REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No. 181
Kularathne Central College - Godakawela
Rathnapura District

March 2025

Prepared for:

ASIAN INFRASTRUCTURE INVESTMENT BANK

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Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
DFC	Department of Forest Conservation
DS	Divisional Secretary
DWLC	Department of Wild Life Conservation
EH & S	Environmental Health & Social
E&SU of PMU	Environmental & Social Unit of Project Management Unit
ESMF	Environmental and Social Management Framework
SSE&SMP	Site Specific Environmental and Social Management Plan
ESMP	Environmental and Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological Surveys & Mines Bureau
NBRO	National Building Research Organization
RHS	Right Hand Side
LHS	Left Hand Side

Introduction

1.1 Project overview

The Government of Sri Lanka has received a loan from the Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying unstable slopes in high-risk areas especially in 13 districts of 06 provinces of the country under the Reduction of Landslide Vulnerability by Mitigation Measures Project (RLVMMP). The project requires to be implemented in accordance with environmental and social safeguards and mandates of the AIIB and that of Sri Lanka. Considering the nature of project actions and its implementation, an Environmental and Social Management Framework (ESMF) has been prepared as required by the AIIB environmental and social safeguard policy.

The purpose of the Environmental and Social Management 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 under the ESMF during all phases of project implementation so that the impacts on the environment and community are minimum.

During the scoping exercise it was revealed that the environmental & social setting, and health & safety conditions are more site specific, and require to be addressed specific to site conditions. Therefore, the ESMF has recommended site specific environmental and social assessments followed by Site Specific Environmental and Social Management Plans (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.

This is the site specific environmental and social management plan for **Kularathne Central College - Godakawela** selected for mitigation under RLVMMP. This plan has been prepared by an in-depth environmental and social assessment 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. Propose mitigation measures
iv. Decide appropriate environmental and social monitoring requirements specific to this project
v. Study relevant environmental regulations and procedures to be followed during project implementation specific to the site

1.2 Intended users

The document provides an in-depth insight into site specific environmental and social issues associated with the proposed project and the mitigation measures and intends to be used by landslide mitigation design team, the PMU and the contractor in the implementation of Environmental and Social Management component of the project. The SSE & SMP is published on the project website (https://rlvmmp.lk/) and can be viewed by wide range of interested parties (public, stakeholder organizations) can be utilized by the contractors for the project and will form the basis of site-specific management plans that will be prepared by the contractors as part of their Site Specific Environmental and Social Management Action Plans (SSE-SMAP) prior to commencing works.

Description of the project

2.1 Name of the project

Rectification of Site No. 181, Ratnapura District, for **Kularathne Central College - Godakawela**

2.2 Location details

The proposed mitigation site falls under Malwatta GN division of Godakawela DS division, Ratnapura District, Sabaragamuwa Province.

GPS references of the site – 6.50497°N and 80.64525°E

Nearest town - Godakawela

Accessibility to the site - Godakawela town is about 1.1 km from the site. The school can be accessed via Pelmadulla – Embilipitiya (A18) main road *(Ref. fig. 1*)

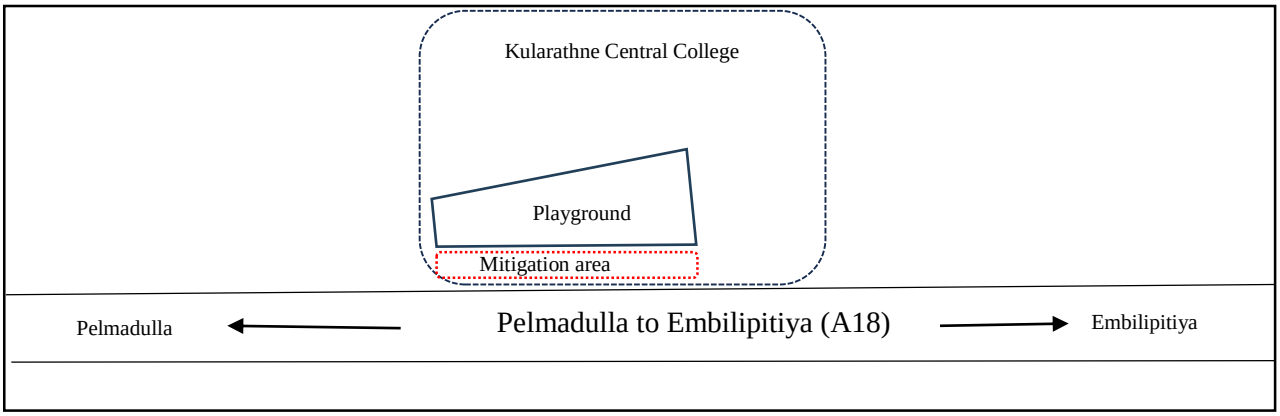

Figure 1: Road map showing accessibility to the site

2.3 Topography and land ownership

The proposed mitigation site is located within Kularathne Central College in Godakawela. The elevation of the area is 207 m (Source: https://mapcarta.com). The extent of site proposed to be mitigated is about 482 m^2. The unstable areas are located in sloppy terrains where the natural slopes have been cut for their construction. The land ownership of the school is Ministry of Education. *Refer figure 2; Google image of the proposed landslide mitigation site, the surrounding environmental features and service infrastructure.*

