



REDUCTION OF LANDSLIDE VULNERABILITY BY MITIGATION MEASURES PROJECT

Site Specific Environmental and Social Management Plan

Site No.139

Ohiya Railway Station, CH 140/20

Badulla District

November 2020

Prepared for:



**ASIAN INFRASTRUCTURE
INVESTMENT BANK**

Prepared by:



National Building Research Organisation

99/1, Jawatta Rd | Colombo 05

Tel: 011-2588946, 011-2503431, 0112-2500354

Contents

1. INTRODUCTION	1
1.1. Project Overview	1
1.2. Intended Users	1
2. DESCRIPTION OF THE PROJECT AND SITE DESCRIPTION	1
2.1. Name of the Site.....	1
2.2. Locational Details	2
2.3. Topography and Land Ownership.....	3
2.4. Meteorology of the area	3
3. LANDSLIDE HAZARD INCIDENT DETAILS	4
3.1. Account of Incident.....	4
3.2. Effects and Consequences of Landslide.....	5
3.3. Description of any remedial measures already undertaken to reduce the potential risk	5
3.4. Evacuation.....	5
3.5. Resettlement (Progress)	5
4. DESCRIPTION OF THE AREA OF THE LANDSLIDE/SLOPE FAILURE AND AREAS ADJACENT TO THE LANDSLIDE AND CURRENT LEVEL OF RISK	7
4.1. Surrounding area of the Slope Failure/ Cutting Failure	7
4.2. Current Level of Risk.....	7
5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT	7
6. BRIEF DESCRIPTION ON THE SURROUNDING ENVIRONMENT WITH SPECIAL REFERENCE TO SENSITIVE ELEMENTS THAT MAY BE AFFECTED BY THE PROJECT ACTIONS	8
7. IDENTIFICATION OF SOCIAL AND ENVIRONMENTAL IMPACTS AND RISKS RELATED TO THE WORKS	9
7.1. Positive Impacts	11
7.2. Negative Impacts	11
8. SITE SPECIFIC RISK ANALYSIS	15
9. SIGNIFICANT ENVIRONMENTAL AND SOCIAL IMPACTS.....	15
9.1. Priority Health and Safety Issues. Specific H&S concerns that require measures that go beyond the standard contractual requirements for contractors	15
9.2. Child Labor and Forced Labor.....	16
10. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN.....	16
10.1. Resettlement Action Plan.....	16
10.2. Evacuation of people.....	16
10.3. Procedure for removal of damaged structures, facilities infrastructure (consent from owners to remove the articles).....	16
10.4. Requirement for compensation for loss of property /uses due to project actions	16

It may require to compensate if any damages happen to the properties of Railway Department during the constructions.	16
10.5. Public awareness and education- needed for following areas.....	16
10.6. Design based Environmental/ Social Management considerations.....	16
10.7. Mitigation of impacts during the construction phase.....	18
10.7.1. Construction contractors’ requirement to comply with environmental and social management during the construction phase	18
10.7.2. Site Specific Mitigation	19
10.7.3. Monitoring requirements specific to the site.....	23
11. PUBLIC AND STAKEHOLDER CONSULTATION - the public consultations that have been and/or will be held	23
11.1. Public Consultation	23
11.2. Stakeholders involved in the consultations any recommendations or agreements reached in the consultations (Refer annexure II).....	24
12. CLEARANCES, NO OBJECTION, CONSENT AND APPROVALS REQUIRED FOR THE IMPLEMENTATION OF THE PROJECT	24
13. GRIEVANCE REDRESS MECHANISM FOR THIS SITE.....	26
14. INFORMATION DISCLOSURE	26

List of Figures

Figure 1- Railway Network in Sri Lanka/ Nawalapitiya Operation Area and Ohiya Railway Station.....	2
Figure 2 – Accessibility to the Location	2
Figure 3- Google image of the proposed landslide mitigation location.....	3
Figure 4 – Climate data of Ohiya based on past 30 years records	3
Figure 5 – Landslide/ slope failure hazard incident location in the site.....	4
Figure 6 – Land-use, General Information, Risk Elements and Cross Section of the location.....	6
Figure 7 – Sensitive elements that may be affected by the project actions.....	9
Figure 8 – Summary of the impacts which are envisaged during project.....	10

List of Tables

Table 1 – Negative impacts and their level of significance	11
Table 2 – Site specific Risk Analysis.....	15
Table 3 – Social and Environmental Consideration in Design Stage	16
Table 4 – Contractor requirement to comply with ES and HS	18
Table 5 – Site Specific ES and HS Mitigation Measures.....	19
Table 6 – Environmental and Social Monitoring Plan – Construction Phase.....	23
Table 7 – Clearances, No Objections, Consent and Approval	24
Table 8 – Tentative Timeline for getting approval	25
Table 9 – Proposed scheme of information disclosure	26
Table 10 – Level of Information gathered through consulting institutions.....	26

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

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 **Ohiya railway station at CH 140/20** (Both side of the railway station) 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.139, Ohiya railway station at CH 140/20, both sides of the railway station, Welimada, Badulla District

2.2. Locational Details

The proposed mitigation site falls under 62A Ohiya GN division of Welimada DS division in Badulla District, Uva Province.

GPS References of the site – 6.81798 °N and 80.84279°E

Elevation – The elevation of the location is around 5872ft (1790m) AMSL. It is the third highest railway station of Sri Lanka, opened in 1893.

Nearest Town to the Site – Boralanda town located around 9.5km away from the site. The station is the 67th station of the Main Line of the Railway network and is operated by Nawalpitiya operation area of Sri Lanka. Ohiya Railway Station is situated between Pattipola Railway Station and Idalgashinna Railway Station on the Main railway line.

Accessibility to the Location –

The distance to the Ohiya railway station from Colombo fort is 231 km through railway line. The mitigation site can be accessed from the Peradeniya-Badulla-Chenkaladi (A5) road or from Colombo-Badulla (A16) road. Boralanda town can be accessed by these roads and when travel around 9.5km from Boralanda town via Ohiya road the railway station and mitigation site can be found.

