilities are

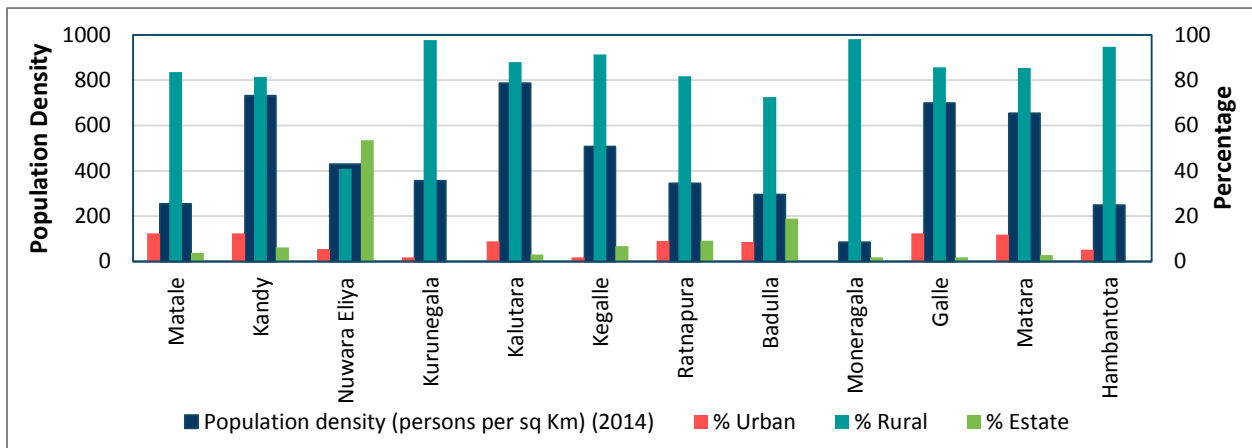


Figure 9: Population density, urban rural and estate sector population distribution in landslide prone districts of Sri Lanka (Source: Central Bank Sri Lanka)

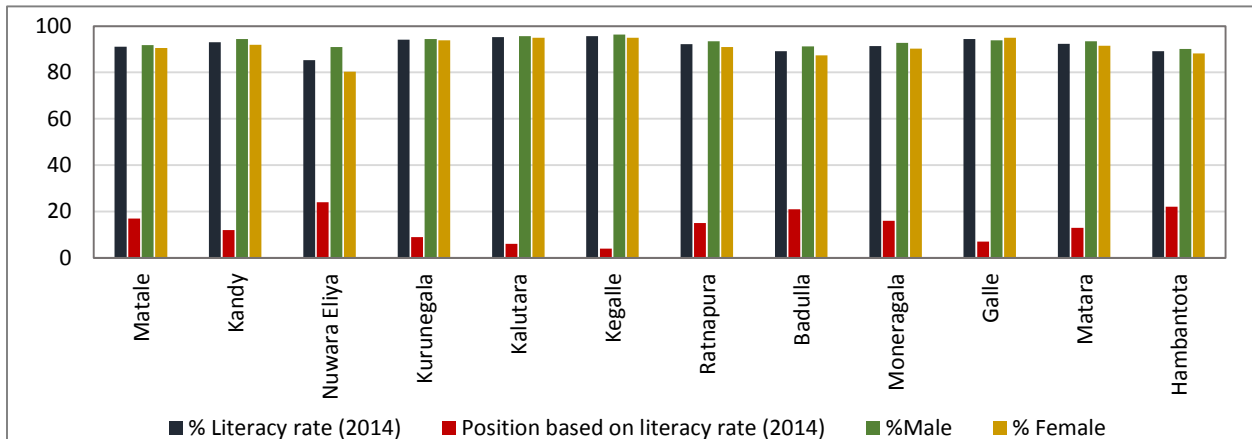


Figure 10: Literacy rate in landslide prone districts of Sri Lanka (Source: Central Bank, Sri Lanka)

characteristics in these districts the literacy rate is in par with highest literate districts in the country. Also, the statistics show that both female and male populations show equal literacy rate. This is mainly due to free education facility provided by the government from grade one up to university. The government offer grade five scholarship program for all students in the country. Students who succeed in the scholarship examination get the opportunity to study in the best schools in the country. This has made a trend towards more rural poor people sending their children to schools and providing good education to their children.

2.2.3 General development, and infrastructure setup

The development setup is mostly rural to semi-urban with moderately populated homestead areas. Constrained by the landform and slopy terrain, the developments and settlement distribution shows clustered pattern. However, ribbon development on either sides of the roads is a common development feature in all districts. Land subdivision is the general practice where parents' land is divided among married children. This results decreasing individual plot size, removal of vegetation cover and slope modification promoting more soil erosion, land degradation and slope failures. Further, in these settlements communities in many cases are close relatives and live in clustered rural village setup.

The road network and the access roads mostly follow the contour lines. The roads traverses villages interconnecting two or more villages, small towns, and also make convenient access to local – divisional commercial & public facilities, and administrative services. The road network largely serve the transportation of tea from the tea estates and tea processing factories, a main export revenue of the country.

2.2.4 The housing development and service infrastructure

The fig 11 show the housing distribution in landslide prone districts.

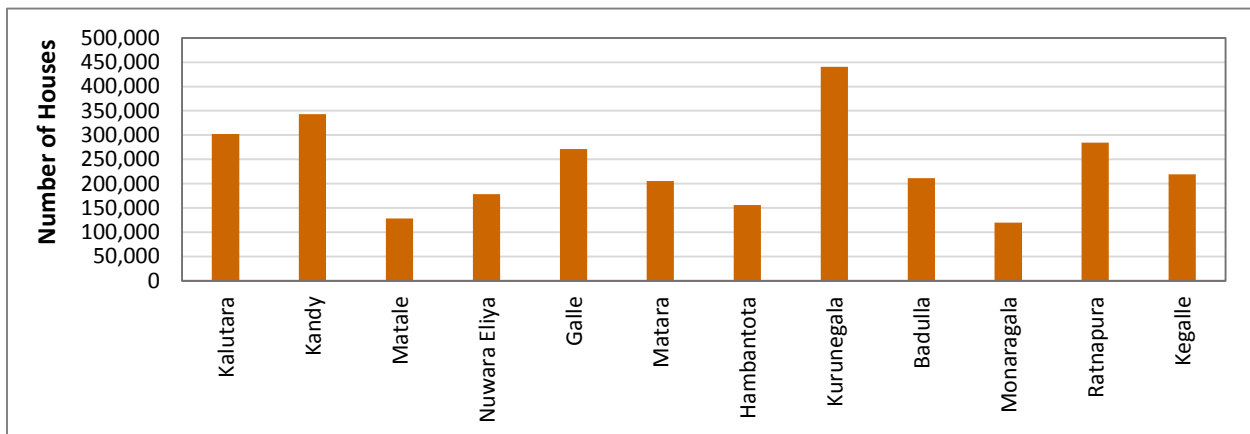


Figure 11: Number of occupied houses in landslide prone districts of Sri Lanka (Census 2012)

Locally, the spatial distribution of housing is mostly individual houses established in sparsely placed clusters (rural villages) or ribbon development. In towns larger clusters of houses are common. Houses are located mostly on either sides of the roads, or facilitated mostly by common or individual access roads. Majority of the community have individual sanitary facilities (common facilities in some cases eg: Estate sector housing), electricity, and water supply etc. In hilly districts national water supply authority water is provided only to towns. Majority of population depend on community water supplies or on individual water supplies, water extracted mostly from local water sources such as springs, streams and dug wells, etc).

2.2.5 Income/ expenditure and poverty

The income sources vary greatly depending on the individual's or community's socio-economic characteristics, and may vary from farming, plantation sector labor force, informal sector, subsistence farmers or commercial agriculture farmers, skilled or unskilled workforce. A substantial fraction of individual income come from home garden crops where cash crops (spices) and tea are grown at household level (small tea holders). Substantial fraction represents workforce in local, district and

provincial administration sectors. Tourism (both local and foreign) and associated allied industry occupation is also among the livelihood of some of the districts such as Kandy and Nuwara-Eliya. Gem mining and allied industry is one of the main income source in Ratnapura district. According to the census 2016 mean monthly expenditure in landslide prone districts fall in the range of 35, 000LKR to 60,000 LKR. Mean household income is in the range 20,000 -30,000 LKR. The difference between income and expenditure is due to communities' way of giving information (fig 12).

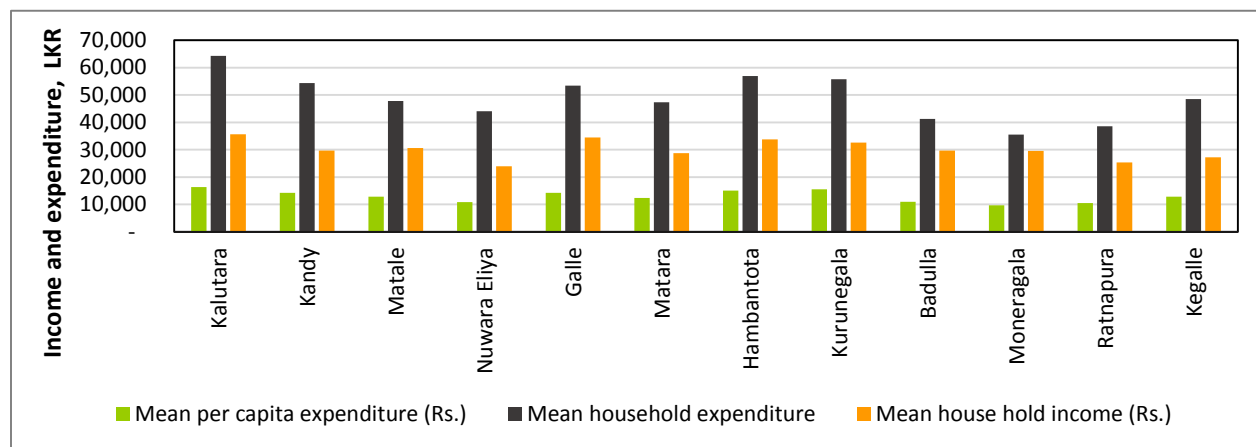


Figure 12: Mean monthly expenditure and income status of landslide prone districts of Sri Lanka: Census 2016

Poverty is common among many communities in the villages of these districts. Among the landslide prone districts Kandy, Kegalle, Badulla, Ratnapura and Monaragala have higher percentage of poor people and people under poverty (fig 13).

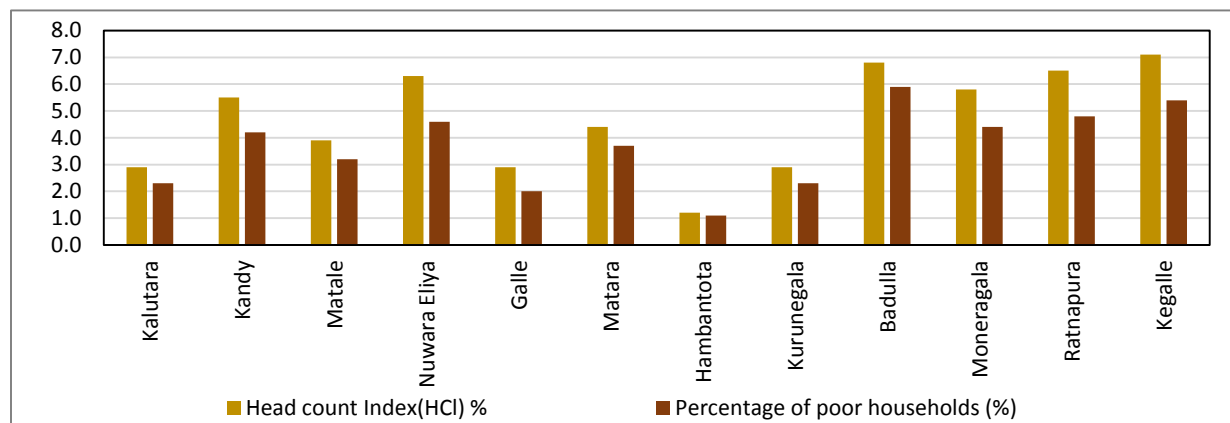


Figure 13: Poverty head count index & percentage of poor households in landslide prone districts: Census 2016

2.2.6 The service facilities and access to services

Include local road network, railway line, transport system, electricity, and individual/group or community water supply, telecommunication lines, schools, health care facilities, banks, shops and other commercial services, and administrative services, etc.

Within GN divisions common facilities to satisfy basic livelihood needs are provided, which include health care facilities, schools, banks and local commercial facilities, and places of worship (Buddhist temple,

Hindu temple, Mosque or Church depending on the community type) and cemeteries, etc. The communities can have access to better facilities available either in divisional level or in the districts (where urban centers are) within reach of few hours.

Communities in all villages in hill country are connected with a relatively good road network in all cases and in some cases by train. Quite a number of households possess individual transport facilities such as either motor cycles or three wheelers as a mode of transport. Public buses are driven daily at working and schooling times to provide transport facilities from the village to urban centers and return. Therefore, the communities can have access to different levels of services depending on their need and affordability within a reach of minutes to few hours.

2.2.7 Natural hazards

Landslides triggered by extreme precipitation during South West monsoon and in Inter-Monsoon are the most devastating hazard risk in these districts. However, Floods are also a life threatening risk in some of the districts such as, Kalutara, Ratnapura, Galle and Matara. In these districts both floods and landslide occur together posing critical disaster situations at extreme weather events. Other weather related disaster risks in these districts include high winds and lightening hazard. The critical situation faced by many landslide prone districts is that both landslides and floods synchronically hammer these districts during extreme weather events while cutting down the access roads either by floods or landslides. This creates serious situation for victims during evacuation and for reaching relief teams to disaster affected communities. This situation is critical in Ratnapura, Kalutara Districts.

2.2.8 The administrative Structure

Village is the smallest spatial unit. Several villages form Grama Niladhari (GN) division which is the smallest administrative unit and is administered by the Grama Niladhari. All individuals in households are administratively linked to GN. The Grama Niladhari (Village Officer) who reports to the Divisional Secretary, plays a key role in connecting the Divisional Secretary's office to the public. Through the Grama Niladhari office, citizens are able to access key services and are identified to benefit from programs that provide relief and development at the village level. These GNs are clustered into a broader administrative unit called Divisional Secretariat (DS). The divisional secretary coordinates with divisional offices of subject ministries.

Within a District, many Divisional Secretariats are clustered in to District Secretariats Office. District Secretariats are the second-level administrative division next to Central Government. Each DS is administered under a District Secretary, who is appointed by the Central Government. The main tasks of the District Secretariat include coordinating, communications of activities of the central government and Divisional

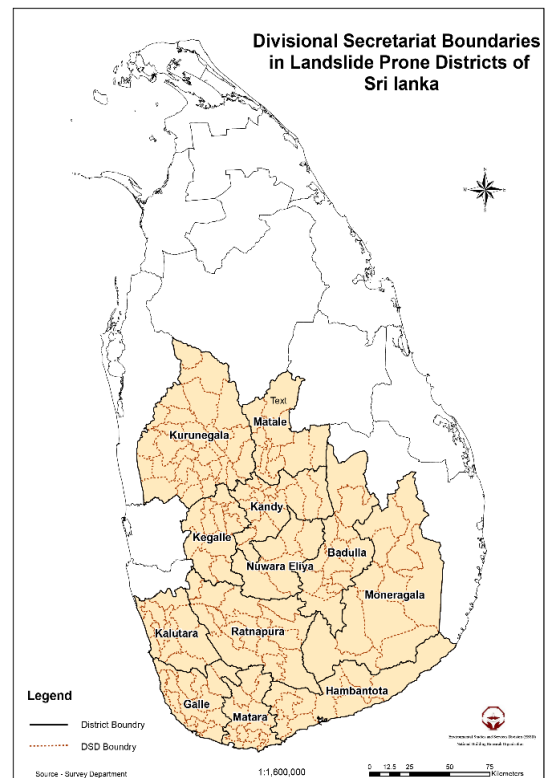


Figure 14: Administrative boundaries (District and Divisional) in Landslide prone districts of Sri Lanka

Secretariats. The District Secretariat is also responsible for implementing and monitoring development projects at the district level and assisting lower-level subdivisions in their activities, as well as revenue collection and coordination of elections in the district.

Chapter 3 - Environmental and social legislation/regulatory framework and institutional framework

3.1 National regulations

3.1.1 The National Environment Act (NEA)

The National Environment Act (NEA) No. 47 is the key national environmental legislation of the country. The legislation protects both natural environment, the resources and the human environment from development projects. This is legislated by the Central Environment Authority (CEA). NEA No. 47 was enacted in 1980, and NEA amended Act No. 56 of 1988 stipulates the regulations for assessing and managing environmental impacts and obtaining the environmental clearance in a timely and systematic manner.

The NEA provide the legislative framework for overall environmental management in the country, which includes management of natural resources, fisheries, wild life, forestry, soil conservation, environmental quality, environmental protection and procedure for approval of projects. The environmental clearance process for development projects is implemented through the designated Project Approving Agency (PAA) as prescribed by the Minister under section 23 Y of the NEA. The procedure that should be followed for obtaining environmental clearance is described under section 23CC and 32 of the NEA as prescribed projects. Upon evaluation of project details CEA decides whether the project fall under the category of "Prescribed Project or not". For prescribed projects, depending on the nature of potential impacts on the environment the CEA decides either EIA or IEE and who the PAA will be for administering the IEE or EIA process to obtain environmental clearance. For Prescribed projects CEA or the designated PAA will issue a TOR for the IEE or EIA required. Under the provisions of section 23 Z of the NEA the EIA process applies only to "Prescribed Projects" (PP), which have been specified by the Minister in charge of the subject of Environment in Gazette Extra-Ordinary No. 772/22 of 24th June 1993. List of prescribed projects was amended by the Gazette Extra Ordinary No. 1104/22 of 05th November 1999.

According to Extra-ordinary No. 772/22 of 24th June 1993 and its subsequent amendments environmental clearances should be obtained from the designated project approving agency for the implementation of projects. The scope of the AIB investment program includes structural mitigation of unstable slopes along the roads, railway line and in places of common interest etc. However, landslide mitigation projects are not listed under this act. Hence, it is unlikely that the projects under the investment program will require to prepare an IEE or EIA for securing an environmental clearance.

However, approval is required for construction works for sites located within or one mile from the boundary of a National Heritage Wilderness Act No. 3 of 1988, the Forest Ordinance (Chapter 451), any erodible area declared under the Soil Conservation Act (Chapter 450). 60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having a width of more than 25 meters at any point of its course. Necessary clearance will need to be sought from the Department of Forest (DF) or Department of Wildlife Conservation (DWC), and CEA. Depending on the sensitivity of the protected area the DF or DWC may request an IEE or EIA study for the respective sub project.

The landslide mitigation project will respect fully the regulations set by the National Govt. of Sri Lanka. Accordingly, respective project actions will comply with National Environmental Regulations. The key regulation that applies to the project is the National Environment Act. Several of complementary legislations too apply depending on the nature of project actions (described under relevant sections).

3.1.2 National environmental regulations for emission /pollution control

Indicated below are the environmental and other regulations relevant to landslide mitigation project.

Table 2: National environmental regulations for emission /pollution control

	Regulation	Scope	Regulator
i.	National environmental protection and quality regulations under Extraordinary gazette notification No. 1534/18 and No. 1533/16 of 2008 under NEA section 32 & 23A, 23B	This regulates the discharge and deposit of any kind of waste or emission into the environment and stipulates requirements for an Environmental Protection License (EPL) depending on the project activity. The landslide mitigation projects are not listed in this	CEA
ii.	National Environmental (Protection and Quality) Regulation No. 1 of 1990 published in Gazette Extraordinary No. 595/16 of February, 1990	Provides standards for discharging effluents into inland surface water during project activities. <i>The project activities should adhere to these emission standards</i>	CEA
iii.	National Environmental (Ambient Air Quality) Regulations, 1994, published in Gazette Extraordinary, No. 850/4 of December, 1994 and amendment gazette No. 1562/22 of 2008	Provides standards for emissions to the air during project activities <i>The project activities should adhere to these emission standards</i>	CEA
iv.	National Environmental (Noise Control) Regulations No.1 of 1996 and its amendments	Regulates maximum allowable noise levels for construction activities during proposed project activities <i>The project activities should adhere to this standard</i>	CEA
v.	The interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA	<i>The prescribed Ground vibration</i> limits for protection different built structures from ground vibration	CEA
vi.	National Environmental (Vehicle Horns) Regulations, No. 1 of 2011	Regulates maximum allowable noise emanating from vehicular horns on a highway or road any motor vehicle use during project construction activities <i>The project activities should adhere to this standard</i>	CEA
vii.	National Environmental (Municipal Solid Waste) Regulations, No. 1 of 2009	Regulates dumping municipal solid waste along sides of any national highway or at any place other than places designated for such purpose by the relevant local authority during proposed project activities <i>The project activities should adhere to this standard</i>	CEA

3.1.3 National environmental regulations for natural resources protection

Given below are the national legislations pertinent to natural resource management

Table 3: National environmental regulations for natural resources protection

	Regulation	Scope	Regulator
i.	Fauna and Flora Protection Act (FFPO) No.2 of 1937 amended in 1993 and 2009	The act specifies that any development activity taking place within one mile from the boundary of a National Reserve declared under the Ordinance requires an environmental clearance which provide for the protection and conservation of fauna and flora of Sri Lanka and their habitats; for the prevention of commercial and other misuse of such fauna and flora and their habitats for conservation of biodiversity of Sri Lanka; and to provide for matters connected there with. <i>The project activities if falls within reservation declared under this act clearance from the department should be obtained prior to implementation of the project.</i>	Department of Wildlife Conservation
ii.	Forest Act No. 34 of 1951	This act is to consolidate and amend the law relating to the conservation, protection and management of forest and forest resources for the control of felling and transport of timber and Forest and for matters connected therewith or incidental thereto. <i>The project activities if falls within forest reservation (declared/undeclared) areas clearance from the department should be obtained prior to implementation of the project.</i>	Department of Forest
iii.	Felling of Trees Control Act No. 9 of 1951 as amended through Act No. 30 of 1953	This Act sought to prohibit and control felling of specified trees (mainly intended to stop indiscriminate felling of specified trees) in the country. <i>If trees listed in the act are present and needs removal, clearance should be obtained through the divisional secretary to cut the trees.</i>	Divisional secretary/Department of Forest/ Timber corporation
iv.	Water Resources Board Act, No. 29 of 1964 and (Amendment) Act, No. 42 of 1999	The act controls and regulates developments (including conservation and utilization) of water resources; prevention of pollution of rivers, streams and other water resources; formulation of national policies relating to control and use of water resources. <i>The project activities should adhere to the regulations of this act with strict control on pollution emissions.</i>	Ministry of Irrigation and Water Resources Management
v.	Soil Conservation Act, No. 25 of 1951 and Amended No. 24 of 1996	This Act makes provisions for the enhancement of productive capacity of soil; to restore degraded land for the prevention and mitigation of soil erosion; for the conservation of soil resources and protection of land against damage by floods, salinity, alkalinity, water logging; and to provide for matters connected therewith or incidental thereto. <i>The project is highly complementary to the prescribed actions under this regulation.</i>	Department of Agriculture

Table 3 cont.

vi.	CEA gazetted environmentally sensitive areas under special gazette notifications	Any development in areas declared as environmental protected areas , Schedule of Gazette Extra Ordinary No. 772/22 of 24.06.1993 and subsequent amendment	CEA
vii.	24 (c) and 24 (d) of National Environmental Act, No.47 of 1980 and subsequent amendments	Any development within any environmentally important threatened or with higher necessity of protection area declared as environmental protection areas under the Act.	CEA
viii.	Plant Protection Act No. 35 of 1999	Plant or seed if needed for bio engineered slope mitigation shall be imported into Sri Lanka under the authority and in accordance with the conditions, of a plant importation permit issued by the Additional Director National Plant Quarantine Service Katunayake for Director General of Agriculture.	Department of Agriculture

3.1.4 Other regulations pertinent to the project

Table 4: Other regulations pertinent to the project

	Regulation	Scope	Regulator
i.	Explosives Act No. 36 of 1976	To provide control of explosions and regulations of matters connected with explosive activities related with the project. <i>The project should obtain approval to use explosive materials for sites requiring blasting activities.</i>	Ministry Of Defense
ii.	Municipal Councils Ordinance No. 29 of 1947, the Urban Councils Ordinance No. 61 of 1939 and the Pradeshiya Sabha Act No. 15 of 1987 as amended in 2010	Regulates and control actions pertaining to socioeconomic development such as roads, culverts, bridges, ferries, waterways and other means of local transport and related site clearance for constructing worker camps, site offices etc. and methods taking place within the command area relevant to government laws and regulations. <i>Planning committee approval may be required from the relevant local authority/ municipal council for implementation of the project.</i>	Ministry Of Local Government And Provincial Council
iii.	Crown Land Ordinance Act No. 1947	An ordinance to make provision for the grant and disposition of crown lands in Sri Lanka; for the management and control of such lands and the foreshore; for the regulation of the use of the water of lakes and public streams; and for other matters incidental to or connected with the matters related to proposed project. <i>If project activities falls within the crown lands consent should be obtained through divisional secretary.</i>	Land Commissioners Department , application through divisional secretary
iv.	Antiquities Ordinance No. 9 of 1940 and amendments	The act regulate activities of projects located in close proximity of any archaeological reserves. <i>If project activities intervene with archeological reserves clearance from Department Archeology should be sought. The project activities are unlikely to cross archeological reserves</i>	Department of Archaeology

v.	Safety & Health Act No.38 of 2009	Safety management and prevent accident for workers	Department of labor (commissioner of occupational health)
vi.	Nuisance Ordinance chapter 230 No. 15 of 1862	The project actions should not cause nuisance to the neighboring settlers	Local Government

3.1.5 The legislative framework of landownership of lands in the project area and acquisition

The lands in the project area fall broadly in to private lands and state lands. In private lands the owner is the private person. They hold deeds for the possession of plot. The state land are lands under the jurisdiction of various government agencies. Land ownership of the state lands are governed by the respective acts of these state agencies.