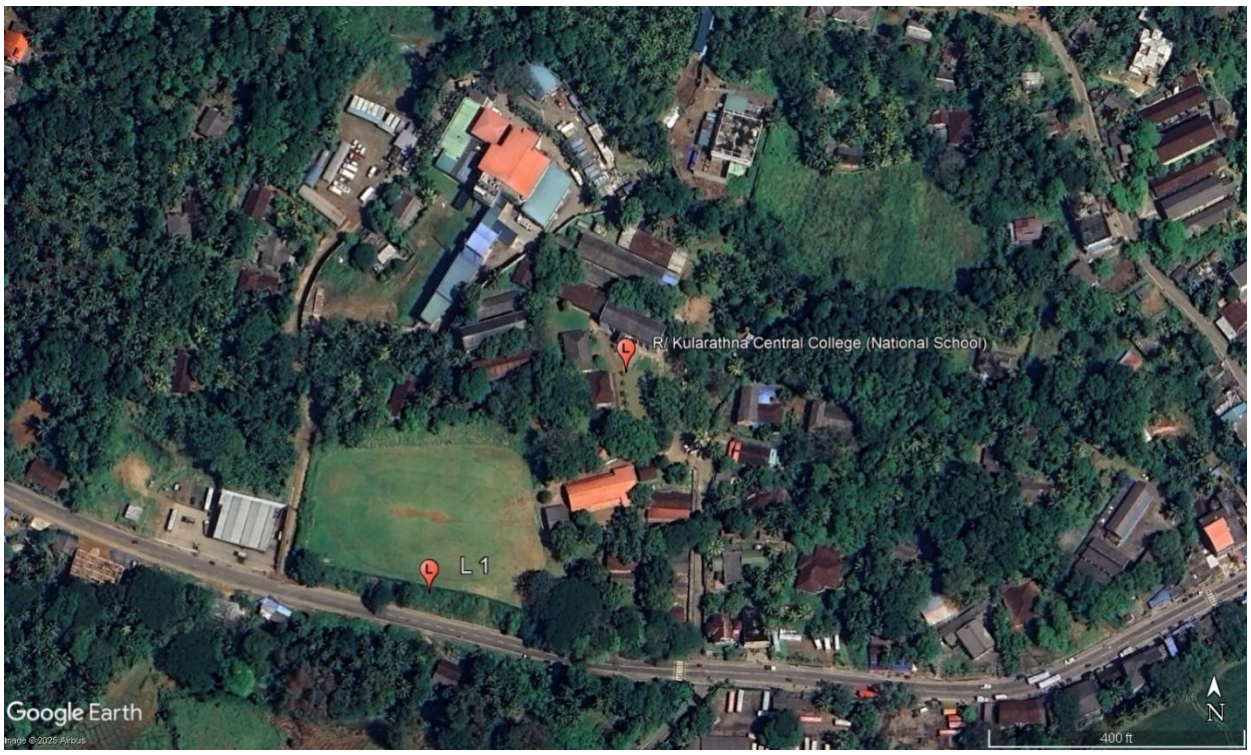

Figure 2: Google image of the proposed landslide mitigation site, the surrounding environmental features and service infrastructure.

2.4 Meteorology of the area

Annual average rainfall - 363.23 mm
Annual high temperature - 29.72ºC (85.5ºF)
Annual low temperature - 19.74ºC (67.53ºF)
(Source: https://weatherandclimate.com)

2.5 Demographic feature of the school

The population of the school is 2110 including 2000 students (Female - 1000, Male - 1000), 100 academic and 10 non-academic staff. Classes 6-13

Landslide hazard incident details

3.1 Account of incident

During the heavy rainy periods, bank slope failure was occurred in November 2022.Main unstable cut slope sections were identified as high-risk locations for slope failures *(Refer Fig 3: cross sections, land use, risk elements and the photographs of special features of the location*).

3.2 Effects and consequences of landslide/ slope failure

Soil mass had fallen blocking the Embilipitiya - Pelmadulla main road (A18). There were no any causalities, injuries to the students and pedestrians.

3.3 Description of any remedial measures already undertaken to reduce the potential risk

As a remedial measure, storm water management system has been improved to reduce the potential risk of the area. The constructed retaining wall prevents the damages from the fallen soil mass.

Short term:

If observed forming any stress cracks, forming fountains with mud water, draining existing fountains, tilting down soil masses, tilting down trees, sinking like landslides and forming geo unstable signs, aware our organization moving away from that place immediately.

Cut off branches of trees may be unstable where above the top of cut slope.
Construct a drain above as minimizing the water flow through the unstable region.
Due to this instability, should be covered the exposed part using polythene.
Should be minimized water clogs in the unstable region.

Long term:

For stabilizing road cut located between Pelmadulla – Ambilipitiya – Nonagama road (A18) R/ Kularathne Central College playground, retaining wall should be constructed in accordance with civil engineering methods to ensure the overall stability of the slope.

To minimize soil water pressure exerted on the retaining wall due to accumulated seepage water behind it, it is essential to install water filters, active weep holes, and horizontal/lateral drains in accordance with accepted standard procedures.

A properly designed and adequately sized surface drainage system should be installed on the playground adjacent to the protective mesh fence and above the slope. These drains should be regularly maintained to prevent blockages.

3.4 Evacuations

No requirement of evacuations for the site.

3.5 Resettlement (progress)

There is no requirement of project-based resettlement program for this site.

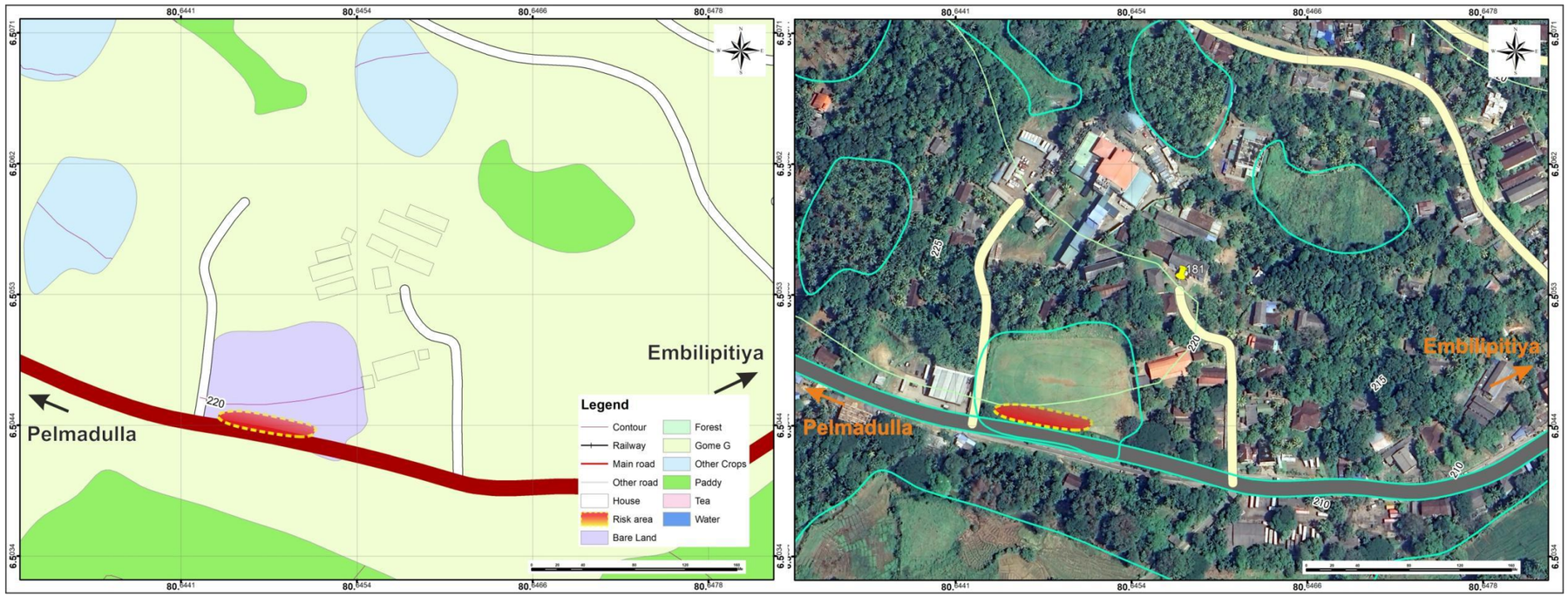

Figure 3: Google image, cross sections, land use, risk elements and the photographs of special features of the location