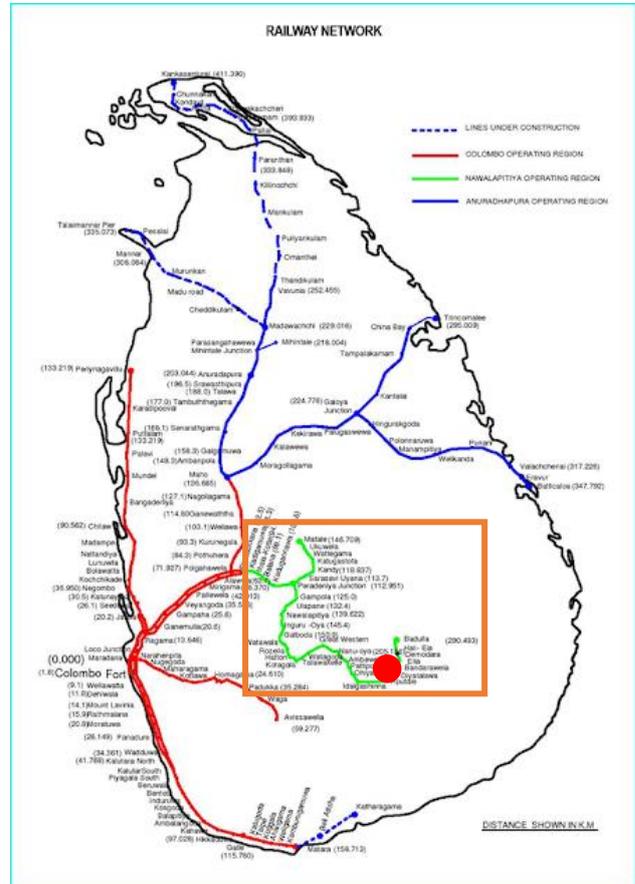


Figure 1- Railway Network in Sri Lanka/ Nawalapitiya Operation Area and Ohiya Railway Station.

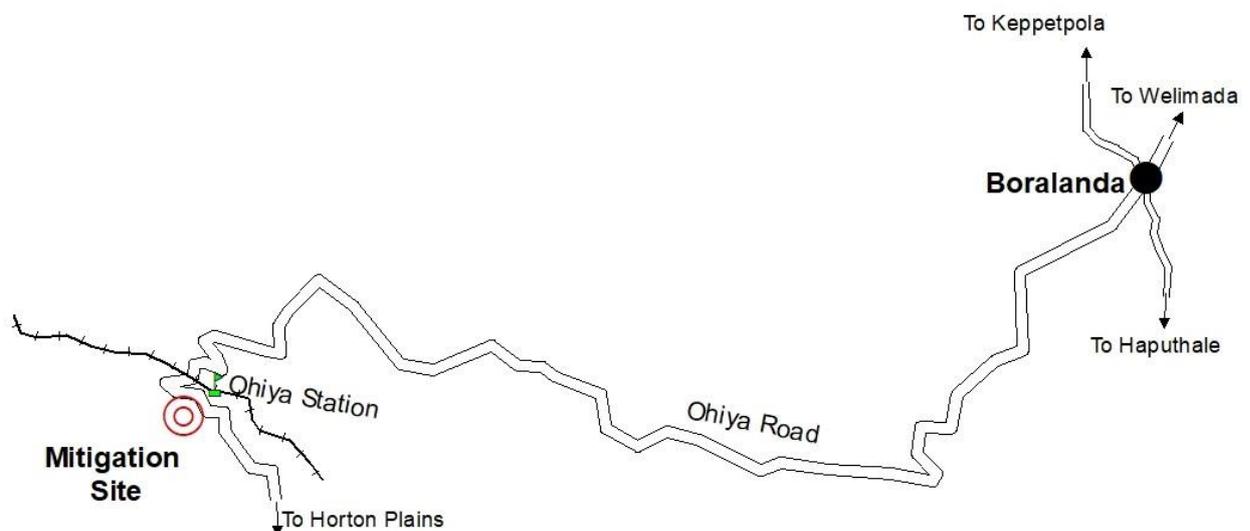


Figure 2 – Accessibility to the Location

2.3. Topography and Land Ownership

The proposed mitigation site is located closer to the Ohiya railway station. The general topography of the site is characterized by vertical cut slopes trending towards the North-East direction. There are two cut slopes closer to railway station and Boralanda – Horton plains road side around 5m of height.

The extent of the land area of the mitigation area is about 1500m². The station is located in a hilly terrain where the natural slope is disturbed and modified several of terraces to gain space for building construction.

The land ownership is belongs to the Railway Department of Sri Lanka and the Department of Forest.