State agencies with land ownership important the proposed landslide mitigation project are

- i. Road reservation under the ownership of Road Development Authority (RDA)
The Road Development Authority Act (1981) provides for the establishment of the RDA and specifies the powers, functions, duties and responsibilities of the RDA. Part II of the Act deals with declaring areas for 'road development', which under the meaning of the Act includes the construction of new roads or the maintenance or improvement of existing roads (Improvements are deemed to include any widening, leveling, provision of footpaths, treatment for mitigation of dust or any other works beyond ordinary repairs).
- ii. Forest reservations under the jurisdiction of Department of Forest
- iii. Wild life reservations under the jurisdiction of Department of Wild Life Conservation
- iv. Stream Reservation under the jurisdiction of Department of Irrigation/or crown lands under the jurisdiction Divisional secretary
- v. Lands under jurisdiction of Land Reforms Commission of Sri Lanka
- vi. Crown lands released for housing; Jayabhoomi and Swarna Bhoomi deeds

Private owned lands:

These lands include lands under the ownership of individuals or few members. There are private land under ownership of companies. The tea plantations and rubber plantations land ownership often lies in the ownership of private companies.

Other ownerships:

Lands under the ownership of Temple and Dewalagam Act

Buddhist Temporalities Ordinance No. 19 of 1931: Vests the management of temple property coming within the scope of the Ordinance with trustees appointed in terms thereof. The rights of the custodian of temples and devales for the receipt of compensation in the event of acquisition for public purposes are spelled out in this Act in addition to the other provisions.

3.1.6 The Land Acquisition Act of 1950 (LAA) and Subsequent Amendments and Regulations

The Land Acquisition Act (LAA) of 1950 makes provisions for acquisition of the Lands and Servitudes for public purposes and provides for matters connected with or incidental to such provision'. *It provides the payment of compensation at market rates for lands, structures and crops.* LAA in force today has several amendments and the latest is the version of 1986. Revisions made to LAA regulations in 2008, and announced by gazette notification No. 1585/7 on Tuesday, 20th January 2009, have a *significant impact*

on resettlement planning as it has reference to “reconstruction cost”. In Sri Lanka the Divisional Secretary is the authorized delegation for acquisition of lands for all development projects in the country.

3.1.7 Regulations pertinent to resettlement of displaced communities

Sri Lanka has a National Involuntary Resettlement Policy (NIRP) 2001. NIRP took the dysfunctions of land acquisition into consideration with the aim of ensuring ‘that all efforts are made to minimize involuntary resettlement in projects and where it is unavoidable, affected people are assisted to re-establish their livelihoods’ (NIRP Forward). NIRP assign responsibility of implementing a Resettlement Plan addressing key resettlement issues such as (i) exploring alternative project options which avoid or minimize adverse impact on people; (ii) compensate those who do not have title to land; (iii) consulting displaced persons and host community on resettlement options, (iv) providing for successful social and economic integration of the displaced persons and their hosts; and; (v) full social and economic rehabilitation of the displaced persons. However, it appears that implementation of policy recommendation in actual situations vary greatly mostly depend on the type of project or situation.

In Sri Lanka many development projects have undergone involuntary resettlement. The major river basin projects such as Accelerated Mahaweli Development Project, Hydropower Projects and Road Development projects etc. have involved involuntary resettlement of people. They have created varying degree of social impacts on the affected communities even leaving unresolved issues over generations. However, current involuntary resettlements due to projects have taken into consideration many social aspects, and have minimized the related impacts largely by giving high compensation packages.

The Ministry of Water Resources, Irrigation and Disaster Management has adopted a resettlement strategy for people displaced by the natural disasters and it is in implementation since 2016. Given bellow is the resettlement process recommended by the Ministry for families under risk/affected by the landslide disaster risk.

The families for resettlement is considered on a priority basis. Accordingly first priority will be given to parties whose houses have been completely or partially damaged by the landslide. The second priority will be given to vulnerable families located in the crown area of the landslide including the houses where there are cracks. Third priority will be given to vulnerable families and houses located on the debris flow path and deposition area.

The resettlement is mandatory for landslide affected parties under priority 1 and 2. In addition, families decided as high risk by NBRO will also be considered for resettlement under high priority.

The resettlement options are given as described bellow

- i. 1.6 m LKR to Purchase a land and a house
- ii. 0.4m LKR to purchase a land and 1.2m LKR to build a house
- iii. The government gives the land, and 1.2 m LKR is given to build the house

The process strongly recommends thorough awareness and consultation to landslide affected parties and promoting the affected parties towards purchase lands and build new houses. If state lands are given for building of houses, selection of suitable lands, land sub division, drainage management, erosion control measures etc. should be done prior to construction based on the recommendations of NBRO. Also, housing design and construction should be done according to the recommendations of NBRO. The money will be released in installments; 0.4M LKR to purchase the land and 4 installments for construction of house. For construction of houses with resilient features NBRO has been advised to provide necessary technical advisories and awareness.

3.1.8 Legislation to protect the rights of indigenous people

There is no universal definition for indigenous people. But communities with following features are considered as indigenous people. They tend to have small populations relative to the dominant culture of their country. They usually have their own language. They have distinctive cultural traditions that are still practiced. They have their own land and territory, to which they are tied in myriad ways.

In Sri Lanka we can find one such community called 'Veddas or Wanniya laeto ('forest-dwellers')'. There is little official literature on Vadda community. The first official record on this community comes from anthropological study on the Vadda community by Seligmans in 1911. According to the author, this community was living between Central highlands to Eastern parts of the country inhabiting mainly the Mahaweli and Galoya river basins.

A Socio- Anthropological Research on Vadda Community in Sri Lanka by Premakumara De Silva, Asitha G. Punchihewa, 2010, University of Colombo, Sri Lanka reveals that the Veddas of Sri Lanka have been the pioneers of the island for centuries and millennia. Veddas descent spans for well over 30,000 years whereas some believe that the Veddas pre-dates King Vijaya's arrival in the country 2,500 years ago. The publications states that there are sufficient evidence to confirm that the Vadda heritage dates back 34,000 years (De Silva 1972 and Dharmadasa 1990). There have been studies conducted on the existence of *Balangoda Manavaya* (Balangoda anthrop or the Homo sapien balangodensis sub species) and the pre-Vijaya era civilisations of Sri Lanka who could be ancestors of the present day Veddas. At the global level, research findings on other indigenous communities in India, Australia, South and North America and other parts of the globe further justify the existence of the indigenous aboriginal natives like the Veddas in Sri Lanka for a significantly prolonged period of time, spanning for well over twenty or even thirty thousand years.

The early Vadda community are hunter gatherers, living purely in the wild. Men traditionally clothe themselves below the waist, wearing their beards down to their chests, and armed with axes and bow. Vadda people speak his 'vedda' native language. They all chose to live in remote jungle village or rain forests wild areas (semi evergreen dry monsoon forest).

However, since historical time, unlike in other indigenous people Vadda community has been adapting to a wide range of natural, climatological, socio political changes that took place in the country time to time. According to resent research study in 2010 on Vadda community, the community has been largely subjected to pressures from external sources such as mainly from the Sinhalese community, the influence of Buddhism, invaders from India and the British rulers, various river basin development projects such as Galoya basin and Mahaweli Development project, drought and Famine, deforestation, agriculture modernization and the Tamil Elarm Conflict and etc. All these have resulted gradual diminishing of self-identity of the community with outmigration from their original lands to places of security. They have been mainstreaming with the major ethnic communities (Sinhalese and Tamils) for better social recognition by serving the kings, practicing the major community cultures and even with mixed community marriages. The river basin projects, deforestation and forest and wildlife conservation laws etc appeared to have a significant impact on the traditional life styles of the Vadda community as under these the Vadda communities were compelled to live as farmers leaving behind their hunting and gathering life styles as e hunting and gathering was considered illegal under conservation laws. Also, the governments were strict on these laws because the Vadda community's traditional hunting and gathering lifestyle were largely abused to kill wild fauna for local meat industry. As early Vadda communities were very much under poverty and illiterate all the governments of Sri Lanka have developed many programs to absorb this community in to mainstream for poverty alleviation and to provide free education.

There are no specific laws pertinent to protect cultural identity of indigenous people, but as a member of United Nation the country is bound by the protection of rights of Vadda community under Indigenous and Tribal Populations Convention and Recommendation, 1957. The First International Decade of the World's Indigenous People was proclaimed by the UN General Assembly in its resolution 48/163 of 21 December 1993. With this resolution, the General Assembly committed itself to seeking improvements in the situation of the more than 300 million indigenous people worldwide between 1995 and 2004 to which Vadda community in Sri Lanka is included. Although the convention has made a considerable impact on the self-identity of Vadda community, their self-identity as an indigenous community is diminishing due to several coherent factors common to many indigenous communities in the world.

The Vadda in Sri Lanka have equal rights for all services including voting rights, free education, employment opportunities in the state sector, and the government support their cultural events. The cultural events of indigenous people is a tourist attraction since long and it has become one of the income source of the community.

The fig 15 and 16 show the distribution of the Vadda community in 1911 (British rule) and in 2010 Current. According to "Adi Vasi Kendra" Center for indigenes People, at present the Vadda community live in 62 villages. The social review of 147 sites considered for the project, none intervene with Vadda community. Hence, AIIB ESS3 will not be triggered in this project.

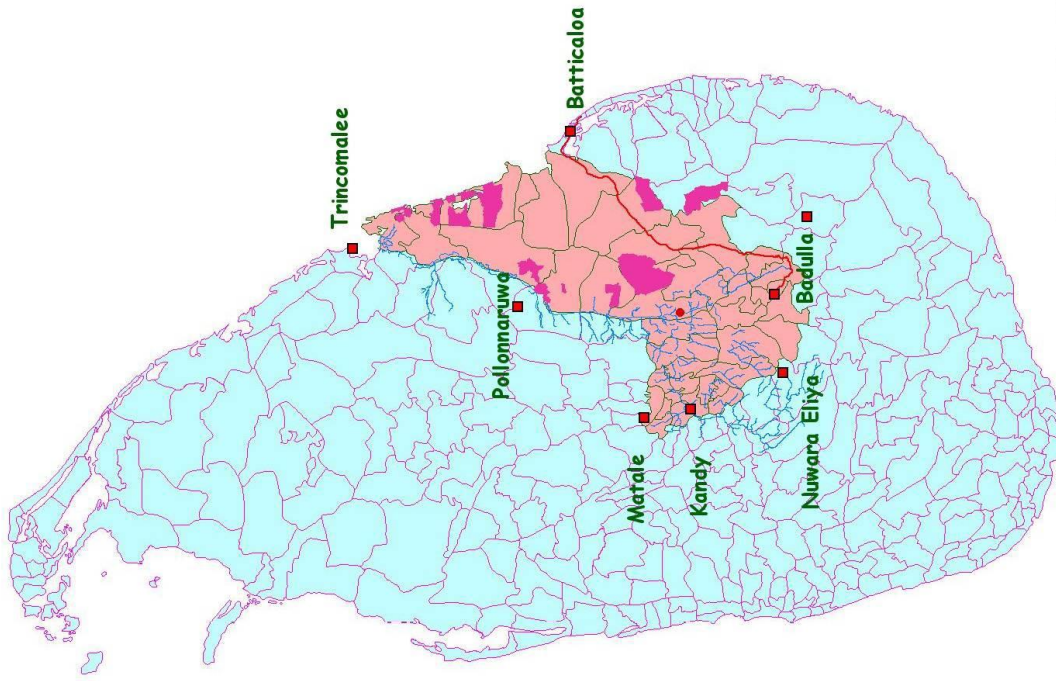
MAHAVEDIRATA (The Vadda Country): According to the Seligmann, C.G. & Seligmann B.Z. (1911).



Boundaries:

- 01. Bounded on the West by the Mahaweliganga
- 02. Badulla - Batticaloa Road is bounded to the Southern limits
- 03. Eastern limit is the Coast

These defined it includes the greater part of the Eastern province, about a fifth of Uva and a small portion of that part of the North Central Province known as Thamarakaduwa.



- Main Cities
- Current Veddass Settlements
- Mahiyanganaya
- Badulla - Batticaloa Road
- Mahaweli Ganga
- Mahavedirata.
- Deds of Sri Lanka

Source:
Seligmann, C.G. & Seligmann, B.Z. (1911),
The Veddass, England, Cambridge University Press.



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Figure 15: Distribution of the Vadda community in 1911

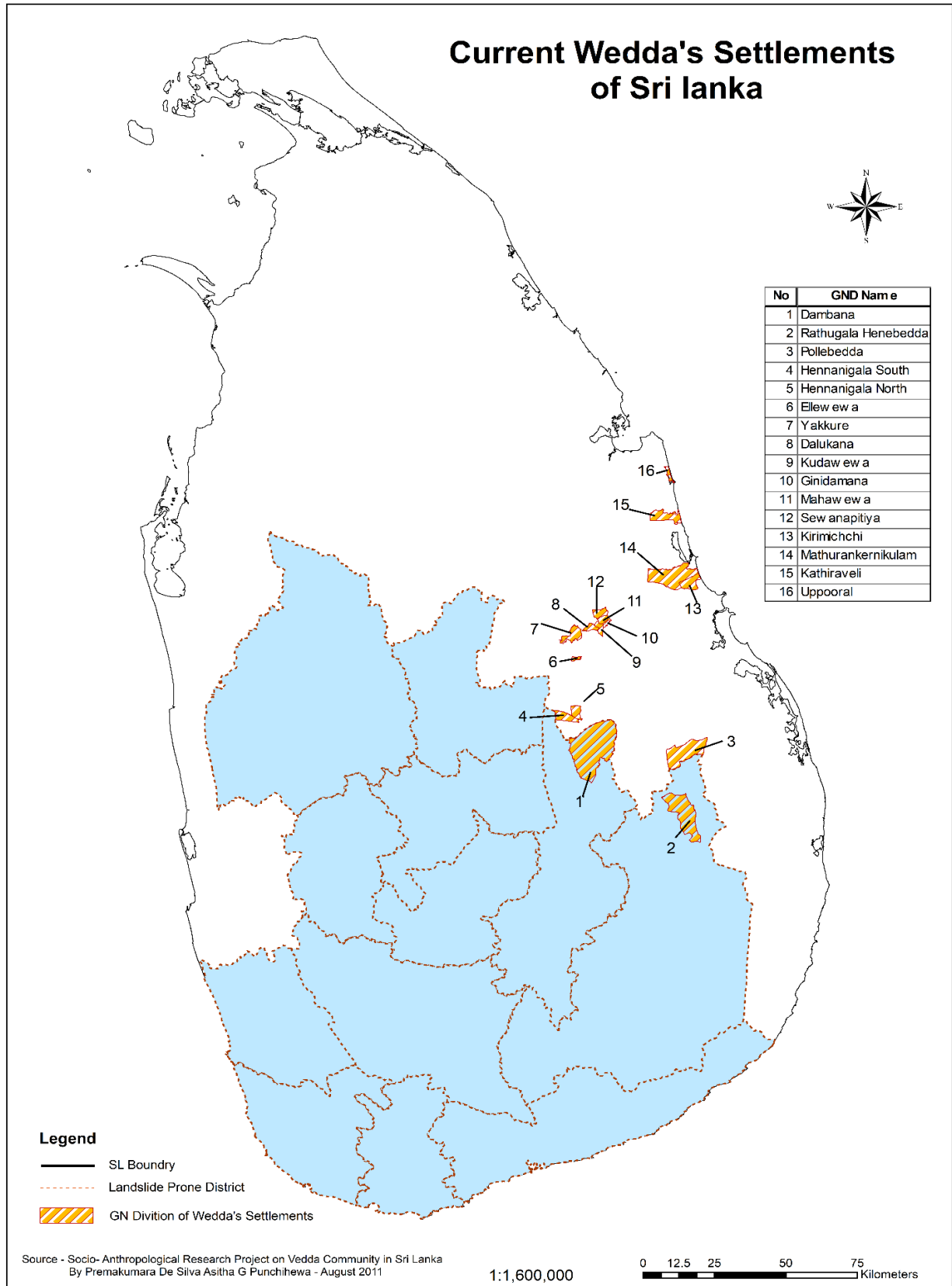


Figure 16: Distribution of the Vadda community in 2010

3.2 AIIB Environmental and social safeguards applicable to proposed landslide mitigation project

Environmental and Social Policy for Investment Project Financing sets out the *mandatory requirements* of the All Bank in relation to the projects it supports through Investment Project Financing. To this end, the bank has defined specific Environmental and Social Standards (ESSs) under three main components (described below), which are designed to avoid, minimize, reduce or mitigate the adverse environmental and social risks and impacts of projects financed by the bank **Reference:** Environmental and Social Framework, Asian Infrastructure Investment Bank, February, 2018.

The bank has requested an environmental and Social Management Framework (ESMF) because the Project consists of a program or series of activities whose details are not identified at the time the Project is approved by the Bank. The purpose of the ESAF is to ensure that the activities will be assessed and implemented according to following.

ESS 1: To conduct an *environmental and social assessment* relating to the risks and impacts, and design appropriate measures to avoid, minimize, mitigate, offset or compensate for them. **This section will be triggered in the landslide mitigation project.**

ESS 2: If the Project would result in Involuntary Resettlement, to address this in the social section of the assessment report, complemented by more in-depth coverage, as required under ESS 2. The Client covers Involuntary Resettlement in a resettlement plan or Resettlement Planning Framework (RPF), **which is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated into the report as a recognizable element.** This aspect may be triggered in the Landslide mitigation project.

ESS 3: If the Project would affect Indigenous People, to address this in the social section of the assessment report, complemented by more in-depth coverage, as required under ESS 3. The **Client covers impacts on Indigenous People in an Indigenous People plan or Indigenous People Planning Framework (IPPF), which is as a freestanding document, an annex to the assessment report, or incorporated into the report as a recognizable element.** This will not be triggered in the landslide mitigation project.

3.3 Gap analysis and measures to address identified gaps

3.3.1 Gaps in implementation of national environmental protection legislations

The national environmental protection legislations in the country provide adequate coverage to protect anticipated impacts on the natural and human environment by the implementation of the project. The NEA legislation is very much in line with environmental safeguard principles of the ESS 1 of the of AIIB. The NEA, its amendments, and sector level legislation that support it have sufficiently transformed the Policy into a satisfactory environmental regulatory framework.

The composite government environmental clearance process, in principle, is consistent with AIIB's environmental appraisal and public disclosure requirements. Disclosure of the EIAs for development projects that are categorized as "prescribed" projects is mandatory. The prescription is based on the magnitude and potential for adverse environmental impacts of a proposed project. The CEA and PAAs have been reviewing and approving the EIAs for prescribed projects since 1993 and have developed a solid technical expertise and capacity for this task. Both AIIB and NEA prescribe that the implementation of an Environmental Management Plan (EMP) will be a part of construction contract. Both CEA/PAA monitor the progress in implementing an EMP.

However, considerable weaknesses in the implementation process encounter. That results range of issues that may lead to constrains on both natural and human environment. They are

- I. Only EIAs are exposed to public hearing, neither IEE nor the committee decisions of other development projects go to public hearing. This result many project influenced parties and agencies not knowing about the details of the project throughout the implementation process.
- II. Often the project proponents do not provide sufficient project information to the project influenced parties or adequately disclose the EIA reports. As a result, the project influenced parties often fail to interpret and understand EIA reports. These difficulties are partially alleviated by public hearings conducted on EIA reports. In such gatherings project proponents and Environmental Impact Assessment consultants explain in local languages the salient features of the project and its environmental/ social impacts and measures to avoid or at least to mitigate them. However, the implementation process has its own weaknesses as much of the critical information pertinent to impacts are not transparently disclosed.

In the implementation of landslide mitigation project these weaknesses need to be overcome by meaningful public consultation and participation, disclosure procedures of the project information, meaningful consultations with all stakeholders including the project influenced parties. Such consultations are to be conducted periodically starting from project planning through implementation and monitoring

- III. Project implementation do not comply with NEA regulations resulting negative impacts on the natural and human environment; pollution, damaging natural resources and causing health issues, nuisance and stress to the community.
- IV. During the project implementation monitoring process for actual implementation of recommended migratory measures is weak. This results often violation of NEA and Environmental and social safeguards.

The aspects iii and iv therefore are required be addressed by a comprehensive environmental and social management plan together with establishing a project management unit with adequate staffing and delegation of powers and responsibility to implement the requirements enforced by the acts.

3.3.2 Gaps in regulations pertinent to land acquisition

The legislative enactments like LAA and other such provisions and regulations with their amendments are directed towards paying compensation for land, structures and crops to lawful owners of such assets. These enactments do not have remedial measures for non-titled holders although they are using the land in question over many years. This is identified as a potential gap and need to be resolved in a sound social management plan.

The current landslide mitigation project do not involve land acquisition. The reason being that sites proposed or mitigation are already considered not suitable for future development and has been categorized as high landslide risk. Due to this fact the houses or structures are considered un-habitable and occupants if any are informed to evacuate. Under the circumstance the land has already lost its value.

Currently, for other landslide mitigation projects a formal agreement called consent/no objection agreement have been signed between the land owner and the project implementing agency. That allows project to access the site, work in the site, erect mitigation structures, and etc. Even in this, the compensation mechanism due to not permitting future development in the land, loses to removal of structures, suspension of economic land uses, removal of structures during construction process etc. are not covered adequately. This is identified as a gap. This aspect should be comprehensively addressed in the environmental and social management plan as discussed in the subsequent sections

3.3.3 Gaps in regulations pertinent to involuntary resettlement

Current landslide mitigation process does not involve involuntary resettlement process. Because, many communities who live in the sites recommended for mitigation have been identified as highly vulnerable to landslide risk and the government have requested them to evacuate the location and resettled elsewhere. For this the affected parties are given resettlement under two options i) a compensation package of LKR 1.6 million (0.4m for the land and 1.2m for the housing construction), ii) provide government built resilient houses. People in some of the sites have already evacuated the site by accepting the government package or have moved to their own places while several others still live under the risk as the compensation is not satisfactory for them. This situation may exist in some of the sites chosen for mitigation under this project. Therefore, resettlement planning approach for this project has a different dimension which need to be addressed carefully to clear issues created under existing disaster based evacuation and resettlement approach for landslide prone victims who intervene with sites considered for mitigation under this project.

The AIB has requested a Resettlement Planning Framework for the project to cover **ESS 2**: The borrower requires to prepare a Resettlement Planning Framework (RPF), ***which is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated into the report as a recognizable element (a resettlement planning frame work has been prepared for the project).***

Chapter 4 - Generic assessment of environmental and social impacts and mitigation measures

4.1 Screening and scoping procedure for environmental and social safeguards

Screening is carried out to decide the level of environmental and social review a project requires. Accordingly project screening was done to identify the depth of assessment required for preparing Environmental and Social Management Plans (ESMP) in par with National and AIIB safeguards. The screening assessment was done i) by studying the nature and scale of project actions ii) Identifying the anticipated environmental and social impacts due to project iv) finding out the significance of potential impacts or risks that a project might encounter v) deciding on institutional resources required for implementation of ESMP and the level of disclosure.

Preliminary screening was carried out first by studying the National Environmental Regulations requirement and Environmental and Social Safeguard Policies of the AIIB bank, and reviewing the project proposals in the environmental and social safeguard contest of both NEA and AIIB. During the screening and scoping process the NBRO project proposal submitted to AIIB was studied in-depth and meetings were held with the Landslide Studies and Services Division (LSSD) project team of NBRO to understand the nature of project, location of project actions, benefits the project would deliver, current level of risk on human and natural environment without the project and etc. Further, a special landslide investigation reports prepared for each of the sites were reviewed and the officer in charge (OIC)s LSSD NBRO district office were consulted regarding further details of the specific sites.

Scoping was done by reviewing the environmental and social sensitivity of the sites with current knowledge of NBRO, visiting some of the sites, overlaying location map on Google images, forest reservation maps & etc., and inquiring key stakeholders for environment; CEA, Forest Department and Department wildlife and etc. to see whether the project actions fall in the highly environmentally sensitive parcels of land, level of environmental legislation required etc. (some of the key stakeholders in Ratnapura district have been already consulted.

The mitigation designs and works carried out on unstable slopes in the past by the Climate Resilience improvement Project (CRIP) and other foreign funded ongoing mitigation projects were also studied to get an understanding on the nature of project actions and their impacts. The mitigation works design team was consulted to get an understanding of nature of mitigation works intend to be proposed in order to study potential impacts; the magnitude, severity and spatial extent, reversibility of impacts, short term, and long term nature of impacts etc.

4.2 Categorization of the project as per AIIB environmental and social safeguard policy

After reviewing the nature of project, the AIIB banks' Senior Environmental Specialist assigned **Category B** to the projects, mainly considering degree of environmental and social impacts due to project actions: a) general environmental and social impacts are localized, and they are not irreversible, b) there are mature engineering technology for impact mitigation and protection, c) there is in-house expertise and management capacity for Environmental and Social issues, d) the project does not encounter project based mass relocation e) the sites are unlikely to fall within or in legal boundaries of strict wildlife, forest or highly environmentally sensitive zones f)the projects is environmentally complementary as it directly support recommendation of national soil conservation regulations, and d) there is local experiences obtained from working in similar projects funded by the government and other investment bank.

Banks definition for Category B projects: A Project is categorized B when: it has a limited number of potentially adverse environmental and social impacts; the impacts are not unprecedented; few if any of them are irreversible or cumulative; they are limited to the project area; and can be successfully managed using good practice in an operational setting. The Bank requires the Client to conduct an initial review of the environmental and social implications of the Project. On the basis of this review, the Bank, in consultation with the Client, determines the appropriate instrument for the Client to assess the Project's environmental and social risks and impacts, on a case-by-case basis. The Bank may determine that an environmental and social assessment or another similar instrument is appropriate for the Project. The scope of the assessment may vary from Project to Project, but it is narrower than that of the Category A ESIA. As in the case of a Category A Project, the assessment examines the Project's potentially negative and positive environmental impacts and recommends any measures needed to avoid, minimize, mitigate, or compensate for adverse impacts and improve environmental performance of the Project.