Description of the area of the landslide/slope failure and areas adjacent to the landslide and current level of risk

4.1 Area of the landslide / slope failure

The crown of the cut slope section is the playground of Kularathne Central College. The Embilipitiya - Pelmadulla main road (A18) is at the toe of the potential sloppy area. The slope is about inclination of 90^0 to build the retaining wall of Kularathne Central College premises in Godakawela.
Refer Fig.3 Google image, cross sections, land use, risk elements and the photographs of special features of the location)

The fallen soil mass during the November 2022 incident can be seen at the sloppy area. The storm water drainage is also observed, and there is no road side drainage to direct storm water, hence it flows through the road. The vegetation at the sloppy area consists grasses like mixed vegetation and shrubs.

The school which the playground belongs is Kularathne Central College. It was founded in 1975. It provides secondary education (Gr.6-13) for girls and boys. Kularathne Central College is comprised with science, mathematics, technology, arts and commerce streams for the Advanced Level.
The playground facilitates to 49 schools for zonal sports competition and Godakawela division competitions. Sport meet among Youth clubs, and SAAS games are held at this play ground. The playground has made the ground for making Sri Lankan record holders such as Mahesh Perera. The school achieved the second place of the Youth Asian Champion. Nearly 2000 people gather around the ground to watch divisional and zonal matches. The playground is specific for the comprises with a 2000 m track is a specific for held zonal competitions.

4.2 Areas adjacent to the landslides

The surrounding area of the unstable slope sections are located in between the premises of school playground and Embilipitiya – Pelmadulla main road (A18). *(Refer Fig 3: Google image, cross sections, land use, risk elements and the photographs of special features of the location*).

4.3 Current level of risk

The unstable slope sections beyond the school premises imposes a high risk on the playground and the road users (vehicles, commuters and pedestrians) during rainy seasons. If the site is not rectified to prevent future failures, the slope failure with soil masses would disturb all functions of the road. The activities of the playground and transportation would be at risk due to this unstable slope sections. As this is one of the famous and important play ground in Ratnapura district, the risk of slope failures may pose a significant impact.

Description of the works envisaged under the project

Location is highly potential for slope failures and cutting failures within the school playground. The proposed project aims to ensure further progressive slope failures are prevented. Therefore, preventive measures such as reshaping, construction of retaining walls, soil nailing, soil masses moving down, surface and subsurface drainage improvements will be used.

Brief description on the surrounding environment with special reference to sensitive elements that may be affected by the project actions

The elements and services at risk during the project implementation are;

i. School children, staff and their activities at the play ground
ii. School playground and structures
iii. Embilipitiya to Pelmadulla main road (A18)

(Ref. Fig.4 Sensitive elements that may be affected by the project actions)

Figure 4a: Play ground at the crown of the unstable road

Figure 4b: Landslide area of the front boundary around the school playground

Figure 4c: Landslide in between playground and the Embilipitiya – Pelmadulla main road (A18) in 2021.12.07

Figure 4: Sensitive elements that may be affected by the project actions

Identification of social and environmental impacts and risks related to the works

7.1 Positive impacts

- The objective of this project is to ensure that further occurrence of slope failure will be prevented to an acceptable level for the unstable land sections of Kularathne central College premises - Godakawela
- The school playground of the school premises would be able to safely use in the future.
- The road will be safely use for vehicles, commuters and pedestrians

7.2 Negative impacts

The mitigation works are generally confined to already failed land areas and unstable areas. Therefore, negative impacts are much localized and also limited to construction period.

Table 1: Negative impacts and their level of significance

Impacts during the construction period	Level of Significance
7.2.1 Hydrological and water Quality impacts	
7.2.1.1 Impacts of the drainage pattern of the area Disruption to existing surface and sub-surface drainage pattern in the area is envisaged with the project implementation. The mitigation works in this site will focus on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to be generated and would be accumulated between the building and the slope. The water inundation of the existing drainages may be expected. Increase of water through the unstable slope may intensify the risk of slope failures of the unstable section.	**Significant**
7.2.1.2 Water pollution and impacts on surface water quality During the slope excavation, removal of debris can generate high sediment laden runoff there could be a possibility that contaminated runoff may pollute the water within the drains and the streams. Improper disposal of oils and other harmful substances/contaminants from machinery, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping could occur causing adverse impacts on quality of the water. However, during rainy season, the rainwater running through the disturbed slope tends to pick up sediment, oil and other pollutants generated during construction can contaminate the water in the streams. Since there are no water streams close to the site, water pollution impact will be insignificant.	Insignificant
7.2.1.3 Erosional impacts and stream bed alterations The project activities will open the slope for surface erosion during the construction phase. The existing surface and sub-surface drainage pattern in the area will be disrupted during construction phase. Therefore, the erosional impacts are significant. The mitigation works in this site will focus largely on the drainage improvement. Therefore, during rainy season heavy flow of water is expected to be generated to enter the natural stream either through a culvert or directly the streams through step drains etc. There are no streams nearby hence the effect on bank erosion, stream bed scouring will not be significant.	Insignificant
7.2.1.4 Open defecation and waterborne infections As site is located within a school premises, possibility of open defecation is less. Faecal contamination of water of the stream or runoff water flow will not be expected during construction due to open defecation of the contractor's workforce as the area does not consists thick vegetation cover.	Insignificant
7.2.1.5 Impacts on the downstream water uses Since there are no water streams close to the site, impact will be insignificant.	Insignificant
7.2.1.6 Impacts on ground water table and ground water quality Addition or mixing of construction materials including cements, grout materials with sub-surface water flows will cause temporary water quality degradation and accumulation of unwanted substances. During the construction period, the hazardous waste from chemical substances, waste water from the construction activities and discharge of waste matter from onsite septic systems would cause adverse impacts on the ground water quality.	**Significant**

