REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No. 180

Athwelthota Gangaramaya Temple

Kalutara 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

1. 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 **Athwelthota Gangaramaya Temple – Kalutara District** 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.

2. Description of the project

2.1 Name of the project

Rectification of Site No. 180, package 10G, Kalutara District, for the failed slope near **Athwelthota Gangaramaya Temple**

2.2 Location details

The proposed mitigation site falls under Athweltota Grama Niladhari Division of Baduraliya Divisional Secretariat Division, Kalutara District of Western Province.

GPS references of the site – 6.543632 N & 80.283237 E
Nearest town – Baduraliya
Accessibility to the site - The site is located adjoining Athweltota Gangaramaya Temple by the RHS of 49 km post of B 421 Baduraliya – Kalawana main road. (Ref. Fig. 1)

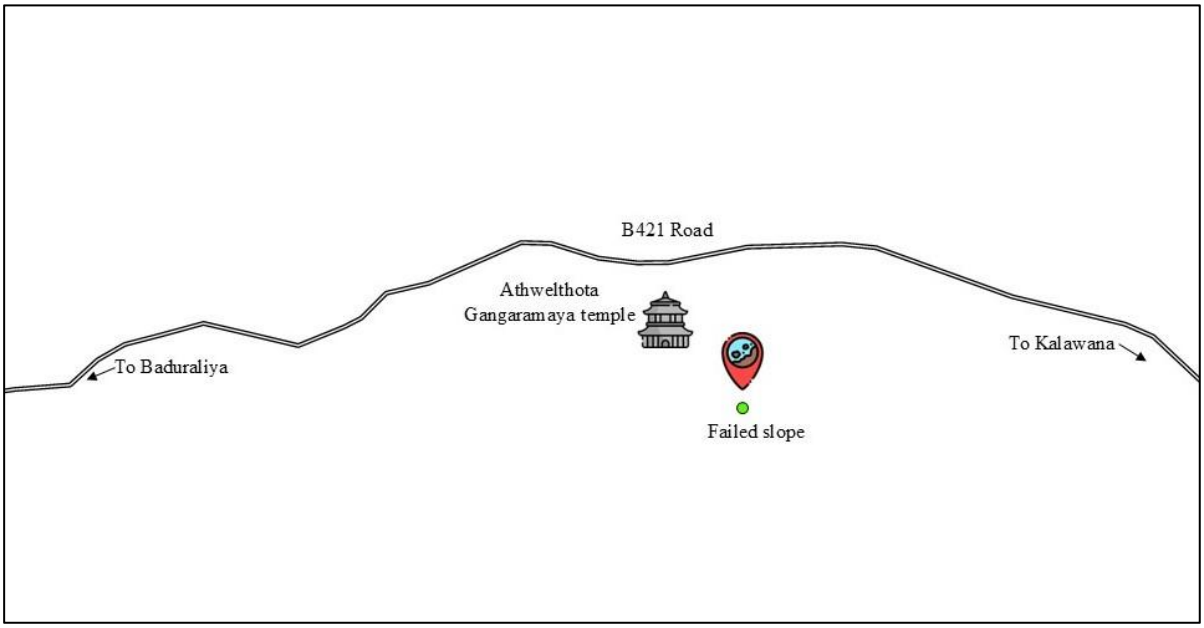

Figure 1. Road map showing the accessibility to the site

2.3 Topography and land ownership

The proposed mitigation site is located within Paru Pana Mukalana Kanda (Forest Reserve) and Athweltota Gangaramaya Temple in Kalutara District. The elevation of the area is 650 ft (Source: Google Earth Pro). The extent of the site proposed to be mitigated is about xxx m^2. The reactivation of the landslide has initiated at the hill crest of Paru Pana Mukalana Kanda, and the resulting debris flow has traversed temple land and nearby road reservations.

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 – 317.35 millimeters (12.49 inches)
Annual high temperature - 29.76ºC (85.57ºF)
Annual low temperature - 24.66ºC (76.39ºF)
(Source: https://weatherandclimate.com)

3. Landslide hazard incident details

3.1 Account of incident

The initial occurrence of the landslide took place on 26th May 2017, following heavy precipitation on 24th, 25th, and 26th of May. Approximately 20,000 m² of land area was affected by the incident. The landslide was initiated at two locations along the mountain crest of Paru Pana Mukulana Kanda. The dislodged earth mass progressed down slope as a debris flow, depositing materials along its path, crossing the road, and eventually terminating in the stream running parallel to the roadway. Investigations revealed that a section of the slope had previously subsided, and the ingress of water through this weakened zone was the triggering mechanism for the slide.

A second landslide event occurred on the night of 2nd June 2024, primarily attributed to heavy rainfalls. During this event, the debris flow partially obstructed the downslope B421 road and posed an increased risk to Athwelthota Temple, as well as surrounding infrastructure and residential areas.

3.2 Effects and consequences of landslide/ slope failure

The first landslide event, which occurred on 26th May 2017, was regarded as one of the most tragic natural disasters of that year. It resulted in the deaths of nine occupants and the destruction of seven houses located along the debris flow path. The dislodged earth mass moved across the road towards the nearby Pelen Ganga River, depositing soil, large boulders, remnants of destroyed houses and personal property, and human remains both on the road and within the stream. The debris completely obstructed vehicular movement, isolating the affected area.

