



# REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

## Site Specific Environmental and Social Management Plan

**Site No.137**

**Between Kotagala and Thalawakele Stations, at CH 115/37 - 115/40  
and 115/52 - 115/57**

**(Approaches of tunnel no 15 from both sides)**

**Nuwara-Eliya District**

**June 2021**

Prepared for:



**ASIAN INFRASTRUCTURE  
INVESTMENT BANK**

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## Abbreviations

AIIB	Asian Infrastructure Investment Bank
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
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
ESMP	Environmental and Social Management Plan
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GSMB	Geological Surveys & Mines Bureau
LHS	Left Hand Side
NBRO	National Building Research Organization
RDA	Road Development Authority
RHS	Right Hand Side
SSE & SMP	Site Specific Environmental and Social Management Plan

# 1. INTRODUCTION

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## 1.1. Project Overview

The Government of Sri Lanka has obtained a loan from the Asian Infrastructure Investment Bank (AIIB) for mitigating/rectifying unstable slopes in high risk areas especially in 11 districts of 06 provinces of the country. 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 a 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 location **between Kotagala (111/25) and Thalawakele (115/72) railway stations, at CH 115/37 - 115/40 and 115/52 - 115/57** (Approaches of tunnel no 15 from both sides) cutting failure mitigation site. 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 intend to be used by landslide mitigation design team, the PMU and the contractor in the implementation of ESMP component of the project. The SSE&SMP is published in NBRO website 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 (SS- ESMAP) prior to commencing works.

## 2. DESCRIPTION OF THE PROJECT AND SITE DESCRIPTION

### 2.1. Name of the Site

Rectification of Site No.137, between Kotagala (111/25) and Thalawakele (115/72) railway stations, at CH 115/37 - 115/40 and 115/52 - 115/57 (Approaches of tunnel no 15 from both sides), Thalawakele, Nuwara Eliya District

### 2.2. Locational Details

The proposed mitigation site falls under Senclair GN Division of Nuwara Eliya DS Division in Nuwara Eliya District, Central Province.

**GPS References of the site** – There are two locations at this mitigation site

Location 01 (CH 115/37 - 115/40) - 6.942605°N and 80.656845°E

Location 02 (CH 115/52 - 115/57) - 6.942104°N and 80.659444°E

**Elevation** – The elevation of the location is around 3940ft (1200m) AMSL.

**Nearest Town to the Site** – Thalawakele town and Thalawakele railway station are located in close proximity to the proposed mitigation site (Tunnel No. 15).

### Accessibility to the Location –

The distance to the Thalawakele railway station from Colombo fort is 187 km through railway line. The mitigation site can be accessed via Thalawakele town on Avissawella-Nuwara Eliya (A7) road and the mitigation site is located closer to the Thalawakele town.

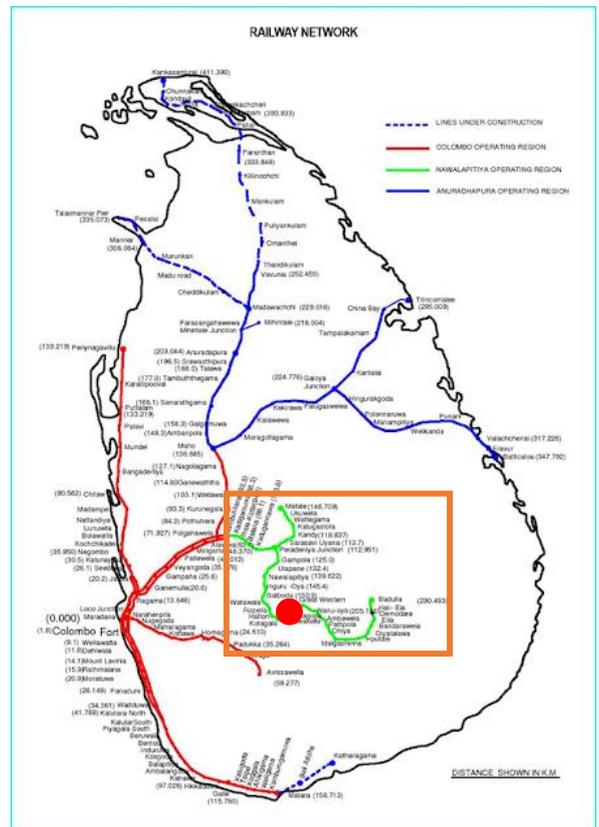


Figure 1- Railway Network in Sri Lanka/ Nawalapitiya Operation Area and Mitigation Location.

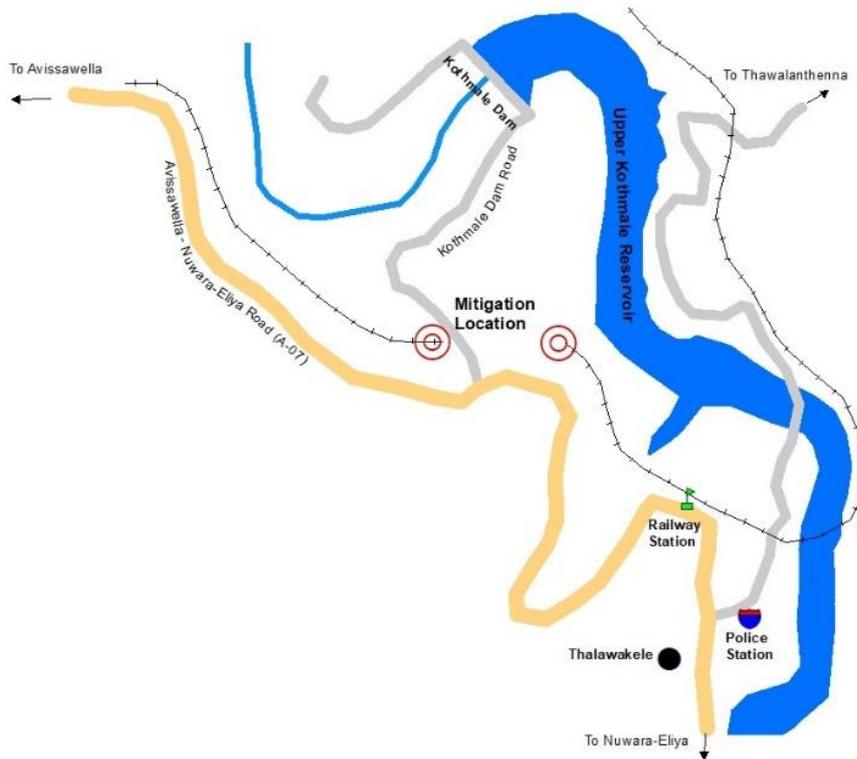


Figure 2 – Accessibility to the Location (Not in a Scale)

### 2.3. Topography and Land Ownership

The general topography of the site is characterized by varying slopes of 20 to 60 degrees from the access way.

The extent of the land area of the mitigation site is about 5000 square meters (0.5 ha). The site is in a hilly terrain where the natural slope has been disturbed for the construction of railway line and the tunnel.

The land ownership of the mitigation area belongs to the Sri Lanka Railways. There are few houses and office/ holiday bungalow belongs to the Ceylon Electricity Board are located closer to the tunnel entrances. However, according to the Inspector of Permanent Way of Nawalapitiya region, other buildings and houses have been constructed in the railway reservation area.