7.2.1.7 Impacts on water or wetlands Since there are no water streams or wetlands close to the site, impact will be insignificant.	Insignificant
7.2.2 Environmental Impacts	
7.2.2.1 Noise and vibration impacts Noise and vibration are expected from construction equipment. Noise and vibration impacts are significant as the site is located within the school premises. The students of the schools and pedestrians would be exposed to high noise during heavy noise generating activities, such as operating loading and unloading of materials, movement of machinery in addition to above mentioned construction works. The pedestrians and commuters on roads will also have an effect from noise and vibration. Hence the project will have a significant noise impact on the activities of the schools.	**Highly Significant**
7.2.2.2 Air pollution impacts Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, demolition and burning. Operating vehicles at high speed under dry weather conditions can increase such pollution. Improper handling and transferring of materials can also generate dust. Improper storage of materials can potentially generate dust if not properly covered. During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. As the premises of school playground is located within the site the effects are highly significant. The Embilipitiya to Pelmadulla main road (A18) is used heavily for vehicles moving (buses, bicycles, lorries, trucks, tippers, three wheels). The air pollution may have significant impact on the commuters and pedestrians. Further, the students of school, staff and the public visiting the parents at the school will be affected by air pollution. The air pollution impacts from the construction are locally significant during dry periods for the students of school, commuters and staff.	**Highly Significant**
7.2.2.3 Solid waste disposal issues Hazard disposal of solid waste; various types of waste such as litter, food waste, construction waste will be generated and may store or dispose on site. The littering and hazard storage and disposal of solid waste in and around the site will create inconveniences to the students, commuters, pedestrians, parents and the staff. It can block the drainages to make breeding grounds for water borne diseases. Waste can pollute the soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period.	**Highly Significant**
7.2.2.4 Explosive hazards and hazardous materials Since the affected area has rock boulders, explosives may be used if the rock blasting is envisaged. This may pose risk due to unsafe use. As these operations are to be done on affected slopes and close to the school buildings the risk of improper use of explosive and accidents from rock fragments are highly significant.	**Highly Significant**
7.2.3 Biological /Ecological Impacts	
7.2.3.1 Effects of important wildlife habitats There are no forested/ wild-life reservation areas within the project influence area with high biodiversity.	Insignificant

7.2.3.2 Effects on Fauna & Flora Trees found in the area are not endemic, threatened and identified in the red list of IUCN.	Insignificant
7.2.4 Social and Economic Impacts	
7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site There is a no agricultural activity within the area to be remediated / immediately to the site.	Insignificant
7.2.4.2 Cracks in the building due to vibration impacts The unstable slopes are located beyond a school premises. The school playground is located within the close proximity of the proposed mitigation site. Therefore, vibration impact on the playground is highly significant. During the construction heavy machinery will be used and the vibration can widen the cracks and may create new ones in the buildings. Also, vibration can affect the stability of the nearby buildings.	**Significant**
7.2.4.3 Loosing access to land and future development activities The land where the project activities are envisaged belongs to Ministry of Education. The mitigation works will be concentrated on the unstable slope areas adjacent to the school play grounds. This area is a mainly a public premise, there will be some impacts to the school with regard to loosing access to the playground (during construction) and loss to valuable use of the buildings close to the construction site. In contrary, remediation works in the unstable slope will increase the stability of the buildings and protect the land from future failures.	**Significant**
7.2.4.4 Impacts on livelihood/ business and income activities There is no income generating or business activity in the proposed mitigation area.	Insignificant
7.2.4.5 Impacts on service provision (water supply, sewage, electricity) There are some water lines running close to the unstable slopes providing water facility to the school which to be impacted by the construction period.	**Significant**
7.2.4.6 Effect due to loss of infrastructure and safety During construction phase, the Embilipitiya to Pelmadulla main road (A18) will be obstructed by frequently moving machinery, loaders, trucks etc. Most of the heavy machinery, trucks and loaders can obstruct the pedestrian passage and cause traffic during the school starting and over times.	**Significant**
7.2.4.7 Work camps and lay-down site requirements The work camps will be established closer to the site. Often the contractor rent out houses in the proximity. The camp site will be selected in the neighbourhood of community. If proper camp management is not in place, it may result several labour issues, social issues with community, conflicts for shared resources with the community, nuisances, and management of waste etc. If temporary camps are built in the close proximity of the site, management of solid waste and sewage will be an issue. Therefore, the effects are significant.	**Significant**

7.2.4.8 Relations between workers and the school children / staff / people living in the vicinity of the site and possibility of disputes The mitigation site is a school playground. The construction workers at this site will be from different social backgrounds and from different geographical areas often under poverty. Usually, they are with poor educational and social background. Such communities may have a wide range of social issues to cause dis-stress on the school staff and the children as indicated below. • Cause nuisance to smooth operation of school works • Unauthorised entry into school premises • Bulling and harassment to children • Quarrels with children and parents • Distracting children from education • Tempting children and parents towards offensive deals • Informal form of child labour • Use of sanitary facilities of school by the workforce • Sexual abuses for the children Although the workers who would engage in such issues will be rare, even few possibilities cannot be ignored. Therefore, issues indicated above at this site will be considered **highly significant**.	**Highly Significant**
7.2.4.9 Workers safety during construction The workers may be 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. Risk of hazard from vehicle and construction machinery accidents is highly significant at this site. Contractor may engage under age workers (children) for construction work, which is risky and can results serious accidents and injuries.	**Highly Significant**
7.2.4.10 Safety to the public from construction activities: High risk for students of the school During construction phase the school premises will be obstructed by the frequently moving machinery, loaders, trucks etc. As most of the mitigation works are to be carried out in limited space on slopes and the school premises the heavy machinery, the trucks and loaders etc. can obstruct the access to the school and it may pose high risk on students and staff life. As they will be exposed to a longer duration to this risk during the construction phase. Therefore, the risk on them is highly significant. There is a risk of falling loose rocks on the proposed site during excavations and removal of rocks posing risk on the students.	**Highly Significant**
7.2.4.11 Impacts on transport infrastructure (especially temporary loss of road access, risks of traffic congestion) The traffic of the Ambilipitiya to Pelmadulla main road (A18) due to full/partial road closure may obstruct the smooth flow of vehicles during the week days, in office hours, school times or holy days. This will cause nuisance to pedestrians and commuters.	**Significant**
7.2.4.12 Areas used for businesses, agriculture or other within the area to be remediated There are no areas used for business, specific agriculture practices or other within the area to be remediated.	Insignificant

7.2.4.13 Areas used for businesses, agriculture or other immediately adjacent to the site There are no areas used for business, specific agriculture practices or other immediately adjacent to the site.	Insignificant
7.2.4.14 Need for students, staff of the school or to enter or cross the site Excavation machinery, loaders, trucks etc. will be used in the school premises where school children and staff are moving. There is no special need for students and the staff to enter the site for other purposes. Construction may use materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling. However, unauthorized entry of ordinary people may occur due to intentional or unintentional purposes and they may be at risk due to operating machinery, vehicles, electricity, and may be blasting materials.	**Highly Significant**