The landslide originated from Paru Pana Mukalana Kanda, a mountain situated along the border of the Diganna Kanda Forest Reservation. The vegetation in the slope area predominantly consists of *Dipterocarpus zeylanicus* (Hora tree), *Mangifera zeylanica* (Atamba tree), and *Calophyllum walkeri* (Keena tree). The forest also supports various fauna, including wild boars, toque macaques, and other species. A portion of this forested area collapsed during the landslide event, significantly increasing the volume of debris.

Although the second landslide event, which occurred on the night of 2nd June 2024, was not as devastating in terms of human loss, it caused considerable damage to property and infrastructure, particularly affecting the Athwelthota Temple. Notably, mitigation structures that had been constructed after the initial event also sustained partial damage during this second occurrence. However, the recently built barriers were effective to some extent, as they reduced the reach of the debris flow. Despite this, accumulated debris still partially blocked the B421 road, again affecting accessibility and local transport.

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

Following the first landslide event, several physical remediation measures, including drainage improvements and other slope stabilization efforts, were implemented to mitigate future risks under RLVMMP -phase 1 Package 2.

Figure 03. Remediation measures taken after the initial landslide

However, the second landslide event in June 2024 caused damages to the majority of these structures. Since then, no further remediation measures have been undertaken to address the renewed risk posed by the reactivated slope. The National Building Research Organisation (NBRO) conducted a comprehensive investigation of the site. During this assessment, unstable slope sections were identified and demarcated, and the potential risks to the Athwelthota Temple were also evaluated.

3.4 Evacuations

Majority of houses classified as high-risk following the 2017 event were evacuated. However, the Chief Incumbent Monk of Athwelthota Temple, Rev. Warakagoda Kassapa Thero, has continued to reside at the temple premises. During the second landslide incident, the monk temporarily evacuated the hermitage building as a precautionary measure, but subsequently returned to the original residence after the immediate threat had passed.

3.5 Resettlement (progress)

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

(*Ref fig.4 - Diagrammatic interpretation of affected slope area and buildings due to ground movement*)