4.3 Requirement of Environmental Impact Assessment (EIA)

The projects listed as prescribed in NEA require environmental clearance from a designated Project Approving Agency (PAA) where the project proponent should conduct either an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) as decided by the PAA. The NEA does not list landslide mitigation project under prescribed list. Therefore, EIA process does not apply directly to landslide mitigations projects. But, for sites that are located in strict forest/wildlife or nature reserves or in the respective legal boundaries require environmental assessments. (eg: within or 1mile from a reserved forest or wild life reserve). In such cases clearance from the PAA is required. In case of landslide mitigations projects some sites are located in above mentioned areas. The legal entity in implementation of NEA is the Central environmental Authority (CEA). CEA may request a Basic Information Questioner (BIQ) to be completed and submitted for all projects along with the project report. After reviewing the documents the CEA may grant approval to the projects or may request site specific IEE or EIAs. Given the nature of the project which is complementary with the soil conservation regulations on already disturbed slopes it is highly likely that all project sites will be granted direct approval upon submission of BIQ along with the project report.

Of the three main safeguard policies of the AIIB, ESS1 is triggered for all sites as the construction activities pose impacts on both natural and human environment. ESS2 may be triggered only in few cases if resettlement of houses, services or infrastructure etc. are required for implementation of project actions. ESS3 is highly unlikely to be triggered as none of the locations are inhabited by indigenous people (**refer section 3.1.8 for details**)

Screening for sub projects

Sites selected for the mitigation are those posing high risk on large communities, infrastructure such as roads rail ways and services; those located in public places with high vulnerability to human life such as schools, bus stations; places of religious or cultural significance and etc.

The locations will be selected based on the criteria as described below. I) criteria common to all sites eg: level of landslide hazard risk, direct and indirect vulnerability and structural mitigation capability, within the budget ii) other criteria are more site specific such as location significance eg: broader economic and Social benefits, community acceptance, environmental sensitivity etc. Several screening sessions will be conducted in prioritizing the sites for the project by the multi-disciplinary team of experts who include design experts, procurement experts, environmental and social experts, town planners. The process of prioritizing first set of 27 sites have been already completed and the design and procurement process is in progress.

Table 5: Set of criteria considered for screening of sub projects

	Criteria	Requirement
1	Disaster Risk Reduction	Should be
	Human life	Very high
	Infrastructure and service facilities	High/very high
	Environment	Medium/high
2	System sustainability/resilience	Should be
	Location specific (social/economic/religious/cultural)	Very high/ to high
	Contribution to sustainable development of the area	Very high/high
	Mitigation measure's ability to withstand climate change variations and other weather extremes	Very high/high
	Contribution to socio-economic/cultural sustainability of area	Very high/high
	Reduction in resettlement requirement	Very high/high/medium
	Project impacts, costs and constraints (Negative)	
1	Environmental impacts	Should be
	Construction phase	Low/medium
	Long-term impacts on land , water, forest resources	Low
	Damage to natural resources (forest, land , water)	Low/medium
	Damage to public infrastructure	Low
2	Social impacts (project related)	Should be
	Social resistance to project	Low
	Displacement (re location)/evacuation	Low
	Community stress due to project implementation	low
	Cultural archeological impacts	Low
3	Investment (project related)	Should be
	Direct project costs	Within economic feasibility
	Infrastructure development costs	Within economic feasibility
	Operation and maintenance costs	Within economic feasibility
	Other costs – resettlement facilities, evacuation	Low –economically feasible
	Compensation costs	Low –economically feasible
4	Other constraints for project implementation	Should be
	Mitigation design capability within feasible budget	Feasible
	Resource limitations-(Acquisition of lands, Human resource, technology)	Low
	Environmental/social impact mitigation capability	High
	Consideration of the site under other investment project	Not considered

4.4 Scoping

Scoping was and will be done through the project cycle focusing mainly on design, construction and operation phases to identify the key issues relevant to a) Nature and extent of environmental and social sensitivities due to project implementation need to be addressed b) Type of stakeholder involvement and consultation process required c) level of environmental and social impact analysis need to be considered d) significant impacts needs considering mitigation e) type of expertise and tools that can be used in the assessment f) type of implementable mitigation measures within the capability of project .

Team of experts from AIIB bank and project implementing agency involved in the scoping exercise. The relevant project documents, countries environmental legislation process, stakeholder agencies involved, approval requirements etc. were studied in detail. Consultations were made with project implementing agency and the relevant stakeholder agencies. Expert teams visited some of the site recommended for mitigation under AIIB investment. The proposed sites are those representing similar nature of environmental and social conditions typical for landslide mitigation projects. Site inspections, consultations with stakeholder agencies, face to face interviews and expert judgment were greatly used

in scoping environmental and social assessment and in the preparation of environmental and social management plan framework.

Following specific areas were highlighted in the scoping,

- i. Project actions directly benefit to disaster mitigation and National and International disaster Management policies, frameworks and plans
- ii. The 147 sites selected for the mitigation works are the most critical sites having different risks such as risk on the main roads, risk to service facilities in towns and infrastructure, affecting school buildings and school children, places of cultural and religious importance, and houses and the occupants and etc.
- iii. The mitigation will ensure greater benefit to safety on road, people and infrastructure
- iv. Analysis of alternative with respect to project locations- As the project is specifically on mitigation of hazard risk from landslides, the mitigation must be implemented at locations identified with the hazard. Hence, alternatives project locations cannot be considered. However, most appropriate engineering technology can be considered for best mitigation of impacts.
- v. The social and environmental sensitivity of project have greater variation depending on the scale of the project, the nature and extent of environmental and social sensitive elements present in the project influence area.
- vi. Majority of the negative impacts (environmental and social) result during the construction phase
- vii. The impacts during construction phase is largely localized, locally significant and can be mitigated through proper environmental management planning
- viii. Good mitigation measures are required to control pollution of water, slope erosion & sediment laden runoff (two major pollution sources common to all sites) during the construction phase
- ix. Relocation of services, houses and facilities although rare may occur in some cases
- x. In some locations, forested/ecologically sensitive vegetation strips are influenced by the project
- xi. Close stakeholder consultation is required
- xii. Careful consultation is required for already disaster vulnerable communities who might be further affected (temporarily or permanently) by the project implementation
- xiii. Workers safety during construction is highly significant
- xiv. Safety of commuters, residents, and structures in landslide influence zone can be affected
- xv. Land ownership issues and disputes may result during the project implementation
- xvi. Project can consider design considerations that can be considered to secure natural resources, eg: water for community, use excavated solid for land filling, use rock fragments as a building material, use plant litter as a fuel.
- xvii. Use of green environmental technology can be integrated in to project design eg: by integrating natural slope stability elements such as nature based slope protection measures
- xviii. Long-term operation and maintenance of the project in sustainable manner is a an important consideration
- xix. The environmental management plan need considering site mitigation measures based on site specific environmental and social impact assessments

During the scoping, it was revealed that there is a significant variation in environmental, social sensitivities and safety during construction phase among the sites with potential impacts. In order to capture these specific situation in a meaningful Environmental Management Plan (EMP), Site Specific Environmental and Social Assessments and preparation environmental and social management plans were decided for all 147 sites based on a ToR prepared by AIB ES and Social Expert and the project implementing agency (Annexure I).

4.5 Anticipated environmental impacts

It is intended to carry out site specific environmental and social assessments for all 147 sites. In the site specific environmental and social assessments, both beneficial and adverse environmental impacts of the project will be identified. The site specific impact assessments will focus on current levels of risks, construction stage impacts and post construction impacts. Initial consultation of stakeholder and community, and field surveys have been already conducted in representative sites to identify key aspects need to be considered in site specific assessments needing comprehensive mitigation measures. Impacts and risks pertinent to mitigation project will be analyzed in the context of project's area of influence.

Given below is an overall account of key benefits that the project will deliver, negative impacts common to all site with some specific situations.

4.5.1 The overall positive impacts

i. Disaster risk reduction

The implementation of project at 147 sites will minimize the landslide hazard risk of the upcountry transport sections in 11 landslide prone districts. Reduce the vulnerability of communities being exposed to regular landslide risk during rainy season. Current risk on commuters and vehicles travelling on the roads will be greatly reduced. The expenditure on road clearing, refurbishment can be cut down. The road will be safe to use without fear. Roads will be safe during flood and landslide disaster to be used as evacuation routes and routes for transport of relief.

The unsafe schools, service facilities in the high populated areas considered for mitigation will become safe to occupy

Therefore the improved slope stability with the proposed structural mitigation will enhance significantly the safety of human life and property, infrastructure, economic development and overall long-term sustainability in the area. Further the project is very much complementary with comprehensive disaster management plan of the Ministry of Disaster Management and the SENDAI framework for Disaster Risk Reduction.

ii. Ensure road connectivity

Currently, several roads in the hill country are kept closed completely and partly during rainy period due to risk of slope failure. Commuters avoid using these roads and use long distance alternative routes. Landslides weakens the road connectivity to a greater extent in already landlocked hilly terrain. With the implementation of project a good road connectivity can be maintained.

iii. Upcountry economic development

Ensuring safe roads and road connectivity will make hill country accessible to investors for business such as plantation sector, housing development, urban development, tourism and etc. At present many eco-tourism destinations access roads in the hill country are unsafe due to landslides (eg: Sinharaja, Hakgala, Peak wilderness reserve, Horton plains). With ensured slope stability on roads eco tourists can safely access a range of nature reserves and wildlife sanctuaries having unique ecological features, and the project will have high benefits towards eco-tourism in the country.

iv. Support religious, social and cultural sustainability

Some of the road locations proposed for mitigation are access routes for places of worship. These places are worshiped by large gatherings of pilgrims. Eg: Adams Peak (Sri Pada) Pilgrimage and worshipping sacred tooth relic of Lord Buddha in Senkadagala, Kandy. The landslides poses the roads unsafe for these pilgrims and them often use alternative (long distance) routes for visiting the religious places. The project would increase the safety of pilgrims who are crossing these risky locations during the religious season. Further, selection criteria give special focus to public, cultural

and religious centers which are currently unsafe to occupy due to risk of landslides. The religious places include temples and churches. These places are social centers for local community. Many such religious places are Buddhist temples built at different times including historical ones. The communities in the villages closely associate with temples for their social/cultural and religious life in many ways such as by offering food and other needs to the clergy, participate in a wide range of religious and cultural activities inherit to Sinhalese Buddhists since historic time. The local communities have belief systems with various religious monuments in the temples (the bo tree, dogoba and statues etc) and they are closely related to their religious beliefs. The children of these village often go to Sunday school to learn religion. Many welfare societies in villages are centered around the temples. The temples often become evacuation and relief centers in disaster events. Current risk has diminished the significance of these religious places by largely distracting the devotee community from the temple. Rectification of landslides in religious places have a great benefit to overall sustainability of the local communities by creating risk free environment while securig above mentioned social, cultural and religious environment.

v. Soil conservation and water resources protection from sediment pollution

Unlike many other investment projects, landslide mitigation projects directly prevent mass soil loss, sediment movement, surface erosion, sediment loading to streams, reduce fraction of sediment responsible for siltation of reservoirs. Therefore, the projects directly support recommendation in national soil conservation regulations.

4.5.2 Type of construction works applied for mitigation of slopes

The slope mitigation measures majorly involve i) change in slope geometry ii) removal of deposited debris both upslope and down slope iii) improvement water drainage iv) reinforcing the weak soil and rock over burden v) surface erosion control measures.

The change in slope geometry involves chipping off and removal of weak soils, surface vegetation, soil /rock over burden to give the slope a more stable geometry. Impending boulders and rock masses will also be removed and it generally involves rock blasting. During, improvement to drainage, both surface drains and sub-surface drainage systems are used. This will cutoff the surface runoff away, control seepage water fraction and lower the water table so the slope become stable during heavy precipitation. The respective constructions are cutoff drains, berm drains, and cascade drains etc. In subsurface drainage structures, perforated pipes are drilled into the slope and are kept permanently to take the groundwater out. These subsurface drains have different modifications and often involve collection of water in a radially installed horizontal drains. The reinforcing weak soil overburden or rock mass involve variation of designs suitable to the slope mitigation. They include retaining structures, concrete pilling, and drilling concrete-steel structure into rock mass by techniques called soil nailing and rock bolting. The surface treatment may also vary depending on the type of mitigation, they are mainly focused on controlling soil erosion and boulder fall. The common approach is shot creating. A wide range of green technology (use of vegetation for slope erosion control) is becoming largely popular in new construction approaches. Geo-nets are used when mitigating slopes have boulder fall risk (**Annexure II: The structural landslide mitigation methods**).

4.5.3 The negative impacts due to project implementation

Majority of the impacts during project implementation would encounter during the construction phase. Main impacts during construction phase are described below.

Table 6: Negative environmental impacts

Project activity	Impact factor	Impact
<p>i. Slope modifications Removal of surface vegetation Cover.</p> <p>ii. Slope Excavations , removal of debris, soil over burden, boulders, rock fragments, removal of deposited debris</p>	<p>Disturb the location ecology Remove important tree species, Generate plant litter. Generate soil and debris, rock fragments, Expose the slope to more erosion, Increase sediment load in the runoff.</p>	<ul style="list-style-type: none"> • Terrestrial ecology: Affect local fauna and flora, impact on habitat connectivity, ecologically important protected, threatened, rare species may be locally eliminated. The impacts on terrestrial ecosystems are localized as many project actions will be taking place on already failed or disturbed slopes. There are sites covered with forest vegetation. The vegetation including grown tree species with high timber value and high environmental significance need cutting for access roads, surface drains, retaining structures, erosion control structures etc. locally significant impacts may occur. • Stream riparian vegetation strips in some locations may require removal. Also in some places relatively large patches of vegetation will be cleared. This may result habitat fragmentation and may reduce habitat connectivity. Locally significant impacts may occur. • Soil erosion, aquatic ecology and stream health: Removal of soil cover and exposing the slope will make the slope highly erosive. This will increase the sediment load in the runoff and river sediment load. High river load will increase the water conductivity, the suspended solid content in water and alter the stream bed conditions. This will make water unsuitable for human use and aquatic life. Altered river bed can affect the local stream ecology specially impairing sensitive aquatic life. In many of the project locations, down slope is bordered by streams having clean water and healthy aquatic ecology therefore the impacts on water quality and aquatic ecology is considered highly significant.
<p>iii. Vegetative erosion control measurers</p>	<p>Use of plants as a means of erosion control. Various plants such as grasses, creepers, and etc. are used as surface erosion control; eg. Hydro seeding. To grow this, foreign soil materials, mulches, composts, seeds and etc. are used. Some of the plants species can be invasive. Seeds in humus /mulches can have invasive species and they may be introduced during the process.</p>	<ul style="list-style-type: none"> • The invasive species Some of the ecologically sensitive rich bio diversity habitats may be encroached by invasive species and may result in damage to ecosystems in the long run. Eg: invasion of forest ecosystems by the invasive species in some of the sites
<p>iv. Erection of support structures</p>	<p>Cutting down of trees for erection of construction support structures The trees in the village forests, or valuable tree species in private lands may be cut and used for construction work.</p>	<ul style="list-style-type: none"> • Damage to forests, trees Valuable timber species may be removed from the system and may damage the local ecosystems and flora

<p>v. Installation of surface drains and subsurface drain systems</p>	<p>Extraction of water by surface and subsurface drains Groundwater storage depletion, water table drawdown and erosive flows during rains</p>	<ul style="list-style-type: none"> • Local springs and stream flow: The localized impacts may occur due to ground water table draw down while reducing the ground water storage. As a result the local springs may dry up. Some of the springs may be used by the local community as a source water for various uses. During dry periods community may face water scarcity. This is a significant negative impact due to the project. • There can be reduction in dry weather flow in the downslope streams. However, when considering the hydrological zone to be influenced by the project (designed drains takeout only the runoff and subsurface water in the affected slope) the contribution to reduction of overall stream flow due to project will be less significant in most of the cases. • Over extraction of ground water and localized subsidence: ground subsidence may result due to over extractions of ground water. If there are built structures on the susceptible grounds cracks on structures may occur • Erosive flows during rainy season: during rainy season the runoff load on the stream will be high. This may result in stream bottom and bank erosion and erosion at culverts if surface runoff is directly conveyed to streams or through culverts. This is considered as a significant impact.
<p>vi. Operation of machinery, open storage soils, debris and construction materials, surface shot-creating, pile driving Operation and transportation of construction /waste materials Rock Blasting</p>	<p>Air pollution Air quality can be deteriorated during construction phase owing to dust and fuel combustion exhaust fumes</p> <p>Noise pollution and vibration impacts Slope excavation, particularly through drilling (pile boring, pile driving), compaction and rock blasting methods will cause noise pollution and high vibration.</p> <p>Also, noise and vibrations will be generated by excavation, cutting, filling and compaction work as well as operation of heavy vehicles during the construction phase.</p>	<ul style="list-style-type: none"> • Dust and suspended Particulate matter levels (SPM): The emissions will exceed the recommended limits of the National Ambient Air Quality Standards, and these particles will be harmful to commuters, pedestrians and local residents in the area. Therefore air pollution impacts during construction phase is considered highly significant in the local context. <p>Noise and vibration impacts on sensitive living receptors</p> <ul style="list-style-type: none"> • The project will have impacts on neighboring community, pedestrians and commuters on roads, some project sites are located in congested urban areas, schools and etc. They will be impacted with high noise and vibration pollution and disturbances. • The project actions will have disturbance especially to the fauna that inhabit some project sites. Specially, birds and mammals will also be affected as some projects will be in forested land parcels. • As most of the project locations are situated in calm peaceful environments the impacts on noise and vibration on living sensitive elements are considered highly significant. • Some of the sites are near the schools, religious places (temples, mosques etc). There will be obstructions to school children, worshippers etc for holding classes, religious activities, etc due to noise pollution causing significant site specific impacts.

Table 6 cont.

		<ul style="list-style-type: none"> • Vibration impacts on structures Some houses located in the proximity of landslides have cracks due to differential settlements and also due to poor quality construction. The vibration generated from drilling and rock blasting can aggravate these cracks and may cause damage to houses and buildings. The vibration impacts on houses /buildings in the proximity of the construction will be significant.
	<p>Water quality Water quality can be affected during construction activities when soils, wastewater, oils and lubricants, sewage and other materials are allowed into the environment.</p>	<ul style="list-style-type: none"> • Water pollution: The discharges may increase the pollution load in the streams with high BOD, COD, Suspended Solids, Oils and Greases etc. The emissions will exceed the ambient water quality standards prescribed for designated uses such as drinking, bathing, and aquaculture and may violate even the minimum standards for water quality. The water quality impacts from discharge of wastewater and pollutants to environment during construction phase is therefore is highly significant.
	<p>Damage to service facilities Some of the locations may have telecommunication lines and posts, power supply lines and posts and etc which may require to be removed or may be damaged during construction phase as machineries such as long arm excavators are frequently used.</p> <p>At some sites small water supply intakes, water supply lines (individual /community) are located on the slopes, alongside the roads (eg: Katandola, Ratnapura District). The construction work and machinery may damage these.</p>	<ul style="list-style-type: none"> • Damage to service infrastructure The residents in the nearby area may suffer from interruption from electricity, telecommunication facilities and water supply. <p><i>(This has already happened in the Katandola site at Ratnapura District where the water supply line supplying water for about 30 families was damaged by the temporarily construction machinery of RDA causing interruption water supply).</i></p> <p>Therefore, the impacts caused to service infrastructure due to operation of construction machinery is significant in this project.</p>
	<p>Culturally important structures and archeological sites Some of the projects may be located close to historical temples and may be site of archeological importance.</p>	<ul style="list-style-type: none"> • Culturally important structures and archeological sites The excavation works may accidentally damage ruins of archeological importance causing significant impact on valuable archeological resources.

<p>vii. Esthetically unpleasing/ Ecologically incompatible designs</p>	<p>Visual pollution The mitigation designs may include structures and treatments that do not blend with natural ecological features in prevailing environment causing visual pollution.</p>	<ul style="list-style-type: none"> • Visual pollution in highly aesthetically sensitive environments Some of the sites are located on the routes of unique natural environmental and high aesthetic quality with unique natural beauty. Erecting incompatible concrete structures and surface treatments will damage the current esthetic beauty of the routes. As these routes are a part of adventure and ecotourism there will be significant impacts on visual quality and esthetic beauty of the environment.
<p>viii. Refuse disposal sites</p>	<p>Unauthorized disposal, air , soil and water pollution, and public nuisance Construction activities generate plant litter, earth debris, rock fragments in large quantities in the initial construction phase these will require disposal.</p>	<p>The refuse may be disposed on road reservations, in stream banks, or in the proximity of public places, access to houses etc. The visual and contamination pollution impacts and nuisance caused are significant.</p>

Table 7: Social /occupational impacts

Project activity	Impact factor	Impact
<p>i. High risk construction works, use of explosives for blasting , operation of heavy machinery</p>	<p>Safety to workers The construction is highly risky as site operations take place in already unstable, collapsed slopes with the risk of sliding, boulder fall and etc. Explosives will be used for rock and boulder blasting on slopes. Heavy machinery such as excavators, drilling machines, rollers etc is also used.</p>	<ul style="list-style-type: none"> • Risk on the workers The workers are exposed to risk from falling. Fatal injuries may occur if the slope fails. The risk of slope failure is aggravated during the rainy season. This risk is highly significant and common to all most all sites especially when upslope construction is envisaged. • Explosives may be used if the rock blasting is involved. May pose risk on unsafe use. Common to sites involving removal of weathered rock and boulders. As these operations are to be done on unstable slopes the risk of improper use of explosive and accidents from rock fragment are highly significant. • The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicle and construction machinery accidents is highly significant. • Heavy machinery operation may require electricity from National Grid or from n on-site power generator. Unsafe electrical lines and power systems may cause electric shock hazard to workforce and public. • Snake bites Many sites are located in areas with forest or thick vegetation. There can be venomous snakes. The workers are susceptible to snake bites during work.
	<p>Safety of commuters, pedestrians and local residents</p>	<ul style="list-style-type: none"> • Risk on the road users Relatively low in sites located away from settlements and roads, but significant risks may impose on the road users and residents if the sites are located close to their inhabitance.

Table 7 cont.

<p>ii. Risk of slope failure induced by construction work</p>	<p>Construction induced slope failure</p>	<ul style="list-style-type: none"> • Very high risk to occupants in the down slope In some sites, occupied houses are present in the down slope or adjoining failed slope. The occupants in these houses are expected to evacuate the houses due to landslide risk, but continue to occupy the houses. These houses and occupants are exposed to high risk during the construction phase.
<p>iii. Construction work force</p> <p>iv. Use of lands/houses as work camps and storage sites</p> <p>The contractor may lease/rent houses or lands for construction camps/machinery parking sites as storage facilities</p>	<p>Communicable diseases, drugs, disputes and conflicts with neighbors and nuisance</p>	<ul style="list-style-type: none"> • Risk to residents The sites are to be constructed by contracting firms. The labor force may often be outsiders from different social backgrounds. <ul style="list-style-type: none"> • Their poor habitual acts, indecent behavior etc. may be a nuisance to neighbors. They may confront with neighbors and may enter in to quarrels and may become a nuisance to them. • Child abuse, adulteration and sex labor can be possible as the many sites are located in rural areas with people under poverty. • Workers addicted to narcotics and alcohol may influence the local community towards addictions.
	<p>Poaching and Hunting The construction work force may engage in poaching and hunting wild animals in some of the forest pockets.</p> <p>Fire hazard /Forest fires Construction work for may engage in accidental fires or intentional fires by setting fire to vegetation, or throwing cigarette buds, or burning solid wastes etc.</p> <p>Open defecation and littering The workforce may use open ground/ stream banks for defecation/urination Solid waste may be thrown on bear ground /or to streams etc.</p>	<ul style="list-style-type: none"> • They may spread sexually transmitted deceases to the community; HIV • Labor force may rob the valuable properties of the neighbors • Conflict/disputes may result when using shared resources such as bathing spots, common water sources etc. Above impacts although may occur in the localized context they are highly significant in terms of magnitude of the impact. • Poaching and Hunting This will disturb the ecosystem, affect the natural living of fauna and even may result loss of endemic / threatened /rare species. As some of the sites are located in bio diversity rich land forms there is a very high significance that the construction work force get engaged in poaching and creating significant impacts on wild life. • Damage to natural ecosystem These activities can trigger forest fires. This risk is highly significant in dry season in site having forests in the proximity. • Fecal pollution of potable water The defecation will pollute potable water sources and may spread water borne infections. At some sites, people use water for bathing, washing and for other domestic purposes. Their source water will be polluted, Hence the impacts are highly significant. Littering may cause visual pollution/ water pollution.

Table 7 cont.