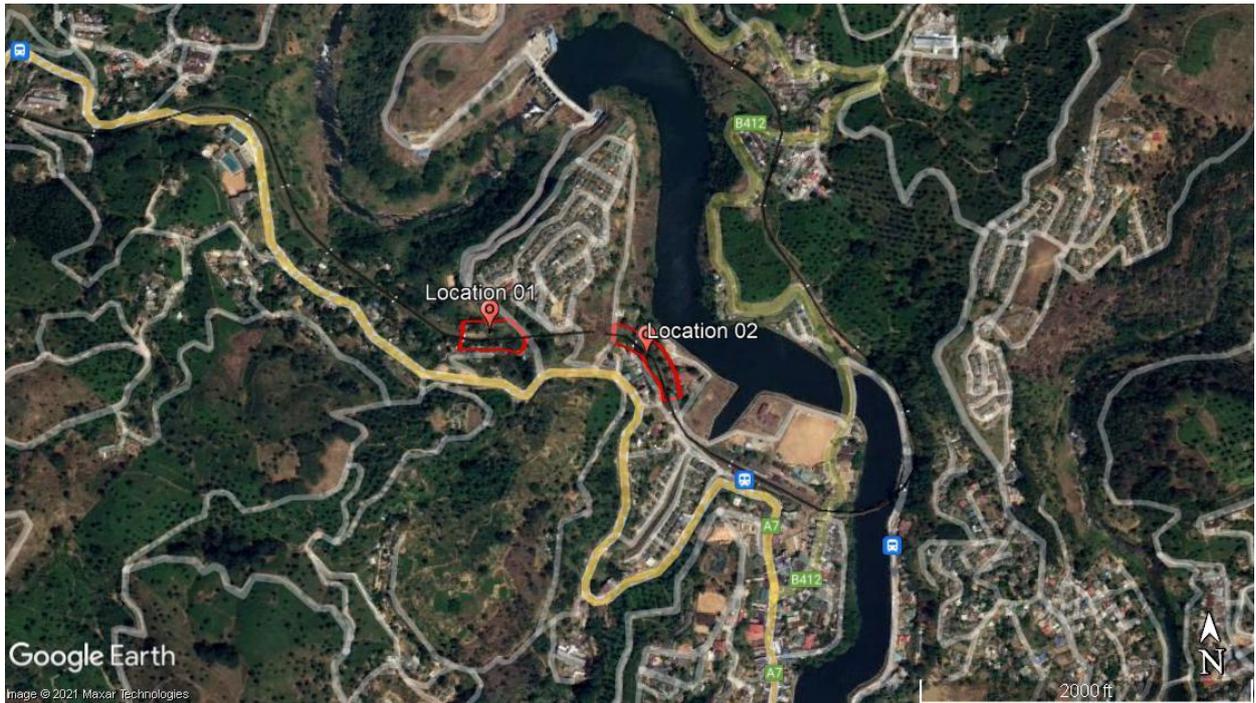
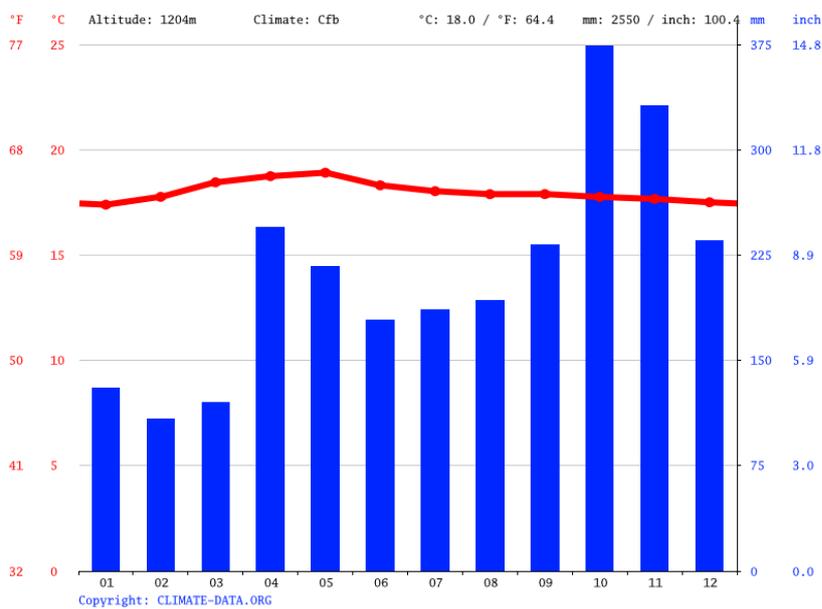


Figure 3- Google image of the proposed landslide mitigation location

## 2.4. Meteorology of the area



The climate in Talawakele is comfortable, muggy, and overcast. The rainfall in Talawakele is significant, with precipitation even during the driest month. This climate is considered as Cfb, according to the Köppen-Geiger climate classification. The average annual temperature in Talawakele is 18.0 °C | 64.4 °F. About 2550 mm | 100.4 inch of precipitation falls annually.

Figure 4 – Climate data of Thalawakele (Source – Climate-Data.org)

## 3. LANDSLIDE HAZARD INCIDENT DETAILS

### 3.1. Account of Incident

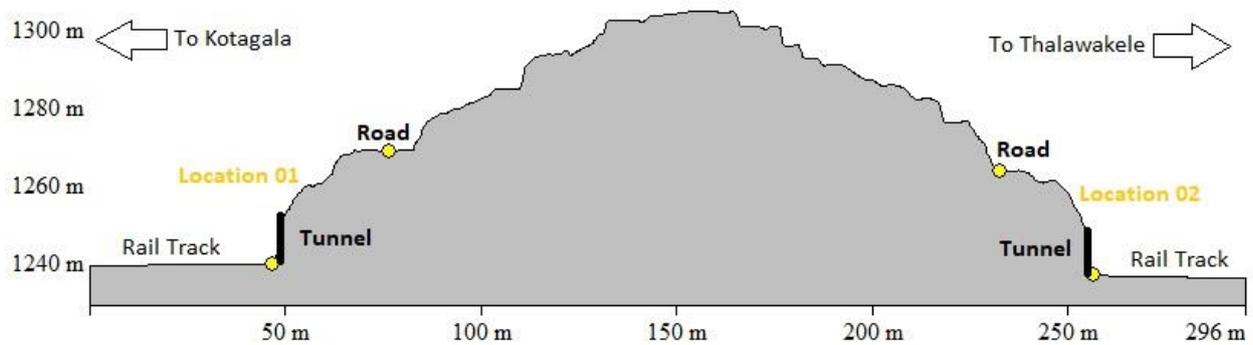
The mitigation site is located at the entrance point of tunnel no.15. Due to the construction of the tunnel, huge cut slopes have been created at the entrance to the tunnel on both side. With the increase of the population and development of the Thalawakele town, many houses/ buildings have been constructed along the railway line disturbing natural drainage system of the area. According to the Inspector of Permanent

Way of Nawalapitiya region, this disturbance to the drainage system causes an unstable cut slope near the tunnel mouth to collapse time to time with the recurring heavy precipitations

The above situation disrupts the smooth functioning of the rail transportation and create unsafe condition for the railway passengers. The deposition masses of soil and rock fragments are removed by the IPW office of Nawalapitiya region to clear the railway track at-least 2-3 times per year. Incidents are happened on both side of the tunnel entrance.