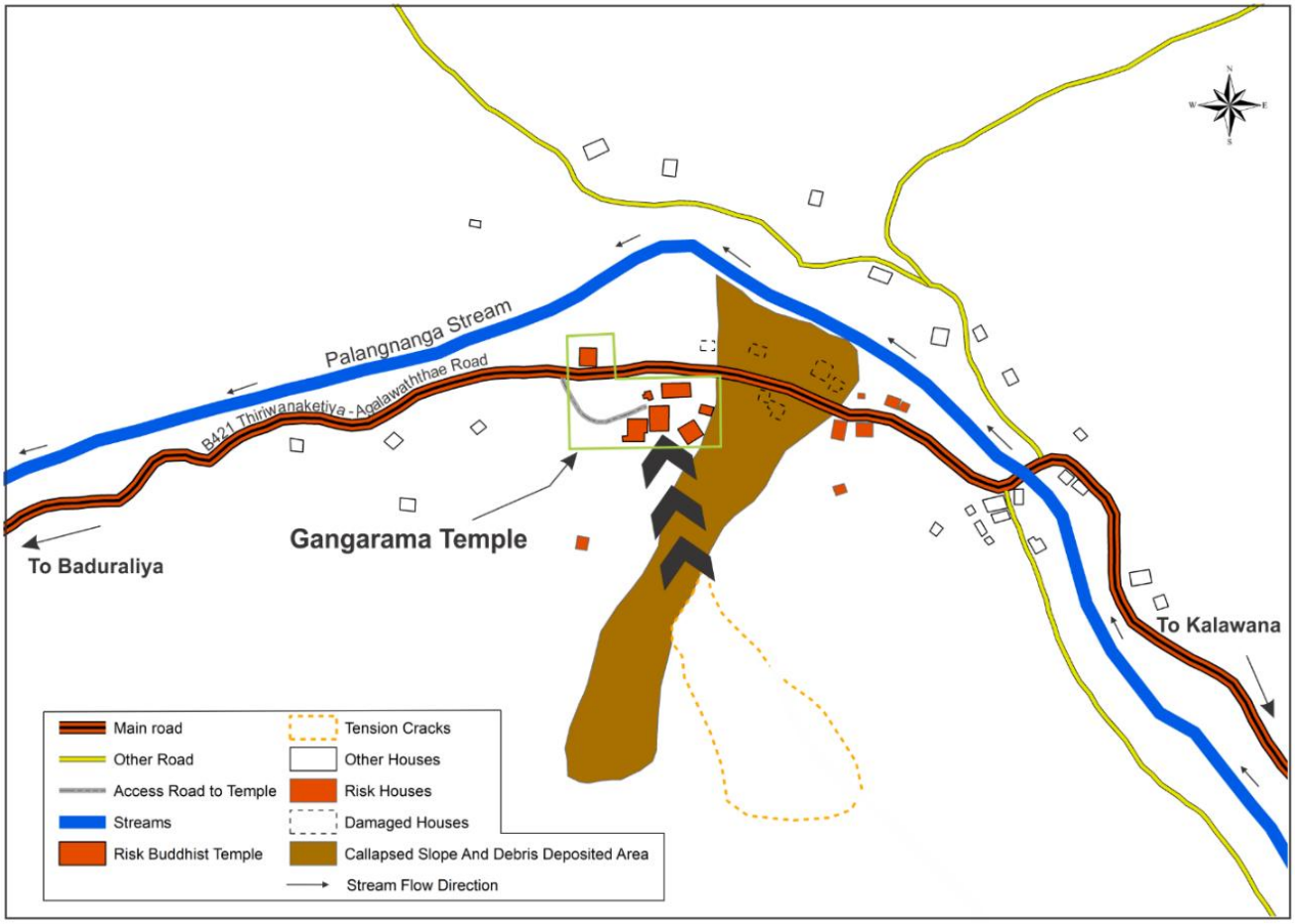

Figure 4. Diagrammatic representation of the affected slope area and impacted buildings due to ground movement, prepared following the initial event.

4. 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 landslide originated from Paru Pana Mukulana Kanda, a steep mountain slope located at the border of the Diganna Kanda Forest Reserve. The slope is mostly covered with forest, while some upper areas have been cultivated with tea. At the lower part of the slope (toe area), there were residential settlements. However, following the landslide incident in 2017, most of these households were relocated due to the high risk.

The Athwelthota Gangarama Viharaya, a Buddhist temple with a history of over 109 years, is situated next to the debris flow path. During the first landslide, debris passed very close to the temple boundary but did not cause any direct damage. At the base of the slope, the Pelan Ganga stream flows parallel to the road. After the event, large boulders, broken house materials, and personal belongings were found deposited in the stream and across the road.

Investigations carried out by the NBRO after the first landslide (NBRO/LRRMD/KT/L1/17/31/31121) identified the presence of tension cracks and unstable areas on the slope. These features were seen as warning signs of future landslides. The Athwelthota Gangarama Temple was classified under the high-risk category due to the presence of a large tension crack above the temple, which poses a direct threat to the monks, devotees, temple buildings, statues, and shrine room. As previously mentioned in NBRO's assessments, the second landslide event in June 2024 occurred in line with those predictions and caused significant damage to the temple's infrastructure.

The vegetation in the slope area predominantly consists of Dipterocarpus zeylanicus (Hora tree), Mangifera zeylanica (Atamba tree), and Calophyllum walkeri (Keena tree). The forest also supports various fauna, including wild boars, toque macaques, and other species.

4.2 Areas adjacent to the landslide

The area surrounding the unstable slope is primarily semi-rural, with human settlements being the dominant feature. Apart from the iconic Athwelthota Gangaramaya Temple located within the site, several nearby attractions draw both locals and tourists. These include Kabaragoi Ella Falls, the Athwelthota Natural Pool, the Kalawana-Morapitiya Sri Sumana Saman Dewalaya, which holds a revered place among devotees in the region, and the historic giant Dun tree, a well-known landmark. Other notable sites include the Sukiri Ella waterfall.

The B421 road, which connects Baduraliya to Kalawana, is one of the key access routes to the Sinharaja Rainforest, further enhancing the area's importance for both tourism and transportation.

(*Refer to Fig. 4: Diagrammatic interpretation of affected slope area and buildings due to ground movement*)

4.3 Current level of risk

The following risks have been identified at the site:

- Threat to human life, including the resident monk and visitors to the temple
- Risk of damage to religious structures, including the shrine room, statues, and other sacred buildings
- Possible loss of access to basic services, such as transport, communication, and emergency response
- Long-term disruption to livelihoods of local people
- Risk of damming the stream, which may cause temporary flooding
- The B421 road, which runs near the landslide site, is partially blocked by accumulated debris. This road is a key transport route between Kalutara and Ratnapura Districts, used for passenger travel and the transportation of goods, especially tea and rubber. Continued instability in the area poses a serious risk to road users and economic activity.

5. Description of the works envisaged under the project

The proposed mitigation works will be highly design exclusive as the slope instability conditions are very much complex. They will include drainage improvement to unstable slope sections, rock barriers to protect the sensitive elements such as road and the river from the debris hazard, and vegetation based slope stability improvement measures as a minimum.

6. 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. Road traffic and commuters of the road and pedestrians
ii. The monk, worshippers, devotees in the Buddhist temple and the religious events
iii. Important worship buildings of the temple
iv. The children of Sunday school
v. River, water quality of the stream, Pelen Ganga and domestic water uses and religious water uses ("Diya kepeema" festival of Saman devalaya).

(Ref. Fig.5 Sensitive elements that may be affected by the project actions)

Figure 5 a. View of the unstable slope from B421 road (current status)

Figure 5 b. The debris on the second event of the landslide (taken at the second event)

Figure 5 c. damages done to the temple infrastructure (current status)

Figure 5 d. Pelen ganga; stream flowing downslope

Figure 5. Sensitive elements that may be affected by the project actions

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

7.1 Positive impacts

The mitigation of the unstable slope is expected to have a strong overall positive impact on landslide disaster risk reduction in the area, as explained below.