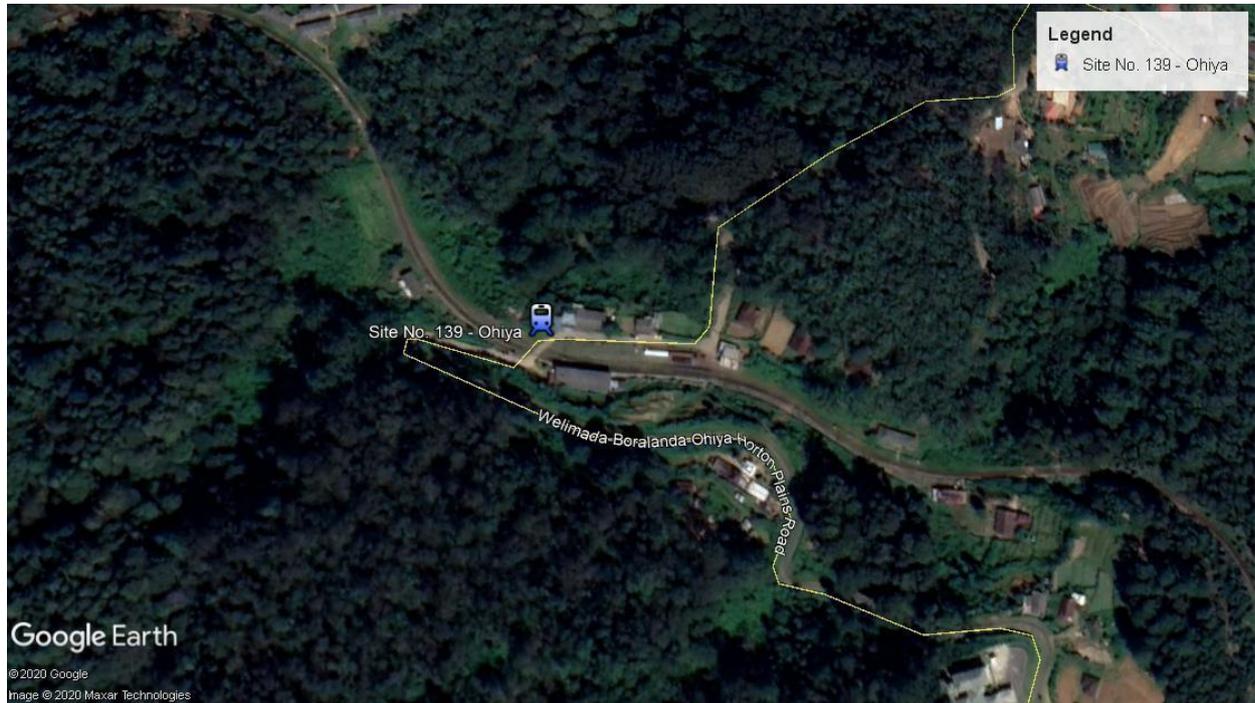


Figure 3- Google image of the proposed landslide mitigation location

2.4. Meteorology of the area

Ohiya has 2 types of climates prevailing, namely the tropical rainforest climate and tropical savanna climate. The average annual temperature for Ohiya is 26°C and there is about 2530 mm of rain in a year. It is dry for 49 days a year with an average humidity of 84% and an UV-index of 6.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Day	25 °C	26 °C	28 °C	28 °C	27 °C	27 °C	27 °C	27 °C	27 °C	26 °C	25 °C	25 °C
Night	16 °C	16 °C	16 °C	19 °C	20 °C	20 °C	20 °C	19 °C	19 °C	18 °C	18 °C	17 °C
Precip	88 mm	166 mm	126 mm	226 mm	213 mm	94 mm	97 mm	123 mm	142 mm	628 mm	406 mm	221 mm

Figure 4 – Climate data of Ohiya based on past 30 years records

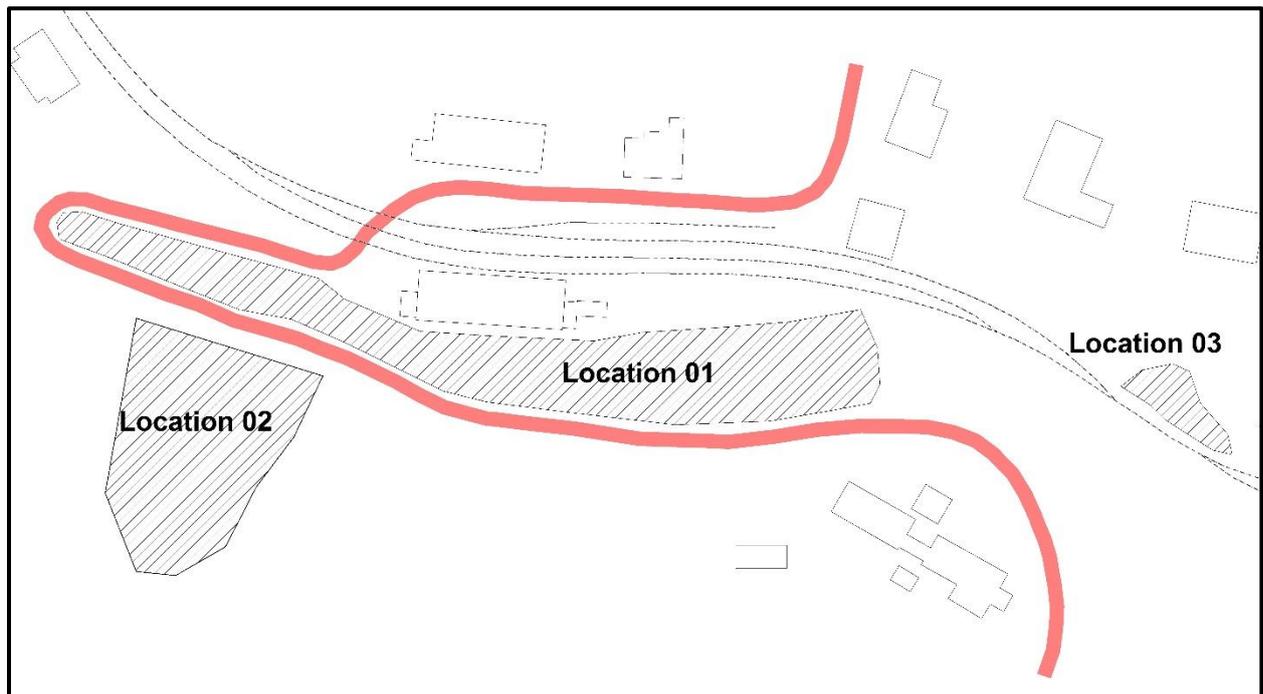
3. LANDSLIDE HAZARD INCIDENT DETAILS

3.1. Account of Incident

Based on the discussions had with station master of Ohiya railway station, it could be identified that a landslide was occurred above the station (near to the temple) in 2002 and soil and debris had been deposited near the station when cleaning the road. Therefore, minor failures is occurring in the area between the railway station and the road due to the accumulation of colluvium soil and debris. Afterward, in 2017 another slope failure has happed near the temple area due to road cut created through slope area when constructing the Boralanda- Ohiya- Horton plains road (the upper part of the road)

Currently, 03 cut slopes could be identified closer to the station where,

- **Location 01** - The debris deposition area beside the railway station (lower part of the station)
- **Location 02** - The road cut failure in upper part of the road
- **Location 03** - And the down slope of the station manager's quarters.



Location 01



Location 02



Location 03

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 station railway line, Boralanda-Ohiya-Horton Plains road forcing risk to passengers, commuters and peoples who are living in downslope and pedestrians of the road. This railway line is the main access path to the households in the RHS of the railway line. Ohiya station and surrounding area is highly tourism attraction zone. Hence, considerable number of commuters, passengers and travelers could be observed in and around this mitigation site.