	<p>Use of fire arms and weapons Worker may keep un authorized fire arms, guns, knives.</p>	<p>• Injuries from fire arms They can use these arms for hunting and injuring people. Hence this impact is significant.</p>
<p>v. Use of private property for project works</p>	<p>Use of private lands for Installation of mitigation structures, to store materials and machinery and to access the sites.</p>	<p>• Loss of valuable land uses The owners will have to provide land for construction work and may lose part of the property from further valuable uses (project do not envisage land acquisition (no compensation involved).</p> <p>The lands are already threatened by the landslide hazard. Hence, use of land under current hazard condition is unsafe and may pose risk to properties at risk. Upon implementation of mitigation measures the lands will be stable and that will make the close by properties currently at risk more stable.</p> <p>i. This will have highly positive impact on the land owner from the disaster perspective, but being unable occupy the land for future uses under terms and conditions of the project there will be negative impacts to the owner. Such future uses that will be hindered are:</p>
		<p>ii. The owner cannot develop the land or build structures. iii. May not be able to carry out any income generating activities. iv. May not be able to grow crops such as tea, spice crops, other crops grown in home gardens for various uses.</p>
<p>vi. Loss of access to the property</p>	<p>The communities may lose access, obstructions will happen to access during construction phase</p>	<p>• There will be a negative impact on the AP due to operation of daily project activities; moving and parking of vehicles, storages of material, and nuisance due to labour force.</p>
<p>vii. Site clearing for construction work</p>	<p>Damage to property During site clearing Some of the sites have structures that are already damaged due to landslides (Damaged houses, Shops, School buildings), or structures that are used for various purposes (drains, wall, landscape elements) . Some of these structures may require demolishing/removal to clear the site for construction.</p>	<p>Impact due to loss of property The owner of the house/property loses the property. The owner may not be willing to allow removal of structures. Then structures may be removed by the contractors without consent of the owners. Some parts of the structures having economic value, recoverable parts etc. may be destroyed during site clearing No compensation be paid for the structures, specially damaged once.</p> <p>This will create an unrest among the owners of the structures, unwilling to allow clearing, even objections for project implementation and accessing the site for maintenance work in the long run.</p>

<p>viii. Construction works in reservations</p>	<p>Disputes and conflicts Many mitigation sites are located on road reservations. Some are located in environmentally sensitive stream reservations, There can be places which are forests and lands belong to land reforms commission of Sri Lanka and Department of Wildlife Conservation.</p>	<p>Disputes due to unauthorized entry and working <small>Table 7 cont.</small></p> <ul style="list-style-type: none"> • Dispute may arise if the sites belongs to other agencies are accessed, or if construction works are carried out without permission. • Or the activities may violate the conditions laid in the respective conservation regulations. • This may result disputes between the agencies and the project team, delay in project work and even lead to legal actions.
<p>ix. Labor camps</p>	<p>Operation of labor camps For this project labor camps in many locations are needed. Most probably they will be established for each or for several packages depending on the Construction Contractors mobilization capability.</p> <p>The possibility would be renting of houses in city areas or in the proximity to the sites.</p> <p>Also, temporary camps may be erected convenient to the site by leasing vacant lands or in public lands.</p>	<p>Disputes and nuisance to neighbors The indecent behavior of workers, alcohol, quarrels, waste disposal, labor noise, adulteration, drugs, abuses etc. may occur if the camps are not operated under proper code of conduct.</p> <p>Also, contractor may not properly close the camps after the project, leaving waste and other unsettled issues causing nuisance to neighbors.</p> <p>In temporary camps erected by the construction contractor may not have proper sanitation such as toilets, water and etc. Un authorized disposal of sewage, open defecation, accessing community water supplies for bathing other sanitary purposes etc may occur resulting significant nuisance to the neighbors, disputes , quarrels etc.</p>

4.6 proposed mitigation measurers

Mitigation measures are proposed at three levels i) design stage mitigation consideration ii) construction phase mitigation measures and iii) operation and maintenance phase considerations. The flowing sections describe the relevant mitigation measures applicable to landslide mitigation project in different phases of project implementation.

4.6.1 Design based mitigation measures

Design phase mitigation measures should be considered in the preparation of structural designs. Given below are considerations that have higher environmental and social relevance to this project. However, as designs always link with technical and financial feasibility and cost and benefits, design based mitigation measures should be considered always specific to the site conditions. The site specific ESMPs will give a reasonable account on the importance of environmental /social mitigation aspects to be included as design based mitigation measures specific to each site. The project management and the structural design team are expected to evaluate the appropriateness the relevant considerations as suitable to the sites.

i. Natural resource management and resource optimized designs

Project specific designs should be considered to eliminate mass clearing of vegetation, minimum number of removal of grown tree species. Sufficient emphasis should be made to consider conservation of trees if important (valuable and ecologically sensitive) tree species are found.

If large fractions of vegetation is required to be cleared in ecologically fragile habitats, or deep drains etc. are to be made the designs should include habitat connectivity features, animal trails and vegetation strips and etc. even if the impact are localized.

ii. Conservation of water resources

Majority of the designs consider surface and subsurface drainage management. That involves extraction of water both surface and sub-surface. The water extracted is in relatively good quality. In a well thought design this extracted water can be conveyed in such a manner that the water can be accessed by wild fauna as well as the neighboring communities for bathing and other domestic purposes including water for drinking water. The community consultation indicated water scarcity during dry season in many rural locations where common water supplies are not available. In a well thought design the water extracted through these drains can be used by them as a source of domestic water. This option is strongly recommended as water scarcity in the dry season is a common.

Many rural communities in the area use spring water for domestic purposes. If the water draining from the slope to be mitigated is used as a source for individual or community water supply, the chance the water source can be affected by the mitigation work is high as drainage improvements may deplete the groundwater storage. In such instances the design should include alternative source of water for the community (temporary/or permanent).

iii. Aesthetically compatible design considerations

The designs in aesthetically sensitive environments should consider structures that blend with natural environment to keep the visual pollution to minimum. Several locations proposed for mitigation are located alongside the roads crossing natural sceneries with exceptional scenic beauty. If mitigation is done with perfect dimension concrete structures and shot-created slope surfaces, it will be an eye sore for the commuters who will be nature lovers, eco tourists and etc. Hence, designs should selectively consider features that blend with natural environmental features especially for surface structures and surface treatment in highly aesthetically sensitive sites. Service of a landscape architect may be important for the design of aesthetically compatible mitigation structures.

iv. Consideration of green environmental features

As many of the mitigations works are carried out in ecologically sensitive habitats, It is recommended to consider green environmental designs as much as possible in the designs eg: use of local vegetation species for erosion control, combination of plants to sustain species diversity in the environment etc.

v. Erosion control structures

In drainage management, water is extracted and conveyed to nearby streams often through culverts. During rainy season the flow in these drainage structures can be significantly high and this may cause bed and bank erosion. Hence the design should adequately consider flow speed breakers to reduce erosive flows entering natural streams. This should be an inclusive part of the design.

vi. Low post maintenance and operation designs

The mitigation should consider passive techniques such as gravity drains for drainage management. Correct pipe diameters, pore diameters and laying angles should be considered to avoid clogging of drains. Low maintenance structures and designs such as designs to withstand erosive forces, sediment trapping systems are recommended for long durability. The materials used for structures

should be chosen carefully so as to withstand local weather conditions with high durability. Designs should specially consider corrosion prevention techniques if steel structures are used. If the overlay medium of sub drains has fine grains use of suitable geo textiles to filter out fine grains to prevent clogging is recommended.

vii. Inclusion safety structures

Some sites may require inclusion of structures to ensure public safety. For examples they may include safety walls if the site is located on a down slope of a school or a road etc. They may include safety walls, fences, safety nets etc. It is recommended that design team pay proper attention to site specific safety requirements that should be considered in the design based on above mentioned safety requirements.

viii. Inclusion of supporting facilities for public infrastructure

There can be mitigation sites with certain public infrastructure facilities. With the mitigation such facilities may be removed. For example there are sites, across it water supply lines traverse. After the mitigation these line may require install permanently in the same location. The mitigation design can consider inclusion of supporting facilities to house the water supply line across the site.

Also, some sites may have intake points for private /community water supply. The project may result these springs run dry. Under such circumstances, the project may have to consider new water springs, other water supply infrastructure such as storage facilities etc. to be included in the design.

4.6.2 Mitigation of impacts during construction phase

Construction phase mitigation measures accounts to greater component of mitigations works in the project implementation. Implementation of construction phase mitigation measures is the responsibility of construction contractor. Given below are the important mitigation measures the project should consider during the construction phase.

Table 8: Mitigation of environmental impacts during construction phase

Anticipated impact	Proposed mitigation
<p>I. Disturbance to natural vegetation (terrestrial and aquatic ecosystems)</p>	<ul style="list-style-type: none"> • During construction clearing of large strips of vegetation should be avoided. Trees should be removed if necessary only. <ol style="list-style-type: none"> i. If habitat connectivity is affected, connective vegetation strips, animal trails should be maintained ii. If trees above 18mm diameter are to be cut, they should be marked, identified and approval should be obtained from Department of Forest through divisional secretary for removal and transportation iii. Stream riparian vegetation should not be damaged. If stream riparian vegetation is to be cleared for project activities, erosion control measures are imperative to protect the stream banks iv. Strict control to prevent sediment runoff is mandatory to all sites. Covering of open slope faces, debris deposits, material deposits are essential. All sites should have runoff control systems with silt traps and temporary measures to prevent silt entering the streams v. If substantial extent of trees are to be removed, it should be compensated by tree planting as much as possible
<p>II. Invasive species</p>	<ul style="list-style-type: none"> • Invasive species should be avoided in using vegetative erosion control structures. Native plants in the local environment should be chosen for vegetative control. The species used for vegetative control measures need

Table 8 cont.

	<p>approval from the Department of Wildlife Conservation. Tree plants for vegetative control can be obtained from the Forest Department nurseries, by informing them in advance the requirement.</p> <ul style="list-style-type: none"> • If imported grass seeds are used for turfing quarantine clearance from the Sri Lanka Custom is mandatory in addition other approvals
III. Cutting trees to get timber for construction work	<ul style="list-style-type: none"> • Under no circumstance the contractor shall use local trees for construction support structures: scaffoldings etc. Use of non-timber materials for scaffoldings and support structures should be made compulsory to contractor unless in essential cases. Contractor's terms and conditions should include strict restrictions on the use of local timber material during construction.
IV. Pollution control during site operation	<ul style="list-style-type: none"> • Contractors' obligation in contract should include a sound plan to control emissions and pollution. Control of air pollution(dust, fumes), noise and vibration, discharge of wastewater and water pollution, solid waste disposal etc. should be abide by him as per the National environmental regulations
V. Ground vibration	<ul style="list-style-type: none"> • Contractor should be extremely careful in operating heavy machinery with ground vibration when there are houses and structures nearby, specially old buildings, building with cracks, temple buildings etc. Special care should be made to operate machinery within the recommended limit by CEA
VI. Traffic control	<ul style="list-style-type: none"> • Contractors' obligation in the contract should include proper traffic management plan in the sites where construction activities are to be taken place in road reservations. • There can be site adjoining the road such as near road bends, narrow roads, and roads with steep down slopes, high traffic roads, next to schools or hospitals etc. It is important that specific traffic management plans with adequate site specific safety should be arranged. • They should include, sign boards, safety fences, barricades as suitable to the place and its sensitivity, full time watchmen, night lamps etc.
VII. Access to sites	<ul style="list-style-type: none"> • It is the obligation of the contractor not to block the access of residents. Project work area should be planned with necessary separations not to block or hinder convenient movement of pedestrians, and residents. Storage of construction materials and refuse and parking construction machinery blocking the accesses or their right of the way should be avoided. Necessary pre planning should be done during the site preparation to avoid such circumstances. <p>In rare cases following situation may arise</p> <ul style="list-style-type: none"> • If accesses are going to be affected by the project actions, a suitable compensation should be paid for Affected residents • If business places/ income activities are affected outside the hazard zone a compensation agreeable to the AP (through meaning full consultation) should be paid
VIII. Damage to service facilities	<ul style="list-style-type: none"> • The contractor's obligations should include a proper assessment on service facilities that may have to be removed or have a potential to be damaged. Eg: Telecommunication lines, electricity lines, water lines, roads, drainage lines. Necessary early precautions should be made in site preparations to remove them and re-install in secured places with the permission of the relevant parties (agencies and owners) to avoid such damages, to minimize damages during construction and to rectify or to compensate if a damage happens. This should be included in the contractors bid documents as a part of his obligations

Table 8 cont.

IX. Culturally important structures, events and archeological sites	<ul style="list-style-type: none"> • Culturally sensitive places if present, contractor should carry out work without disturbance to cultural activities. Construction work may be temporarily suspended on festival days. Noise and vibration prone machinery use should be strictly controlled on cultural days. <ul style="list-style-type: none"> i. If archeologically important sites are found during construction, construction works should be immediately stopped and informed to Department of Archeology (provincial) through the project director, PMU ii. These should be included in the contractors obligations under his environmental and social management plan
X. Visual pollution	<ul style="list-style-type: none"> i. During construction good housekeeping should be maintained to minimize visual pollution, health issues and nuisance to public. These should be included in the contractors obligations under his environmental and social management plan
XI. Refuse disposal sites	<ul style="list-style-type: none"> i. Contractor's potential to dispose refuse in an ad-hoc unauthorized manner should be avoided. Disposal near stream banks, into streams should be avoided. Depositing refuse near road reservations should be avoided. Refuse disposal should be made mandatory only in the approved sites. Prior approvals should be obtained from the GSMB and the Local Authority for transport and disposal. The project director should coordinate with the contractor to make sure that the refuse will end up in disposal at the approved sites. ii. Waste should be managed to minimize visual pollution, health issues and nuisance to public iii. Use of recoverable material as construction raw material. In the site review, many sites were observed with large rocks and boulders that can be used as a construction aggregate on-site or off site. Contractor should consider use of these materials or extract them in such a manner useful to others. However, with the formal approval of PD PMU. iv. These should be included in the contractors Code of conduct and obligations under his environmental and social management plan
Implementation responsibility: Construction Contractor	

Table 9: Mitigation of social /occupational impacts during construction phase

Anticipated impact	Proposed mitigation
<p>I. High risk construction works, use of explosives for blasting , operation of heavy machinery</p>	<ul style="list-style-type: none"> • Safety to workers, Safety of commuters, pedestrians and local residents. A well prepared safety management plan should be prepared and implemented by the contractor to ensure safety of workers in sites appropriately with the following mandatory precautions, <ol style="list-style-type: none"> i. Awareness on health and safety issues particular to unstable slopes ii. Use of personnel protective equipment iii. Avoid site operation during night, and rainy periods iv. Use of safety precautions such as safety nets, holding mattresses, soil berms etc. to prevent rolling rock /boulder fragments v. Ensure safety of workforce working on vertical structures vi. Strict safety concerns on on-site electricity from national grid or from power generators to prevent electric shocks during work vii. Proper emergency management system for snake bites (include awareness on snake bites, safety shoes while at work, first aid on a snake bite, hospitalization and admission to correct hospital where snake bite management facilities are available. viii. Full time watchmen for checking, warning and immediate evacuation system for potential collapses/ debris flows, boulder falls ix. Safety protocols for operation of heavy machinery in limited spaces x. Immediate first aid in an injury xi. Immediate hospitalization arrangements <p>These should be included in the contractors’ obligations under his environmental and social management plan.</p>
<p>II. Safety of down slope upslope occupants at risk</p>	<ul style="list-style-type: none"> • During construction the occupants in up slope and down slope are at high risk. The risk on them should be managed by, <ol style="list-style-type: none"> i. Installation of safety barriers to protect community from boulder fall risk ii. Awareness on the risk, immediate evacuation on possible risks iii. Use of temporary evacuation shelters during critical construction times • Temporary surface drainage control, covering the slope, and removal of impeding unstable earth and rocks before rain starts. These should be included in the contractors’ code of conduct and obligations under his environmental and social management plan.
<p>III. Workforce: Communicable diseases, drugs, disputes and conflicts with neighbors and nuisance</p>	<ul style="list-style-type: none"> • The anticipated issues will be mitigated by, <ol style="list-style-type: none"> i. Awareness programs for workers and the community on possible issues ii. Continuous vigilance and monitoring on workforce acts and interaction s with community by the work superintendents iii. Give punishment to workers who violate the disciplines/code of ethics etc. <p>These should be included in the contractors code of conduct and obligations under his environmental and social management plan</p>
<p>IV. Poaching and Hunting</p>	<ul style="list-style-type: none"> • Awareness to workforce on the regulations pertinent to poaching and hunting, obligations on nature conservation, punishments to those who violate the law. These should be included in the contractors’ obligations under his environmental and social management plan.
<p>V. Fire hazard /Forest fires</p>	<ul style="list-style-type: none"> • Awareness to contractors workforce on possible acts leading to fires, environmental obligations to protect the nature, regulations regarding intentional fires <ol style="list-style-type: none"> i. Prohibition of setting fires in sensitive places ii. Fire management plan for work camps

	<p>These should be included in the contractors obligations under his environmental and social management plan</p>
VI. Hazardous materials and Hazards	<ul style="list-style-type: none"> • Approvals to use chemical blasting from authorities, <ul style="list-style-type: none"> i. Establish a proper chain of custody for blasting chemicals and detonators ii. Incl. authorized personals to poses the materials iii. Safe transportation by the authorized personnel iv. Use by the approved skilled professionals v. On-site safety during blasting operation vi. Clearing the site from hazardous materials after the blasting activity
VII. Open defecation and littering	<ul style="list-style-type: none"> • The potential water/soil pollution issues will be mitigated by, <ul style="list-style-type: none"> i. Awareness on water pollution and water borne infections, damage to downstream uses due to open deification ii. Arrange onsite toilet facilities for workers in the proximity of the site if the sites are located in environmentally (streams), socially (schools, hospitals) or culturally sensitive places (temples, mosques), etc. iii. Vigilance and monitoring of worker mal sanitation practices iv. Punishment to worker violating the conditions <p>These should be included in the contractors code of conduct and obligations under his environmental and social management plan</p>
VIII. Use of fire arms and weapons	<ul style="list-style-type: none"> • The relevant risks will be minimized by, <ul style="list-style-type: none"> i. Awareness on the site restrictions pertained to keeping and use of fire arms ii. Vigilance and monitoring of workers iii. Punishment to worker violating the condition <p>These should be included in the contractors code of conduct and obligations under his environmental and social management plan</p>
IX. Use of private property for project works	<ul style="list-style-type: none"> • The issue should be addressed in the Resettlement Planning Frame work which include, <ul style="list-style-type: none"> i. It is necessary to declare the lands for mitigation by authorized parties (NBRO has no vested power for declaration of lands for public purposes), The Divisional secretary has this authority. Hence, it is imperative that the land is surveyed, demarcated with the exact area require to be declared followed by formal declaration by DS to release the land for project implementation. ii. From the land owner's side, especially for households who poses only a small piece land, and had lost it due to landslide may not want to release his piece of land. For these people, government offer 1.6m LKR compensation. Which is very much inadequate to build a reasonable house. There may be situations that the project requires them evacuate the site to facilitate project work. In such circumstances meaningful consultation should be done with landowners regarding the project and importance of allowing the construction in his land while facilitating a background for him to accept the offer and leave the land. iii. Proper legally bound agreement made between land owner and project implementing agency to utilize the land for mitigation work, post operation works, restrictions on future land uses by the land owner is a mandatory requirement to refrain him from future legal issues pertinent to landownership. iv. The ES & HS unit of PMU should pay special attention and should carefully handle this situation following above recommendations as a minimum.
X. Site clearance for construction work	<ul style="list-style-type: none"> • The issue should be addressed in the Resettlement Planning Frame Work which include. <ul style="list-style-type: none"> i. Follow the land declaration process as in section ix

	<ul style="list-style-type: none"> ii. Adequate awareness to landowners regarding the project and importance of allowing the construction in his land and essential need to remove the structures, productive land uses for the construction iii. Signing a legally bound agreement between the land owner and the project implementing authority allowing no-objection to remove the structures iv. Allow land owner to extract/ or extraction by the contractor on behalf of the land owner any valuable items from the structures v. Project bear the cost of removal of the structures vi. If there are facilities to be removed, but have an impact on the current wellbeing of the land owner eg: removal of drains, water lines etc. the alternative arrangement will have to be made by the project under the project cost, or may consider compensation
<p>XI. Construction works in reservation areas</p>	<ul style="list-style-type: none"> • The possible impacts will be mitigated by <ul style="list-style-type: none"> i. Identifying the land ownership (the agency) ii. Consultation with relevant agencies iii. Submission of written requests to relevant agencies, including applications, project proposals and designs iv. Follow instructions of the agency in approval process v. Obtaining written clearances form the agencies vi. Implementation of the project according to the terms and conditions laid by the agency vii. Make the agencies adequately aware/involved during the project implementation process at progress review meetings viii. Address the agencies concerns pertinent to violations of the terms and conditions if any within a shortest possible time
<p>XII. Labor camps</p>	<ul style="list-style-type: none"> • The construction contractor is expected to inform the PMU on the arrangement of labor camps. If temporary camps are expected to be established the contractor should get the plan approved by PMU. The labor camps should be operated respecting the following environmental and social norms and conditions as a minimum. <ul style="list-style-type: none"> i. Camps should have adequate space for the labor force with required facilities for resting (sleeping) , sanitation and access to communications ii. Camps should have and adequate water supply throughout iii. Sanitary waste should be disposed according to the regulations of the local authority. iv. For camps that are to be established by the construction contractor, sewage disposal systems, water supply and other sanitation facilities should be properly established without causing nuisance to others v. Proper solid waste disposal systems should be established and operated. burning waste, disposal into neighboring land should be avoided. The best way of disposal is to handing over to local authority or disposal at approved site by the authority vi. Possession of fire arms, or life threatening tools inside the camp should be prohibited vii. The In charge of the camp should be vigilant on possible acts such as using drugs, alcohol, adulteration, sex abuses of women and children, robberies, disputes and indecent behaviors. viii. Proper awareness should be made by the contractor ES officer on behavioral issues and on camp disciplines ix. A scheme of punishments, legal actions or even expel from the job should be in place to control unavoidable cases x. Fire safety arrangement should be arranged in the camps

	<ul style="list-style-type: none"> xi. The labor force should be adequately supervised for possible violation of environmental and other laws of the country such as poaching and hunting, illegal trade of archeological artifacts and protected wildlife specimens xii. First aid box should be available in the camp xiii. The labor camps should be properly hand over to the owner/removed without leaving any waste, construction materials etc.
Implementation responsibility: the Construction Contractor	

4.6.3 Operational phase mitigation measures

As the mitigation works largely consist of structural mitigations works that are linked to slope stabilization the environmental and social impacts are considered minimum during the operation phase. The ESMF gives an in-depth analysis on aspects to be considered to mitigate environmental and social impacts during the project cycle. If they are implemented properly the possible operational phase impacts are negligible. However, there can be issues in the initial phase soon after project completion. It is recommended that the project considers a sufficient monitoring period after the completion of construction work to identify such issues and remediate when arise.

Long-term operation and maintenance

The long term operation and maintenance work may require to be carried out for sites. Most of the time they are minor maintenance activities such as weeding, cleaning drains to remove silt and litter, surface treatments etc. For the sites of RDA, the maintenance will be looked after by them under maintenance of road reservations. However, for other lands both state and earlier private lands the Divisional Secretary will be given the authority for maintenance. The maintenance will be done under NBRO directions. In case of special maintenance works (that might arise in rare cases) NBRO will provide necessary technical guidance to the contracting parties who under take the work.

The community based organizations can engage in minor maintenance and operation works whereas for major works if arise services of competent contractor will be used.

Necessary funds will be released by government to Divisional Secretary to execute maintenance activities

Chapter 5 - Consultation with stakeholders and vulnerable communities, and information disclosure

Stakeholder consultation becomes an important part of the implementation of the project smoothly. The relevant stakeholders will be made adequately aware regarding the nature and scale of the project, the deliverables and long-term project benefits. Also, adequate information disclosure will be made on the project actions, use of resources including lands, environmental and social impacts and resettlements if any.

Identification of stakeholder agencies and stakeholder consultation process

The stakeholder agencies important for the project were identified by stakeholder analysis. Experiences in doing EIA and Environmental projects were largely used for screening important stakeholders for the project. The stakeholders important for the project are,

- i. State agencies who will be a part of the project approving
- ii. State/ private/public sector to whom the land belongs where the mitigation works are expected to be carried out; who's consent will be required to implement the project action in the lands
- iii. State agencies who's authorization or approval is required with respect to environmental and social aspects of the project
- iv. Other state sector agencies required for mobilization of environmental and social safeguards of host country and AIIB

The past experiences of NBRO team working in similar projects and the Officer In charge (OIC) of District offices of Landslide Studies and Services Division (DO/LSSD) were used to drawdown the stakeholder profile important for the implementation of the project. Once the list of stakeholder agencies were prepared several brain storming sessions were held among the NBRO team, the PMU PD and OICs of DO/LSSD to analyses mode of consultation, identify the stakeholder involvement, level of information disclosure and the mechanism of dissemination of information including the feedback and the manner the consultation outcomes are integrated into the project.

From the analysis following stakeholder agencies were decided as important for the project implementation under the plan indicated below.

Table 10: Stakeholder and consultation process

Sector	Agency and the role
i. State agencies who will be part of the project approving	<p>Divisional Secretary and District Secretary</p> <p>The project will require consent/approval from the Divisional Secretary and the District Secretary. Divisional Secretaries are well aware of the sites requiring landslide mitigation with relevant vulnerability details. However, the sites prioritized for AIIB project will require to be informed to the Divisional Secretary and their recommendations will require to be obtained. The project will be communicated in writing to Divisional secretaries.</p> <p>The selected project/s will be presented to the District Secretary at the District Coordination Committee to which all stakeholder agencies will participate. Two way communication will take place at this meeting</p> <ol style="list-style-type: none"> i) Making stakeholders agencies aware of the project and risk mitigation benefits ii) Inform of expected interventions by various stakeholders iii) Disclose the project details (designs and implementation mechanism) to the stakeholders

Table 10 cont.