The reactivation of the landslide and the current level of hazard risk have caused psychological distress among the residents of surrounding villages. The Athwelthota Gangarama Temple, currently at risk, is a Buddhist religious site with a history of approximately 109 years. Over the decades, the temple has built a strong cultural and social bond with the local Sinhala Buddhist community. Approximately 1,500 devotees from four Grama Niladhari (GN) divisions, Athwelthota, Abegoda, Diganna, and Morapitiya are closely associated with the temple and participate in a variety of religious, social, and cultural activities.

One of the key religious practices includes serving dana (offering of food and other essentials) to the monks residing in the temple. Roughly 700 families are actively engaged in this practice. The temple holds central importance to the community, especially since the next nearest Buddhist temple is located approximately 2 kilometers away, in Morapitiya. The temple is a complete Buddhist religious complex, comprising all essential spiritual elements commonly found in traditional temple architecture. These include:

- A shrine room for Lord Buddha, built according to historical design traditions
- A dagoba (stupa) for sacred relics
- A bo-tree, grown from a sapling of the Jaya Sri Maha Bodhi
- A chamber for the chief incumbent thero
- A Seema Malaka, a special structure for conducting ordination ceremonies (upasampada) for Buddhist monks

The temple serves as a spiritual and cultural center for the Buddhist population in the area. It is also artistically significant, as the shrine room paintings were created by the renowned temple artist Solius Mendis, adding further heritage value.

In addition, the Saman Devalaya, a shrine dedicated to God Saman, is located approximately 2 km away at the border of the Ratnapura District. God Saman is highly revered in both the Ratnapura and Kalutara regions. The Athwelthota Gangarama Temple plays a central role in organizing religious activities of the Saman Devalaya, including its annual procession (perahera). This event is rich in traditional dances, cultural elements, and serves as a symbol of local heritage and religious devotion.

Moreover, the main halls of the temple have traditionally served as a central meeting place for various community groups, including the Tharuna Sangamaya (youth societies), elders' societies, and women's societies. The temple premises were also used as a designated location for official election duties and activities prior to the first landslide event in 2017. This highlights the temple's multifunctional role in the community not only as a religious center but also as a social and civic hub that supports public events, gatherings, and administrative functions.

The temple is situated between a forested mountain slope and a flowing stream, and its architecture blends harmoniously with the natural scenic beauty of the rural landscape. This setting not only enhances the spiritual atmosphere but also contributes to the area's aesthetic and cultural identity.

Therefore, implementing the proposed slope stabilization and structural mitigation measures is expected to:

- Significantly improve the safety of commuters using the adjacent road
- Protect the temple's devotees, its religious functions, and sacred structures
- Preserve an important spiritual and cultural landmark for future generations

The project thus carries both engineering and cultural significance, and its successful implementation is essential for community well-being, cultural preservation, and disaster resilience in the region.

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.)

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 If the mitigation measures include improvement to drainage in a relatively large area, it lowers the ground water table. A significant lowering of ground -water table may dry out the springs on the mountain, the impacts however will be localized and confined to the area. Currently, the spring water in the mountain is used by the families in area and by the temple. Lowering of water table by drainage improvement will dry these springs causing water stress to the temple and the neighbors. Hence impacts on drainage is locally significant.	**Significant**
7.2.1.2 Water pollution and impacts on surface water quality Sedimentation to existing watercourses and siltation in the downstream channels can be expected during the removal of debris soil produced from earlier slide and during the process of landscaping/reshaping of slopes. Improper disposal of oils and other harmful substances/contaminants from machinery, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping from workers sites could occur causing adverse impacts on water quality of the stream running in the toe area. Intentional and careless disposal of construction waste may result addition or mixing of construction materials (cements/other grout materials used for soil strengthening) with surface water to cause temporary water quality degradation and accumulation of unwanted substances in the downstream. These discharges may increase the pollution load in the streams with high Biochemical Oxygen Demand, Chemical Oxygen Demand, 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 stream water is used by villages for special religious functions. The water quality impacts from discharge of wastewater and pollutants to environment during construction phase is therefore highly significant.	**Highly significant**
7.2.1.3 Erosional impacts and stream bed alterations If the mitigation works focus largely on the drainage improvement, during rainy season heavy flow of water may enter the nearby natural stream etc**.** This will result increased stream discharge causing stream bank erosion, stream bed scouring, and increased river load in the downstream area. The impacts on environmental flow and sediments on aquatic ecosystems will be significant.	**Significant**