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

No any 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 - 139 - Badulla- Welimada- Ohiya- Ohiya Railway Station (AIIB Project)

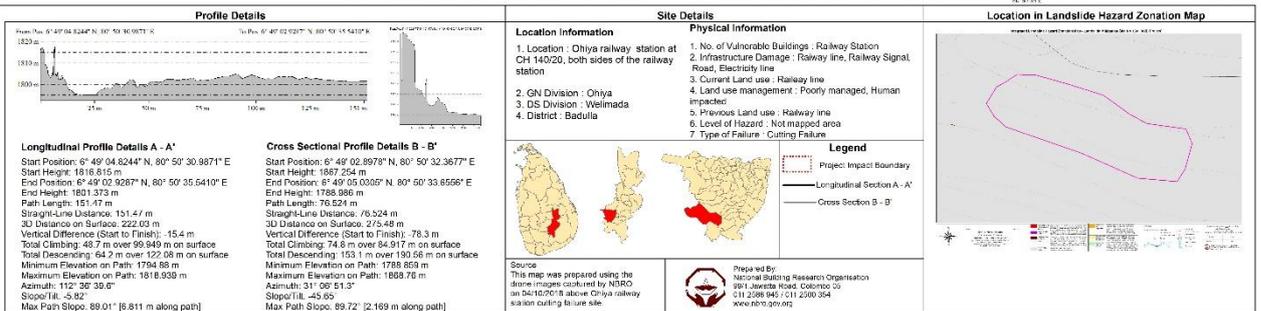


Figure 6 – Land-use, General Information, Risk Elements and Cross Section of the location

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

4.1. Surrounding area of the Slope Failure/ Cutting Failure

The proposed mitigation site is located closer to the Ohiya railway station. The Ohiya railway station, platform and offices, main railway line, signal line, railway signal controlling building and quarters are located within the premises. The area include 100m from the railway line are belongs to railway department on both sides. Around 10 trains stop at the Ohiya railway station on week days and it is less on weekends. About 100-150 passengers use the Ohiya station daily and out of them more than 75% are tourists as per the station manager.

Following features and land-use pattern could be observed surrounding area of the slope failure.

- Boralanda – Ohiya – Horton plains road runs through this location and therefore so many travelers and tourists hanging around the station and passing the sites.
- The upslope area of the road contain dense cultivated forest cover with Eucalyptus trees.
- The downslope of the road consist with railway line and railway station and its properties and buildings which constructed and opened in 1893 during the British period.
- Scattered settlement pattern could be observed in this area. Most of the area is covered with dense commercial forest maintained by Department of Forest.
- There were several small boutiques around the railway station to cater to the needs of local and foreign tourists passing through the area. Few residential houses and quarters of the railway department could be observed around the site.
- There are many famous tourist hot spots where can be accessed via this location namely, Horton Plains National Park, Ohiya Gap/Dondra Watch, Ohiya Forest, The Devil's Staircase, a road which drops down 1,100 m (3,600 ft) in less than 12 kilometres and Rahangala Mountain etc.

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 Boralanda – Ohiya road. The railway passengers, local and foreign travelers, the occupants of the neighboring houses, their livelihood activities and life of the public who use the Ohiys railway station and would be at risk due to this unstable ground section and their smooth functioning will be disrupted.

5. DESCRIPTION OF THE WORKS ENVISAGE UNDER THE PROJECT

The proposed project aimed to ensure that the further subsidence of soil is prevented. The proposed mitigation works will be largely concentrated on unstable land area. Therefore, surface drainage improvement, toe protection with retaining structures 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

The affected site is located within a Railway Station premises. The buildings are located at different elevations.

Following sensitive elements will be at risk due to project actions;

- Neighboring houses and its occupants and their livelihood activities
- Current services and activities of the Ohiya railway station
- Railway commuters
- Railway switches and the railway tracks
- IPW office (Inspector Permanent Way)
- Current services, economic and tourism activities of the area