8.Site Specific Risk Analysis

Table 2: Site specific risk analysis

Risk	Affected group	Risk level
1. Facing accidents when working in a limited space	Workers/school children	Very high
2. Transporting materials and machineries	Workers/school children / commuters/ pedestrians	Very high
3. Throw out disposals (litter, bottles, and food) to the school premises from the construction site	school children/ teachers	Very high
4. Facing accidents during constructions at night time	Workers	Very high
5. Accidents from the construction activities and materials placed in the limited space	Workers/school children	Very high
6. Injuries due to rock particles due to explosions/ blasting	Workers/school children	Very High
7. Rock fall from the unstable area	Workers/ Students and staff	High
8. Site Working – Working in poor visibility	Workers	High
9. Lone Working	Workers	High
10. Emergency evacuation	Workers/ Students and staff	High
11. Extreme weather conditions (wind, rain etc.)	Workers	High

9.Significant Environmental and Social Impacts

Environmental, social impacts or risks that will require special attention on the part of NBRO.

9.1 Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors

The health and safety issues pertinent to this site is significant as the workers have to work on an unstable slope with a risk of falling. Such common E & HS issues have been discussed in the **ESMF**. Worker safety requirement in the construction site is more detailed under 2003 5: Safety equipment and clothing in the section 2003: Working conditions and community health and safety in the Bidding document.

9.2 Child labour & forced labour

Child labor & Forced labor is detailed under 2003.3 under section 2003: Working conditions and community health and safety in the Bidding document.

10.Environmental Social Management Plan (ESMP)

Measures to manage and or mitigate the impacts and risk. Especially the significant impacts and risks identified in sections 7 & 8. This section will include the specific recommendations and requirements of the ESMP for design stage, construction phase and maintenance operation phase.

10.1 Resettlement action plan

There is no project-based resettlement in this site. The buildings may have some impacts in the form of structural damage during the project actions due to ground vibration induced by heavy machinery operation. (The scheme of compensation, in case of damage to structures due to project should be arranged, (Refer 2002.2.17) utilities and roadside amenities in contracts requirement to ESMP.

10.2 Evacuation of people

Project based evacuations are not required for this site.

10.3 Procedure for removal of damaged structures, facilities infrastructure (consent from owners to remove the articles)

This risk may not be triggered in this site.

10.4 Requirement for compensation for loss of property /uses due to project actions

It may require to compensate for the loss occurred due to closing the water supply lines due to project actions. If the water line is disturbed, it may require to provide alternative water sources to maintain discontinuous water supply to the school. The engineer should consult the school management on this matter before construction of the location.

10.5 Public awareness and education- needed for following areas

i. Programs to inform and educate about the risks posed by landslide to specially the nearby residents, school children, teachers and the parents of the school.
ii. Requirement for special awareness for commuters and the people passing through the area using the Embilipitiya to Pelmadulla main road (A18) with potentially high-risk during construction phase and early warning.

10.6 Design based Environmental/ Social Management considerations

The site is located in an aesthetically beautiful, environmentally sensitive natural environment in the rural setup. Hence, following environmentally and socially significant design considerations are recommended.

Table 3: Design stage Environmental & Social considerations

Design feature	Recommended level of consideration for this site
i. Natural resource management and resource optimized designs Project specific designs should be considered to eliminate mass clearing of vegetation and minimum number of removals of grown tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found.	Moderate
ii. Site Planning During site planning it is necessary to be cautious on possible re-activation of slope failures and movements of soil masses. Also, the site is located in a very limited space of a slope with other buildings. The vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones of the slides. It is very necessary to keep trained flagman or safety officer during the construction period and proper communication between contractor's workforce and the other responsible officials should be maintained.	Very High
iii. Habitat connectivity and animal trails If large fractions of vegetation are required to be cleared in ecologically fragile habitats as for permanent structures or for access, or if deep drains etc. are to be made the designs should include habitat connectivity features, animal trails and vegetation strips and etc. even if the impacts are localized.	Low
iv. Conservation of water resources If extraction of water is involving as a mitigation measure, as the extracted water is in a good quality and yield it can be considered as a source of water for school usage such as gardening and sanitary activities.	Low
v. Interruption to water supplies If the water in the mitigated slope is used as a source for water supply, the chance the water source can be affected by the mitigation work is high due to water table draw down. In such instances the design should include alternative source of water for the school community (temporary/or permanent).	High
vi. 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. As the proposed mitigation site is located in a school premise, greening could be used in construction activities to develop the area as an aesthetically pleasant environment. Service of landscape architect may be important for the design of suitable mitigation structures.	Very High
vii. Consideration of green environmental features As many of the migratory works are carried out in well maintained school premises with green landscape, it is recommended to consider green environmental designs as much as possible in the designs e.g.: use of local vegetation species for erosion control, combination of plants to sustain species diversity in the environment, avoiding inclusion of potentially invasive species & etc.	Very High
viii. Conservation of social and cultural features The local cultures and heritages are strengthened by their close connections to the natural environment that sustains them. Therefore, the project actions should be carried out considering local culture and social aspects, providing opportunities to reinforce them during the project actions.	Low

ix. Workers/ staff and community safety Due to the limited space in the proposed mitigatory site people may face accidents specially the workforce during the construction phase. Unauthorized entry and ignorance may cause severe accidents around the site. Activation of slides or ground subsidence may occur during construction phase and may pose threat to students and staff. Therefore, design-based safety consideration such as beams, safety nets etc. should be considered specific to safety of school children should be considered.	Very high
x. Erosion control structures During rainy season the flow in these drainage structures can be significantly high. During rainy season the heavy flow of surface runoff can be expected through the unstable slopes. This water should be conveyed to nearby storm water drains. Hence the design should adequately consider flow speed breakers to reduce erosive flows of slopes within the school.	High
xi. 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 etch should be considered if drain water is expected be directed to natural streams. The materials used for structures and should be chosen carefully so as to withstand weather conditions with high durability. Designs should specially consider corrosion prevention techniques if steel structures are used	Very High

10.7 Mitigation of impacts during the construction phase

10.7.1Construction contractors' requirement to comply with environmental and social management during the construction phase

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 has prepared a comprehensive document on "***contractors' requirement to comply with Environmental and Social Health and Safety (ES & HS) management during the construction phase"*** to be included in construction contractors' bid document. The main sections are summarized below (Table 4) indicating the degree of relevancy for this site. For details ESMP for construction contractors should be referred.