7.2.1.4 Open defecation and waterborne infections As the site is located in forested, low inhabited area with a stream there is a possibility of open defecation by the workforce. As the stream in the down slope is used by people for bathing, washing and other sanitary purposes, and also for special religious activities faecal contamination of stream water is significant.	**Significant**
7.2.1.5 Impacts on the downstream water uses There is a possibility of feacal contamination of water and spread of water borne infections. This will make water unsuitable for human use and aquatic life. The water quality impacts from discharge of wastewater and pollutants to environment during construction phase is therefore is highly significant.	**Highly significant**
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 The Pelen Ganga River flows downslope of the road, located at the base of the unstable slope. Therefore, the potential negative impacts on the waterbody are highly significant. These may include increased sedimentation due to slope failure or erosion, contamination from construction runoff or debris, and potential disruption of aquatic habitats. If not properly managed, these impacts could degrade water quality and affect the ecological integrity of the river system.	**Highly significant**
7.2.2 Environmental Impacts	
7.2.2.1 Noise and vibration impacts Noise and vibration is expected from construction equipment. Noise impact is significant as the construction is carried in the proximity of the temple. The noise generated from the machinery will disturb the religious activities in the temple. Hence the impacts of noise is considered significant at this site If heavy machinery is operated the vibration can affect the buildings of the temple. As a result structural deformations such as cracks and collapse of walls etc. may happen. Hence vibration impacts at this site is considered significant.	**Significant**
7.2.2.2 Air pollution impacts Construction activities that contribute to air pollution include: land clearing, operation of diesel engines, excavations, burning, and transportation disposal of construction materials, construction waste and working with toxic material (blasting chemicals). During construction, it generates high levels of dust typically from concrete, cement, wood, stone, and silica. The direct exposure risk of residents to air pollution is minimum as there are no houses with occupants closes to the site. However, Air pollution may have an impact on the pedestrians/ commuters of the road.	**Significant**

7.2.2.3 Solid waste disposal issues Storage of waste debris near river banks and road reservation can generate contaminated runoff and pollute the stream water. The impacts are highly significant as the stream is a clean water body with multiple downstream water uses (domestic and religious).	**Highly Significant**
7.2.2.4 Explosive hazards and hazardous materials The slope has several impeding boulders and boulders deposited on the debris flow path. Explosives may be used to blast these boulders. This may pose risk due to unsafe use. 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.	**Highly Significant**
7.2.3 Biological /Ecological Impacts	
7.2.3.1 Effects of important wildlife habitats There is a forest reserve in upslope areas within the project influence area. Important wildlife habitats may be impacted due to construction activities such as high noise generation activities.	Significant
7.2.3.2 Effects on Fauna & Flora Following impacts to forest ecology and wildlife can happen during construction phase. • The mitigation work may involve relatively large structures to work as barriers, they can be death traps for wild life, loose habitat connectivity of some species. • There is a tendency that contractor labor force may engage in hunting and poaching of wildlife or may collect of protected forest specimens (plants and animals). Such acts are prohibited under the Fauna and Flora Protection Ordinance and may damage the resource hence impacts are significant. • The contractor may carelessly or intentionally remove valuable timber species in the forest area or clear large patches of forest and may damage the resource hence impacts are significant. • The contractor may cut and use forest trees for temporary structures for construction works and may damage the resource hence impacts are significant. • Contractor may set fire (intentionally or unintentionally) to the forest. During dry season this may initiate forest fires and damage the forest resource, hence impacts are significant.	Significant
7.2.4 Social and Economic Impacts	
7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately at the site There is 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 slope is located within the temple premises. The temple buildings are located within close proximity of the proposed mitigation site. Therefore,	

vibration impact on the buildings is 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 Losing access to land and future development activities The land where the project activities are envisaged is road reservation of RDA, private lands, lands belonging to the temple and the forests under Department of Forest. As the proposed mitigation structures will be exclusive to comparatively high magnitude landslide hazard there will be structures extending to relatively large spans of land. Also, some structures may come at the boundaries of the temple premises. As these are relatively large structures to function as barriers to cut off debris flow the owners may lose the future development opportunities of the lands. However, most of these lands are open lands and do not cross any access to houses or service facilities.	**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) The existing electricity lines are located upslope of the sub-road, which itself is upslope of the mitigation site. Therefore, the risk to service provision is considered insignificant.	Insignificant
7.2.4.6 Effect due to loss of infrastructure and safety During the construction phase, the Bduraliya-Kalawana B421 road will be obstructed by frequently moving machinery, loaders, trucks, etc. Therefore, most of the heavy machinery, trucks, and loaders may obstruct the pedestrian passage and cause traffic.	**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 camps site will be selected in the neighbourhood of the community. If proper camp management is not in place, it may result in several labour issues, social issues with the community, conflicts for shared resources with the community, nuisances, and management of waste, etc. If temporary camps are built in close proximity to 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 people living in the vicinity of the site and the possibility of disputes 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 neighbouring community and the workers of the project. Although the workers who would engage in such issues will be rare, even few possibilities cannot be ignored.	**Significant**
7.2.4.9 Workers safety during construction	