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



Figure 7a: Neighbouring house with a boutique



Figure 7b: Services of railway station



Figure 7c: Railway passengers



Figure 7d: Quarters



Figure 7e: Residential houses



Figure 7f: IPW office

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

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

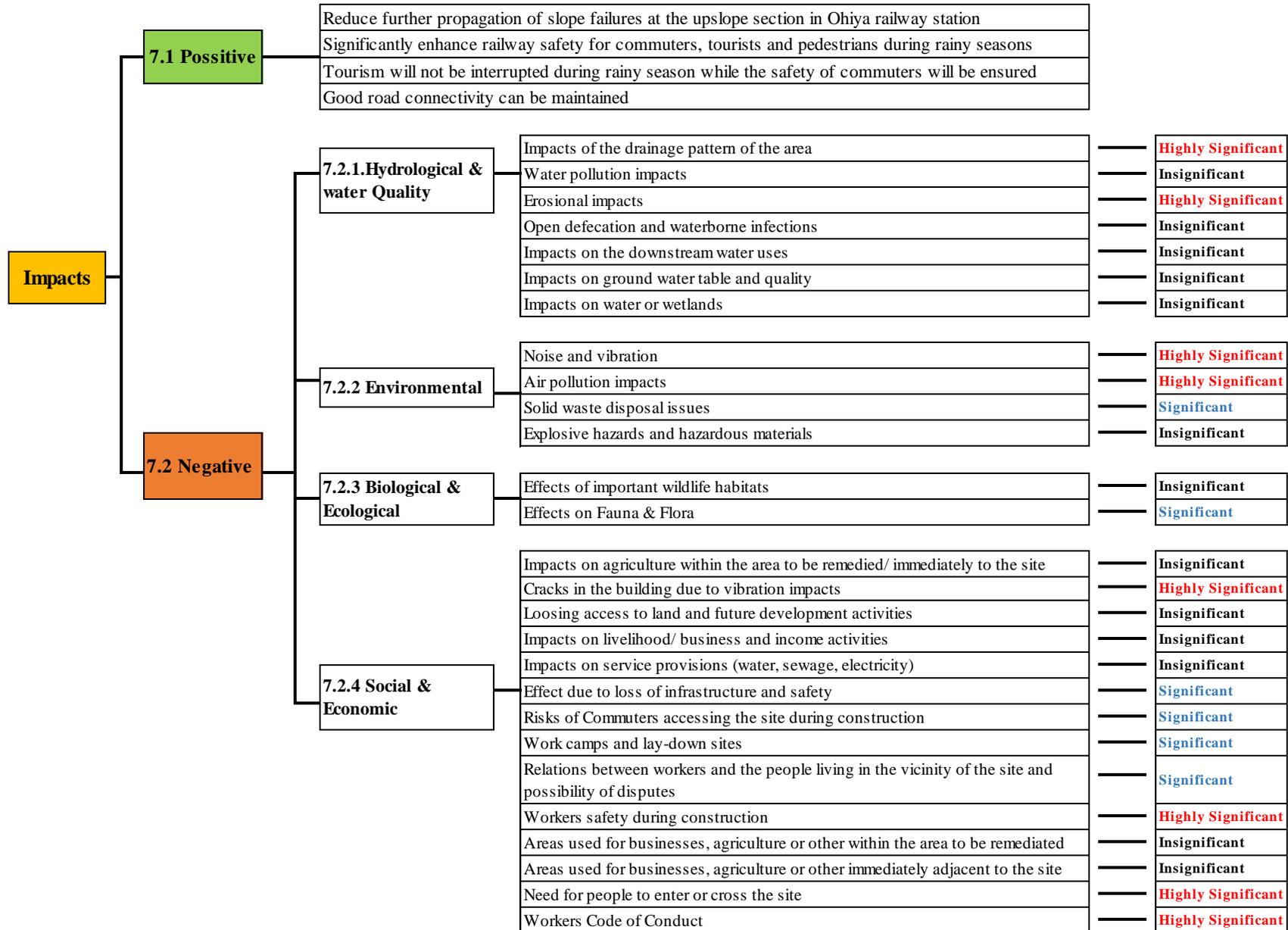


Figure 8 – Summary of the impacts which are envisage during project

7.1. Positive Impacts

- The project will reduce further propagation of slope failures at the upslope section in Ohiya railway station. 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.
- This location is highly tourism attraction destination in the country. Therefore, tourism will not be interrupted during rainy season while the safety of commuters will be ensured.
- The Boralanda-Ohiya-Horton Plains road runs through the mitigation location which connecting many tourism hot spots in the area. With the implementation of project a good road connectivity can be maintained.
- Value addition to the railway station with enhancing the facilities for passengers through incorporating development opportunities with mitigation.

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
7.2.1 Hydrological and water Quality impacts	
7.2.1.1 Impacts of the drainage pattern of the area 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. 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. The mitigation works in this site will focus largely on the drainage improvement. Due to diversions, cut-off drains and increased sub-surface drainage, the premises will have increased flows at higher velocities in rainy periods.	Highly Significant
7.2.1.2 Water pollution impacts It was not observed any stream, canal or water source closer to the mitigation site. Hence, the water pollution impact for this site is insignificant	Insignificant
7.2.1.3 Erosional impacts The project may envisage clearing of surface vegetation exposing soils during rainy period. There was colluvium soil accumulation area behind the railway station to remove the top soil layer and mitigate under this project. 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 disrupted during construction phase. However, as the area exposed is confined to a smaller plot, the erosional impacts are localized but significant. This would be directly impacted to the activities of railway station premises, passengers, travelers and surrounding residential houses.	Highly Significant
7.2.1.4 Open defecation and waterborne infections 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.	Insignificant

7.2.2 Environmental Impacts	
<p>7.2.2.1 Noise and vibration impacts</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 Ohiya railway station and houses with occupants.</p> <p>Vibrations can cause adverse effects on the railway station and other railway building since those were constructed more than 125 years ago. 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>	Highly Significant
<p>7.2.2.2 Air pollution impacts</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.</p> <p>The air pollution impacts from the construction is highly significant during dry periods for the activities of the railway station, tourists, workers, occupants of the neighboring houses, commuters and pedestrians as the proposed site is located closer to railway station and occupied houses.</p>	Highly Significant
<p>7.2.2.3 Solid waste disposal issues</p> <p>During the construction phase, two types of solid waste will be generated; spoils resulting due to construction activities and domestic refuse generated by the labour force engaged in construction work.</p> <p>This mitigation site is located in a pleasant, greenery, historically important and tourist attraction location. Haphazard disposal of solid waste can pollute the environment and soil, and leave various environmental impacts if proper disposal mechanism is not in place during the construction period. The effect is significant.</p>	Significant
<p>7.2.2.4 Explosive hazards and hazardous materials</p> <p>Since the affected area has no rock boulders, explosives may not be used and the rock blasting is not envisaged.</p>	Insignificant
7.2.3 Biological /Ecological Impacts	
<p>7.2.3.1 Effects of important wildlife habitats</p> <p>There are no forested/ wild-life reservation areas within the project influence area with high biodiversity, or habitat fragmentation. The site is surrounded by dense cultivated commercial forest cover (Eucalyptus). Hence, the small mammals such as rabbits, wild boar etc. and bird species would be there. The contractor's workforce may be engaged hunting and pouching in this area. Therefore, in this context the project will have an impact on the biodiversity</p>	Insignificant
<p>7.2.3.2 Effects on Fauna & Flora</p> <p>Majority of the trees found in the area are not endemic, threatened and identified in the red list of IUCN.</p> <p>But, valuable timber species may be removed from the system and may damage the local ecosystems and flora. Further, some construction activities may engage in accidental fire, or intentional fires by setting fire to vegetation, or throwing cigarette buds, or burning solid wastes can trigger forest fires. This risk is highly significant in dry season in site having forests in the proximity.</p>	Significant

During the project implementation there will be requirement of cutting/ uprooting trees, some of may be regulated under Felling of Trees (Control) Act. Hence the removal of them may be required approval from the relevant authorities especially from the Department of Forest. Valuable timber species may be removed from the system unintentionally/intentionally if proper supervision is not done by the Environmental and Safety Officer with relevant knowledge on these species.	
7.2.4 Social and Economic Impacts	
<p>7.2.4.1 Impacts on agriculture within the area to be remedied/ immediately to the site</p> <p>There are no agricultural practices within the area to be remedied or immediately to the site.</p>	Insignificant
<p>7.2.4.2 Cracks in the building due to vibration impacts</p> <p>Ohiya railway station, other railway buildings, commercial shops and residential houses are located close to the unstable area. Especially, the railway station which was constructed in 1893 during the British period has historical and architectural value is located very closer to the mitigation site. During the construction heavy machinery will be used and the vibration can cause cracks in these buildings. Vibration can affect the stability of the nearby buildings.</p> <p>In this regard it is strongly advised to ensure that the vibration levels are being kept within the tolerable limits recommended by the Central Environmental Authority.</p>	Highly Significant
<p>7.2.4.3 Loosing access to land and transport infrastructure</p> <p>There will be no significant impact to the land owners with regard to loosing access to the land or loss to valuable uses.</p>	Insignificant
<p>7.2.4.4 Impacts on livelihood/ business and income activities</p> <p>There is no significant impact on livelihood, business or income activities of the area</p>	Insignificant
<p>7.2.4.5 Effect due to loss of infrastructure and safety</p> <p>The mitigation site is located at Boralanda- Ohiya- Horton Plains road and also closer to the railway station with rail line crossing. Although it was not observed heavy traffic congestion in this area, significant number of vehicles used to transport tourist and local commuters pass through the area to reach the Horton plains and other tourist destinations.</p> <p>Hence, project activities can obstruct the traffic and pedestrian movements during the day time causing traffic congestion. This situation would be critical since the railway station also located nearby. It is essential to make special traffic arrangement during construction phase with the assistance of Road Development Authority and Railway Department to minimize the effects.</p>	Significant
<p>7.2.4.6 Risks of people accessing the site during construction</p> <p>The site may have machinery with high hazard risk such as drilling, boring and excavation machines etc. Site may use high voltage power for operation of certain machinery. Construction may use materials such as metal aggregates, steel etc. which can be injurious under improper storage and handling.</p> <p>Only skilled workforce will be safe working in this environment. If unauthorized persons access the site, they may be at risk of being subjected to accidents by operating heavy machinery.</p> <p>There are so many vehicles, pedestrians, children and tourist passing this area. Hence, careless operation of machinery can cause fatal injuries and accidents to pedestrians and tourists.</p>	Significant