	<p>iv) Identify potential constraints and issues on various aspects need to be addressed</p> <p>v) Obtain positive feed backs</p> <p>vi) Integration of feed backs and recommendations in to the project</p> <p>Planning committee approval</p> <p>The structural mitigation design should require approval for the planning committee of the local government. The landslide mitigation structural designs will be submitted for the approval from the planning committee</p>
ii. State/ private sector agencies to whom the land belongs where the mitigation works are expected to be carried out	<p>The stakeholder analysis identified several state agencies, groups of companies and sectors to whom the lands belong require consultation. Such Agencies are The Road Development Authority, Forest Department, Department Of Wildlife Conservation, Local Authority, Urban Development Authority, divisional Secretary (crown Lands), Mahaweli Authority of Sri Lanka, Department of Irrigation, Lands Reforms Commission, Estate Lands of Plantation Sector, lands of Department of Education, Lands under the Jurisdiction of Vihara and Dewala Gam act (land donated by the kings for religious places)</p> <p>If project actions fall within these lands, consent from the relevant title holder agencies should be obtained. Consultation will be carried out with disclosure of the project details, requirement of the land for project actions, project risk mitigation benefits, requirement for releasing land for mitigation work, signing an agreement to release the land and restrictions for future developments and etc. Usually, there are requirements specific to different agencies that the project should respect during the implementation process. The consultation include understanding on such requirements and also disclosing the boundaries of the AIB project compromising the process with full respect of both parties.</p> <p>In this the project team will meet the relevant agencies to inform the project, disclose the details and obtain their consent for project while signing a written agreement</p>
ii. State agencies who's authorization or approval is required with respect to environmental and social aspects of the project	<p>The analysis reveal that the project require consultation for obtaining approval from following agencies depending on the location of the site i) Department of Forest ii) Department of wild Life conservation and iii) Central/Provincial Environmental Authority</p> <p>The relevant district offices of these agencies will be consulted by visiting these offices by the project team and disclosing the project activities, obtaining the feedback, negotiating on terms and integrating in to project actions</p>
v. Other state sector agencies required for mobilization of environmental and social safeguards	<p>The Stakeholder analysis revealed that the project require permits and license for various project activities such as local authority permit for disposal of waste , Geological Mines and Surveys for obtaining permit for transportation of earth and rocks, approval form local authority or water board for extraction of water. Ministry of defense license for use of blasting materials</p> <p>Grama Niladhari</p> <p>Grama Niladhari will be a key stakeholder in the project. In all cases the project team will meet /communicate with Grama Niladhari to obtain information, identify sensitive issues that would encounter during implementation, identify status of vulnerable/sensitive groups requiring special attentions, Also consultation of GN is considered important as they will be a mode of communication of information to PAP and in dispute resolving</p> <p>Religious leaders/ social workers/ Non-Governmental Organizations</p> <p>The above groups in the proximity to the sites will be consulted as they are important stakeholders to identify status of vulnerable/sensitive groups requiring special attentions, Also consultation of these groups is considered important as they will be a mode of communication of information to PAP and in dispute resolving</p>

v. Project affected parties and beneficiaries	The project affected parties in most cases will be title holders of affected lands, occupants in neighboring houses, The above parties in the proximity to the sites will be consulted as they are important to obtain consent for the project, get the lands released for project, ensure favorable environment for project implementation, and identify community specific project inclusions, as a vigilant group on project.
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Consultation has been already commenced in the project preparation phase, and this will continue through all phases of the project. The process will include i) sharing adequate information with the project affected parties (PAP) and stakeholders in a timely manner, ii) conduct consultations in an atmosphere which is conducive to arrive at decisions that are beneficial to the project, the PAPs, and other stakeholders; and iii) include women and vulnerable groups in discussions. This ensures that the views of all affected parties are taken into consideration in environmental planning.

Consultation was made/will be made with the Regional RDA offices, Department of Forest, Department of Wildlife Conservation, Divisional Secretary, the relevant Grama Niladhari, Officer of District Disaster Management Center, Disaster Relief Officers, Divisional Development Officer, District Central Environmental Authority Office, community leaders, and religious leaders in the project affected area wherever necessary.

During the preparation of ESMF the Project team engaged in comprehensive stakeholder analysis to identify the relevant agencies and parties requiring consultation. The institutions included Project Director-AIIB, The design team experts, OIC DO Ratnapura/LSSD/NBRO, Kegalle/LSSD/NBRO, Kalutara/LSSD/NBRO, Disaster Management Office Ratnapura, Range Forest Office Ratnapura, Regional Road Development Authority Ratnapura, Central environmental Authority, Ratnapura, Lands Reforms Commission, Ratnapura. Project affected parties in Kalawana Town, Kalawana Gamini Vidyalaya, Ayagama, Pebotuwa, Durekkanda, Galaboda, Ketendola, priests of Abhinawarama at Lihiniyawa and Athweltota Gangaramaya, Kalutara and The Grama Niladhari, the period of consultation during 08-09 and 17th August 2018, 07th Sept 2018. The Project team was conversant with both Sinhala (local Language) and English. The consultations were mainly done in Sinhala Language as it was the local language in the area (Ratnapura, Kegalle and Kalutara)

5.1 Disclosure of environmental and social management documents

All environmental planning documents which include ESMF, Site Specific ESMPs will be sent to AIIB for the review. These documents along with mitigation proposal under each package will be disclosed in AIIB and NBRO websites. Relevant sections of mitigation proposals will be submitted to all key stakeholders during the approval process. They include the District Secretary, Divisional Secretary, and local authority, Department of Forest, Wildlife Conservation Department, the Central Environmental Authority and other stakeholder agencies as relevant.

The ESMP implementation progress reports together with all environmental quality monitoring reports along with the remedial actions taken to rectify nonconformities, violations of standards and deviations from the recommended procedures, rectifications etc. will be made available to AIIB, the relevant stakeholder agencies at the project review meetings and in inspections.

The PMU will reply in a meaningful manner writing to all complaints that will be received. The PMU will engage in adequate project briefing with relevant parties indicated above in all projects phases to ensure full transparency.

A project brocher for each district will be prepared in local languages to be distributed to any party concerned.

The stakeholder agencies such as FD, WCD, CEA officers etc. will be allowed to inspect the sites for environmental conformance as appropriate

Given bellow is the proposed information disclosure mechanism pertinent to the project

Table 11: Proposed information disclosure mechanism

Information	Proposed agencies	Mode of information disclosure
i. ESMF	Any party concerned	AIIB and NBRO websites in all three languages
ii. Project plan (site details, design , implementation arrangements)	District CEA, DFC, DWLC, District Secretariat, Divisional secretary, RDA, State land owners Other district levels Agencies, NBRO district office, AIIB	Meetings, District coordination committee, submission of relevant report to sign agreements, approvals and consents.
iii. Site Specific Environmental and Social Management plan	Any party concerned And District CEA, DFC, DWLC, AIIB,	AIIB and NBRO websites in all three languages Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents
iv. Monitoring reports (baseline and during construction)	District CEA, DFC, DWLC, AIIB and relevant parties as appropriate	Progress meetings, special meetings, submission of relevant reports
v. Site inspections for environmental conformance workers health and safety	District CEA, DFC, DWLC, RDA, Divisional secretary, Police, State Land Owners, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Written and verbal communications, submission of relevant reports.
vi. Decisions taken at the progress review meetings pertinent to ES matters	District CEA, DFC, DWLC, RDA, Divisional secretary, Police, State Land Owners, Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Meetings, submission of relevant reports.
vii. Grievance redress	Relevant parties , AIIB	Meetings, written and verbal communications.

Chapter 6 - Approvals/ consents /clearances and agreements

The project will require to obtain several approvals, consents and clearances during the process of project implementation. The PMU will be the responsible agency in obtaining all approvals, consents and clearances required for the project implementation.

6.1 Approvals for Project implementation

i. Approval from the Divisional Secretary

The sites chosen for mitigation is extracted from the list of landslides asking remediation to NBRO by the Divisional Secretary. Suitable sites for mitigation has been chosen after evaluating technical and economic feasibility of proposed mitigation. These sites will be informed to Divisional Secretaries and consent from them will be obtained for the project .This process has been already commenced for 27 sites.

ii. Approval from the District Secretary

The approvals will require to be obtained from the District secretary for the implementation of project where the proposals will be presented at the district coordinating committee, to which chief minister and stakeholder agencies in the district will also participate. The Officer of PMU will present the project, disclose the project details and various concerns including environmental and social issues will be discussed. The relevant decisions, recommendations and concerns will be included in the project implementation plan as well as the environmental and social management concerns.

iii. Approval from the planning committee

The project will obtain the approval from the planning committee from the relevant local authority, municipal council, or urban council.

6.2 Consent to implement the project in state lands

The stakeholder analysis revealed that project needs clearances for land from Road Development Authority (RDA), Forest Department (FD), Department of Wild Life Conservation (DWC), Land Reforms Commission of Sri Lanka (LRC), Divisional Secretary's Crown Lands and etc if the sites are under their jurisdiction.

Consent will be obtained from the relevant agencies to whom the project land belongs to implement the project actions. The project actions will be implemented subjected to the terms and conditions of the relevant agencies. Necessary agreements will be made between NBRO and the Agencies to access the land, carry out construction work, remove materials (trees, soils, rocks and boulders), erect structures, and continue operation and maintenance works. The relevant agencies are Road Development Authority, Land Reforms Commission Sri Lanka, Divisional Secretary, Department of Forest, and Department of Wild Life Conservation (**Refer Annexure III : Sample Agreement**).

6.2.1 Proposed procedure for RDA approval for implementation of landslide mitigation projects in RDA reservation areas

- a) The design to be reviewed by the RDA: The project implementing agency should submit detailed design report to RDA with a formal request on nature of consent required. PMU should prepare above documents and should submit the documents to RDA regional office.
- b) RDA regional office will evaluate the proposal and may call for project briefing. The PMU should provide necessary briefing as appropriate

- c) On the consent by RDA, an agreement will be signed between RDA and Project implementing agency to access the site, erect structures, and implement mitigation works.
- d) A conditions that would include are
 - A proper handing over of the project is required after the mitigation
 - RDA will do the maintenance after mitigation
 - At all times, the contractor shall provide safe and convenient passage for vehicles, pedestrians, and traffic safety measures , barricades, flagmen, and for the night work, lights and illumination should be provided.
 - Construction waste/ excavated materials should not be deposited on the road reservations and should not be a nuisance to public/commuters
 - Pollution control for air, noise needed
 - The sediment laden runoff should not be allowed to flow on the road, proper sediment control is needed
 - Parking of vehicles , construction machinery should not obstruct the road of pedestrian walk area
 - Safety signs including night lamps are mandatory

6.2.3 Clearance from Central Environmental Authority, Department of Forest, Department of Wildlife

- i. As many project sites are located in environmentally sensitive areas approval from the district Central Environmental Authority is required.
- ii. The project actions if located within the legal boundaries of Department of Forest or Wild Life Conservation approval from these agencies will be obtained.
- iii. Also, the project actions may involve removal of protected species, approvals from the Department of Forest through divisional secretary will be obtained for the removal of protected trees.

Following procedure is proposed for the landslide mitigation sites. The procedure has been developed after consultation with the relevant district agencies and based on past experiences in carrying out similar projects.

- i. **Proposed clearance procedure for District Central Environmental Authority**
 - a) In the project preparation phase, the ES & H&S unit of PMU will study the project design and Site specific ESMPs and will submit a request for clearance for the project to district office of CEA: details of the Aerial extent that would be influenced by the project actions with special references to sections of site specific ESMP relevant to the project.
 - b) A basic information questioner (BIQ) should be completed and submitted along with the above details
 - c) CEA may call for project briefing and further information on ESMP that should be provided by the PMU
 - d) clearance will be granted subjected to site specific conditions that should be adhered by the project
- ii. **Proposed clearance procedure for Department of Forest for implementation of landslide mitigation projects in forest reservation areas**
 - a) In the project preparation phase, the ES & H&S unit of PMU will study the project design and Site specific ESMPs and will prepare a request for clearance to district office of DF which include the details of the aerial extent that would be influenced by the project actions

(references to sections of site specific ESMP relevant to Forest resource). This approval is applicable for all forested areas (declared and undeclared).

- b) FD will examine the design, the land to be cleared and will study the specific habitat significance of the area to be affected by project actions, the breadth of trees to be removed and etc.
- c) At this point The PMU will be requested to consider possibility of securing the valuable tree if affected by the project.
- d) If there are no financial and design variations, these requests will be considered by the project (However. as the project has already considered these in the design stage possible variation to design will be minimum)
- e) After investigation, FD will prepare a report, and trees to be cut will be submitted to Timber Cooperation. The trees can be cut by the contractor under the supervision of FD, all trees with dbh of > 18 cm will be taken by the Timber Cooperation.
- f) Clearance will be granted for implementation of the project subjected to site specific conditions that should be adhered by the project
- g) Agreements are required to be signed if project actions are falling within lands belonging to FD

iii. Proposed clearance procedure for Department of Wildlife Conservation for lands under wild life reservation

- a) In the project preparation phase, the ES & H&S unit of PMU will study the Site specific ESMPs and should submit the project proposal to range office of DWC with details of the aerial extent that would be influenced by the project actions with (references to, sections of site specific ESMPs relevant to fauna and flora) and a request for clearance for implementation of project in wildlife conservation areas, buffer zones, lands with protected species under fauna and flora protection ordinance).
- b) DWC will examine the site, and may request securing protected species if found affected by project actions,
- c) The project design may consider the request if it could be accommodated in the design and within the project cost
- d) Clearance will be granted subjected to site specific conditions that should be adhered by the project
- e) Agreements are required to be signed if project actions are falling within land belonging to DWC

6.3 Other approvals

- i. Approval from regional Geological Surveys and Mines Bureau will be obtained for transportation and disposal of earth, rocks and mineral debris
- ii. Approvals from local authority will be obtained for the disposal of waste and plant litter
- iii. Approval from the district office of ministry of defense will be obtained for the sites requiring rock blasting

6.4 Consent/no objection/legally bound agreement from the private land ownerships

For the implementation of project the land should get released. Land acquisition for the project will not happen as lands are already considered risky to occupy. Therefore, a procedure will be adopted to get the lands released. Which may require declaration of lands under special circumstances for common interests. However, NBRO has no legal provision to declare any lands under this provision. Which is declaration of

lands as landslide hazard prone. In the current regulatory system the provisions and powers are available with the Divisional Secretary. This will be used to get private owned lands released for the project.

In this, the lands will be declared as landslide hazard risk zones where no future developments is allowed, but require mitigation to secure safety of surrounding areas' life and property. Following, procedure is recommended to adopt in the process that has minimum impact on the project and the landowner.

- i. After completion of site surveys and designs, the NBRO demarcates the exact land area for mitigation works that need to be declared.
- ii. The NBRO prepare documents pertinent to declaration of lands as "as land under landslide hazard risk –no development in the future, need for risk mitigation" with a survey plan demarcating exact area require to be declared. This area should be the minimum land area required for the project
- iii. NBRO submits the documents to Divisional secretary, and inform DS to declare the land as "land under landslide hazard risk –no development in the future, need for risk mitigation".
- iv. The divisional secretary declares the land as landslide risk hazard zone -no development in future, need for risk mitigation
- v. In this process the PMU should conduct meaningful consultation to get the consent of the land owner. The consultation should be done carefully emphasizing individuals social obligation towards common interests and governments practical limitations for giving a high investment resettlement package. If project require only a part of the land it should also be communicated to the landowner.
- vi. For situations where only a part of the land is used for the project, the project should consider making provisions for the landowner for future development activities outside the declared project boundary in his land with the advice of NBRO
- vii. If the landowners house is affected, steps should be made to implement/expedite the government resettlement compensation process for the landowner for the loss of land and property as appropriate
- viii. The project implementing agency should sign a legally bound agreement between the land owner and the project implementing agency ensuring no-objection to remove the structures (**Refer Annexure III: Sample Agreement**). This should be communicated to landowner during the consultation process.
- ix. Allow land owner to extract/ or extraction by the contractor on behalf of the land owner any valuable items from the structures
- x. Project should bear the cost of removal of the structures
- xi. If there are facilities to be removed, but have an impact on the current wellbeing of the land owner eg: drains, water lines etc. crossing the declared zone. the alternative arrangement should be made by the project under the project cost
- xii. The compensation scheme for these landowners under government compensation package should be established and implemented

Chapter 7 - Inclusion of environmental, social, health and safety concerns in project implementation

7.1 Inclusion of environmental and social concerns in the mitigation designs

The mitigation designs will consider inclusion of environmental and social concerns. This will include design consideration with minimum damage to natural vegetation, stream attrition and erosion control, aesthetically pleasing designs to blend with natural environment at locations with high aesthetic sensitivity, animal trails, habitat connectivity structures in sensitive environments, use of water for human and wildlife, and etc. (Refer section 4.6.1 for design considerations specific for landslide mitigation works)

7.2 Construction phase environmental/social impacts management

Measures to manage and to mitigate the environmental and social impacts are generally common to all landslide mitigation sites. Such impacts are largely attributed to activities in the construction phase. The mitigation of impacts therefore becomes an obligation of construction contractor. NBRO (reviewed by AIIB) has prepared a comprehensive document on “*contractors’ requirement to comply with environmental and social management during the construction phase*” to be included in construction contractors’ bid document.

Based on this document the contractor is expected to prepare an environmental and social management plan (expressing contractor’s obligation to ESMP in the bid), and a method statement (ESM Action Plan) along with relevant proofs of his competency. The cost for ESMP will require to be indicated as a separate pay item. The environmental and social management method statement is expected to be submitted by the selected construction contractor and should be approved by the PMU unit.

The sections in 7.2.1 and 7.2.2 will also be included in the contractors bid document as a guidance for contractor to prepare site specific ESMP method statements.

7.2.1 Implementation of contractors’ requirement for Environmental, Social and Health and Safety (ES, H&SMP) in the construction phase

During the site specific assessments the assessment team will evaluate the specific site sensitivities under all these categories and will emphasize the level of concern in contractors’ ESMP requirement. Given below is the format that should be referred in preparing site specific Environmental, Social and Health and Safety requirements in construction phase. This will be included into construction contractors bid document as a guide for him to pay emphasis appropriately so that all the aspects are adequately covered in his ESMP.

Table 12: Implementation of contractors’ requirement for ES, H&SMP in the construction phase and its relevance to a given site (format) (Refer Annexure IV)

Reference No. as per construction contractors obligation to ESMP	Item	Relevance to the site /mitigation works (The assessment team will indicate the relevance)
A Environmental and Social Monitoring		
A (1)	Storage on site	
A (2)	Noise and Vibration	
A (3)	Cracks and damages to the buildings	
A (4)	Disposal of waste	

Table 12 cont.

A (5)	Disposal of refuse	
A (6)	Dust control	
A (7)	Transport of Construction materials and waste	
A (8)	Water	
A (9)	Flora and Fauna	
A (10)	Physical and cultural resources	
A (11)	Soil Erosion	
A (12)	Soil Contamination	
A (13)	Borrowing Earth	
A (14)	Quarry Operations	
A (15)	Maintenance vehicles and Machinery	
A (16)	Disruption to public	
A (17)	Utilities and roadside amenities	
A (18)	Visual environment enhancement	
A-5. Environmental Monitoring	Baseline surveys (air, water, noise , vibration, crack surveys)	
	Surveys during construction (air, water, noise , vibration, crack surveys)	
	Surveys during operation phase	
	Reporting and maintenance of records	
B. Working Conditions and Community Health and Safety		
1	Safety organization and communication	
2.	Child Labor and Forced Labor	
3	Safety reports and notification of accidents	
4	Safety Equipment and Clothing	
5	Safety inspections	
6.	First Aid Facilities	
8	Health and safety information and training	
8.	Plant equipment and qualified personnel	
<p>Relevant: The section is relevant to the site as a common ESMP applicable to any site</p> <p>Highly relevant: The contractor should pay special emphasis in the preparation of environmental method statements to ensure that the relevant ESMP is implemented specific to the site</p> <p>Possibly relevant: This ESMP will be triggered if the site come across with relevant aspect during project implementation</p> <p>Not relevant: The section may not be relevant to this site under disclosed conditions</p> <p>Optional: require to be implement if needed only</p> <p>Refer site specific monitoring plan: Contractor is obliged to carry out monitoring as specified in the site specific monitoring plan</p> <p>Reference: Contractors Obligation for implementation of ESMP</p>		

7.2.2 Other mitigations measurers require to be considered during construction phase highly specific to the given site needing special mitigation measures beyond the common ESMP

In the Environmental and social assessment, the assessment team is expected to emphasize highly specific mitigation measures also to a given site that go beyond the common ESMPs of the construction phase. This will be included in the bid documents of the contractor as a part of ESMP specific to the site. **His response to bid or method statement should include the proposed ESMP approach to mitigate site specific social and environmental concerns.**

7.3 Monitoring

7.3.1 Monitoring environmental and social management plan implementation

The environmental and social expert team of the PMU or the consultant's environmental and social team will monitor the performance of environmental and social management plan by the contractor. The contractor's environmental and social method statement will be evaluated to see its adequacy with the requirements and will be approved by the PMU for implementation.

Through this process the PMU environmental unit will

- i. Verify a project's compliance with safeguard requirements
- ii. Document and disclose monitoring results and identify necessary corrective and preventive actions by studying monitoring reports
- iii. Submit safeguard monitoring reports to AIB
- iv. Follow up on recommended actions to ensure that desired outcomes are achieved

7.3.2 Monitoring environmental quality

The contractor is expected to conduct baseline environmental quality monitoring for ecology, air quality, water quality, background noise pollution and ground vibration levels as appropriate if relevant sensitive elements are present. When houses and building (specially old cultural and temple buildings) are located near the sites (50m) pre crack surveys are required. During, construction phase periodic monitoring of water, air quality, noise and vibration need to be carried out by the contractor to ensure that project emissions are within the emission standards prescribed by the Central environmental Authority. Parameters such as vibration may be measured only during heavy vibration operations or PMU.

The contractor is expected to submit the measurement reports to project director. Who will review the reports and update the level of compliance. The contractor is expected to conduct measurements by engaging competent monitoring authorities approved by the Central Environmental Authority.

7.3.3 Monitoring with special reference to building cracks, air pollution, noise, vibration, and water quality

The mitigation sites under consideration often have houses already damaged by the slope instability. Therefore, cracks in the building is common in many cases. These cracks can be aggravated during the construction phase as heavy machinery may generate ground vibrations. Further, the house owners may demand claims for already made cracks in the buildings claiming that they have been caused due to construction works. In order to minimize these disputes crack surveys must be carried out in buildings if the buildings are located adjacent to the site. Buildings in 50m distance from the site is recommended for crack surveys. Crack surveys should be carried out before construction and during heavy construction works generating vibrations

Monitoring regular air quality, noise and vibrations, water quality are strongly recommended respectively for sites in the proximity of settlements, roads, forest, streams. Given bellow is the recommended monitoring schedule, but should not be limited only to this.

Table 13: Typical environmental quality monitoring schedule for construction phase

Monitoring requirement	Parameters	Frequency
i. Baseline monitoring	i. Stream water quality ii. Pre crack survey of the high risk houses iii. Ground vibration iv. Background noise measurement v. Air quality: particulate matter	Once *
	vi. Micro habitat assessments to be reported for DWC	Once for highly environmentally sensitive sites ***
ii. During construction	i. Stream water quality	During slope excavations, ground soil boring works (every month) *
	ii. Crack survey of the high risk houses	If noticeable displacement is observed during construction **
	iii. Ground vibration	During operation of drilling machinery, boring works, or any works that generate ground vibrations*
	iv. Construction noise	Once a month during heavy noise generation times *
	v. Air quality particulate matter	Once a month *
iii. Vehicular Emission	All machinery/vehicles operational should have the emission control test certificate as applicable - should be checked by the site ES officer of the consultant	
iv. Monitoring agency	* A competent independent monitoring agency with registration of Central Environmental Authority for all parameters except crack surveys **Crack surveys should be conducted by competent agency acceptable to PMU *** By a biodiversity/ecosystem specialist approved by the PMU	
v. Reporting requirements	<p>Stream water quality – Comparison with <i>ambient water quality standards published by the CEA, 2017</i></p> <p>Pre crack survey of the high risk houses-Professional report</p> <p>Ground vibration-as per <i>The interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA</i></p> <p>Background noise measurement –<i>Extraordinary Gazette No.924.1, May 23,1996, CEA</i></p> <p>Air quality particulate matter- <i>The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 -Central Environmental Authority of Sri Lanka.</i></p> <p>Micro habitat assessment reports: <i>to be evaluated by the DWC/FD/PUM ES specialists.</i></p>	

7.4 Contractors' code of conduct

The Contractor shall submit the Code of Conduct that will apply to contractor workforce. The contractor shall submit an outline of how the Code of Conduct will be implemented.

The aspects to be addressed include:

- i. Compliance with applicable health and safety requirements with the understanding of site specific risk associated with potential landslide disaster situation,

- ii. Ensure protection of local community (including vulnerable and disadvantaged groups), the Consultant's staff, the Client's staff, and the Contractor's workforce, including sub-contractors and day workers
- iii. Ensure establishment of required level of site safety to prevent accidents fulltime watchmen and warning systems. Wearing prescribed personal protective equipment, preventing avoidable accidents, establish required level of first aid at site for accidents, snake bite, emergency hospitalization plans and a duty to report conditions or practices that pose a safety hazard or threaten the environment
- iv. Prohibit use of illegal substances such as illegal drugs at all times and alcohol during work
- v. Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), for example, on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status)
- vi. Interactions with the local community(ies), members of the local community (ies), and any affected person(s) (for example to convey an attitude of respect, including to their culture and traditions)
- vii. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
- viii. Violence, including sexual and/or gender based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty)
- ix. Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading behavior, exploitative behavior or abuse of power)
- x. Protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behavior towards children, limiting interactions with children, and ensuring their safety in project areas)
- xi. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
- xii. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
- xiii. Respecting reasonable work instructions (including regarding environmental and social norms)
- xiv. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
- xv. Duty to report violations of this Code
- xvi. Non-retaliation against personnel who report violations of the Code, if that report is made in good faith

The Code of Conduct should be written in plain language and signed by each key to indicate that they have: received a copy of the code; had the code explained to them; acknowledged that adherence to this Code of Conduct is a condition of employment; and Understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

A copy of the code shall be displayed in the contractor's site office. It shall be provided in appropriate languages.

Chapter 8 - Effective grievance redress mechanism (GRM)

The GRM is a part of projects supported by AIIB. The GRM is a bottom-up multitier Structure. A three tier GR is proposed for this project. All complaints regarding social and environmental issues will be received either orally or in writing by the PMU, Consultant or the Construction Contractor (CC). The project will use existing institutional structure to establish grievance redress process. Which is the NBRO District offices. The district offices are the most familiar place for local stakeholder institutions, the Grama Niladhari, the disaster vulnerable communities and the public in the landslide prone districts. This tier is already activated to capture grievances from the project inception. Complain boxes will be maintained at each project office. A register will be maintained at the respective project offices to write the complaints. All complainants will be treated respectfully, politely and with sensitivity.

The PMU will establish a GRM for each project package and will establish a grievance redress committee (GRC). The responsibility of GRCs is to receive and facilitate the resolution of the PAPs' grievances due to the project activities that will have environmental and social impacts. In addition to this all district offices will receive any complaints from the PAP and will direct to PMU.