Table 4: Contractor requirement to comply with ES & HS

Reference No. as per construction contractor's obligation to ESMP	**Item**	**Relevant to the project**
2002. Environmental and Social Monitoring		
2002.2 1)	Storage on site	Highly Relevant (school premises)
2002.2 2)	Noise and Vibration	Highly Relevant (school premises)
2002.2 3)	Cracks and damages to the buildings	Highly Relevant (buildings)
2002.2 4)	Disposal of waste	Highly Relevant (school premises,)
2002.2 5)	Disposal of refuse	Highly Relevant (school premises)
2002.2 6)	Dust control	Highly Relevant (school premises)
2002.2 7)	Transport of Construction materials and waste	Highly Relevant (road reservation, commuters, pedestrians)
2002.2 8)	Water	Relevance
2002.2 9)	Flora and Fauna	Low Relevance
2002.2 10)	Physical and cultural resources	Relevant
2002.2 11)	Soil Erosion	Highly Relevant

2002.2 12)	Soil Contamination	Relevant
2002.2 13)	Borrowing Earth	Relevant
2002.2 14)	Quarry Operations	Not Relevant
2002.2 15)	Maintenance vehicles and Machinery	Highly Relevant
2002.2 16)	Disruption to public	Highly Relevant
2002.2 17)	Utilities and roadside amenities	Highly Relevant
2002.2 18)	Visual environment enhancement	Highly Relevant
2002-5. Environmental Monitoring	Baseline surveys (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during construction (air, water, noise, vibration, crack surveys)	Refer site specific monitoring plan
	Surveys during operation phase	Refer site specific monitoring plan
	Reporting and maintenance of records	Relevant
2003. Working Conditions and Community Health and Safety		
2003.2	Safety organization and communication	Highly Relevant (school children, workers)
2003.3	Child labor and forced labor	Highly Relevant (school premises)
2003.4	Safety reports and notification of accidents	Highly Relevant (school children, workers)
2003.5	Safety Equipment and Clothing	Highly Relevant (school children, workers)
2003.6	Safety inspections	Highly Relevant (school children, workers)
2003.7	First Aid Facilities	Highly Relevant (school children, workers)
2003.8	Health and safety information and training	Highly Relevant (school children, workers)
2003.9	Plant equipment and qualified personnel	Highly Relevant (school children, workers)

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*
Reference: Contractors Obligation for implementation of ESMP

10.7.2 Site Specific mitigation

Given below are the site-specific mitigation measures that the project is expected to implement during the construction period.

Table 5: Site specific ES & HS mitigation measures

Mitigation item	Project implementation phase	Responsibility
i. Minimize erosional impacts during construction It is recommended that mitigation works involved with site clearance, slope reshaping, removal of debris etc. are avoided during rainy season. Therefore, it is imperative that site works in upslope mitigation are carried out in the dry season and avoid such activities on upslope area in the wet season as much as possible. This should be considered in project planning stage. Silt traps should be introduced to cut down sediment laden runoff.	Site preparation & construction	Construction Contractor
ii. Planning project activities inside the school premises As contractor has to operate mitigation actions within the school premises, he should carefully prepare a plan for management of construction activities inside the school premises. This should include careful selection of material storage as vehicle parking, mixing of concrete, cleaning activities etc. which considering the safety and optimization of space. The contractor should discuss scales of project operations with a time plan and should make the school management adequately aware on the construction plan. Necessary adjustments to the plan should be made after discussing with the school management in order to minimize the disruption to school activities with special attention to working hours minimizing nuisance to during conducting classes special school events etc.	Site preparation & construction	Construction Contractor
iii. No Entry Zone The PMU should make a detailed assessment on possible risk of slope destabilization in the site during construction phase. No entry zones may require to be declared. This should be made adequately documented and communicated to the contractor and the school management. Also mitigate the risk of accidents from moving vehicles operational machinery construction activities, electrical leakages etc. should be given high priority in the health and safety management plan especially considering potential high risk on school children. As there is a school premises within the site proper safety measures should be included with warning signs and permanent trained watchmen. Sign boards indicating slope instability risk are strongly recommended at this site.	Construction	E & S Unit of PMU contractor
iv. Machinery and material transportation Access roads need to be used for machinery, materials and vehicle transportation during construction phase. School premises should not be used as a location for material storage. The contractor should pay special attention for this matter and extreme care should be taken to prevent possible accidents in the road and damages to the school assets. The management of the school should aware if the location requires shifting machinery.	Construction	Construction Contractor
v. 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 approval from the Department of Wildlife Conservation & Department of Forest.	Construction	Construction Contractor

vi.Noise and vibration control The noise and vibration generating activities may disturb the smooth flow of activities of the school. Vibration generating activities should be done within the prescribed limits to avoid damage to structures. Cracks in the buildings should be monitored before, during and after completion of the project. Suitable compensation should be made if cracks from the damages or cracks enlarge due to construction work.	Construction	Construction Contractor
Vii.Traffic management and safety Traffic management system should be in place day and night. A good traffic management plan should be prepared as this is a road with bends vulnerable to accidents. It should be approved by the PMU. Proper road safety measures should be included with warning signs and permanent trained watchmen, luminous sign boards indicating slope instability risk and road obstruction signs, night lamps etc. are strongly recommended at this site. If a section of the road to be closed for the construction activities for a shorter period, RDA should be consulted and necessary safety measures for the road users to be in place.	Construction	Construction Contractor and
viii. Priority Health and Safety Issues As the workers in the site have to work in high-risk conditions, it is imperative to implement recommendations given in section 2003 of contractors' obligation on ESMP under "working conditions and community health and safety". These recommendations should be followed carefully in a proper organization and safety monitoring system. i. Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities ii. Prepare a special COVID 19 Preparedness Plan prior to commencement of construction activities iii. A good warning system and fulltime watchmen is highly recommended for this site for both worker and commuter safety. iv. Safety barriers and safety nets should be installed at places of risk to protect workers and commuters from boulder falling risk Adoption of standard worker safety methods v. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc. vi. Provision of trainings and awareness programs to employees vii. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities viii. If the wasp nest is in the vicinity, it is mandatory to use Evacuation Centres for ensure of workers' safety ix. Additionally, work should be discontinued for sufficient time period during rainy period as working on unstable land will be highly risky in the rainy season	Construction	PMU Construction Contractor