From Pos: 6° 56' 33.0797" N, 80° 39' 24.3754" E

To Pos: 6° 56' 32.2717" N, 80° 39' 33.7580" E



Location 01 - CH 115/37 - 115/40



Location 02 - CH 115/52 - 115/57

Figure 5 – Landslide/ slope failure hazard incident location in the site

### 3.2. Effects and Consequences of Landslide

During intense rainy periods the unstable slope and debris tends to fall imposing risk on the railway line, passengers, commuters and peoples who are living closer to the location and pedestrians of the road. This railway line is the main access path to the central hilly country which has high tourist attraction areas. Hence, interruption of the main railway line of the country would be impacted to the tourism industry as well as the national economy.

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

The debris falling to the railway line during the rainy season is being removed by the IPW office of Nawalapitiya operational area.

Except that, no any long term remedial measures have been taken to reduce the potential risk of the area.

### **3.4. Evacuation**

No any evacuation for this site.

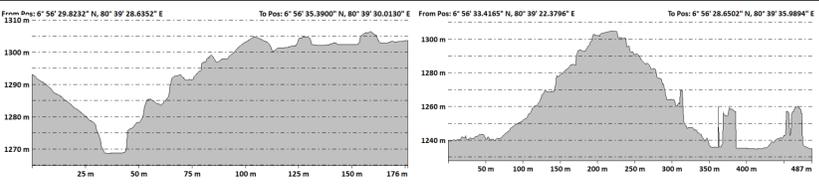
### **3.5. Resettlement (Progress)**

No any resettlement for this site.

# Landslide Mitigation Site No - 137 - Nuwara Eliya - Thalawakele (AIB Project)



## Profile Details



### Longitudinal Profile Details A - A'

Start Position: 6° 56' 29.8232" N, 80° 39' 28.6352" E  
 Start Height: 1293.03 m  
 End Position: 6° 56' 35.3900" N, 80° 39' 30.0130" E  
 End Height: 1303.594 m  
 Path Length: 176.16 m  
 Straight-Line Distance: 176.16 m  
 3D Distance on Surface: 219.2 m  
 Vertical Difference (Start to Finish): 10.6 m  
 Total Climbing: 53.7 m over 119.56 m on surface  
 Total Descending: 43.1 m over 99.641 m on surface  
 Minimum Elevation on Path: 1268.657 m  
 Maximum Elevation on Path: 1306.303 m  
 Azimuth: 13° 53' 27.6"  
 Slope/Tilt: 3.43°  
 Max Path Slope: 87.08° [44.428 m along path]

### Cross Sectional Profile Details B - B'

Start Position: 6° 56' 33.4165" N, 80° 39' 22.3796" E  
 Start Height: 1239.691 m  
 End Position: 6° 56' 28.6502" N, 80° 39' 35.9894" E  
 End Height: 1234.931 m  
 Path Length: 487.48 m  
 Straight-Line Distance: 442.69 m  
 3D Distance on Surface: 733.11 m  
 Vertical Difference (Start to Finish): -4.8 m  
 Total Climbing: 189.8 m over 383.78 m on surface  
 Total Descending: 194.6 m over 349.33 m on surface  
 Minimum Elevation on Path: 1234.84 m  
 Maximum Elevation on Path: 1304.777 m  
 Azimuth: 109° 18' 48.6"  
 Slope/Tilt: -0.62°  
 Max Path Slope: 88.86° [361.68 m along path]

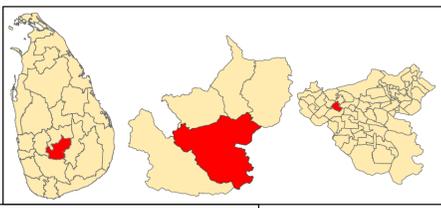
## Site Details

### Location Information

1. Location : Tunnel no 15 from Both Sides - Between Kotagala & Thalawakele
2. GN Division : Thalawakele
3. DS Division : Nuwara Eliya
4. District : Nuwara Eliya

### Physical Information

1. No. of human lives in risk : -
2. No. of Vulnerable Buildings : 01
3. Infrastructure Damage : 50m of Railway Line
4. Current Land use : Railway Line
5. Land use management : Poorly Managed + Human Impacted
6. Previous Land use : Railway Line
7. Level of Hazard : Inaccessible Slopes/Not Mapped area
8. Type of Failure : Slope Failure



Source  
 This map was prepared using the drone images captured by NBRO on 4/10/2018 above Thalawakele landslide potential site.

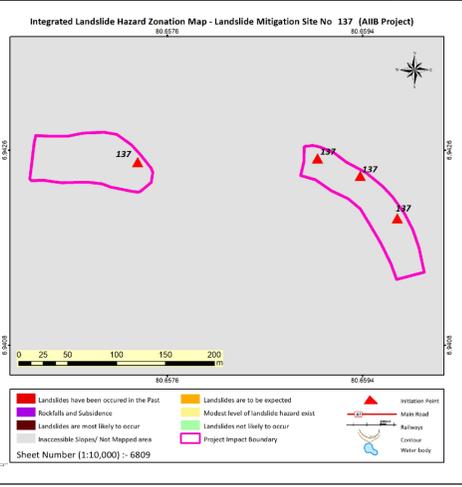
## Legend

- Project Impact Boundary
- Longitudinal Section A - A'
- Cross Section B - B'



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## Location in Landslide Hazard Zonation Map



#### **4. DESCRIPTION OF THE AREA OF THE LANDSLIDE/SLOPE FAILURE AND AREAS ADJACENT TO THE LANDSLIDE AND CURRENT LEVEL OF RISK**

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##### **4.1. Surrounding area of the Slope Failure/ Cutting Failure**

The proposed mitigation site is located closer to the Thalawakele town. The Thalawakele railway station is located about 200m away from the mitigation location No. 02. Around 18 trains pass through at the Thalawakele railway station on weekdays and it is less on weekends. The Station is used daily by around 400-500 passengers including tourists and residents of the area. The 100m from the each side of the railway line is belongs to railway department. (According to the Station Manager, the railway reservation area varies from place to place.).

Further to the above, following features and land-use pattern could be observed surrounding area of the slope failure.

- The Upper Kothmale Reservoir is located within 500m radius from the mitigation location. The lands and properties belongs to Ceylon Electricity Board and the Upper-Kothmale Hydro Power Plant could be observed close to the mitigation location No. 02 area.
- As this site is close to the Talawakale town center, it is possible to observe the built-up areas around the mitigation locations. There are considerable number of houses at upper part of the site and according to the Inspector of Permanent way most of them are built within the railway reservation areas. Some houses were not accessible by road and they use the railway line to reach their homes. Therefore many foot paths connected to railway line from their homes could be observed in around the mitigation site no. 01.
- The small stream runs through the site No. 01 and the people living in the surrounding and down slope areas use the water of this canal for domestic purposes. Also, upper Kothmale reservoir could be observed closer to the site No. 02.
- The Upper Kothmale dam (or Reservoir) road and the road to housing scheme are running upper part of the mitigation locations.
- The home gardens also could be observed near to site no. 01 including fruit trees, Avacardo, Jack fruit, banana and timber trees.

##### **4.2. Current Level of Risk**

If the site is not rectified to prevent future landslides, soil mass or debris of the future cutting failure can directly affect the operations of trains and the functions of the area. The railway passengers, local and foreign travelers, the occupants of the neighboring houses, their livelihood activities would be at risk due to this unstable ground section.