<p>7.2.4.7 Work camps and lay-down site requirements</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>	<p>Significant</p>
<p>7.2.4.8 Relations between workers and staff / people living in the vicinity of the site and possibility of disputes</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 neighbouring community and the railway staff of the Ohiya station. Although the workers who would engage in such issues will be rare, even few possibilities cannot be ignored.</p>	<p>Significant</p>
<p>7.2.4.9 Workers safety during construction</p> <p>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>	<p>Highly Significant</p>
<p>7.2.4.10 Areas used for businesses, agriculture or other within the area to be remediated</p> <p>There are no areas used for business, specific agriculture practices or other within the area to be remediated.</p>	<p>Insignificant</p>
<p>7.2.4.11 Areas used for businesses, agriculture or other immediately adjacent to the site</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>	<p>Insignificant</p>
<p>7.2.4.12 Need for people to enter or cross the site</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>	<p>Highly Significant</p>
<p>7.2.4.13 Code of conduct</p> <p>The site is located within Railway station 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>	<p>Highly Significant</p>

8. SITE SPECIFIC RISK ANALYSIS

Table 2 – Site specific Risk Analysis

Risk	Affected group	Risk level
1. Facing railway accidents when working / shifting in between railway tracks.	Workers	Moderate
2. Transporting materials and machineries	Workers	Very high
3. Facing railway accidents during constructions at night time	Workers	Moderate
4. Accidents from the construction activities and materials placed on the railway tracks	Railway commuters Employees of the station	Moderate
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	Very high
7. Work adjacent to electrified lines, signal lines	Workers	Moderate
8. Site Working – Working in poor visibility	Workers Railway commuters	High
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

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

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 Ohiya railway station constructed in 1893 which has historical and architectural value located nearby the site 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 if any damages happen to the properties of Railway Department during the constructions.

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 premises specially the occupants of the households in the downslope area and commuters using the railway station.
- ii. Requirement for special awareness for commuters, railway station users and the people passing through the station with potentially 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
i. Natural resource management and resource optimized designs Project specific designs should be considered to eliminate mass clearing of vegetation and minimum number of removals of grown tree species. Sufficient emphasis should be made to consider conservation of trees if important tree species are found.	Moderate

<p>ii. Site Planning During site planning it is necessary to be cautious on possible re-activation of slope failures and movements of soil masses. Hence vehicle parking sites, material storage and temporary shelters etc. should not be installed in the danger zones of the slides. The site is located in a very limited space and a closer to the railway station. 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.</p>	<p>Very High</p>
<p>iii. Habitat connectivity and animal trails If large fractions of vegetation are required to be cleared in ecologically fragile habitats as for permanent structures or for access, or if deep drains etc. are to be made the designs should include habitat connectivity features, animal trails and vegetation strips and etc. even if the impacts are localized.</p>	<p>Very Low</p>
<p>iv. Conservation of water resources If extraction of water is involving as a mitigation measure, as the extracted water is in a good quality and yield it can be considered as a source of water for downslope houses who are currently depending on less reliable local water sources.</p>	<p>Low</p>
<p>v. Consideration of opportunities for harness development potentials The mitigation site is located in a highly local and foreign tourist attraction location. But, the services provided within premises for tourist and travelers are very poor. Hence, significant attention should be given in the design to harness the development potential of this premises and development of railway station as service centre for tourists. The conceptual design for this site is attached in Annexure IV.</p>	<p>Very High</p>
<p>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. 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>vii. Consideration of green environmental features As many of the mitigatory works are carried out in well maintained premises, 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.</p>	<p>Very High</p>
<p>viii. Workers and community safety Activation of slide may occur during construction phase and may pose threat to workers, passengers and the community. Therefore, design based safety consideration such as berms, safety nets, safety fencing etc. should be considered specific to safety of community.</p>	<p>High</p>
<p>ix. Erosion control structures 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 storm water drains. Hence the design should adequately consider flow speed breakers to reduce erosive flows of slopes.</p>	<p>High</p>

<p>x. Low post maintenance and operation designs</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>	Moderate
---	----------

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
2002. Environmental and Social Monitoring		
2002.2 1)	Storage on site	Highly Relevant (Railway station, nearby buildings)
2002.2 2)	Noise and Vibration	Highly Relevant (Railway station, staff, commuters)
2002.2 3)	Cracks and damages to the buildings	Highly Relevant (Railway station, railway buildings)
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
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	Relevant
<p>Relevant: The section is relevant to the site as a common ESMP applicable to any site</p> <p>Highly relevant: The contractor should pay special emphasis in the preparation of environmental method statements to ensure that the relevant ESMP is implemented specific to the site</p> <p>Possibly relevant: This ESMP will be triggered if the site come across with relevant aspect during project implementation</p> <p>Not relevant: The section may not be relevant to this site under disclosed conditions</p> <p>Optional: require to be implement if needed only</p> <p>Refer site specific monitoring plan: Contractor is obliged to carry out monitoring as specified in the site specific monitoring plan in addition to monitoring requirement indicated in contractors ESMP</p> <p>Reference: Contractors Obligation for implementation of ESMP</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>i. Avoid train accidents / possible emergency situations during construction</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>ii. Traffic management and safety</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 lamps etc. are strongly recommended at this site. Flagman of the Railway Department is responsible signaling the in and out trains</p>	Construction	Construction Contractor and Railway Department