ix. Safety of school children The school management should be made adequately aware of possible issues detrimental to school children as indicated bellow i. Expose school children towards narcotics, alcohol, sex abuse, smuggling, and various criminal offenses and a wide range of un-suitable habitual behaviours ii. Unauthorised entry into school premises iii. Bulling and harassment to children iv. Quarrels with children and parents v. Distracting children from education vi. Tempting children and parents towards offensive deals vii. Informal form of child labour The PMU ES unit should engage in meaning full consultation with school management regarding above mentioned issues. Each issue should be properly communicated and adequately discussed with the school management. Also, it is advised that PMU request from the school management on the following i. Make students and parents aware of the project ii. Possible social issues that will have impact on children iii. Establish a system of vigilance to monitor the behaviour of children with the workforce and the movement of workforce during construction phase iv. Establish a confidential information receive system in the school premises to receive any complains pertinent to the project v. Enforce a system to punish or remove troublesome workers The PMU should made contractor aware on all potential issues with contractor workforce and school children that should be properly managed. Following is recommended for contractors' workforce i. Proper awareness, education, monitoring and punishing. ii. Define project activity zone beyond which workers cannot enter iii. Workers cannot use water sources of the school iv. Workers cannot use sanitary facilities of the school v. The contractor should not use children for any form of project related works (direct/indirect) vi. The heavy machinery operators should be extremely cautious in operation of machinery as possible accidents will be high. vii. Full time watchmen should be kept in the risk area to ensure safe movement of heavy machinery and vehicles Other i. Adequate no entry / danger signs and monitoring should be established so that school children are not permitted in the project area ii. The electrical wiring systems and layout should be done with proper safety measures approved by the PMU ensure that accidents mainly to children from electric shocks are prevented iii. Parking and storage areas should be done in approved locations by the PMU	Construction	E & S Unit of PMU contractor

x. Throw out disposals (litter, bottles, and food) to the construction site. Put up the safety sign boards prior to the construction site indicating people at work. The students and visitors should be aware about the construction activities through notices erected before reaching the proposed mitigation site.	Site preparation & construction	Construction Contractor
xi. Injuries due to rock particles due to explosions/ blasting Minimize all blasting activities during visiting hours and making awareness announcements through the blasting period. Establish an emergency accidents preparedness plan for their injuries due to rock particles due to explosions/ blasting.	Construction	Construction Contractor
xii. Disposal of construction waste The contractor should pay special attention with respect to disposal of construction waste. This site is located within a school premises with a pleasing and clean environment. Therefore, such waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Construction waste should not dispose within the school premises or along the road.	Site preparation & construction	Construction Contractor
xiii. Onsite sanitary facilities for the workers The contractor should prepare temporary sanitary facilities for the workforce within the site. Workers should not use the wash rooms or toilets of the students and school staff.	Site preparation & construction	Construction Contractor
xiv. Dust and aerosol control screens Dust particles generated during the construction period can influence the patients, staff and students of school. The public visiting the patients may affect from the dust particle generated through the construction activities. Special screens etc. should be used if heavy dust or aerosol generating activities are envisaged.	Site preparation & construction	Construction Contractor
xv. Water for construction Water for construction works should be obtained only from the approved sites.	Construction	Construction Contractor
xvi. Working hours The construction activities should be restricted to day time only. Working after 6.p.m. is not recommended for any reason due to safety issues.	Construction	Construction Contractor
xvii. Impact on service infrastructure Telecommunication, electricity, water lines should be relocated before construction starts as per the approval of PMU.	Construction	Construction Contractor
xviii. Need for people to enter or cross the site Possible unauthorized access to the site should be avoided by awareness, warning signs and vigilance by the contractor's full-time watchmen.	Construction	Construction Contractor
xix. During construction good housekeeping should be maintained to minimize visual pollution	Site preparation & construction	Construction Contractor

xx. Worker's code of conduct Possible disputes between the labor force and the commuters and tourists should be prevented by maintaining the agreed code of conduct by the contractor. Possible disputes between workforce and commuters should be avoided especially when using shared resources such as common bathing and washing places etc.	Construction	Construction Contractor
xxi. Emergency management by accidents Accidents are common in these kinds of sites. Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site.	Construction	Construction Contractor

10.7.3 Monitoring requirements specific to the site

Following monitoring plan is strongly emphasized during the construction phase specific to this site. In addition to this, monitoring procedure indicated in the contractors' obligation to ESMP should also be implemented by construction contractor. The contractor is expected to indicate in the bid the ESMP procedure to be implemented 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 to be approved by the PMU unit.

Table 6: Environmental and Social monitoring plan; construction phase

Monitoring requirement	**Parameter**	**Frequency**
i. Baseline monitoring	Water quality	-
	Pre-construction crack survey of the school buildings	Once*
	Ground vibration	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality	-
	Crack survey for the risk buildings	If noticeable displacement is observed during construction **
	Ground vibration	During operation of drilling machinery, boring works, or any works that generate ground vibrations*
	Construction noise	Once a month during heavy noise generation times *
	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	
v. Reporting requirements	**Stream water quality** – Comparison with National Environmental (ambient water quality) regulations, no.01 of 2019 **Pre-construction crack survey of the high-risk buildings**-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 **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.

11.Labour management

Sound worker-management relationships, treating workers in the project fairly and providing safe and healthy working conditions is required. Responsibility is lies with the PMU and the construction contractor.

The Objectives are;

- To promote safety and health at work.
- To promote the fair treatment, nondiscrimination and equal opportunity of project workers.
- To protect project workers, including vulnerable workers such as women, persons with disabilities, children and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- To prevent the use of all forms of forced labor and child labor.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national laws.
- To provide project workers with accessible means to raise workplace concerns.

12. Preventive measures for COVID-19 that was issued by Sri Lankan national health authority (this is applicable if Notification on Covid -19 epidemic/ endemic is issued by Health Authorities Sri Lanka)

COVID-19, the novel coronavirus infection has not been totally eradicated in the world. Therefore, to prevent/ control of the spread of infection also to prevent panic situations in the event of detecting a suspected case, all contractors are required to develop a COVID-19 Preparedness plan and need implementing in the site as per the "Health and Safety Guidelines for Sri Lankan Construction Sites to be adopted during COVID 19 outbreak" Guidelines given by Construction Industry Development Authority CIDA 29th April 2020.

13. Public and Stakeholder Consultations -the public consultations that have been and/or will be held

13.1 Public Consultations

Mr.E.G. Tiron Gamage, Teacher was consulted and made aware of landslide early warning alerts, the mitigation project and the funding mechanism. They stated that the mitigation works are appreciable and expressed his willingness to the project with the full support of the staff.

13.2 Stakeholders involved in the consultations any recommendations or agreements reached in the consultations (Refer annexure II)

Mrs. G.L.W.A. Prahtibha, Divisional Secretary of Godakawela DS Division and D.S.K.S.Balasooriya, GN Officer of Malwatta GN division were informed about the project works. They stated that the mitigation is highly needed and they agree to give their support.