#### **5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT**

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The proposed project aimed to ensure that the further slope failure is prevented. The proposed mitigation works will be largely concentrated on unstable land area. Therefore, surface drainage improvement, toe protection with retaining structures, soil nailing and soft soil improvement will be implemented as the mitigation.

**6. BRIEF DESCRIPTION ON THE SURROUNDING ENVIRONMENT WITH SPECIAL REFERENCE TO SENSITIVE ELEMENTS THAT MAY BE AFFECTED BY THE PROJECT ACTIONS**

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Following elements will be at risk due to project actions;

- Neighboring houses and its occupants and their livelihood activities
- Current services and activities of the Thalawakele railway station
- Railway commuters
- Railway switches, railway tracks and the tunnel
- Stream and the Upper Kothmale Reservoir
- Water supply lines
- Current services and smooth functioning of CEB activities

*(Ref. Fig.7 Sensitive elements that may be affected by the project actions)*

	
<p><i>Figure 7a: Houses located nearby</i></p>	<p><i>Figure 7b: Railway and Signal line</i></p>
	
<p><i>Figure 7c: Stream running through the site</i></p>	<p><i>Figure 7d: Railway tunnel</i></p>

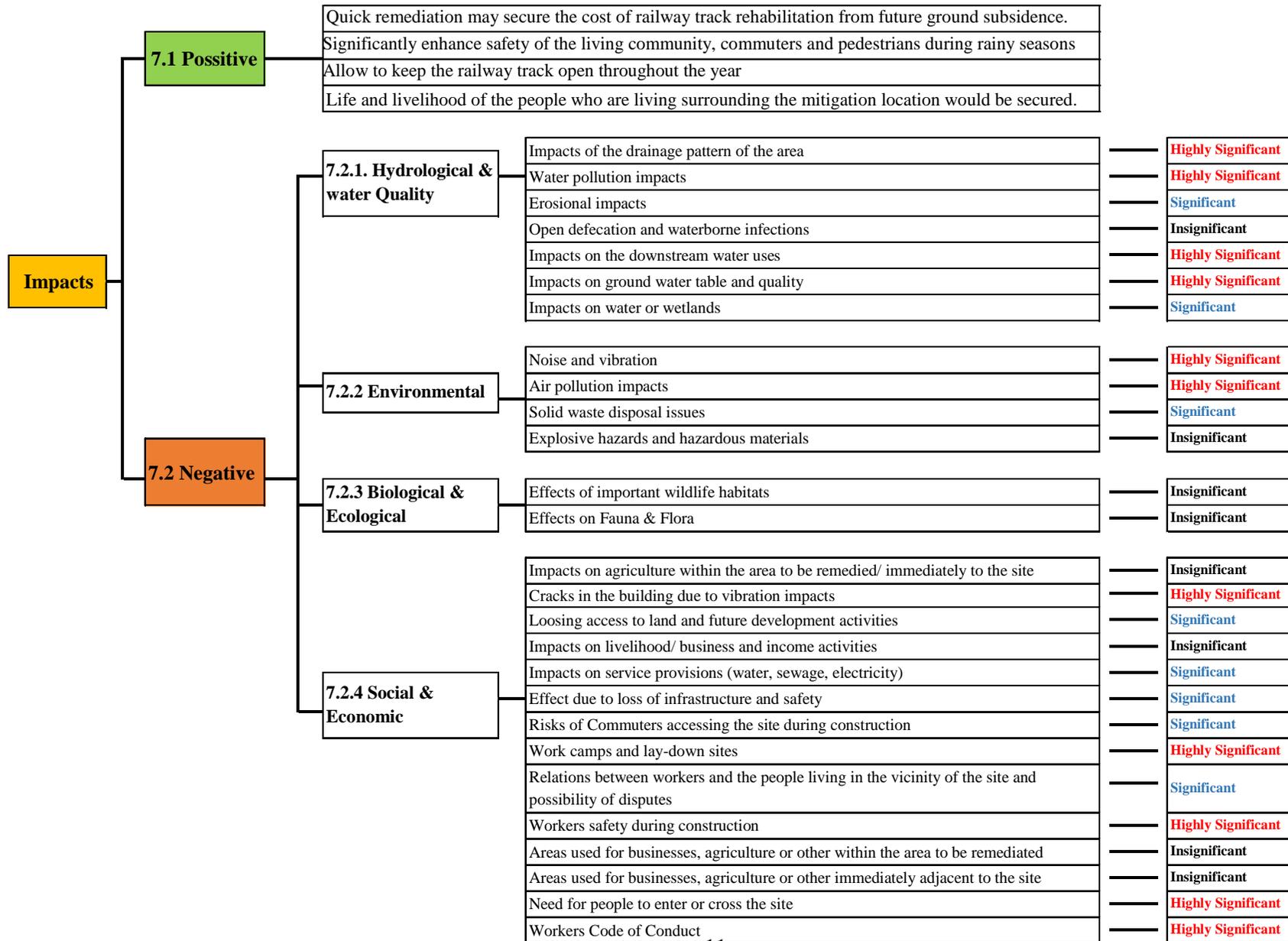
*Figure 7 – Sensitive elements that may be affected by the project actions*

## **7. IDENTIFICATION OF SOCIAL AND ENVIRONMENTAL IMPACTS AND RISKS RELATED TO THE WORKS**

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Chart below summarizes the positive and negative impacts which are envisaged during project actions and their significance.

Figure 8 – Summary of the impacts which are envisaged during project



### 7.1. Positive Impacts

- The project will reduce further propagation of slope failures at the upslope section in entrance of Tunnel No. 15 of main rail line. Therefore, the proposed project will significantly enhance railway safety for commuters, tourists and pedestrians during rainy seasons. It will allow to keep the railway track open throughout the year.
- Quick remediation may secure the cost of railway track rehabilitation from future ground subsidence in the area.
- Most of the local and foreign tourists use the main railway line to reach tourism hotspots in central hilly area and also there are lots of tourist attraction locations along the main railway line as well. Therefore, tourism industry will not be interrupted during rainy season while the safety of commuters will be ensured.
- Life and livelihood of the people who are living surrounding the mitigation location would be secured.

### 7.2. Negative Impacts

The mitigation works are generally confined to an area which is already unstable and highly potential for slope failures. 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
<b>7.2.1 Hydrological and water Quality impacts</b>	
<p><b>7.2.1.1 Impacts of the drainage pattern of the area</b></p> <p>There were not proper drainage pattern in this area and only small drain could be observed to allow storm water run-off which is not sufficient in location 02. During the observations, it is identified that the natural drainage pattern of the area is disturbed by constructing houses.</p> <p>Further disruption of existing surface and sub-surface drainage pattern in the area is envisaged due to the reshaping of the unstable slopes, removal of soils, and diversions of existing drainage and surface runoff flow paths.</p> <p>Due to diversions, cut-off drains and increased sub-surface drainage, the nearby water flows will have increased flows at higher velocities in rainy periods at location No. 01.</p>	<b>Highly Significant</b>
<p><b>7.2.1.2 Effect on water quality and quantity/ Water pollution</b></p> <p>The stream is flowing very closer to the mitigation location 01 and the surrounding people use the stream water for domestic purposes like washing and bathing. Also, the Upper Kothmale reservoir is located within 200m of distance from the location 02 site.</p> <p>Washout of fines, sedimentation in existing watercourses and siltation in the nearby stream channels can be expected during the removal of debris and boulders and during the process of landscaping the of land area. Improper disposal of oils and other harmful substances/contaminants from machineries, leakages from temporary storage tanks, solid waste and wastewater disposal/dumping could occur causing adverse impacts on quality of the water in the stream and the seepages running close to the unstable land. This may pollute water of the stream/ reservoir and may disturb its aquatic ecology. The sediment pollution impact on the stream and reservoir will be significant. During rainy season the rainwater running through the disturbed land tends to pick up sediment, oil and other pollutants generating during construction. These will direct to the stream flowing immediately adjacent to the potential slope failure area.</p>	<b>Highly Significant</b>