through the stations according to the requirements of the construction activities.		
<p>iii. Impacts on railway transport infrastructure (especially temporary loss of road or rail access, risks of traffic congestion)</p> <p>A good traffic control should be implemented in the construction stage. As there are road bends closer to the 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>iv. Minimize erosional impacts during construction</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>v. Planning project activities inside the sites</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>vi. No Entry Zone</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>vii. Machinery and material transportation</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>viii. Noise and vibration control</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>ix. Disposal of construction waste</p> <p>The contractor should pay special attention with respect to disposal of construction waste. This site is located within a public place in a rural landscape with a pleasing environment. It is also a place that attracts local and foreign tourist.</p> <p>Hence, 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 railway station 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.</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>x. Dust and aerosol control screens</p> <p>The Contractor must ensure that dust generation is mitigated and will not annoy commuters, tourists 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>xi. Water for construction</p> <p>Water for construction should be obtained only from approved places. . If contractor intends to use water from the railway station, it should be done through the consent of Ohiya railway station master.</p>	Construction	Construction Contractor
<p>xii. Priority Health and Safety Issues</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"> i. Prepare a special Occupational Health and Safety Management Plan prior to commencement of construction activities 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. iii. Adoption of standard worker safety methods iv. Provision of personal protective equipment (PPE) such as safety boots, helmets, protective clothing goggle etc. 	Construction	E & S Unit of PMU contractor

<ul style="list-style-type: none"> 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. 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. viii. Safety barriers and safety nets should be installed at places of risk to protect workers and community from boulder falling risk ix. Proper emergency management unit for other accidents (first aids facilities, safety items, hospitalization facilities and transportation facilities) should be maintained for this site. 		
<p>xiii. Safety structures/sign boards</p> <p>During construction phase adequate safe fencing should be established to prevent potential falling risk of workers from upslope areas.</p> <p>As the railway station is located within the mitigation site, the tourists and passengers can stay around the place. Hence, 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>xiv. Use of sanitary facilities of contractor's workforce</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>xv. Working hours</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>xvi. Need for people to enter or cross the site</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>xvii. During construction good housekeeping should be maintained to minimize visual pollution</p>	Site preparation & construction	Construction Contractor
<p>xviii. Workers code of conduct</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	-
	Pre crack survey for the buildings	Once**
	Ground vibration	Once*
	Air quality: particulate matter	Once*
	Background noise measurement	Once*
ii. During construction	Water quality	-
	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	Stream water quality – Comparison with ambient water quality standards published by the CEA, 2017 Pre crack survey of the 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. PUBLIC AND STAKEHOLDER CONSULTATION - the public consultations that have been and/or will be held

11.1. Public Consultation

The occupants and the shop owners living closer to the mitigation site were consulted during the field visit. They have built their house and shops in lands belong to the Railway Department on lease basis and they all run a small shop to cater to local and foreign tourists passing through the area. 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 Ohiya 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. Furthermore, following are the main factors he mentioned during the discussion to consider when planning and designing the mitigation measures.

- About 150 passengers use this station daily and 75% of them are foreign tourist. But, after a long journey they do not have proper sanitary facilities and waiting areas to rest. It is therefore important to integrate such facilities with the mitigation in order to provide better service to tourist.
- The climate of this area is suit for horticulture and therefore nature based development could be proposed for this area to ensure the aesthetic beauty.
- This station was built during the British rule in 1893 and therefore it has a historical and architectural value. It is therefore important to design the mitigation measures as not to interfere with such values.
- The railway department can manage the maintenance of such proposed building and sanitary facilities.

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
12.1 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 Welimada Pradeshiya Sabha.
12.2 Approval from the state lands owners relevant to the project	
Central Environmental Authority	Approval from the Central Environmental Authority is required as the project should comply with National Environmental Regulations

Department of Forest Department of Wildlife Conservation	As the Eucalyptus forest area owns by the Department of Forest within the site, approval is needed. As there are not wildlife habitat in this area, the wildlife conservation approval is not needed.
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).
Welimada Pradeshiya Sabha	Approvals from Welimada 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.
12.3 Consent/ no objection/ legally bound agreement from the private land ownerships	
Land owners	Signing a legally bound agreement between the land owners 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
Project implementation <i>Approval from the District Secretariat</i> Submission of application Project briefing Respond to comments Approvals	—	—	—	—	—	—	—	—
<i>Approval from planning committee</i> Submission of application Project briefing Respond to comments Approvals		—	—	—	—	—	—	—
Other approvals 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
05/09/2020 @ 12.00 hrs	Ohiya railway station	Station Master Ohiya railway station
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



Consultation with railway staff and occupants



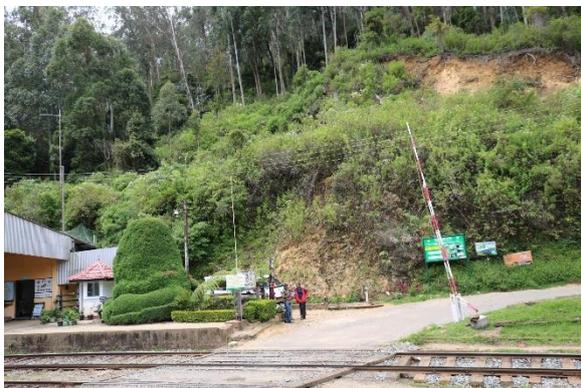
Discussion at the Way and Works Railway Department



Mitigation area



Ohiya Railway Station



Mitigation area



Shops and residential houses nearby

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"> ✓ This area is under the jurisdiction of the Department of Sri Lanka Railway. ✓ The SLR has no objection and states the mitigation is very much needed. ✓ 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. ✓ Other concerns raised <ul style="list-style-type: none"> • A safety officer or flag man of SLR is provided to each mitigation location by SLR. • At least three flagmen should be kept in a site. • Safety structures and sign boards will be provided by SLR. • Flag man or the safety officer has all the responsibilities of the train schedules and stop train in emergency situations. • Workers must be followed his advices and guidance for safety issues. • Material transportation for locations which haven't other road access will be done according to the requests of the contractor • All the cost including railway material transportation, wages of the flagman and other resources from SLR should be bear by the construction contractor. • A proper handing over of the project is required after the mitigation. • SLR will do the maintenance after mitigation. • It is emphasised that during the construction the contractor should use Personal Protective Equipment • 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. • The contractor should use temporary toilet facilities • The service infrastructure should be relocated under the supervision of SLR. ✓ It is also stated that construction waste/ excavated materials should not be a nuisance to public/commuters.

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.

Annexure IV: Conceptual Ohiya Squire Development Plan

Reduction of landslide vulnerability by mitigation measures an opportunity for harness development potential:

Introduction

National Building Research Organisation (NBRO) with the financial assistance of the Asian Infrastructure Investment Bank (AIIB) perform landslide mitigation, rectifying unstable slopes in locations at high risk of landslides. Mitigation of landslide threats mainly associated with infrastructures: railway, highways, roads, and communities. The project covers landslide mitigation of 147 sites covering 11 districts of 06 provinces of the country.