The proposed mitigation site is a steep, forested mountain slope that is at risk of landslides. Workers may have to operate on these unstable, steep slopes, regularly climbing them to carry out various construction activities. Some of these activities may even take place within the forested area. Furthermore, as this is a dense forest, the workforce may be exposed to risks such as snake bites and attacks by toxic insects, including wasps. Therefore, worker safety during construction is of high importance. The risk of accidents involving vehicles and construction machinery is also significant, as is common at any construction site. There is also a risk that the contractor may engage underage workers (children) for construction work, which can result in serious accidents and injuries.	**Highly Significant**
7.2.4.10 Safety to the public from construction activities: High risk for commuters During the construction phase, the road will be obstructed by frequently moving machinery, loaders, trucks, etc. As most of the mitigation works are to be carried out in a limited space on slopes, the heavy machinery, trucks, and loaders can obstruct commuter and pedestrian passage and may pose a high risk to their safety. The same high-level risk will also apply to the devotees and people of the Athwelthota Gangarama Temple, which is adjacent to the unstable slope, as they will be exposed to this risk for a longer duration during the construction phase. Therefore, the risk to them is highly significant.	**Highly Significant**
7.2.4.11 Impacts on transport infrastructure (especially temporary loss of road access, risks of traffic congestion) The traffic on the Baduraliya - Kalawana road due to full/partial road closure may obstruct the smooth flow of vehicles during the week days, during office hours, school times, or holidays. 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 people to enter or cross the site There is no special need for people to enter the site for other purposes. However, unauthorised entry of ordinary people may occur due to intentional or unintentional purposes may at risk due to operating machinery, and 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	Very high
2. Transporting materials and machineries	Workers/ commuters/ pedestrians	Very high
3. Throw out disposals (litter, bottles, and food) to the school premises from the construction site	Workers	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/ commuters	Very high
6. Injuries due to rock particles due to explosions/ blasting	Workers Commuters, Community nearby	Very High
7. Rockfall from the unstable area	Workers Commuters, Community nearby	Not relevant
8. Site Working – Working in poor visibility	Workers	High
9. Lone Working	Workers	High
10. Emergency evacuation	Workers Commuters, Community nearby	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 a 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

There are occupied houses in the hazard zone instructed to evacuate, but continue to live in the same location. These houses may have a life-threatening impact during the construction. Also the Athweltota temple is in the high-risk category. As possible activation of slide during the construction phase may occur, and also as the mitigation work has a strong influence to the aggravation of slope failure risk, it is logical to consider that the risk is linked with project works. Therefore, a temporary evacuation system is strongly recommended to this site.
Also, the Environmental, Social and Health and Safety unit of PMU should pay special attention to implement the warning systems and ensure evacuations of people at this site. Further, measurers should be taken to minimize all possible risks on the community from the boulder fall, debris flows and etc.

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

Meaningful consultation should be done to get the landowners agreed for removal of structures. The owner may require removal of the structure at the project cost as it has no future value. But, signing a legally bound agreement between the land owner and the project implementing authority allowing no-objection to remove the structures is mandatory. During this process following is recommended as a minimum

i. Thorough consultation with the land owner to get his consent
ii. Allow land owner to extract/ or extraction by the contractor on behalf of the land owner any valuable items from the structures
iii. Project bear the cost of removal of the structure

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

May be applicable as moving vehicles, construction machinery and excavation works may damage roads, structures and water supply lines etc.

10.5 Public awareness and education- needed for following areas

i. i. Programs to inform and educate people in the vicinity and the school/dhamma school population about the risks posed by landslides.

ii. Requirement for special awareness for communities with potentially high-risk during construction phase; short-term early warning measures (evacuation), and measures related to construction and land use.

iii.

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 consideration

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 a minimum number of removals of tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found to intervene with designs	High
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 fraction of vegetation is required to be cleared in ecologically fragile habitats for permanent structures or for access, or if deep drains, etc. The designs should include habitat connectivity features, animal trails and vegetation strips and etc., even if the impacts are localized.	Very High

Construction of deep long drains if required, proper safety measures should be included to minimize deaths of wild animals who would fall and die. Such safety measures may include climbing steps at selected locations so that animals can climb up and save their lives. If large debris barriers are to be included between the slope and the stream, consider keeping connectivity of animals trails that might be disturbed by large structures	
iv. Conservation of water resources This 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, even as drinking water.	Very High
v. Interruption to water supplies Analysis of design for drainage control should consider whether proposed mitigation measure would dry out the natural springs on the mitigation slope. If drying out of springs is significant, permanent design solution for domestic water should be provided for the affected parties. Such solutions could be storage and distribution for extracted water (extraction of water both surface and sub-surface) to be used as a source of drinking water.	Very 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. 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 mitigations works are carried out in ecologically sensitive habitats, 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.	High

ix. Workers/ staff and community safety Activation of slide may occur during construction phase and may pose threat to workers and commuters. Therefore, design based safety consideration such as berms, safety nets etc. should be considered.	High
x. 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 stream 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 if there are streams and culverts in the proximity of the mitigation site. A natural stream with potentially high aquatic diversity flows at the toe area of the failed slope.	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 etc. should be considered if drain water is expected to be directed to natural streams. 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 and geotextiles if fine sediments are prone to enter sub drains.	Very High