<p><b>7.2.1.3 Erosional impacts</b></p> <p>The project may envisage clearing of surface vegetation exposing soils during rainy period.</p> <p>The exposed surfaces can get eroded if proper covering is not maintained. The existing surface and sub-surface drainage pattern in the area will be further disrupted during construction phase. However, as the area exposed is confined to a smaller plot, the erosional impacts are localized but significant.</p>	<p><b>Significant</b></p>
<p><b>7.2.1.4 Open defecation and waterborne infections</b></p> <p>There are occupied houses close to the proposed mitigation site. Also, as the site is located in an open area in a railway line close to working institutes and its employees are present in most of the places possibility of open defecation is low.</p>	<p>Insignificant</p>
<p><b>7.2.1.5 Impacts on the downstream water users</b></p> <p>The mitigation sites are located adjacent to a stream and the Upper Kothmale reservoir. Construction activities will be carried out on already disturbed area with high seepages. Therefore, the area will be prone to erosion during the early construction phase. This may increase the sediment load in the stream flowing adjacent to the unstable land which have clean water. The possibility of contamination of water is very high due to construction activities especially during rainy season. Impacts on water quality and aquatic ecology in the stream and the reservoir will be high as 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.</p>	<p><b>Highly Significant</b></p>
<p><b>7.2.1.6 Impact on ground water table and ground water quality</b></p> <p>Observation reveals that the groundwater level in the area is high and that the surrounding residents use groundwater for their domestic purposes in site No. 01. Dewatering during construction could lead to lower groundwater table when the sub surface water bearing zone is over drained. Addition or mixing of construction materials including cements/other grout materials used for soil strengthening with sub-surface water flows may cause temporary water quality degradation and accumulation of unwanted substances in the sub surface water bearing zone system.</p>	<p><b>Highly Significant</b></p>
<p><b>7.2.2 Environmental Impacts</b></p>	
<p><b>7.2.2.1 Noise and vibration impacts</b></p> <p>Noise and vibration are expected from machinery in site preparation and landscaping. Impact is significant as the construction is carried out in the proximity of the railway tunnel and houses with occupants.</p> <p>Vibrations can cause adverse effects on the railway tunnels since those were constructed more than 100 years ago. Further it will be impacted to the houses located nearby. All the proposed construction activities including excavations shall be carried out under the close supervision of qualified engineers ensuring the safety and integrity of the structures in the vicinity and minimizing the inconvenience to the residents of the area, occupants of the adjacent buildings and the road users.</p> <p>The noise generated from the machinery will disturb the activities of the railway line, passengers, travelers, tourist and houses with occupants within the 100m influential limit of the proposed mitigation site.</p> <p>Hence, monitoring of vibration and noise due to construction activities should be done on a regular basis</p>	<p><b>Highly Significant</b></p>
<p><b>7.2.2.2 Air pollution impacts</b></p> <p>Potential impacts on the air quality will be due to the fugitive dust and the exhaust gases generated in and around the construction site due to vehicular movement and site clearance, storage and handling of construction materials such as sand, cement, etc. The air pollution impacts from the construction is highly significant during dry periods for the occupants of the neighboring houses, workers, commuters and pedestrians as the proposed site is located within railway tracks and located closes to occupied houses.</p>	<p><b>Highly Significant</b></p>

<p><b>7.2.2.3 Solid waste disposal issues</b></p> <p>Poor management of solid waste such as litter, food waste, and construction waste during the construction phase may lead to create inconveniences to railway passengers, occupants of the neighboring houses and the workers. Also, these can block the water seepages in the area to create breeding grounds for water borne refection vectors and pathogens peril. Waste can pollute the soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period.</p>	<p><b>Significant</b></p>
<p><b>7.2.2.4 Explosive hazards and hazardous materials</b></p> <p>Since the affected area has no rock boulders, explosives may not be used and the rock blasting is not envisaged.</p>	<p>Insignificant</p>
<p><b>7.2.3 Biological /Ecological Impacts</b></p>	
<p><b>7.2.3.1 Effects of important wildlife habitats</b></p> <p>There are no forested/ wild-life reservation areas within the project influence area with high biodiversity, or habitat fragmentation.</p>	<p>Insignificant</p>
<p><b>7.2.3.2 Effects on Fauna &amp; Flora</b></p> <p>Majority of the trees found in the area are not endemic, threatened and identified in the red list of IUCN.</p>	<p>Insignificant</p>
<p><b>7.2.4 Social and Economic Impacts</b></p>	
<p><b>7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site</b></p> <p>There are no agricultural practices within the area to be remedied or immediately to the site.</p>	<p>Insignificant</p>
<p><b>7.2.4.2 Cracks in the building due to vibration impacts</b></p> <p>There are several buildings located in the proximity of the mitigation site. Houses with occupants, railway tunnel, buildings of CEB are located close to the unstable area. During the construction heavy machinery will be used and the vibration can cause cracks in these buildings and tunnel structures. Vibration can affect the stability of the nearby buildings and the tunnel.</p>	<p><b>Highly Significant</b></p>
<p><b>7.2.4.3 Loosing access to land and future development activities</b></p> <p>The mitigation works will be concentrated on the railway reservation area and some of houses were located in the reservation area closer to the site. Many people use railroads to gain access to these houses. Therefore, construction activities of this area might obstruct the access to their lands.</p>	<p><b>Significant</b></p>
<p><b>7.2.4.4 Impacts on livelihood/ business and income activities</b></p> <p>There is no significant impact on livelihood, business or income activities of the area because the site is located around railway tracks.</p>	<p>Insignificant</p>
<p><b>7.2.4.5 Effect due to loss of infrastructure and service provision</b></p> <p>During construction phase, the railway tracks from will be obstructed by frequently moving machinery, loaders, trucks etc.</p> <p>The water line runs through the mitigation site to supply water to the station and neighbouring houses and the surrounding people use the stream water for domestic purposes like washing and bathing. This will be impacted during the construction period.</p>	<p><b>Significant</b></p>
<p><b>7.2.4.6 Risks of people accessing the site during construction</b></p> <p>Excavation machineries, loaders, trucks etc. will be used in the proposed mitigation site where commuters, residents of the households, staff of railway station are moving. Site may use high voltage power for operation of certain machinery. Construction may use</p>	<p><b>Significant</b></p>