The Provincial Director of Central Environmental Authority in Sabaragamuwa Province was informed about the project works. He emphasized; landslide mitigation projects are not considered as prescribed projects in the Gazette. As the proposed project intends to reduce the risk from landslide for an emergency action, CEA approval is not needed considering the priority of the project.

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

Table 7: Clearances, no objection, consent and approvals

Requirement / Approval / Institution	Relevance to the project
14.1 Project implementation	
Approval from the District Secretariat	The approvals will be required and the proposals need to 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 at this meeting. The issues arrived will be addressed in the ESMP, the decisions and recommendations taken up at this meeting will be considered in the ESMP.
Approval from the planning committee	The approval from the planning committee of the Godakawela Local Authority
14.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Consent from District Central Environmental Authority is required as Godakawela Divisional Secretariat is under the sensitive area under Soil Conservation Act 25 of 1951.
Department of Forest Department of Wildlife Conservation	As there is no forest reservations and wildlife habitats; Department of Forest and Department of Wildlife Conservation approvals are not needed
Geological Surveys and Mines Bureau	Approval will be obtained for extraction of materials, transportation and disposal of earth, rocks and mineral debris. (If necessary, only).
Godakawela Divisional Secretariat Pradeshiya Sabha	Approvals from Godakawela Divisional Secretariat will be obtained for the disposal of waste and plant litter.
Ceylon Electricity Board	Approvals from regional office of Ceylon Electricity Board will be required for power supply for site operation.
National Plant Quarantine Service	Approval from Additional Director National Plant Quarantine Service Katunayake for Director General of Agriculture under the Plant Protect Act No. 35 of 1999 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.
14.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owner (Ministry of Education)	Signing a legally bound agreement between the land owner and the project implementing authority allowing no-objection to remove the structures, access the land, implement construction works, and engage in long-term maintenance works

The tentative timeline for getting approval is given in the table 8.

Table 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 state land owners								
Submission of application								
Respond to comments								
Approvals								
Other approvals								
GSMB								
Ministry of Defense (Depends on the requirement)								
Consent/ no objection from the land ownership (Ministry of Education)								

Grievance redress mechanism for this site

The PMU ES officer is responsible for establishing the grievance redress mechanism for this site for impact communities. *(Reference: Environmental and Social Management Framework for recommended procedure for establishment of grievance redress mechanism).*

Information disclosure

It is the responsibility of the PMU to disclose the ES information to following agencies and organizations by indicated modes as a minimum as given in the following table.

Table 9: Proposed scheme of information disclosure

Information	Proposed agencies	Mode of information disclosure
i. Project plan (site details, design, implementation arrangements)	District CEA, District Secretariat, Divisional secretary, Other district levels Agencies, NBRO district office, AIIB	Meetings, District coordination committee, submission of relevant report to sign agreements, approvals and consents.
ii. Environmental and Social Management plan	District CEA, AIIB,	Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents
iii. Monitoring reports (baseline and during construction)	District CEA, AIIB and relevant parties as appropriate	Progress meetings, special meetings, submission of relevant reports
iv. Site inspections for environmental conformance workers health and safety	District CEA, 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

v. Decisions taken and progress review meetings pertinent to ES matters	District CEA, Police, State Land Owners,Grama Niladhari, District Office NBRO, AIIB and relevant parties as appropriate	Meetings, submission of relevant reports
vi. Grievance redress mechanism	Relevant parties, AIIB	Meetings, written and verbal communications

Table 10: Level of information gathered through consulting institutions

Date	**Institution**	**Person contacted for information**
03/2025	Central Environmental Authority	Mr. S.M.A Senanayake Provincial Director, Central Environmental Authority Sabaragamuwa Province.
24/03/2025	Divisional Secretariat of Godakawela	Mrs. G.L.W.A. Prahtibha - Divisional Secretary Mr. D.S.K.S Balasooriya - GN Officer (0718685741) Godakawela DS Office
24/03/2025	Kularathne Central College - Godakawela	Mr. Jinal Gunarathne - Principle

Annexure I: Images of the stakeholder consultation

Consultation with Mr. E.G. Tiron Gamage, Teacher – Kularathne Central College - Godakawela

Annexure II: Report on the Stakeholder Consultation: Ratnapura District

Institution	Name and designation of the contact officer	Concerns raised
Central Environmental Authority	Mr. S.M.A Senanayake Provincial Director, Central Environmental Authority Sabaragamuwa Province.	✓ Under the Soil Conservation Act no 25 of 1951 and No 29 of 1953. of National Resource Management Centre, Kegalle District has been gazetted as a sensitive area. ✓ Under this gazette any development is not allowed irrespective of the magnitude of the project. ✓ In a disaster this is not needed. ✓ Landslide mitigation projects are not considered projects prescribed in the Gazette ✓ As the proposed project (mitigation) intends to reduce the risk from landslide for an emergency action CEA approval is not needed considering the priority of the project. ✓ Before project commence a request indicating the mitigation sites need. ✓ If the project is carried out in a sensitive area, even not within a prescribed project, consideration of sensitive area will govern the process.

Annexure III: Proposed procedure for obtaining approvals from state land owners and environmental agencies.

1. Proposed approval procedure for Environmental Clearance form District Central Environmental Authority

i. In the project preparation phase, the ES & H&S unit of PMU study the Site specific ESMPs and should submit the project proposal to district office of CEA with details of the Arial extent that would be influenced by the project actions with spatial references, sections of site specific ESMP relevant to the project.

ii. A basic information questioner (BIQ) should be completed and submitted along with the above details
iii. CEA may call for project briefing and further information on ESMP that should be provided by the PMU
iv. Approval will be granted subjected to site specific conditions that should be adhered by the project

Annexure IV: Study team

Name	Designation	Position in the study
SAMS Dissanayake	Senior Scientist/ESSD/NBRO	Senior Environmental Scientist
PrabathLiyanaarachchi	Scientist/ ESSD/NBRO	Environmental scientist
Thilina Dissanayake	Project Assistant/ESSD/NBRO	Demographic data /survey support

Annexure V: List of references

1. Contractor's obligations for Generic Environmental and Social Management Plan- Sri Lanka Landslide Mitigation Project-AIIB
2. Environmental and Social Management Framework-Sri Lanka Landslide Mitigation Project - AIIB
3. Resettlement Planning Framework- Sri Lanka Landslide Mitigation Project -AIIB
4. Felling Trees (Control) Act by Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation and Fisheries and Aquatic Resources Development