10.7 Mitigation of impacts during the construction phase

10.7.1 Construction 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
2002.2 2)	Noise and Vibration	Highly Relevant
2002.2 3)	Cracks and damages to the buildings	Highly Relevant (buildings)
2002.2 4)	Disposal of waste	Highly Relevant
2002.2 5)	Disposal of refuse	Highly Relevant
2002.2 6)	Dust control	Highly Relevant
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	Highly Relevant
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	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
2003.3	Child labor and forced labor	Highly Relevant
2003.4	Safety reports and notification of accidents	Highly Relevant
2003.5	Safety Equipment and Clothing	Highly Relevant
2003.6	Safety inspections	Highly Relevant
2003.7	First Aid Facilities	Highly Relevant
2003.8	Health and safety information and training	Highly Relevant
2003.9	Plant equipment and qualified personnel	Highly Relevant

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 temple premises As the contractor has to operate mitigation actions within the temple premises, he should carefully prepare a plan for the management of construction activities inside the temple 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 the scales of project operations with a time plan and should make the temple authority adequately aware on the construction plan. Necessary adjustments to the plan should be made after discussing with the temple authority in order to minimize the disruption to temple activities, minimizing nuisance during conducting special events (E.g., Bodhi pooja, Dhamma school) 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, the temple authority, and commuters. Also, mitigating 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 temple community. Sign boards indicating slope instability risk are	Construction	E & S Unit of PMU contractor

strongly recommended at this site.		
iv. Machinery and material transportation Access roads need to be used for machinery, materials, and vehicle transportation for mitigation locations during the construction phase. The contractor should pay special attention to this matter, and extreme care should be taken to prevent possible accidents on the road and damage to the temple assets. The authority of the temple should be 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 heavy noise-generating activities should be discontinued during Poya days and during large public gatherings, such as delivering sermons, Poojas, etc**.,** in the temple The monk should be made adequately aware of planned heavy construction activities before the execution. Vibration-generating activities should be done within the prescribed limits, especially to avoid damage to old temple structures. Cracks in the temple buildings should be monitored before, during, and after completion of the project. Suitable compensation should be made if damages/ cracks due to construction work occur in the buildings	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.	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	PMU Construction Contractor

construction activities ii. A good warning system and fulltime watchmen is highly recommended for this site for both worker and commuter safety. iii. 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 iv. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc. v. Provision of trainings and awareness programs to employees vi. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities vii. If the wasp nest is in the vicinity, it is mandatory to use Evacuation Centres for ensure of workers' safety viii. 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		
ix. Managing disputes between construction workers and public and workers code of conduct The PMU should make the contractor aware of all potential disputes between the contractor workforce and devotees that should be properly managed. The following are recommended for the contractor's workforce. • Proper awareness, education on code of conduct, monitoring, and punishing. • Define project activity zones with restricted access to other areas in the temple. • Workers cannot use water sources of the temple without proper permission. • Workers cannot use sanitary facilities of the temple, on site sanitary facilities should be arranged to avoid possible open defecation. • The contractor should not use children for any form of project related work (direct/indirect) • The heavy machinery operators should be extremely cautious in the operation of machinery as possible accidents will be high. • Full-time watchmen should be kept in the risk area to ensure safe movement of heavy machinery and vehicles • Discontinue construction work on Poya days and religious festival days of Buddhist • The electrical wiring systems and layout should be	Construction	E & S Unit of PMU contractor

done with proper safety measures approved by the PMU to ensure that accidents mainly to children from electric shocks are prevented • Parking and storage areas should be done in approved locations by the PMU • Establish a system of vigilance to monitor the behaviour of the workforce and the movement and address immediately any dispute that would rise during construction phase • Ensure strict code of conduct in the worksite is maintained. They include No alcohol, no smoke, indiscipline noisy behavior, any form of sexual abuse with female devotees. • The workers should not enter the worship places with untidy un acceptable dresses or use worship places for resting during construction without a purpose		
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 commuters 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. Such waste if generated should store properly without getting washed off and dispose according to approved procedures by the PMU. Under any circumstance construction waste should not be released to the temple premises or deposited near river banks etc. The contractor should obtain approval from the Baduraliya Pradeshiya Sabha for disposal of solid waste at approved locations	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.	Site preparation & construction	Construction Contractor

xiv. Dust and aerosol control screens The heavy dust generation activities should be carried out with sufficient care. Adequate water spaying is recommended to this site.	Site preparation & construction	Construction Contractor
xv. Water for construction Water for construction works should be obtained only from the approved places. Water in the temple sources should not be used for construction and should be under approval from relevant authority	Construction	Construction Contractor
xvi. Working hours The construction activities should be in accordance with the monk of the temple. Noise, vibration and dust generation activities should be carried out not disturbing the religious activities of the temple. If night-time operations are required to achieve project targets such works should be carried out with adequate safety measures.	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 the workforce and temple community 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

xxii. Snake bites, toxic insect bite management and emergency management by accidents Proper emergency management systems for snake bites and toxic insect bites (including awareness of 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) should be introduced. 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	Once*
	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	Once*
	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 Corona Virus 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

The Chief Incumbent Thero of Athwelthota Gangarama Viharaya, Rev. Warakagoda Kassapa Thero, was consulted during the site visits. The monk expressed his emotional distress about living under the constant threat of landslides. According to him, the area is exposed to multiple hazards during extreme weather

events, including both landslides and flooding from the Pelan Ganga stream. During floods, evacuation routes become inundated, causing significant difficulties for the local residents.