<p>materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling.</p> <p>The children of the neighboring households will be attracted to these machineries, materials and may even enter the site without proper awareness of the site staff. Ignorance of entry of public and careless operation of machinery can cause fatal injuries and accidents to the people and children.</p>	
<p><b>7.2.4.7 Work camps and lay-down site requirements</b></p> <p>The camps 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 such as 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, solid waste management and sewage will be an issue.</p>	<b>Highly Significant</b>
<p><b>7.2.4.8 Relations between workers and staff / people living in the vicinity of the site and possibility of disputes</b></p> <p>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 neighboring community, staff of the CEB and the railway staff of the Thalawakele station. Although the workers who would engage in such issues will be rare, even few possibilities cannot be ignored.</p>	<b>Significant</b>
<p><b>7.2.4.9 Workers safety during construction</b></p> <p>The mitigation site is located closer to a tunnel entrance with steep slope area. The workers may be exposed to risk from falling. Fatal injuries may occur if the slopes fail. The heavy construction machinery may be used in limited work spaces. Risk of hazard from vehicles and construction machineries 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.</p>	<b>Highly Significant</b>
<p><b>7.2.4.10 Areas used for businesses, agriculture or other within the area to be remediated</b></p> <p>There are no areas used for business, specific agriculture practices or other within the area to be remediated.</p>	Insignificant
<p><b>7.2.4.11 Areas used for businesses, agriculture or other immediately adjacent to the site</b></p> <p>There are no areas used for business, specific agriculture practices or other commercial activities immediately adjacent to the site hence has no significant impact.</p>	Insignificant
<p><b>7.2.4.12 Need for people to enter or cross the site</b></p> <p>Excavation machineries, loaders, trucks etc. will be used in the road and railway station premises where pedestrians, railway commuters and railway staff are moving. There is no special need for commuters and the station 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, unauthorised 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.</p>	<b>Highly Significant</b>
<p><b>7.2.4.13 Code of conduct</b></p> <p>The site is located within Railway reservation area and closer to the CEB premises. Therefore, it has separate regulations maintaining by railway staff, especially operating train services and handling cargo etc. Hence, the workers should adhere to the rules and regulations of this premises.</p>	<b>Highly Significant</b>

## 8. SITE SPECIFIC RISK ANALYSIS

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Table 2 – Site specific Risk Analysis

Risk	Affected group	Risk level
1. Facing railway accidents when working / shifting in between railway tracks.	Workers	Very high
2. Transporting materials and machineries	Workers	Very high
3. Facing railway accidents during constructions at night time	Workers	Very high
4. Accidents from the construction activities and materials placed on the railway tracks	Railway commuters Employees of the station Employees of the CEB	Very high
5. Water inundation in the unstable area	Workers Railway commuters Employees of the station	Very high
6. Injuries due to explosions with flammable substances /Fires	Railway commuters Community nearby	Moderate
7. Work adjacent to electrified lines, signal lines	Workers	Moderate
8. Site Working – Working in poor visibility	Workers Railway commuters	Moderate
9. Lone Working	Workers	High
10. Emergency evacuation	Workers	High
11. Extreme weather conditions (wind, rain etc.)	Workers	High

## 9. SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS

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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 almost vertical unstable slope with a risk of slope failure. The health and safety of workers is highly significant at this site. 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 Labor and Forced Labor

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 AND SOCIAL MANAGEMENT PLAN

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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. There are occupied houses close to the mitigation sites. These houses 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. But, the area in the downslope should be named as a “No Entry Zone” for the construction period.

### 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 losses occurred due to damaging the pipe lines or if any damages happen to the properties of Railway Department and CEB due to project actions.

### 10.5. Public awareness and education- needed for following areas

- i. Programs to inform and educate people in the vicinity about the risks posed by unstable land section located closer to the railway tunnel/ mitigation area specially the occupants of the households in the upslope areas.
- ii. Requirement for special awareness for commuters, staff of SLR and pedestrian who use the railway track about potential high risk during construction phase and early warning.

### 10.6. Design based Environmental/ Social Management considerations

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

Table 3 – Social and Environmental Consideration in Design Stage

Design feature	Recommended level of consideration for this site
<p><b>i. Natural resource management and resource optimized designs</b> 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.</p>	Moderate

<p><b>ii. Site Planning</b>  During site planning it is necessary to be cautious on possible re-activation of ground subsidence around the railway tracks. Also, the site is located in a very limited space of a railway tracks. The vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones.  It is very necessary to keep trained flagman or safety officer of SLR during the construction period and proper communication between contractor’s workforce, railway station and PMU must be built.  Safer location of SLR reservation can be used for a camping sites for the contractor’s workers under authorization of the SLR.</p>	<p>Very High</p>
<p><b>iii. Habitat connectivity and animal trails</b>  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.</p>	<p>Very Low</p>
<p><b>iv. Conservation of water resources</b>  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 downslope houses who are currently depending on less reliable local water sources.</p>	<p>High</p>
<p><b>v. Consideration of opportunities for harness development potentials</b>  The mitigation site is located in a highly local and foreign tourist attraction location. Hence, significant attention should be given in the design to harness the development potential of this premises.</p>	<p>High</p>
<p><b>vi. Aesthetically compatible design considerations</b>  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.  As the tourism industry is one of the major economic activity of the project area, it is crucial to have aesthetically compatible design consideration to develop the area as a tourist attraction.</p>	<p>Very High</p>
<p><b>vii. Consideration of green environmental features</b>  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 &amp; etc.</p>	<p>High</p>
<p><b>viii. Workers and community safety</b>  As the construction activities are carried out within the railway tracks people may face railroad accidents specially the workforce during the construction phase. Activation of ground subsidence may occur during construction phase and may pose threat to workers, occupants of the neighboring houses and commuters. Therefore, design based safety consideration such as berms, safety nets etc. should be considered.</p>	<p>Very High</p>
<p><b>ix. Erosion control structures</b>  During rainy season the flow in the 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 streams/ storm water drains. 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 since there are streams and culverts in the proximity of the mitigation site.</p>	<p>Very High</p>

<p><b>x. Low post maintenance and operation designs</b></p> <p>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 be directed to natural streams.</p> <p>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.</p>	High
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## 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 summarised 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 and HS

Reference No. as per construction contractors obligation to ESMP	Item	Relevant to the project
<b>2002. Environmental and Social Monitoring</b>		
2002.2 1)	Storage on site	Highly Relevant (Railway line, nearby houses)
2002.2 2)	Noise and Vibration	Highly Relevant (Railway line, nearby houses, Tunnel structures)
2002.2 3)	Cracks and damages to the buildings	Highly Relevant (Nearby houses, Tunnel structures)
2002.2 4)	Disposal of waste	Highly Relevant (railway station, nearby houses, staff and commuters)
2002.2 5)	Disposal of refuse	Highly Relevant (railway station, nearby houses, staff and commuters)
2002.2 6)	Dust control	Highly Relevant (railway station, nearby houses, staff and commuters)
2002.2 7)	Transport of Construction materials and waste	Relevant
2002.2 8)	Water	Relevant
2002.2 9)	Flora and Fauna	Low Relevance
2002.2 10)	Physical and cultural resources	Not 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 (pollution)	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
<b>2002.5. Environmental Monitoring</b>	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
<b>2003. Working Conditions and Community Health and Safety</b>		
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	Relevant
<p><b>Relevant:</b> The section is relevant to the site as a common ESMP applicable to any site</p> <p><b>Highly relevant:</b> The contractor should pay special emphasis in the preparation of environmental method statements to ensure that the relevant ESMP is implemented specific to the site</p> <p><b>Possibly relevant:</b> This ESMP will be triggered if the site come across with relevant aspect during project implementation</p> <p><b>Not relevant:</b> The section may not be relevant to this site under disclosed conditions</p> <p><b>Optional:</b> require to be implement if needed only</p> <p><b>Refer site specific monitoring plan:</b> Contractor is obliged to carry out monitoring as specified in the site specific monitoring plan in addition to monitoring requirement indicated in contractors ESMP</p> <p><b>Reference: Contractors Obligation for implementation of ESMP</b></p>		