- i. **Addressing complaints at the project office level:** Every possible effort will be made by the consultants' or the contractors' Environmental social unit to resolve the issues referred in the complaint within their purview.
- ii. **Addressing complaints at PMU level:** The PMU will review regularly the progress of grievance redress process. At the progress reviewing, complaints that require high level intervention will be taken up by a committee comprising of following core members; the Project Director, senior environmental and social specialists of PMU, Senior Environmental and Social Experts from the Consultant. The complaints received will be reviewed by this committee and actions will be recommended to resolve the grievances at the PMU level.
- iii. **Addressing complaints at GRC:** there may be certain problems that are more complex and cannot be solved through Project-level mechanisms. Such grievances will be referred to GRC. In such circumstances the grievance of the affected party will be heard by a committee with the Grama Niladhari, the Divisional secretary, Local Authority representative, the religious leaders of the affected party and other relevant officers. The proposed most appropriate place for grievance hearing would be the Divisional Secretariat office. However, the place may change appropriately to the convenience of the PAPs. The committee will analyze the grievances and every effort will be taken to however, depending on nature of grievances. The complaint will be resolved at the meeting within four weeks, and the decision of the GR will be conveyed to the Complainant in writing soon after the decision is made.
- iv. **Complain records and information disclosure:** Each complain will be recorded and acknowledged by the GRC's Secretary. The PMU will communicate the decisions to PAPs with sufficient justification if the decisions are unfavorable for PAPs. Adequate transparency will be maintained in the process.

Chapter 9 - Project implementation institutional setting and roles and responsibilities of the key staff

9.1 Project financing agency

The AIIB is the project financing agency. The funds will be provided in a form of a loan to the Government of Sri Lanka (GoSL). Through the treasury the funds will be released to the project execution agency (Ministry of Irrigation, Water Resources Management and Disaster Management). Relevant component for the implementation of ESMF and ESMPs will be included in the AIIB financial investment plan. AIIB environmental and social unit: will support the PMU for reviewing conformance of ES safeguards, giving advisories on ES safeguard implementation process and giving the PMU ES& HS unit as necessary for successful implementation of ESMPs.

9.2 Executing Agency and Implementing Agencies

The (MIWRM&DM) will be the executing agency of the whole project. The project implementing agency will be National Building Research Organization. The project executing and implementing agencies will be responsible for the overall coordination of project planning, implementation, and monitoring. The implementing Agency will prepare the overall ESMF and Resettlement Planning Framework (RPF) of the project. In addition the implementing agency will prepare the contractor obligations for Environmental Management Plan for the bid documents and site specific ESMPs for 27 mitigation sites.

9.3 Project management Unit (PMU)

Under project executing agency a project management unit will be established. The PMU will be headed by a project director (PD). Under PMU an environmental social unit will be established. The project will get advice on safeguard policy issues and safeguard compliance from the environmental social unit at the PMU located in Colombo. Under PD two environmental and social safeguard specialists (possessing required academic background with field experience in environmental safeguards) will be appointed to function environmental and social unit to ensure implementation of ESMF and RPF. The PMUs environment and social specialists will be supported by several environmental/ social and safety officers as required.

The environmental unit at the PMU will be responsible for the

- i. Preparation of documents. if there are any changes in scope or alignment during implementation that warrant more studies),
- ii. Responsible to carry out EIAs, IEEs (if necessary), and prepare SSEMPs ;
- iii. Obtaining environmental clearances and approvals required from various agencies
- iv. Liaise with CEA, FD, DWC for adequate communications/consultation of ES matters, obtaining approvals and implementing their recommendations, disclose reports and information to maintain transparency
- v. PMU is also responsible in maintaining a close link with Divisional and District Secretariats for project reasoning, obtaining approvals and during the implementation of relevant mitigation packages which would certainly consider district as the unit.
- vi. Conduct awareness programs and engage in adequate consultation with stakeholder agencies
- vii. Conducting of due diligence and preparing reports
- viii. Monitoring of safeguard compliance
- ix. Perform grievance redress and execute the grievance redress committee as need arises
- x. Formulate and conduct awareness training modules on environment /social safeguards. Such activities could be outsourced; but the responsibility of implementation lies with PMU

- xi. The PMU environmental unit will ensure that the relevant sections of SSEMPs are included in contract documents. It will also ensure that contractors will adhere to the implementation and mitigation measures listed in the project EMPs.

9.4 Project supervision consultant unit

A project consultant unit will be established. Which will be established under the PMU. It will be responsible for overseeing project construction works and for ensuring such works are in compliance with safeguard requirements, outlined in this ESMF. The environmental and social unit will address all safeguard issues at the project level. The officials of this unit will coordinate with stakeholder offices and divisional secretariats. The officers will help the contractor to obtain permits and licenses and other clearance for project activities. The consultants ES safeguard official's key role is to ensure that all construction works comply with environmental safeguards, and ESMPs are implemented in a timely and satisfactory manner.

9.5 Construction contractor

The mitigation construction will be contracted to competent contractors, who will be selected through either national or international bidding procedure. The contractor is obliged to adhere to ESMP which is included in the bid documents. Based on that the contractor should prepare an environmental method statement (action plan). For the implementation of environmental method statement the contractor is required to appoint qualified staff. The staff include environmental /social safeguard officer and safety officer. In the bid, implementation of Environmental Method Statement by the contractor will be indicated as a separate cost item in the contractor's project budget.

9.6 State agencies important to the project and institutional mechanism

i. The CEA

The District CEA is the authority responsible for regulation of NEA. It is entrusted with powers to enter and inspect the ESMP process in any project site within the districts. The projects with environmental sensitivity require obtaining approvals from the CEA. As the landslide mitigation projects are environmentally complementary and not in the prescribed list approval will be granted upon PMU submitting the project proposals, and the Site specific E&SMPs to CEA when submitting the Basic Assessment Questioner (BAQ) which is a pre requisite for environmental approvals. The CEA can monitor the ESMP implementation, can call reports and can give instructions for improvement. CEA can directly intervene with the project upon complains by PAP, can call meetings , resolve environmental issues and even can take legal actions against possible violation of environmental law.

ii. The DWC and DF

All project sites with forest vegetation, list of species protected under fauna and Flora act if require felling in lands within forest reservations or wildlife reservations, or within their buffer zones require approvals. The E&S unit of the PMU will follow the necessary procedures to obtain required approvals. In addition, support of FD and DWC will be obtained during removal of valuable plants, selection of suitable vegetation for control measurers etc. The both institutions can intervene with project, can inspect the sites, may advice or issue notifications with regard to violation of respective legislations.

iii. Other institutions involved in the project implementation process are;

- a. The District Secretariat office for obtaining consent to projects and stakeholder consultations,
- b. Divisional Secretary to obtain consent to project, to declare the landslide risk zone, facilitate landslide hazard risk based resettlement process, solving disputes and grievance redress
- c. Local Authorities for planning approval, approval for disposal of waste, extraction of water
- d. National Water Supply and drainage board for extraction of water

- e. Ceylon Electricity Board; Removal of Power lines, Temporary electricity connections
- f. Institutions for land matters
- g. The Grama Niladhari, Community leaders and NGOs: for dispute resolving , grievance redress and communication of landslide warning alerts during rainy season
- h. District Disaster Management Officer: Emergency management in case of a disaster. Management Center Officers: conducting awareness grams
- i. Disaster Relief officer, Emergency management in case of a disaster

9.7 Relevant environmental and social safeguard documents

The table below lists the important documents (policies, laws, plans, agreements, approvals and reports) for the implementation of AIBB and National Governments’ environmental and social safeguard standards with responsible agency.

Table 14: Relevant environmental and social safeguard documents

Document	Authority/responsible implementing agency
i. AIBB Environmental and Social Safeguard Policy	AIBB environmental and social safeguard unit
ii. National Environmental Act/ related national acts	Central Environmental Authority –National Government
iii. Environmental and Social Management Framework	Environmental and Social unit of the PMU
iv. Resettlement Planning Framework	Environmental and Social unit of the PMU
v. Construction contractors’ requirement to comply with environmental and social management plan during the construction phase	Construction Contractor
vi. Construction Contractors bid response(relevant sections on proposed environmental management planning and implementation)	Construction Contractor
vii. Construction Contractors Site specific Environmental Method statement	Construction Contractor
viii. Environmental and social safeguard performance progress monitoring reports	Environmental and Social unit of the PMU/AIBB
ix. Baseline environmental quality /construction phase Environmental quality compliance monitoring reports	Construction Contractor
x. Agreements with the relevant state agencies and private land owners for lands clearances	PMU
xi. Approvals/clearances for project implementation <ul style="list-style-type: none"> • Divisional secretary/ District secretary (project) • Planning committee approval (project) • District Central Environmental Authority (environmental) • Department of Forest (felling of trees and as applicable) • Department of wildlife (wildlife sensitive areas as applicable) • Geological Surveys and Mines bureau (transport of earth and rocks) • Ceylon Electricity Board for (power supply) • Approval from local authority for disposal of waste • Approval from ministry of defense (for rock blasting) • Other as applicable 	PMU

9.8 Capacity development; training and awareness

The environmental unit at the PMU will organize awareness programs and training sessions for project implementation staff at the project level on environmental and social safeguard requirements and safeguard compliance. It will prepare safeguard training materials and pamphlets for the benefit of project personnel, safeguard monitors, the PAPs and project contractors. The environmental unit will establish direct links with all projects and will develop and maintain an environmental safeguard database. It will be shared with project personnel, monitors and project stakeholders. The environmental unit could obtain the services from outside, if required, for Environmental Assessments, safeguard awareness programs, and training sessions.

9.9 Cost estimate for implementation of environmental and social management plan

The PMU will prepare overall project implementation plan, including time schedules and budget for the implementation.

Annexure 1

ToR for preparation of Site Specific Environmental and Social Management Plans for Landslide Mitigation Projects

ToR for preparation of Site Specific Environmental and Social Management Plans for Landslide Mitigation Projects

- 1. Introduction to the project :** Should cover current landslide disaster risk, need for mitigation , funding agency and purpose of ESMP
 - 1.1 Location details and site description:** *Location details with a Google image of the proposed landslide mitigation site.*
- 2. Landslide hazard incident details**
- 3. The damages occurred due to the incident:** Description of the hazard, damage with photographs and illustrations
- 4. Description of any remedial measures already undertaken to reduce the potential risk and evacuations**
- 5. Description of the area of the landslide and areas adjacent to the landslide and current level of risk**
- 6. Brief description on the surrounding environment with special reference to sensitive elements that may be affected by the project actions**
- 7. Description of the works envisaged under the mitigation project**
- 8. Identification of social and environmental impacts and risks related to the works**
 - 8.1 Positive impacts
 - 8.2 Negative impacts (construction and operation phase)
 - 8.2.1 Loss of access to land and future development activities
 - 8.2.2 Ecological, biological impacts, and fauna and flora
 - 8.2.3 Impact on the drainage pattern of the area
 - 8.2.4 Erosional impacts and stream bed alterations
 - 8.2.5 Water pollution impacts from construction activities
 - 8.2.6 Open defecation and waterborne infections spread during construction phase
 - 8.2.7 Impacts on the downstream water uses:
 - 8.2.8 Solid waste disposal issues
 - 8.2.9 Air pollution impacts
 - 8.2.10 Noise pollution, Vibration, blasting, impacts during construction, potential damage to buildings, infrastructure
 - 8.2.11 Relations between workers and the people living in the vicinity of the site and possibility of disputes
 - 8.2.12 Work camps and lay-down sites requirement
 - 8.2.13 Risks of public accessing the site during construction
 - 8.2.14 Explosive hazards and hazardous materials
 - 8.2.15 Safety to the public from construction activities: High risk for commuters
 - 8.2.16 Workers safety during construction
- 9. Public and Stakeholder Consultations - that have been held and/or will be held**
- 10. Significant Environmental and Social Impacts: Social or Environmental impacts or risks that will require special measures on the part of NBRO**
 - 10.1 Ecological, biological impacts, and fauna and flora
 - 10.2 Solid waste disposal issues
 - 10.3 Air pollution impacts

- 10.3 Noise pollution, Vibration, blasting, impacts during construction, potential damage to buildings, infrastructure
- 10.4 Relations between workers and the people living in the vicinity of the site and possibility of disputes
- 10.5 Risks of public accessing the site during construction
- 10.6 Relations between workers and the people living in the vicinity of the site and possibility of disputes
- 10.7 Risks of public accessing the site during construction
- 10.8 Impacts on downstream service provision (water supply, sewerage, electricity, etc.)
This impact will be both during the construction and operation phases
- 10.9 Households living in high-risk or medium-risk areas adjacent or near to the site (up-slope, down-slope, downstream, etc.)
- 10.10 Areas used for businesses, agriculture or other within the area to be remediated
- 10.11 Areas used for businesses, agriculture or other immediately to the site
- 10.12 Need for people to enter or cross the site
- 10.13 Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors
- 10.14 Child labour & forced labour
- 10.15 Cracks in the buildings due to vibration impacts
- 10.16 Fire hazard and forest fires

11. Clearances, no objection, consent and approvals required for the implementation of the project

- 11.1 Project implementation
- 11.2 Approval from the District Secretariat
- 11.3 Approval from the planning committee
- 11.4 Approval to implement the project in the specified site
- 11.5 Approval from environmental authority, Department of Forest, Department of Wildlife Conservation
- 11.6 Other approvals
- 11.7 Consent/ no objection/ legally bound agreement from the private land ownerships

11.8 Tentative timeline for getting approvals

Approvals	Month 1				Month 2			
	W1	W2	W3	W4	W1	W2	W3	W4
Project implementation								
Approval from the District Secretariat								
Submission of application								
Project briefing								
Respond to comments								
Approvals								
Approval from planning committee								
Submission of application								
Project briefing								
Respond to comments								
Approvals								

Approval from CEB Submission of application Respond to comments Approvals								
Other approvals GSMB Ministry of Defense (Depends on the requirement)								
Consent/ no objection from the private land ownership- temple								

12. Environmental and social management plan (ESMP) Measures to manage and or mitigate the impacts and risks, especially the impacts and risks identified in Sections 8 & 10. This will be included in the specific recommendations and requirements of the ESMP.

- 12.1 Resettlement action plan
- 12.2 Evacuation of people
- 12.3 Procedure for removal of damaged structures, facilities infrastructure
- 12.4 Requirement for compensation for loss of property /uses due to project actions
- 12.5 Public awareness and education- needed for following areas
- 12.6 Design based environmental/ social management considerations: Indicate the suitable design based mitigation measures applicable to the site

Design feature	Recommended level of consideration for this site
1. Natural resource management and resource optimized designs	
2. Habitat connectivity and animal trails	
3. Conservation of water resources	
4. Aesthetically compatible design considerations	
5. Consideration of green environmental features	
6. Workers/ commuters and community safety	
7. Low post maintenance and operation designs	
8. Other specific design consideration	

- 12.7 Mitigation of impacts during the construction phase
 - 12.7.1 Construction contractors' requirement to comply with environmental and social management during the construction phase: Contractor requirement to comply with ES & HS; indicate the level of relevancy to the mitigation project

Reference No. as per construction contractors obligation to ESMP	Item	Relevance to the project
2002. Environmental and Social Monitoring		
2002.2 1)	Storage on site	
2002.2 2)	Noise and Vibration	
2002.2 3)	Cracks and damages to the buildings	
2002.2 4)	Disposal of waste	
2002.2 5)	Disposal of refuse	
2002.2 6)	Dust control	
2002.2 7)	Transport of Construction materials and waste	
2002.2 8)	Water	
2002.2 9)	Flora and Fauna	
2002.2 10)	Physical and cultural resources (temple)	
2002.2 11)	Soil Erosion	
2002.2 12)	Soil Contamination	
2002.2 13)	Borrowing Earth	
2002.2 14)	Quarry Operations	
2002.2 15)	Maintenance vehicles and Machinery (pollution)	
2002.2 16)	Disruption to public)	
2002.2 17)	Utilities and roadside amenities (road to temple)	
2002.2 18)	Visual environment enhancement	
2002.5. Environmental Monitoring	Baseline surveys (air, water, noise , vibration, crack surveys)	
	Surveys during construction (air, water, noise , vibration, crack surveys)	
	Surveys during operation phase	
	Reporting and maintenance of records	
2003. Working Conditions and Community Health and Safety (school children)		
2003.2	Safety organization and communication	
2003.3	Child Labor and Forced Labor	
2003.4	Safety reports and notification of accidents	
2003.5	Safety Equipment and Clothing	
2003.6	Safety inspections	
2003.7	First Aid Facilities	
2003.8	Health and safety information and training	
2003.9	Plant equipment and qualified personnel	
Relevant: The section is relevant to the site as a common ESMP applicable to any site		
Highly relevant: The contractor should pay special emphasis in the preparation of environmental method statements to ensure that the relevant ESMP is implemented specific to the site		
Possibly relevant: This ESMP will be triggered if the site come across with relevant aspect during project implementation		
Not relevant: The section may not be relevant to this site under disclosed conditions		

Optional: require to be implement if needed only

Refer site specific monitoring plan: Contractor is obliged to carry out monitoring as specified in the site specific monitoring plan in addition to monitoring requirement indicated in contractors ESMP

Reference: Contractors Obligation for implementation of ESMP

12.7.2 Site specific mitigation: Describes its specific ES & HS migratory measures for impacts identified specific to the project

Mitigation item	Project implementation phase	Responsibility

12.7.3 Monitoring requirements specific to the site: Environmental and social monitoring plan: construction phase and operation phases

Monitoring requirement	Parameters	Frequency
Baseline monitoring	Pre crack survey of the high hermitage and shrine room buildings**	
	Air quality: particulate matter*	
	Ground vibration *	
	Background noise measurement *	
	Micro habitat assessment ****	
Construction phase	Crack survey of the buildings **	
	Ground vibration *	
	Construction noise *	
	Air quality particulate matter	
	Drying of springs in the water supply lines to community ***	
Operational phase	Drying of springs in the water supply lines to community ***/****	
Vehicular Emission	All machinery/vehicles operational should have the emission control test certificate as applicable - should be checked by the site ES officer of the consultant	
Monitoring agency	* A competent independent monitoring agency with registration of Central Environmental Authority for all parameters except crack surveys **Crack surveys should be conducted by competent agency acceptable to PMU *** Contractor ES officer **** Agency recommended by PMU	
Reporting requirements	<ul style="list-style-type: none"> • Pre crack survey of the high risk houses-Professional report • Ground vibration-as per The interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA • Background noise measurement –Extraordinary Gazette No.924.1, May 23,1996, CEA 	

	<ul style="list-style-type: none"> • Air quality particulate matter- The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 - Central Environmental Authority of Sri Lanka. • Micro habitat assessment report : As per the TOR given by DF
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12. Grievance redress mechanism for this site

13. Information disclosure: Proposed scheme of information disclosure

Information	Proposed agencies	Mode of information disclosure
1. Project plan (site details, design , implementation arrangements)		
2. Environmental and Social Management plan		
3. Monitoring reports (baseline and during construction)		
4. Site inspections for environmental conformance workers health and safety		
5. Decisions taken and progress review meetings pertinent to ES matters		
6. Grievance redress mechanism		

14. Level of information gathered through consulting institutions

Date	Institution	Person contacted for information

Annexure I: Drone image of the project area and other relevant site photographs

Annexure II: Details of stakeholder consultation including photographs as proof (date, time location)

Annexure III: Details of the study team

Name	Designation	Position in the study

Annexure IV: List of references: The team should refer the following reports in the preparation of SSESMPs

1. NBRO site investigation report on landslide disaster
2. Contractor’s obligations for Geriatric Environmental and Social Management Plan- Sri Lanka Landslide Mitigation Project-AIIB
3. Environmental and Social Management Framework-Sri Lanka Landslide Mitigation Project _AIIB
4. Resettlement Planning Framework- Sri Lanka Landslide Mitigation Project _AIIB
5. Indicate other if any

Annexure II

The structural landslide mitigation methods

The structural landslide mitigation methods

The project envisages using engineering technology for mitigation of slopes prone to landslides, it is commonly referred as structural stabilization of unstable slopes. There are a wide range of engineering technologies for mitigation of unstable slope. These slope stabilization measures are primarily designed to increase the slopes factor of safety. The main structural slope stabilization measures applicable to current project are described below. Usually, a given structural design includes a combination of below mentioned mitigation measures that collectively increase the factor of safety towards designed value.

1.1 Slope modification

1.1.1 Changing slope geometry

Slope modification as a method of stabilization involves reshaping the slope in order to improve the stability. It often involve cutting and filling. The stability of the slope is increased by reducing the driving forces (unloading or removing the top of the slope) and/or increasing resistant forces (placement of fill at the toe of the slope) along the potential failure surfaces.

Contour grading is also used as a slope modification to reduce the visual impacts of the graded areas by designing the finished slope face to more closely conform to natural contours. Contour grading does not reduce the quantity of grading, but can create rounded or undulating landforms designed to resemble the unaltered slopes on and adjacent to the construction site.



Figure 5: Modification of slope geometry: RDA SL

1.1.2 Removal of impinging boulders, rock masses

Especially in bordered colluvium deposits and on the slopes with fractured bed rock. Loosen boulders and rock fragment may require removal as a means of mitigation. This is often involved with rock blasting

1.2 Slope stabilization through Drainage Control

One of the initial stages in stabilizing a slope is to establish control of surface and groundwater drainage systems. Water control is generally maintained through installation of surface and subsurface drainage devices within and adjacent to potentially unstable slopes. In landslide areas drainage design is especially important because an influx of water from mainly runoff can raise groundwater levels, increase pore-water pressure, and load slopes, thus causing an increase in failure potential (Control of surface and groundwater flow is also important in minimizing erosion and siltation both on and off site. A properly designed drainage system should increase slope stability and decrease erosion and siltation.

1.2.1 Surface Drainage Systems

Surface drains and/or landscape design are used to direct water away from the head and toe of cut slopes and potential landslides, and to reduce infiltration and erosion in and along a potentially unstable mass. Surface drains are instrumental in controlling erosion of slopes and in drainage control adjacent to fill slopes. The most common surface drainage

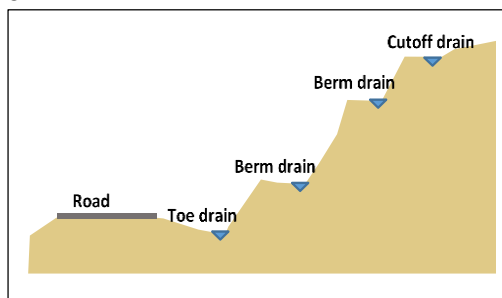


Figure 7: A typical surface drainage control system



Figure 6: Cascade drains

devices used in prevention of slope erosion and failure are terrace drains. Terrace drains get clogged by debris and drains are effective only if they are periodically cleaned and maintained.

Pipe drains are also used as a drainage control technique in slope stabilization. Perforated pipes buried at the surface can perform the same function as terrace drains, but the buried pipes often get plugged and drainage control is hindered.

1.2.3 Subsurface Drainage Systems

Subsurface drains are used to remove the water that is in deeper soil masses of the slope. Sub surface drains collect in filtered water thus the stability of a slope is increases due to decreased seepage, pore-water pressure, and slope weight. The main functions of sub drains are to remove subsurface water directly from an unstable slope, to redirect adjacent groundwater sources away from the subject property and to reduce hydrostatic pressures beneath and adjacent to engineered structures. Control of subsurface drainage is generally attained by installing a network of horizontal and/or vertical sub drains which channel and remove groundwater from potentially unstable slopes.

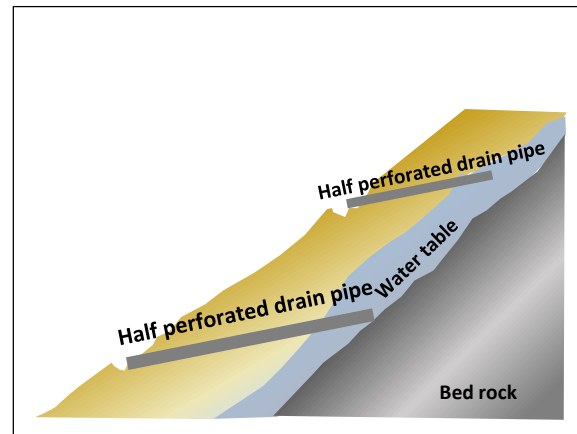


Figure 8: Horizontal drains-subsurface drainage control measure

1.3 Stabilization through Support

Rarely is drainage the only control device utilized in stabilizing a large slope. The described drainage systems are generally installed along with other mitigation devices to increase slope stability. The methods outlined in this section require various amounts of grading, however, the included techniques generally result in less landform alteration than does cut and fill. The differences in grading and degree of landform alteration are generally reflected in the installation method and the size of a particular engineered mitigation device. This section includes descriptions of the effective applications, limitations, installation, and maintenance of various engineering devices.

1.3.1 Ground Inclusions

A ground inclusion is a metal bar that is driven or drilled into competent bedrock (rock which is not highly fractured or broken up) to hold together highly fractured or jointed rock or to provide foundation for stable structures such as retaining walls.

There are three common types of ground inclusions. They are ground anchors, soil nails and rock bolts. Permanent ground anchors are tendons which are placed in competent rock or soil to control displacements and provide vertical and lateral support for engineered structures and natural slopes. Anchors are frequently used in waterfront structures and to tie-back retaining walls to prevent failures due to rotational loading or failures due to buoyant forces of water.

Soil nailing is a soil reinforcement technique that places closely spaced metal bars or rods into soil to increase the strength of the soil mass. Soil nailing is a method that can be used to control shallow landslides. Soil nails are either installed in drilled bore holes or secured with grout, or they are driven into the ground. The soil nails are generally attached to concrete facing located at the surface of the structure. The function of the facing is to prevent erosion of the surface material surrounding the soil nails, rather than provide structural support. This facing can be constructed to mimic the look of the surrounding landform and provide spaces for vegetation; however, the facing will not be the same as the existing top soil.

Rock bolting is a method of securing or strengthening closely jointed or highly fissured rocks in cut slopes by inserting and firmly anchoring a steel bar in predrilled holes. Rock bolts generally have heads that expand following installation and are classified according to their method of anchorage: expansion, wedge, grouted and explosive. Like soil nails, these bolts generally are attached to some type of facing.



Figure 9: Rock bolting: RDA SL

1.3.1.1 Piles

Piles are long, relatively slender columns positioned vertically in the ground or at an angle (battered) used to transfer load to a more stable substratum. Piles are often used to support or stabilize structures built in geologically unstable areas. The effectiveness of piles is increased dramatically when they are incorporated into an anchored stabilization system (. In addition, piles are used to minimize the effects of scour and undercutting along the foundations of waterfront structures.