During the scoping exercise it was revealed that the environmental & social setting, and health & safety conditions are more site specific. Therefore, site specific environmental and social assessments followed by Site Specific Environmental and Social Management Plans (SSE&SMP) was undertaken for each site. During this assessments it is found that landslide mitigation doesn't pay attention to harness the development potentials associated with the location, facilitating or creating space for development. Some of such development potentials identifies are: town expansion by means of providing spaces for market facilities, establish service centers or recreational facilities and create space to present opportunities for people to engage in socioeconomic activities.

The Ohiya railway station has been identified as one of the landslide mitigation site. Owing to the findings of site investigations and public consultation development potential was identified. Therefore, Ohiya Squire Development Plan is drafted to mainstream potential development activities into the landslide mitigation that would provide more socioeconomic benefits to the society parallel to land slide risk reduction.

Landslide Mitigation at Ohiya railway station

Owing to the discussions had with Ohiya railway station master, landslide occurred above the station (near to the temple) in 2002. As the result soil and debris deposited near the station due to clearing of road. Minor slope failures occur in the area between the railway station and the road due to the accumulation of colluvium soil and debris. In 2017 another slope failure happed near the temple area due to road cut created through slope area with the construction of Boralanda- Ohiya- Horton plains road (the upper part of the road).

At present, 03 cut slopes could be identified closer to the station as below;

- **Location 01** - The debris deposition area beside the railway station
- **Location 02** - The road cut failure in upper part of the road
- **Location 03** - Down slope of the station manager's quarters



Figure 02 – Mitigation Locations in Ohiya Railway Station Site

Following landslide mitigation measures are proposed to undertake at this site.

- Construction of surface drainage system including cut-off drain and cascade drain.
- Construction of retaining wall along the debris deposition area beside the railway station.
- Soil nailing.
- Earth excavation to reduce the top load of the deposition area.

Proposed Ohiya Square Development Plan

Development Potentials

Ohiya railway station is located at tourism destination. There are many prominent tourism hot spots at the surrounding of Ohiya railway station namely; Horton Plains National Park, Ohiya Gap/Dondra Watch, Ohiya Forest, The Devil's Staircase, a road which drops down 1,100 m (3,600 ft) in less than 12 kilometres and Rahangala Mountain etc. Those tourism hot spots can be accessed via Ohiya station.

Therefore, many local and foreign tourists ~~hang~~ moving around and passing through this area. Station master reveals about 100-150 passengers use the Ohiya station on daily basis. Of those passengers more than 75% are tourists. Hence, development of this area as tourist center along with the land slide risk reduction would provide more socioeconomic benefits to the society and to local and foreign tourists as well.

Development Needs

Following development needs were identified through the site investigations, analysis and public and institutional consultation;

- Although about 100 foreign tourists visit this station daily by train there is no appropriate place for waiting, changing of clothes and relaxing within the premises after a long journey.
- Ohiya station is located about 9km from the Boralanda town and 10km from the Horton Plains. All the way from Boralanda to Horton Plains, there is no any proper place available local and foreign tourists for relaxing after long journey by road.
- Many vehicles could be seen around the railway station to pick tourists. Due to the lack of proper parking spaces, tourist transport vehicles use the main road for parking and generate traffic congestion in the area.

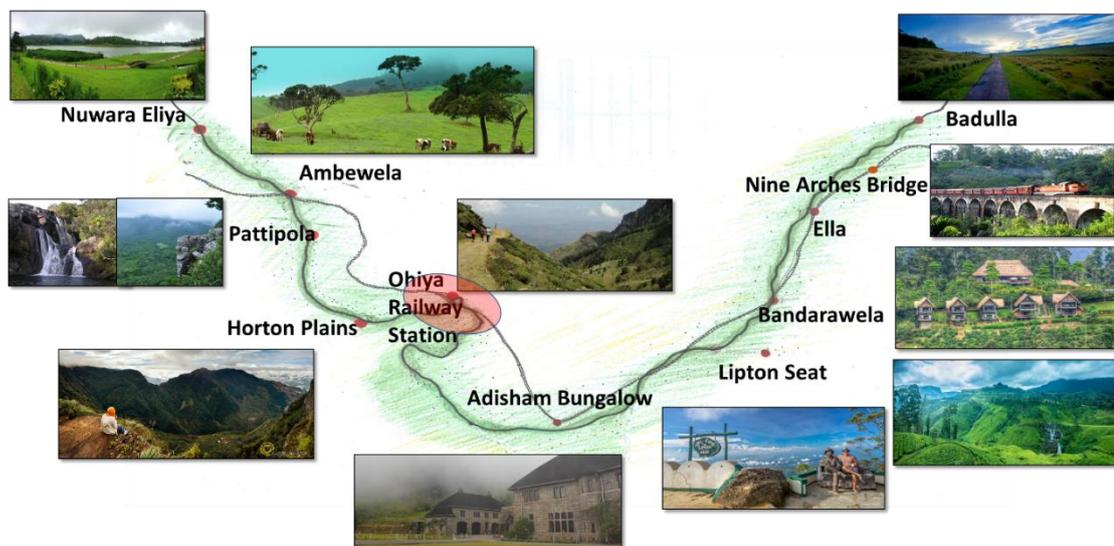


Figure 03 – Tourism hot spots around the mitigation site.

Proposed Project Actions

By understanding the development potentials of the area, proposed Ohiya Square Development mainly focus on following aspects;



Figure 04 – Proposed action plan for the mitigation site

Zone 01 – Parking Area – The narrow strip is proposed for the parking lots for Tourist pickups, Hiring vehicles, and Local tourists.

Zone 02 – Semi-open Area – After completing the slope mitigation measures at the rear side of the station about 400m³ of flat land will be created. It is proposed to create semi-open area in this premises with waiting area, relaxing area and changing room for local and foreign tourist, waiting area for drivers, information center and some small cafeteria.

Zone 03 – Nature Based Mitigation with Garden Area – Nature based landslide mitigation measures are proposed in this area comprise of garden area for leisure and recreation purpose.

Zone 04 – Observation Deck – Observation and viewing deck for commuters and train lovers.

The ownership of the proposed buildings and structures are belongs to Department of Railways. Station master agreed to continue the maintenance measures of proposed area.



Figure 05 – 3D Sketch of proposed actions