### 10.7.2. Site Specific Mitigation

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

Table 5 – Site Specific ES and HS Mitigation Measures

Mitigation item	Project Implementation Phase	Responsibility
<p><b>i. Avoid train accidents / possible emergency situations during construction</b></p> <p>Safety officers and flag men of SLR are highly recommended to each mitigation location. At least 02 flagmen should be kept in a site. Flag man or the safety officer has all the responsibilities of the train schedules and stop train in emergency situations. Always be alert on the signals and instructions given by the safety officers of SLR.</p> <p>An awareness and training programme on railway safety for the construction workforce, railway station staff and users are compulsory.</p>	Site preparation & construction	PMU Construction Contractor Railway Department
<p><b>ii. Traffic management and safety</b></p> <p>Traffic management system should be in place day and night. A good traffic management plan should be prepared with the concurrence of Sri Lanka Railway Department as this site is located very close to the railway station. Proper rail road safety measures should be included with warning signs and permanent trained watchmen, luminous sign boards indicating instability risk and road obstruction signs, night</p>	Construction	Construction Contractor and Railway Department

lamps etc. are strongly recommended at this site. Flagman of the Railway Department is responsible signaling the in and out trains through the stations according to the requirements of the construction activities.		
<p><b>iii. Impacts on railway transport infrastructure (especially temporary loss of road or rail access, risks of traffic congestion)</b></p> <p>A good traffic control should be implemented in the construction stage. As there are road bends at upper part of the mitigation site proper safety measures should be included with warning signs and permanent trained watchmen, flagman, luminous sign boards indicating slope instability risk and rail road obstruction signs, night lamps etc. are strongly recommended at this site. All the safety sign boards must be used under the supervision of SLR and according to the railway transportation.</p>	construction	Construction Contractor
<p><b>iv. Minimize erosional impacts during construction</b></p> <p>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 rainy season as much as possible. This should be considered in project planning stage. Silt traps should be introduced to cut down sediment laden runoff.</p>	Site preparation & construction	Construction Contractor
<p><b>v. Planning project activities inside the sites</b></p> <p>As contractor has to operate mitigation actions within site, he should carefully prepare a plan for management of construction activities inside the railway station premises. This should include careful selection of material storage as vehicle parking, mixing of concrete, cleaning activities etc. which considering the safety of workers, passengers, tourist and optimization of limited space.</p>	Site preparation & construction	Construction Contractor
<p><b>vi. No Entry Zone</b></p> <p>The PMU should make a detailed assessment on possible risk of slope destabilization in the site during construction phase. “No entry zone” may require to be declared.</p> <p>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. Sign boards indicating slope instability risk are strongly recommended at this site.</p>	Construction	E & S Unit of PMU contractor
<p><b>vii. Machinery and material transportation</b></p> <p>Inform and obtain prior approval from the authorized person of SLR is necessary before any material and machineries transport through / along the railway tracks. If the railway line is used for material transportation, extreme care should be taken because of possible accidents and damages to the railway line and its components are high. The railway station platform or the railway trucks must not be damage due to the material and machineries transportation.</p> <p>The commuters and the workers should be informed about the material and machineries transportation schedule.</p>	Construction	E & S Unit of PMU Contractor

<p><b>viii. Noise and vibration control</b></p> <p>The noise and vibration generating activities may disturb the smooth flow of activities of the station and surrounding area. Vibration generating activities should be done within the prescribed limits to avoid possible damages. Cracks in the railway station and buildings in surrounding 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.</p>	Construction	Construction Contractor
<p><b>ix. Disposal of construction waste</b></p> <p>The contractor should pay special attention with respect to disposal of construction waste. This site is located very closer to the upper Kothmale reservoir.</p> <p>Therefore, any 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 site or around the reservoir in any circumstance.</p> <p>Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery must be collected in holding tanks and removed from site by a specialized oil recycling company for disposal at an approved hazardous waste site. Improper disposal of oil and lubricants pollutes the reservoir.</p> <p>Appropriate communication and training programs must be put in place to prepare workers to recognize and respond to workplace chemical hazards.</p>	Site preparation & construction	Construction Contractor
<p><b>x. Dust and aerosol control screens</b></p> <p>The Contractor must ensure that dust generation is mitigated and will not annoy commuters and railway staff and should implement measures to control dust concentration in order to maintain safe working place and minimize disturbance to surrounding residences/houses.</p> <p>Material loads must be suitably secured during transportation to prevent the scattering of soil, sand, materials or dust.</p> <p>Special screens etc. should be used if heavy dust or aerosol generating activities are envisaged.</p>	Site preparation & construction	Construction Contractor
<p><b>xi. Water for construction</b></p> <p>Water for construction should be obtained only from approved places. If contractor intends to use water from the available sources in nearby, it should be done through the consent of relevant authorities and PMU.</p>	Construction	Construction Contractor
<p><b>xii. Priority Health and Safety Issues</b></p> <p>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.</p> <ol style="list-style-type: none"> <li>i. Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities</li> <li>ii. A good warning system, watchman and fulltime flagman of the Railway Department is highly recommended for this site for both worker and commuter safety.</li> <li>iii. Adoption of standard worker safety methods</li> <li>iv. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc.</li> </ol>	Construction	E & S Unit of PMU contractor

<ul style="list-style-type: none"> <li>v. Provision of trainings and awareness programs to employees</li> <li>vi. Conducting hazard analysis and plan/provide adequate mitigation measures for such hazards identified, prior to carrying out major construction activities.</li> <li>vii. Additionally, work should be discontinued for sufficient time period during rainy period as working on unstable slopes will be highly risky in the rainy season.</li> <li>viii. Safety barriers and safety nets should be installed at places of risk to protect workers and community from boulder falling risk</li> <li>ix. Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site.</li> </ul>		
<p><b>xiii. Safety structures/sign boards</b></p> <p>During construction phase adequate safe fencing should be established to prevent potential falling risk of workers from upslope areas.</p> <p>Warning sign boards indicating slope instability risk should be placed at the unstable slope area. As the risk is high during the rainy season where there is no construction work it is mandatory that safety signs boards are displayed even during the no project period as well.</p>	Construction	E & S Unit of PMU contractor
<p><b>xiv. Use of sanitary facilities of contractor's workforce</b></p> <p>The contractor should prepare temporary sanitary facilities for the workforce within the site, to mitigate open defecation of the workers. Prior approval of the Station Master should be obtained, if using property belonging to the railway department.</p>	Construction	Construction Contractor
<p><b>xv. Working hours</b></p> <p>The construction activities can be carried out at both day and night time. Working after 6.p.m. could be done after with the consent from Station Master due to safety issues.</p>	Construction	Construction Contractor
<p><b>xvi. Need for people to enter or cross the site</b></p> <p>Possible unauthorized access to the site should be avoided by awareness, warning signs and vigilance by the contractor's full time watchmen.</p>	Construction	Construction Contractor
<p><b>xvii. During construction good housekeeping</b> should be maintained to minimize visual pollution</p>	Site preparation & construction	Construction Contractor
<p><b>xviii. Workers code of conduct</b></p> <p>Possible disputes between the labor force and the villagers, staff of the station, commuters and tourists should be prevented by maintaining the agreed code of conduct by the contractor.</p>	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	Parameters	Frequency
i. Baseline monitoring	Water quality	Once*
	Pre crack survey for the buildings	Once**
	Ground vibration	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality	During rainy season if noticeable change in the appearance of water
	Crack survey for the buildings	Once**
	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	<b>Stream water quality</b> – Comparison with ambient water quality standards published by the CEA, 2017 <b>Pre crack survey of the buildings</b> -Professional report <b>Ground vibration</b> -as per the interim standards on vibration for the Machinery, Construction activities and Vehicular movements, CEA <b>Background noise measurement</b> –Extraordinary Gazette No.924.1, May 23,1996, CEA <b>Air quality particulate matter</b> - The National Ambient Air Quality standards stipulated under the Extraordinary Gazette, No. 1562/22 August 15, 2008 -Central Environmental Authority of Sri Lanka.	