1.3.1.2 Retaining Walls

Retaining walls are engineered structures constructed to resist lateral forces imposed by soil movement and water pressure. Although grading is necessary for construction of all retaining walls, the excavation takes place predominantly along the toe of a slope, with the upper slopes requiring little, if any alteration. Since cutting the toe of a slope can destabilize the slide, the construction of retaining walls at the toe of a slide should be undertaken only after it has been determined that the slide can remain stable during construction. Retaining walls are commonly used in combination with fill slopes to reduce the extent of a slope to allow a road to be widened and to create additional space around buildings. Retaining walls are also used as protection against the erosive forces of water and as a method of slope stabilization along highways, railroads, and construction sites (Dismuke and Cornfield, 1991). Retaining walls can be separated into categories based upon the force parameters acting on the structure to provide stability. The three types of retaining walls are anchored, gravity, and cantilever. All three can be used as coastal structures and for slope stabilization.



Figure 10 : Retaining wall: RDA SL

1.4 Stabilization by Soil stabilization and soil Improvement

Soil stabilization and soil improvement include methods that increase the load carrying capacity and resistance of soils by physical or chemical alteration of the soil. Such soil improving and stabilizing techniques include, among others, reinforced earth, geosynthetics, grouting and chemical treatment.

1.4.1 Reinforced Earth

Reinforced earth is a construction system made of a frictional backfill material reinforced with flexible strips and covered with facing elements. A reinforced earth system is generally constructed by layering soil with either metal strips or geosynthetic materials which are brought into tension and resist horizontal

deflection. For retaining walls, ends of the strips are bolted to horizontal wall elements during assembly and filling.

1.5 Stabilization by Geosynthetics

Geosynthetics are porous, flexible, man-made fabrics which act to reinforce and increase the stability of structures such as earth fills, and thereby allow steeper cut slopes and less grading in hillside terrain. Geosynthetics of various tensile strengths are used for a variety of stability problems, with a common use being reinforcement of unpaved roads constructed on weak soils. Geosynthetics and a steel or fiberglass reinforced material can be used to increase slope strength, and can also be used to reinforce retaining walls.

A geogrid is geosynthetic material used to reinforce soils and similar materials. Geogrids are commonly used to reinforce retaining walls, as well as subbases or subsoils below roads or structures. Soils pull apart under tension.



Fig 7: Geogrid application for slope protection:
<http://www.happho.com/geogrids->



Fig 8: Geogrid application for rock fall protection:
<http://rockfallmesh.sell.eychina.com/p->

1.6 Debris Flow Disaster Prevention Slit-SABO Dams

Steel Slit Dams are so-called "Open type" steel structure dams formed by free-standing steel sheath pipes set in a lattice pattern (Net interval of pillars and beams) with wide opening to ensure both capturing boulders & driftwood, and letting outwash flow down in normal time. Depending on the needs and conditions for each river stream and anticipated debris flow impact, a couple of types of Steel Slit Dams can be considered. Can be used to protect culverts, roads, streams and structures from debris flow

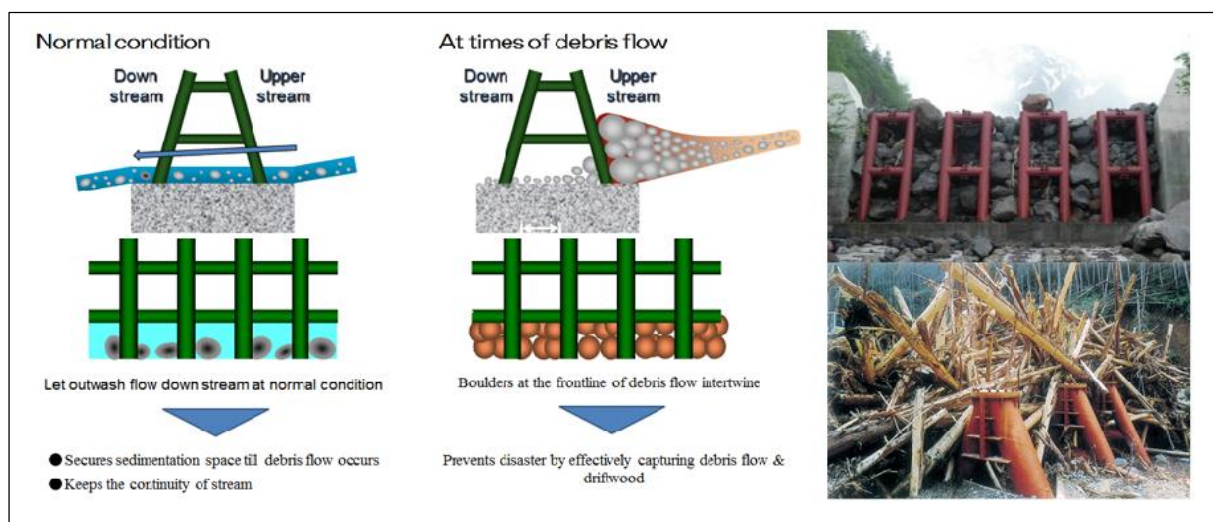


Figure 9: Debris flow barriers

1.7 Erosion control measures

Erosion control measures are key mitigation method used especially on slopes having soil over burden. Both vegetation and artificial materials are used in erosion control. These material are placed on the exposed surfaces so that the slope is protected from sheet, rill and gully erosion. Depending on the slope geometry and the structural mitigation measure the type of erosion control method vary. Vegetative erosion control erosion control using artificial material.

1.7.1 Vegetative erosion control measures

Grasses, herbs, trees etc. used in the vegetative control measures. Among which hydro seeding often used in erosion control of slopes. Concreting is commonly used as a surface treatment by artificial materials as a measure for slope erosion control in many cases.

1.7.1.1 Hydro seeding (or hydraulic mulch seeding, hydro-mulching, hydro seeding) is a planting process that uses a slurry of seed and mulch. It is often used as an erosion control technique on construction sites, as an alternative to the traditional process of broadcasting or sowing dry seed.



Figure 10: Hydro seeding as a slope erosion control measure

1.7.2 Erosion control by artificial materials

1.7.2.1 Shotcrete, concrete is concrete or mortar conveyed through a hose and pneumatically projected at high velocity onto a surface, as a construction technique. It is typically reinforced by conventional steel rods, steel mesh, or fibers.

Reference: <https://www.coastal.ca.gov/landform/attach3.html>



Figure 11: Shotcreting of slopes

Annexure III

Sample Agreement

Sri Lanka Landslide mitigation Project (Asia Infrastructure Investment Bank) AIIB

No object/Consent to use the Land for Landslide Disaster Mitigation Works

Agreement

Herewith the First Party being the (name of the agency), established under Act (details of the act) of Sri Lanka Government with Office at “(official address of the agency), and (name of the titleholder, of reference to the title, address) will be the Second Party. Following are included in the agreement signed by both parties.

The First Party (or the a party engaged by the project) needs to enter into the land and do the land protection activities in which details are attached in the following annexes; to implement the counter measures intended to protect the land from landslide disaster, slope failure and/or rock falls. Herewith the two parties agree to implement the rehabilitation activities on the land at which details are attached to in the following annexes are adhered to under agreed terms and conditions.

The Following are the agreed terms and conditions as stipulated in the annexes

1. Considering the social and economic benefits from the implementation of counter-measures to prevent landslide disaster at the particular land detailed in the annexes which belong to second party should be temporarily entrusted to the first party to implement and maintain the counter-measures for preventing the landslide disaster of the particular land.
2. The second party is fully aware of the land instability risk of current location, and understand clearly need to implement mitigation structures on the current location to reduce potential risks and agree to release the land to install mitigation structures in the land
3. The first party will installed mitigation measures in the most appropriate location of the land in a minimum area of land of the second party. The second party allow the first party (or the a party engaged by the project) to use the land for installation of mitigation measures to reduce the landslide risk in his land and surrounding lands
4. The first party agrees that external party (contractors) who will be carrying out mitigation will execute work without causing any harm to the second party or his property.
5. The first party will agree to attend to any grievances of second party in case of disputes, nuisance or other form of difficult situations that would rise during project implementation
6. In the event there are persons, and/or non-movable assets found within this particular project site, needs to be removed before construction of the mitigation measures will start; the First Party will pay the cost for removal or compensation for losses and other benefits to the Second Party
7. The Second Party will allow the First Party to install an information display board at the site providing details on the countermeasures implemented, for all people to see.
8. After completion of rehabilitation activities by the First Party on the land whose details are found in the annexes, the land will be handed back to the Second Party including the “As-built” drawings.

9. The Second Party should give access to the First Party to inspect/monitor, maintain or improve the counter measures and to implement preventive actions on land slide disaster/slope failure/rock falls at the particular land from time to time.
10. The Second Party or his/ her representative will agree not to disturb the First Party or its representative, when the First Party conducts its annual inspection, maintenance, improvement of counter measures, and implementing relevant slope failure protection actions at the particular land.
11. Two parties agree that this land is used for above purpose by us/ institute, and has entered to this agreement with our own free will.
12. The Second Party agree not to willfully damage, remove or replace in part or as a whole, the land slide disaster counter measures, or not to willfully disturb maintenance activities conducted for these measures after handing over the land where the land slide/slope failure/rock fall counter measures have been installed by the First Party, and if the Second Party or his representative willfully damage these counter measures, the Second Party agree to repair those constructed counter measures under the supervision of the First Party. However, if such damage is caused by a Third Party unknown to the Second Party, the liability would not fall with the Second Party. The Second Party shall promptly inform the First Party of the damage, and allow the First Party maintenance team to carryout appropriate repair work on the damaged counter measure.
13. If the Second Party willfully and continuously violates provisions of this agreement despite notices issued by the First Party to comply with the agreement, the First Party can exercise its prerogative to permanently acquire the land on which the mitigation measure is installed following existing laws of the country.
14. This agreement takes effect upon signing by both Parties and witnesses. This agreement will remain enforced until the end of Project life or upon termination of the First Party, whichever comes first.

In addition, herewith two parties promise to fulfill the above agreements correctly for themselves and on behalf of their subordinates.

Annexes

1. Location map, Google view and Site photo of landslide -
2. Survey Plan
3. Details of the land which will be temporarily released to the Project for the implementation of the counter measures (Tenement List)

Lot No.	Extent (Ha)	Details of Boundaries			
		North	East	South	West
1					
3					

4. Designed plan prepared for Site.
5. Guidelines for landslide.

For witness of this, both parties have signed herewith and have agreed upon for First Party to get this land/land section mentioned in the annexes and Second Party to temporarily donate the land /land section mentioned in the annexes on this. Day of Month of Year 2016.

.....
First party

.....
Second party

First Party:

Second Party:

Witness:

.....
Project Director
Landslide Disaster Mitigation Project

.....

.....
Divisional Secretary
(Name of the DS)

.....
Grama Niladhari
(Name of the GN)

Annexure IV

**Contractors' requirement for ESMP in the construction phase
2001 Environmental and Social Policy**

Contractors' requirement for ESMP in the construction phase 2001

Environmental and Social Policy

2001.1 Suggested Content for an Environmental and Social Policy (Statement)

The Works' policy goal, as a minimum, should be stated to integrate environmental protection, occupational and community health and safety, gender, equality, child protection, vulnerable people (including those with disabilities), sexual harassment, gender-based violence (GBV), sexual exploitation and abuse (SEA), HIV/AIDS awareness and prevention and wide stakeholder engagement in the planning processes, programs, and activities of the parties involved in the execution of the Works. The Client is advised to consult with the World Bank to agree the issues to be included which may also address: climate adaptation, land acquisition and resettlement, indigenous people, etc. The policy should set the frame for monitoring, continuously improving processes and activities and for reporting on the compliance with the policy.

The policy shall include a statement that, for the purpose of the policy and/or code of conduct, the term "child" / "children" means any person(s) under the age of 18 years.

The policy should, as far as possible, be brief but specific and explicit, and measurable, to enable reporting of compliance with the policy and reporting requirement.

As a minimum, the policy is set out to the commitments to:

1. apply good international industry practice to protect and conserve the natural environment and to minimize unavoidable impacts;
2. provide and maintain a healthy and safe work environment and safe systems of work;
3. protect the health and safety of local communities and users, with particular concern for those who are disabled, elderly, or otherwise vulnerable;
4. ensure that terms of employment and working conditions of all workers engaged in the Works meet the requirements of the ILO labour conventions to which the host country is a signatory;
5. Be intolerant of, and enforce disciplinary measures for illegal activities. To be intolerant of, and enforce disciplinary measures for GBV, inhumane treatment, sexual activity with children, and sexual harassment;
6. incorporate a gender perspective and provide an enabling environment where women and men have equal opportunity to participate in, and benefit from, planning and development of the Works;
7. work co-operatively, including with end users of the Works, relevant authorities, contractors and local communities;
8. engage with and listen to affected persons and organizations and be responsive to their concerns, with special regard for vulnerable, disabled, and elderly people;
9. provide an environment that fosters the exchange of information, views, and ideas that is free of any fear of retaliation, and protects whistleblowers;
10. minimize the risk of HIV transmission and to mitigate the effects of HIV/AIDS associated with the execution of the Works;

The policy should be signed by the senior manager of the Client. This is to signal the intent that it will be applied rigorously.

2002 Environmental and Social Monitoring

2002.1 General

The Contractor shall, during the whole period of project should comply fully with **National Environmental Protection laws and those pertinent to prevent nuisance to public stipulated by the Democratic Socialist Republic of Sri Lanka and the Environmental and Social Policy of the Asian Infrastructure Investment Bank.** This obligation shall extend to the construction sites themselves and all of the Contractor's installations elsewhere within the national territories.

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons, private and/or public properties or others resulting from pollution, noise, vibration or other causes arising as a consequence of his methods of operation. The Contractor should fully aware with the implementation of Environmental Management Plan (EMP), and the pollution control facilities should be installed adequately and appropriately before commencement of the project actions where there is potential to emit pollutants to the environment.

The project activities during site preparation, construction and post construction should comply but not limited to the National Environmental Act (NEA) No. 47 of 1980 and amended Act No.1562/22 of 2008 with respect to emission of gaseous, liquid and solid waste, National Environmental Noise Control Regulations No.01 of 1996 for emission of noise, Interim Standards on Vibration Pollution control for Central Environmental Authority (CEA) for vibration during construction activities, Fauna Flora Protection Ordinance (FFPO), Forest ordinance and Forest (Amendment) Act No.65 of 2009 (FO), Antiquities Ordinance No. 4 of 1940 and subsequent amendment; Ordinance to provide better preservation of the antiquities of Sri Lanka, and the sites, buildings of the historical or archeological importance in Sri Lanka, Felling of tree (Control) Act No 09 of 1951, and Soil Conservation Act No. 24 of 1996, Geological Surveys and Mines Bureau (GSMB) Act No.33 of 1992 amended by No.66 of 2009 for excavated material (earth, rubble and aggregates) as relevant.

Construction contractors' requirement to comply with Site specific environmental, social management and health and safety during the construction phase given under 2004 with this document. The contractor is expected to address all sections of ESMP adequately with the indicated level of relevance in his bid response by referring to give information in the site.

The Project Manager under any terms is not responsible either fully or partly for damage caused due to the Contractors' failure to apply necessary pollution control measures, environmental protection measurers or measurers to minimize nuisance to public. The Project Manager will not appear in courts, pay compensation or engage in public conflict resolution on behalf of the Contractor under such situations if arise.

The Contractor shall prepare and submit to the Project Manager for review and approval, a site specific "Environmental Management Action Plan (EMAP)" based on the Contractors' Environmental and Social Management Plan (C-ESMP) **to Project Manager within one month from the date of signing the contract and prior to commencing construction.**

The contractor shall not commence the work until the resettlement plan is established.

The Contractor shall appoint an Environmental and Social Officer for each package, whose duties throughout the period of the Contract shall be exclusively connected with the Environmental and Social Management activities at the Site.

Monthly EMAP performance reports should be prepared and submitted, on-site checklists and log books should be maintained.

The ESMP implementation and the costs should be included clearly according to the format given under "**Payment schedule**".

2002.2 Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan (ESMP) outlines the framework for planning, implementation and monitoring of environment, measures required to ensure that potential adverse environmental impacts from the project activities are eliminated, offset, or reduced to an acceptable level. At the same time, it is expected that the plan will help the project enhance environmental benefits from the project interventions. The ESMP is built based on relevant existing national policies, legislation, regulations and guidelines.

- a) All works should be arranged to cause the least possible disturbance to the environment and local residents/institutions, in particular soil erosion along the area of intervention and any access roads that may be required and adjacent area, to the river/stream banks, irrigation canals and other water ways. Similarly, cutting of trees, tea shrubs and other vegetation of economic, religious and ecological value found outside of the ROW, whenever possible be avoided; else replacement planting in a place selected by the owner of the affected tree and/or vegetation will be carried-out by the Contractor for the damages caused.
- b) Proposals shall be submitted for:
 - 1) **Storage on Site**
 - i. Materials and equipment on Site shall be stored in a manner so as to prevent damage to the Site and adjacent areas, and minimize hazards to persons, materials and equipment and all Temporary and Permanent Works. Storage areas shall be kept organized, neat and tidy.
 - ii. Areas assigned for carrying out Permanent Works shall not be used to store materials, plant and equipment, nor used as access to storage areas without prior approval of the Project Manager.
 - iii. Hazardous materials (including fuel and oil) shall be stored and handled only within an area set-aside specifically for this purpose. This area shall be enclosed from the remainder of the Site with waterproof concrete flooring and rainproof roof, so as to contain any spillage, clearly marked and signs installed at a close distance from the storage area to warn unauthorized workers and visitors to stay away.
 - iv. The area shall be located away from any natural waterways, drainage lines and open drains. In case of petroleum fuel and oil, a collection basin is to be installed in the storage area to gather any spillages, to facilitate the recovery of the petroleum products for reuse or proper disposal using government licensed recyclers or otherwise.

2) Noise and Vibration

- i. The Contractor shall abide by the Central Environmental Authority (CEA) regulations and other applicable laws and regulations related to noise and vibration levels.
- ii. The Contractor shall take all practical precautions to minimize noise and vibration resulting from work under the Contract, especially Sites adjacent to residential and institutional areas, from polluting such areas and shall fit all equipment with noise suppressors so that noise levels are minimized. Similarly, as much as practicable, construction methods that produce minimal vibration be adopted, most especially in sites adjacent to residential and institutional areas where possible damage to the structures due to vibration may occur.

3) Cracks and damages to the buildings/ road damages

- i. The contractor shall take all practicable measures to prevent cracks in neighboring houses or buildings.
- ii. In case of an unconditional cracks, the contractor shall immediately inform to the Project Manager and repair the damage by their own cost.
- iii. Crack survey should be done before works starts and after the work is completed

4) Disposal of waste

- i. Solid, liquid and gaseous waste shall be disposed in accordance with relevant Sri Lanka Environmental regulations and contractual requirements.
- ii. Non-toxic and/or non-hazardous liquid waste shall be stored in approved containers for transport and disposal at locations approved by the Project Manager and local authorities.
- iii. Non-toxic and/or hazardous solid wastes shall be disposed of by removal from site, transport and depositing in approved locations.
- iv. Toxic and hazardous wastes must be temporarily stored using suitable containers at a designated place authorized by the Project Manager and local authorities, and disposed through a government licensed collection agent or otherwise.

5) Disposal of Refuse

- i. The Contractor shall take adequate measures to ensure that the Site and associated areas are maintained in a clean and orderly condition. Provision shall be made for the daily removal of rubbish, debris, surplus materials, etc., and for the stacking and storing of materials in authorized locations.
- ii. The excavated materials should be covered and stored safe until removed. The location of onsite storage should be sufficiently away from stream banks, water ways, runoff paths etc.
- iii. The final disposal site should be approved by the Project Manager before dumping. The disposed matter should not pollute water bodies
- iv. The contractor shall obtain approval from relevant Authority such as Pradeshiya Sabha, Municipal Council and other government agencies (as required), for disposal of spoil at the specified location, as directed by the Project Manager. Private land that will be selected for disposal should also require written consent from the land owner.

6) Dust Control

- i. Dust screens and/or watering of open and unpaved areas shall be used to control dust and to eliminate public health issues and/or nuisance to adjoining residential and institutional areas, national highways often travelled by commuters, and natural habitats frequented by wildlife during the period of the Works.
- ii. The on-site piles should be covered regularly to prevent particles to become air borne.

7) Transport of construction materials and waste

- i. Transportation of material should be done covered always using tarpaulin
- ii. Precautions should be made to prevent spill of any material on ground during transportation and minimize damage to ground cover/ vegetation
- iii. Should not to be a nuisance to public
- iv. Transportation should be done only in the dedicated haul roads. Use of any other access roads should be strictly avoided.
- v. The tyres of the vehicles should be inspected regularly when leaving the sites and disposal site, should clean mud in tyres before entering the haul road.

8) Water

i. Water removal

Surplus water shall be promptly removed from the Site by draining off or by mechanical means to keep the Works reasonably dry and so as not to interfere with construction work. The water removed from the Site is kept reasonably free of soil, oil/petroleum and other debris, and the discharge shall not adversely affect the adjoining landowner's residential and livelihood assets, or to pose as a pollution hazard to waterways and farmlands.

ii. Water quality

The Contractor shall ensure that construction activities do not have a detrimental impact on the water quality of surface or ground water in the areas adjoining the Site. Specific measures shall be adopted to prevent the discharge of contaminated runoff from the Site. When necessary, potable water source of local people such as springs located immediately downslope of the Site shall be provided with protection ("spring box") from contaminants originating from construction works as appropriate.

iii. Contaminated water

The Contractor shall adhere to the regulations of NEA Act on disposal of wastewater. Wastewater shall not be discharged to ground or waterways in a manner that will cause unacceptable surface as ground water pollution.

iv. Siltation

All drains, streams, and waterways shall be kept clear from mud, silt and other obstructions arising from the execution of work under the Contract. Soil and other debris removed from the drains, streams and waterways are to be deposited by the Contractor in suitable areas subject to the approval of the Project Manager and the concerned local authorities. The Contractor shall ensure that effective construction practices are employed to minimize siltation to the satisfaction of the Project Manager.

v. Alternation of drainage paths

Contractor shall not close or block existing canals and streams permanently causing nuisance to public. If diversion or blocking of canals and streams is required for the execution of works, Contractor must obtain the Project Managers approval.

vi. If streams or waterways/ community water supplies that are used by neighboring community are obstructed even temporarily, it should be done with the approval of the Project Manager, subjected to consent from the community with alternative sources are arranged.

vii. Contractor shall restore drainage paths back to its original status once the need for such diversion or closure or blockage no longer required.

9) Flora and Fauna

All works shall be carried out in a manner that the destruction to flora and fauna and their habitat is minimal. Trees and vegetation shall be felled /removed only if that affect directly on permanent works or necessary temporary works.

i. Contractor shall take effort to avoid removal/ destruction of religious, cultural, aesthetic species.

ii. Contractor shall adhere to the regulations of Fauna Flora Protection Ordinance (FFPO) and Forest (Amendment) Act No.22 of 2009), Forest ordinance, Forest (Amendment) Act

No.65 of 2009 (FO) and relevant area declared under Central Environmental Authority or Mahaweli Authority of Sri Lanka if any with regard to felling of trees and removal of vegetation.

- iii. A list of trees to be removed during construction of site to be marked and forwarded to the Project Manager.
- iv. Measures shall be taken to avoid or minimize any adverse impacts on fauna and flora (either terrestrial/ aquatic) living in natural environments adjacent to the Site during the construction period.
- v. During construction, if a rare/ threatened/ endangered flora and or fauna is found, it shall be immediately informed to the Project Manager. All activities that could destroy such flora/fauna and its habitat shall be stopped with immediate effect. Contractor shall carry out works again only after the Project Manager's approval.
- vi. Hunting and collection of wildlife and specimens within the Site and adjacent area is strictly prohibited. The Contractor shall ensure that no damage occurs to any trees, shrubs and other vegetation with ecological, spiritual and/or economic value that are to be retained at the Site; and that none of its workers and subcontractors should be engaged in wildlife hunting or collection.
- vii. Contractor shall take measures to avoid introduction of invasive species during transportation or refuse or spoil.
- viii. Plant or seed if needed for bio Project Managed slope mitigation shall be imported into Sri Lanka under the authority and in accordance with the conditions, of a plant importation permit issued by the Additional Director National Plant Quarantine Service Katunayake for Director General of Agriculture under the Plant Protect Act No. 35 of 1999.

10) Physical and cultural resources

Whenever chance finds are made during the works, the contractor shall immediately inform to the Project Manager and in turn inform the government department concerned with cultural property.

11) Soil Erosion

The Contractor shall take measures to minimize the soil erosion that may result from construction activities using any of the control measures. Control measures include but not limited to.

- i. Install sediment filter, fences, hay bale filters drains, and filter strips, grass outlets, sediment transport basin traps around culverts, drains, soil stockpiles and all other areas which may have the potential to erode or be affected by soil erosion.
- ii. Install catch drains, slope drains and nearby dissipaters in conjunction with sediment traps installed to divert storm water around the Site.
- iii. Stabilize by grass, materials (excluding pavements and screenings) stockpiled for periods longer than one month.
- iv. Stabilize disturbed areas using measures such as drains.
- v. Minimize as much as practicable, when the removal of existing vegetation within and around the project area at any time.

- vi. Plan the execution of work under the Contract in stages to minimize soil erosion during continuous periods of rainfall that will cause heavy run-off.
- vii. Soil erosion control devices shall be regularly inspected and maintained, especially after heavy and/or continuous periods of rain.

12) Soil Contamination

The Contractor shall undertake all practicable control measures to prevent the contamination of the soil in and around the site. Control measures include but not limited to;

- i. **Acceptance of Clean Fill.**
All fill material to be imported and used on the Site shall be free of contamination.
- ii. **Fuel Chemicals and Other Hazardous Materials**
All practicable steps shall be taken to ensure contamination of soil does not occur through: fueling, maintenance of vehicles or equipment; storage of fuel, chemicals, and other hazardous materials; and spillage of such materials on to the soil, by ensuring all the above activities are conducted in bounded or sealed areas.
- iii. **Clean up of Soil Contamination**
All soils contaminated during construction shall be cleaned up by the Contractor to the satisfaction of the Project Manager, and at no cost to the Employer.
- iv. Any contaminated spoil material (whether or not contaminated by the Contractor) shall be removed from the Site in an approved manner to prevent further pollution.
- v. **Installation of Oil separators**
Contractor shall install oil separator to prevent fuel, oil and other petroleum products from spilling into the existing drainage lines and then into the adjacent soil, resulting in its (soil) contamination.