Furthermore, he stated that due to the ongoing landslide risk, the alms (daily meals) provided by devotees to the temple have substantially decreased. The number of people attending temple functions, including Poya Day seela practices and the evening Bodhi Pooja, has also reduced noticeably in recent times, particularly on rainy days, when the temple remains almost deserted.

The monk and devotees were informed about the project, the current level of risk, the proposed mitigation measures, the funding mechanism, the requirement to use land for site access, and the movement of construction machinery. They were also briefed on the project's benefits, as well as the potential environmental and social impacts both positive and negative.

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

Ms. E.A.R. Kumari, the Grama Niladhari (GN) officer of Athwelthota, Ms. Madara Lakshani, Assistant Divisional Secretary of the Baduraliya–Palindanuwara Divisional Secretariat, and Mr. T.H.M.D. Nishantha, the Development Officer (Disaster Management), was consulted. All parties expressed their full support for the project and agreed to provide access and necessary facilities within the temple premises for construction activities.

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 Palinda nuwara Pradeshiya Sabha
14.2 Approval from the state lands owners relevant to the project	
Department of Forest Department of Wildlife Conservation	The approval will require to be obtained from the Forest Department for the implementation of project where the proposals need to be

	submitted to the Forest Department for Approval.
Geological Surveys and Mines Bureau	Approval will be obtained for extraction of materials, transportation and disposal of earth, rocks and mineral debris.
Palinda nuwara Pradeshiya Sabha	Approvals from Palinda nuwara Pradeshiya Sabha 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 owners	Signing a legally bound agreement between the private land owners, chief incumbent of the temple and the project implementing authority will be made 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								

15. Grievance redress mechanism for this site

The consultants ES officer is responsible for establishing the grievance redress mechanism for this site with special consideration for following impact communities; a) Chief incumbent of temple b) Occupants of nearby houses. *(Reference: Environmental and Social Management Framework for recommended procedure for establishment of grievance redress mechanism).*

Also, it is recommended to keep a grievance box in the temple premises

16. 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
10/04/2025	District secretariat – Baduraliya Palindanuwara	Ms. Madara Lakshani – Assistant District secretariat Mr. T.H.M.D.Nishantha - Development Officer (Disaster Manangemt) 0707744399 Ms. E.A.R. Kumari – Grama Niradhari, Athwelthota 0713441678

Annexure I: Images of the stakeholder consultation

Fig a: Consultation with the Ven. Kassapa thero- Chief incumbent of the temple

Annexure II: Report on the Stakeholder Consultation:

Institution	**Name and designation of the contact officer**	**Concerns raised**
Central Environmental Authority	Mrs Chandrika Hewage Deputy Director –CEA Kalutara District	✓ Landslide mitigation projects are not considered projects prescribed in the Gazette ✓ The Basic Information Questionnaire (BIQ) is needed to fill for the project and submit the application ✓ 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.

Forest Department	Mr Upul Wijayantha Range Forest Officer	✓ The Forest Department has no objection on the project ✓ Following matters were emphasized. ✓ Regarding the project implementation, he said that mitigation proposal with draft layout should be submitted to Conservator Forest and approval to be obtained. ✓ If plants are used for remediation prior approval should be obtained

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

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

I. The design to be accepted by the RDA: The project implementing agency should submit a detailed design report to the RDA with a formal request for the nature of approvals required. PMU should prepare the above documents and submit the documents to the RDA regional office.

II. RDA regional office will evaluate the proposal and may call for a project briefing. The PMU should provide the necessary briefing as appropriate

III. On the approval by RDA, an agreement will be signed between RDA and the Project implementing agency to access the site, erect structures, and implement mitigation works.

IV. Conditions that would include are

- A proper handover of the project is required after the mitigation
- RDA will do the maintenance after mitigation
- It is emphasized that during the construction, the contractor should use Personal Protective Equipment
- At all times, the contractor shall provide safe and convenient passage for vehicles, pedestrians, and traffic safety measures, barricades, flagmen, and for night work, lights and illumination should be provided.
- Construction waste/ excavated materials should not be a nuisance to the public/commuters

Annexure IV: Study team

Name	**Designation**	**Position in the study**
SAMS Dissanayake	Senior Scientist/ESSD/NBRO	Senior Environmental Scientist
Prabath Liyanaarachchi	Scientist/ ESSD/NBRO	Environmental scientist
Thilina Dissanayake	Project Assistant	Report Preparation

Annexure V: List of references

I. NBRO site investigation report on landslide disaster at Athweltota landslide

II. Contractor's obligations for Geriatric Environmental and Social Management Plan- Sri Lanka Landslide Mitigation Project-AIIB

III. Environmental and Social Management Framework-Sri Lanka Landslide Mitigation Project - AIIB

IV. Resettlement Planning Framework- Sri Lanka Landslide Mitigation Project -AIIB
V. National Building Research Organisation. (2018, October). Site Specific Environmental and Social Management Plan (SSE & SMP): Site No. 26, Athweltota Gangaramaya, Kalutara District – Package 8.