## 11. PUBLIC AND STAKEHOLDER CONSULTATION - the public consultations that have been and/or will be held

### 11.1. Public Consultation

The occupants living closer to the mitigation site were consulted during the field visit. They were made aware of landslide mitigation project and the funding mechanism. The occupants expressed their willingness to the project and to give full support to the project.

The station master of the Thalawakele railway station was consulted and made aware of the mitigation project and the funding mechanism. He stated that the mitigation works are appreciable and expressed his willingness to the project with the full support of the staff.

## 11.2. Stakeholders involved in the consultations any recommendations or agreements reached in the consultations (Refer annexure II)

Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project), Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track) and Mr. D.W.N.Amarasena, Superintend Engineer (Design) of Way and Works Railway Department were consulted during the group discussion about the project activities of the railway sites. They highlighted the procedures to be followed during the construction phase and how to carry them without disturbing the railway transportation.

## 12. CLEARANCES, NO OBJECTION, CONSENT AND APPROVALS REQUIRED FOR THE IMPLEMENTATION OF THE PROJECT

Table 7 – Clearances, No Objections, Consent and Approval

Requirement / Approval / Institution	Relevance to the project
<b>12.1 Project implementation</b>	
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 Thalawakele Pradeshiya Sabha.
<b>12.2 Approval from the state lands owners relevant to the project</b>	
Central Environmental Authority	Approval from the Central Environmental Authority is required as the project should comply with National Environmental Regulations
Department of Railway/ Road Development Authority	As the site is located within Railway Department land and closer to railway line, the construction activities might impact to their operations. Hence, the approval from Railway Department is 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).
Thalawakele Pradeshiya Sabha	Approvals from Thalawakele Pradeshiya Sabha will be obtained for the disposal of waste and plant litter.
Ceylon Electricity Board	As the mitigation site is located closer to the CEB premises, need to obtain their consent before commence the construction. 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.

<b>12.3 Consent/ no objection/ legally bound agreement from the private land ownerships</b>	
Land owners (Department of Railway)	Signing a legally bound agreement between the land owner (SLR) 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 approval

Approvals	Month 1				Month 2			
	W1	W2	W3	W4	W1	W2	W3	W4
<b>Project implementation</b>								
<b>Approval from the District Secretariat</b>								
Submission of application	—							
Project briefing		—						
Respond to comments		—	—	—				
Approvals					—	—		
<b>Approval from planning committee</b>								
Submission of application		—						
Project briefing		—	—					
Respond to comments				—				
Approvals					—	—		
<b>Other approvals</b>								
CEA								
Railway/ RDA		—	—	—				
Forest		—	—	—				
GSMB		—	—	—				
Ministry of Defense (Depends on the requirement)		—	—	—				
Consent/ no objection from the land ownership	—	—						

### 13. 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*).

### 14. 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 Secretariat, Divisional secretary, Railway station master, Other district level 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, Railway station master, AIIB	Meetings, District Coordination Committee, submission of relevant report to sign agreements, approvals and consents
iii. Monitoring reports (baseline and during construction)	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, Railway station master, 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, Divisional secretary, Police, Railway station master, 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
19/05/2021 @ 13.00 hrs	Thalawakele railway station	Station Master Thalawakele railway station  Inspector of Permanent Ways (Railway) Nawalapitiya Region
03/02/2020 @ 13.00 hrs	Way and Works Railway Department	Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project) Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track) Mr. D.W.N.Amarasena, Superintend Engineer (Design)

**Annexure I: Images of the site condition and the consultation**



*Arial view of the mitigation site and surrounding*



*Discussion at the Way and Works Railway Department*



*CEB land located nearby*



*Mitigation area*

## Annexure II: Report on the Stakeholder Consultation: Badulla District

Institution	Name and designation of the contact officer	Concerns raised
Way and Works Railway Department	<p>Mr. H.M.K.W. Bandara, Deputy Chief Engineer (Project)</p> <p>Mr. E.M.S.P.K. Deegala, Deputy Chief Engineer (Track)</p> <p>Mr. D.W.N.Amarasena, Superintend Engineer (Design)</p>	<ul style="list-style-type: none"> <li>✓ This area is under the jurisdiction of the Department of Sri Lanka Railway.</li> <li>✓ The SLR has no objection and states the mitigation is very much needed.</li> <li>✓ Detailed work plan and time schedules must be provided to the SLR by contractor before starting construction activities and keep good relationship between contractor, PMU and SLR.</li> <li>✓ Other concerns raised               <ul style="list-style-type: none"> <li>• A safety officer or flag man of SLR is provided to each mitigation location by SLR.</li> <li>• At least three flagmen should be kept in a site.</li> <li>• Safety structures and sign boards will be provided by SLR.</li> <li>• Flag man or the safety officer has all the responsibilities of the train schedules and stop train in emergency situations.</li> <li>• Workers must be followed his advices and guidance for safety issues.</li> <li>• Material transportation for locations which haven't other road access will be done according to the requests of the contractor</li> <li>• All the cost including railway material transportation, wages of the flagman and other resources from SLR should be bear by the construction contractor.</li> <li>• A proper handing over of the project is required after the mitigation.</li> <li>• SLR will do the maintenance after mitigation.</li> <li>• It is emphasised that during the construction the contractor should use Personal Protective Equipment</li> <li>• At all times, the contractor shall provide safe and convenient passage for train transportation, traffic safety measures, barricades, flagmen and for the night work, lights and illumination should be provided.</li> <li>• The contractor should use temporary toilet facilities</li> <li>• The service infrastructure should be relocated under the supervision of SLR.</li> </ul> </li> <li>✓ It is also stated that construction waste/ excavated materials should not be a nuisance to public/commuters.</li> </ul>

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

**1. Proposed procedure by SLR for approval for implementation of landslide mitigation projects in SLR reservation areas**

- i. The design to be accepted by the SLR: The project implementing agency should submit detailed design report to SLR with a formal request on nature of approvals required. PMU should prepare above documents and should submit the documents to Way and Works of Railway Department.
- ii. Way and Works Railway Department will evaluate the proposal and may call for project briefing. The PMU should provide necessary briefing as appropriate
- iii. On the approval by SLR an agreement will be signed between SLR and Project implementing agency to access the site, erect structures, and implement mitigation works.