13) Borrowing Earth

- i. Earth available from construction site excavation works as per design, may be used as embacement materials, subject to approval by the Project Manager
- ii. Contractor shall comply with environmental requirements/ guidelines issued by CEA and the respective local authorities with respect to the locating burrow areas and with regard to all operations related to excavation and transportation of earth from such sites.
- iii. Contractor can also find suitable soil materials from currently operated licensed borrow pits in the surrounding area, subject to approval of the Project Manager.
- iv. Borrow areas shall not be opened without having a valid mining license from the Geological Survey and Mines Bureau (GSMB)
- v. All borrow pits/areas should be rehabilitated at the end of their use by the contractor in accordance with the requirement/ guidelines issued by the CEA and the respective Government Authority

14) Quarry operations

- i. Utilizing the existing quarry sites available in the project influential area as much as possible which are approved by GSMB with valid Environmental Protection License (EPL) and

Industrial mining license

- ii. If new quarries are to be opened, prior approval should be obtained from GSMB, NBRO (as applicable), CEA and Local authorities.
- iii. Selected quarry sites should have proper safety measures, such as warning, safety nets etc.
- iv. Quarry sites should not be established within protected sites under FFPO and FO

15) Maintenance vehicles and machinery

- i. All maintenance and servicing should be done outside the site.
- ii. Waste clothes, wrappings, waste machine oil, rugs etc. should be collected separately and disposed outside through proper disposal channels
- iii. Operation of concrete mixer
Storage of construction materials cement, sand concrete aggregates and any other should be done in a dedicated place closer to the concrete mixture yard. Materials prone to wash off or air borne would be covered with impervious material.
- iv. Separate places should be kept for cleaning concrete mixes away from storm water drains. Cleaning should be done with minimum quantity of water and wastewater generated should be allowed soaked into ground. If extra wastewater is generated, the drain water should be filtered through check dams and temporary sand mounds before letting to storm water drains.

16) Disruption to public

- i. Loss of Access
At all times, the contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock.
- ii. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the provisions to the prior satisfaction of the Project Manager.
- iii. On completion of the works, all temporary obstructions to access shall be cleared away, all rubbish and piles that obstruct access be cleared to the satisfaction of the Project Manager.
- iv. Contractor shall make sure that his work team or project actions shall not engage in any form of dispute with neighboring persons or communities under the Nuisance Ordinance chapter 230 No. 15 of 1862 of Sri Lanka. All contractors' and subcontractors' personnel to act courteously and treat people living in the people with respect.

17) Utilities and roadside amenities

- i. The Contractor shall take care not to damage/destroy or affect the functional purposes of utilities such as water, electricity, telephone posts. The arrangements the Contractor made with those service providers shall be informed to the Project Manager.
- ii. In case of an unintentional damage cause to a utility, the Contractor shall immediately inform the service providers and help to restore the service without delay at its own cost.

18) Visual environment enhancement

- i. Landscape plantations, re-vegetation and filling slopes and other slopes, edge treatment of water bodies shall be carried out.
- ii. The Contractor shall remove all debris, piles of unwanted earth, spoil material, away from the roadsides and from other work places and disposed at locations designated to acceptable to the Project Manager.

On completion of the works, the temporary structures shall be cleared away in full, all rubbish burnt, waste dumps and septic tank shall be filled and closed and roadsides work places and labour camps, cleared and cleaned.

2002.3 Environmental Management Action Plan (EMAP)

- i. The selected Contractor shall prepare and submit to the Project Manager for review and approval, the “Environmental Management Action Plan (EMAP) based on the Environmental and Social Management Framework (ESMF) that shall be implemented during the work execution, and shall be monitored on a daily basis. The Contractor shall take into account the regulations and all applicable Local Government by-laws in the preparation of the EMAP.
- ii. The directions on preparing EMAP will be given by Environmental consultant of the Project Manager for selected Contractor. The Contractor should submit the EMAP statement to the Project Manager within 28 days from the date of signing the contract and prior to commencing construction.
- iii. The contractor shall not commence the work until the resettlement plan is established.

2002.4 The Contractor’s Environmental and Social Officer

Within 28 days before the commencement of the works, the Contractor shall appoint an Environmental and Social Officer, whose duties throughout the period of the Contract shall be exclusively connected with the Environmental Management activities on the Package as per ESMF and EMAP.

The Environmental and Social Officer shall have an acceptable working knowledge of the ruling language of the Contract as stated in the Conditions of Contract, and shall be a suitably qualified and experienced person who shall prepare, supervise and monitor environmental management activities. The person should be responsible for community liaison and to handle public complaints regarding environmental/social related matters.

The appointment and designation of the Environmental and Social Officer shall be subject to the Project Manager’s approval.

Unless specifically agreed in writing by the Project Manager, the Contractor shall not undertake any work on the Package, which may affect the environment, until the Environmental and Social Officer has commenced duties on the Package, and the Environmental Management Action Plan (EMAP) has been approved by the Project Manager.

The Contractor shall not remove the Environmental and Social Officer from the Package without a written permission of the Project Manager. Within fourteen (14) days of any such removal, or notice of intent of removal, the Contractor shall nominate a replacement Environmental Officer for the Project Manager’s approval.

2002.5 Environmental Monitoring

The contactor shall monitor the compliance of implementation of Environmental Management actions and the emission of pollutants with respect to the environmental regulations. The contractor shall include the monitoring plan in his site specific EMAP. The monitoring plan should be prepared in accordance with the monitoring regulations of National Environmental Act and that of the funding agency, and any other specific monitoring indicated in Environmental Assessment reports (EIA, IEE) as appropriated. The environmental monitoring plan should be approved by the Project Managers.

The Contractor shall monitor the environmental aspects of the construction according the environmental monitoring plan, and control measures shall be implemented to minimize the environmental impacts. However, should the control measures put in place be found to be unsatisfactory as a result of monitoring, then the Contractor shall amend the control measures to provide a satisfactory result.

a) The contractor shall:

- i. Prepare monthly and quarterly progress reports in three copies on the implementation of the EMP using a report format acceptable to the Project Manager.
- ii. Participate in coordination meetings called by the Project Manager to discuss the progress of the EMP implementation, among others, and act on agreements reached during the activity.
- iii. Participate in Site Inspections requested by the Project Manager, and/or the NBRO, and Authorities (RDA, Railway Department) to review the EMP performance.
- iv. Keep daily records of environment related incidents (if any), note the details, actions taken, identify persons responsible for these actions, the results of the actions, and any recommendations for further work. Also indicate in the record if the Project Manager had been informed of the incidents as well as other local authorities. Complaints and their status will also be included in the record.

b) Monitoring environmental parameters for regulations for pollutant emissions

- i. The contractor shall monitor the environmental parameters for regulations for pollutant emissions. The monitoring parameters should be decided based on the sensitive environmental elements within the project area and in its proximity. For this, the contractor should obtain the services of a competent local organization, to decide and conduct environmental monitoring as baseline and during construction for ambient air quality, surface and ground water quality, noise and vibration levels at the specific locations of the site.
- ii. The monitoring agency shall review environmental data obtained for conduct baseline monitoring for parameters as per the Table 1. The monitoring agency shall prepare environmental quality monitoring reports with the results of field sampling and laboratory analysis, interpretations of the results and recommendations.
- iii. And shall set out same monitoring stations for the monitoring during the construction period.
- iv. The reports should be analyzed by the environmental consultants of the Project Manager to ensure that effectiveness of the mitigation measures implemented, the necessary environmental regulations are complied, and non-compliances should be acted according to conditions of the contract

Table 1 – Guidance to select Environmental Quality Monitoring Parameters

Activity	Instructions for contractor	Parameters	Frequency and monitoring Agency
<p>*Baseline surveys</p>	<p>The contractor shall conduct a baseline environmental assessment for all sites before commencing the construction activities.</p> <p>The assessment should include Ambient Air quality, noise, vibration and water quality at closes streams (reflecting upstream and downstream) as compliance to:</p> <p>Air quality - The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 -Central Environmental Authority of Sri Lanka.</p> <p>Noise- Extraordinary Gazette, No. 924/1- May 23, 1996 -Central Environmental Authority of Sri Lanka.</p> <p>Vibration- The interim standards on Vibration for the Machinery, Construction activities and Vehicular Movements - Central Environmental Authority of Sri Lanka.</p> <p>Ambient Water Quality- Ambient water quality standards – CEA –EAIP-DHV-2000</p> <p>Crack surveys should be conducted if necessary on existing buildings or structures before commencing the work by the contractor. The reports should be analyzed by the experts to identify cracks that might get aggravated by some project actions. And necessary precautions should be made during execution of project actions to keep such possible aggravation of the cracks if identified sensitive to specific project actions.</p>	<p>Air Quality parameters Carbon Dioxide (CO₂), Carbon Monoxide (CO), SO₂, NO₂, Total Suspended Particulate Matter (TSPM), Repairable Particulate Matter (PM10) & PM(2.5), Particulate Lead (Pb)</p> <p>Noise (15 min and 1 hour in Morning, Afternoon, Evening and Night in a day) Leq, L90, L50 & L10</p> <p>Vibration (Ground and Structural) PPV, Hz</p> <p>Water quality parameters pH, temperature, electricity conductivity, DO, BOD, TSS, Oil and Grease, FC, Pb, and any other specific parameters deemed necessary</p> <p>Cracks in each building within 50 m from the site and any other structures in the vicinity that could potentially be affected by the landslide or by the works.</p>	<p>Once</p> <p>From reputed laboratory</p> <p>Once by contractor representative</p>

<p>During construction</p>	<p>Ambient Air Quality, Noise, vibration, water quality Compliance to;</p> <p>Air quality - The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 -Central Environmental Authority of Sri Lanka.</p> <p>Noise- Extraordinary Gazette, No. 924/1- May 23, 1996 -Central Environmental Authority of Sri Lanka.</p> <p>Vibration- The interim standards on Vibration for the Machinery, Construction activities and Vehicular Movements - Central Environmental Authority of Sri Lanka.</p> <p>Ambient Water Quality- Ambient water quality standards – CEA –EAIP-DHV-2000</p> <p>Crack Surveys</p>	<p>Air Quality parameters Carbon Dioxide (CO₂), Carbon Monoxide (CO), SO₂, NO₂, Total Suspended Particulate Matter (TSPM), Repairable Particulate Matter (PM10) & PM(2.5), Particulate Lead (Pb)</p> <p>Noise (15 min and 1 hour in Morning, Afternoon, Evening and Night in a day) Leq, L90, L50 & L10</p> <p>Vibration (Ground and Structural) PPV, Hz</p> <p>Water quality parameters pH, temperature, electricity conductivity, DO, BOD, TSS, Oil and Grease, FC, Pb, and any other specific parameters deemed necessary</p> <p>Cracks in each building within 50 m from the site boundary representative</p>	<p>In critical noise and vibration monitoring activities</p> <p><i>From a reputed laboratory</i></p> <p><i>In critical events as directed by the Project Manager</i></p>
<p>Site inspections, Execution of EMP</p>	<p>An Environmental and Social officer from contractor should be present at site responsible for execution of EMP and monitoring project actions in respect of environmental compliance and giving necessary instructions at site to ensure satisfactory implementation of EMP</p>		
<p>After completion of works</p>	<p>Crack Surveys</p>	<p>Cracks in each building within 50 m from the site and any other structures in the vicinity that could potentially be affected by the landslide or by the works.</p>	<p><i>Once by contractor representative</i></p>

2002.6 Environmental Complaints

The Contractor shall maintain a register of all environmental and social complaints received and shall notify the Project Manager of each complaint. Complaints received by the Project Manager shall be referred to the Contractor and shall be detailed in the complaints register.

The Contractor shall investigate all environmental and social complaints received and, where necessary, adopt measures to address the complaint. All measures undertaken to address the complaints shall be detailed in the register. A summary of the complaints received, actions taken and the ensuring results; and further actions needed (if any); are to be included in the regular reports submitted by the Contractor to the Project Manager.

2002.7 Environmental Incidents

Should an environmental incident (being environmental nuisance, medium environmental harm, or serious environmental damage) occur during the construction phase, the Contractor shall immediately take appropriate action to minimize any impact or to compensate the impact and inform the Project Manager of the incident? The Contractor shall carry out any instructions received from the Project Manager to remedy the situation. The Contractor is responsible for the clean-up of any contamination caused by construction work and no additional payment will be made in this regard.

2002.8 Environmental Training

The Contractor shall be responsible for ensuring that all employees (including all Sub-Contractors and their employees) have received training/orientation in relation to the Contractor's Environmental and Social Management Action Plan (EMAP) and other related operating guidelines. Posters are to be placed on strategic places, as well as reading materials are to be made available, to remind workers and visitors on how each one can on a personal basis, help protect the environment. The Contractor will ensure that all machinery on the Site are operated within the appropriate guidelines in-order to minimize environmental impacts related to excessive noise and vibration; deteriorated air and water quality; waste and pollution control; as well as damages to the natural ecology in and around the project area. All construction materials used on the Site shall be utilized in a manner to minimize negative environmental impacts. Reusable containers no longer needed at the Site, can be donated to the local schools or government units for use in their community development projects.

2002.9 Reporting and Maintenance of Records

- (a) Environmental Management Action Plan (EMAP)
The Contractor should prepare an EMAP and obtain approval.
- (b) Monthly EMAP performance reports should be prepared and submitted
- (c) On-site checklists maintained regularly
- (d). Logbooks should be maintained at site with daily inspection entries, issues noticed, action taken and produced to the Project Manager on-site inspections
- (e) Emission test reports and approvals etc. should be made available officers of the Project Manager at on-site inspections

2002.10 Attending to Progress Meeting

The Project Manager will hold monthly progress meeting at a venue that will be either at the head office or at a pre informed location in the proximity of the project site. An authorized officer responsible for EMAP, I.E. the Contractor's Environmental and Social Officer should attend the meeting and should present the progress.

2002.11 Performance Monitoring by the Project Manager

The Environmental and Social officer (EO) will be appointed by the Project Manager to monitor performance of EMP at site. The monitoring will include site inspections, checking on-site environmental records, reviewing EMAP, raise non compliances on EMAP where performance is not satisfactory. The EO of the Project Manager will endorse log entries and on-site checklists, and will prepare monthly performance review reports including non-compliances and present at the progress meetings. All claims are subjected to approval of the EO.

2002.12 Measurement and Payment

a. Measurement

- (i) Environmental and Social Officer shall not be measured and deemed to be included in the construction management staff as stated in Annex- B under section 120.1.
- (ii) Environmental Management Action Plan shall be measured as Lump Sum.
- (iii) Baseline Environmental and Social Monitoring shall be measured as Lump Sum.
- (iv) EMAP Progress Reports shall be measured in number of reports (not the number of copies) submitted as described above.
- (v) Environmental Quality Monitoring during construction shall be measured as Provisional Sum.

b. Payment

- (i) Environmental and Social Officer shall not be paid and all the expenditure incurred by the Contractor in keeping the personnel at the Site and all the facilities provided to such personnel to discharge his duties satisfactorily shall be deemed to be included Contractor's staff.
- (ii) EMAP Progress Reports shall be paid at the Contract monthly rate and shall include all the expenditure incurred by the Contractor in preparing the reports (not the number of copies) in three copies and submitting them to the Project Manager.
- (iii) Environmental Quality Monitoring shall be paid at the Contract as provisional sum and shall include all the expenditure incurred by the Contractor in carrying out this work and the Contractor and Project Manager shall agree on a payment of the provisional sum in a manner that the payment is distributed across the monitoring period.
- (iv) All the other obligations of the Contractor under this Section are deemed to be included in the rates and no separate payment shall be made in respect of them.
 - Submission of claims– All claims regarding the EMAP implementation are subjected to submission of reports followed by approval by the Project Manager. The format for claim form and authorized signatories should be informed prior to commencement of the project. The incomplete claims or those with inadequate information will not be paid and the Project Manager hold no responsibility for delays encountered in submission of such claims. All claims are subjected to approval of the Environmental Officer (EO) certifying satisfactory performance. Full payment, No or partial payment or payment suspension will be based on the endorsement by the EO on the claims of Contractor.
 - If a large number of NCs are reported in the given month, and are not rectified within the minimum time needed to address these issues, the unsatisfactory performance of implementation of ESMP will be lead to suspension of payments, disregarding the monthly report that has been submitted.
 - **Performance of environmental officer at site and attending the progress meetings**– No or partial payment will be made, or payment will be suspended for unsatisfactory performance of environmental officer of contractor.

- **Performance of on-site EMAP**– No or partial payment will be made, or payment will be suspended for unsatisfactory performance
- **Suspend of work** – If the contractor is seriously violating the norms of environmental regulations, the Project Manager reserve the right to suspend the project activities until satisfactory control measures are set in place. The under such situations the Project Manager will not pay any delay claims.
- **Damage Surcharge** – If substantial damage has resulted to environment or public due to contractor poor performance of EMAP **the contractor will have to remedy it at its own expense.** If the contractor is unable to repair the damage or there is an unacceptable delay in attending to remediation the Project Manager reserves the right to deduct the specified amount from the payment as remediation cost.
- The Contractor will entitle to additional 15% overhead and profit on the top of the premium for PS item.

Pay Item	Description	Pay Unit
2000 (1)	Submission of satisfactory Environmental Management Action Plan (EMAP) and on-site arrangement before commencing the project actions	Lump sum
2000(2)	Baseline Environmental Monitoring and submission of the report	Lump sum
2000 (3)	ESHS Monthly Progress Reports (if required)	Month
2000(4)	Monitoring Environmental Quality Parameters and Environmental mitigation measures during construction	Provisional Sum

2003 Working Conditions and Community Health and Safety

2003.1 General

The Contractor shall, as a priority in all its activities, undertakings and endeavors, ensure the continuous safety measures of the public and all persons directly or indirectly associated with the Works. The Contractor shall comply with all safety and industrial health legislation and regulations of Sri Lanka.

The Contractor will be responsible for the safety of the public legitimately passing through or adjacent to the Site. All excavations, use of explosives (chemical or other), or plant or items of potential danger to the public must be barricaded and sign-posted to the satisfaction of the Project Manager and the Contractor must provide sufficient watchmen to ensure the safety of the public at all times. All existing pedestrian routes shall be maintained in a safe condition unless an alternative route is provided to the satisfaction of the Project Manager.

The Contractor shall appoint a Health and Safety Officer for each package, whose duties throughout the period of the Contract shall be exclusively connected with the Health and Safety Management activities at the Sites for workers and the community.

Availability of Safety-related Documents: The Contractor shall comply with the Project Manager's requirements insofar as displaying in each of its site offices and workshops, copy of such safety and industry health posters and keeping on the Site copies of such regulations and documents. All regulations and documents shall be translated into languages which are understood by the workers and operators

engaged by the Contractor or subcontractors and such translations shall be displayed or kept alongside those in Sinhala, Tamil and English languages.

Assistance to the Project Manager: The Contractor shall provide full co-operation and assistance in all safety surveillance carried out by the Project Manager or the Employer.

2003.2 Safety Organizations and Communication

- Safety control staff organizational structure, which should identify the personnel to be engaged solely for safety assurance (including Health and Safety Officer will be responsible for all safety on the Site), their responsibilities and authorities
- Proposed interaction and communication procedures between the Contractor's construction personnel and safety assurance staff
- Frequency and coverage of site safety meetings, and regular site safety reports
- Safety information and training
- Records to be prepared and maintained by the Safety Officer.
 - i. Measures for compliance by Subcontractors
 - ii. Safety equipment and facilities
 - Safety equipment, rescue apparatus and protective clothing which will be required for the Works. Such equipment shall include, but not limited to, eye protectors, hearing protectors, safety harnesses, safety equipment for working underground and in the confined spaces, rescue equipment, fire extinguishers, first aid equipment, lanyards, hard hats and, where appropriate, associated shock absorbers, chest harnesses
 - Testing, inspection, and replacement of safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing, and guarding equipment
 - Operation and equipment of the specified first aid station
 - Emergency and rescue procedure and associated equipment
 - Any other equipment, gear and facilities necessary for prevention of accidents
 - iii. Protection of authorized and unauthorized visitors to the site (including people from the vicinity)
 - iv. Supervision of Safety systems
 - v. Safety of Construction methods
 - vi. Types of Hazards and Emergency Measures
 - An appreciation of the industrial health hazards, and proposals for minimization of the risks associated with such hazards.
 - vii. Personal Health and Sanitation program which focus on measures to be adopted by the Contractor in the worker's camp to ensure that the health of every personnel hired in the Project is properly taken care of. This program includes the following:
 - a) Installation of a temporary workers camp that is provided with sleeping quarters, sanitary toilet and shower rooms, adequate potable water supply and lighting facilities
 - Location for worker camps shall be approved by the Project Manager and comply with guidelines recommendations issued by the CEA/local Authority.
 - Worker camps should be located 200 m away from water ways or site of religious cultural or archeological importance or near schools
 - b) Personal hygiene and sanitation training for workers;

- c) Orientation on the prevention of communicable diseases, including sexually transmitted diseases
- d) Prevention on vector borne diseases.
- e) Prevention of the use of alcohol, drugs, possession of knives or other weapons by the contractors' and subcontractors' employees working or accommodated at the site
- f) For foreign workers, an orientation on local customs and traditions.
 - Worker camps shall be provided with appropriate facilities for disposal of solid waste and sewerage.
 - Garbage bins shall be provided the camps and regular emptied.

The design and location of the worker's camp is subject to the approval of the Project Manager and local authorities.

2003.3 Child Labor and Forced Labor

In order to protect children from jeopardy to their health, safety or morals, ensure that children under the age specify in Labor regulations will apply and not limited to; Employment of Women, Young Persons, and Children Act. Law No, 29 of 1973 and amendments.

2003.4 Safety Reports and Notification of Accidents

(a) Safety Reports

The Contractor shall submit regular site safety reports to the Project Manager as a requirement of the Project Health and Safety Plan. A summary report shall be submitted as part of the Monthly Progress Report. Prior to submission, the Contractor's Representative shall endorse the Report. Site safety reports shall comprehensively address all relevant aspects of site safety and industrial health regulations and, in particular, report on all site safety audits undertaken during the period covered by the report.

(b) Notification of Accidents.

The Contractor shall notify the Project Manager immediately when any accidents occur whether on-site or off-site in which the Contractor, his personnel or Contractor's Equipment, or those of his Subcontractors are directly or indirectly involved and which result in any injuries to any persons. Such initial notification may be verbal and shall be followed by a written comprehensive report in the format approved by the Project Manager within 24 hours immediately after the accident.

2003.5 Safety Equipment and Clothing

The Contractor shall ensure that safety equipment and protective clothing as described in the Health and Safety Plan are available on the site at all material times and that measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing are incorporated into the Health and Safety Plan.

- (a) The Contractor shall provide all authorized persons on the Site (including the Employer's and Project Manager's personnel) with protective clothing, where the minimum items (Personnel Protective Equipment-PPE) shall be as follows;

- protective headgear (hard hat or similar),
- a reflective jacket
- safety boots (with steel toe caps and steel sole plate)

Other items such as safety glasses, gloves, safety harness, rubber boots etc. will be provided as necessary to the operation being undertaken.

- (b) The Contractor shall provide other necessary safety equipment, clothing and facilities as instructed by the Project Manager.

- (c) The contractor shall provide all persons of sub-contractors with Personnel Protective Equipment (PPE)

2003.6 Safety Inspections

The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstacles and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately.

2003.7 First Aid Facilities

The Contractor shall establish, maintain at least one fully equipped first aid box at each Location prior to start the any activities at each site. All provided facilities should be maintained during construction at site.

2003.8 Health and Safety Information and Training

- (a) The Contractor shall ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons regularly or occasionally on the Site. Posters, in Sinhala, Tamil and English languages, that draw attention to site safety, rescue and industrial health regulation, shall be made or obtained from appropriate sources, and shall be displayed prominently in strategic areas within the Site.
- (b) The Contractor shall carry out regular safety training courses, the frequency, coverage and application of which, shall be in accordance with the Health and Safety Plan. The Contractor shall require all Subcontractors' employees to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works.
- (c) The Contractor shall carry out monthly general meetings and give out safety awards to deserving laborers employed in the project, as motivation for all to be more safety conscious.

2003.9 Plant, Equipment, and Qualified Personnel

All construction plants and equipment used on or around the Site shall be fitted with appropriate safety devices. These shall include but not be limited to:

- (a) Effective safety catches for crane hooks and other lifting devices,
- (b) Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists.

All construction plants and equipment used on or around the Site, shall be operated by suitably qualified personnel.

2003.10 Measurement and Payment

a. Measurement

Provisional Sum is allocated in the Bill of Quantities for conducting awareness programme for Sexually Transmitted Diseases (STDs). The amount allocated for this Provisional Sum shall not be exceeded, without prior approval of the Project Manager.

All the costs related to the implementation and execution of Health and Safety shall be measured in months during which they are carried out to the satisfaction of the Project Manager.

b. Payment

Payment to the Contractor for preparation and implementation of STD program shall not exceed the Provisional Sum indicated for this purpose. Payment shall be based on the rates and sums assessed and agreed by the Project Manager for the completed works to the satisfaction of the Project Manager, which shall include full compensation for providing all materials, labour, tools, equipment and incidentals necessary to carry out the work.

Payment for health and safety measures during the construction period shall include all costs necessary and required for the proper implementation of the Project Safety and security in compliance with the safety plan, and also in compliance with the requirements of this Specification, including updating, monitoring and submittals monthly.

The Project Manager may at any time withhold payments if, in his opinion, the Project Safety has not been provided in due compliance with the requirements and procedures of this Specification.

Pay Item	Description	Pay Unit
118(1)	Health & Safety measures during construction conforming to the latest industrial standards	Month
118(2)	Awareness Programme for STDs	Provisional Sum