Initial Environmental Examination

June 2017

SRI: Second Integrated Road Investment Program

Uva Province

Prepared by Road Development Authority, Ministry of Higher Education and Highways for the Government of Sri Lanka and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 30 May 2017)

Currency unit	–	Sri Lanka Rupee (SLRl}
SLR1.00	=	$ 0.00655
$1.00	=	Rs 152.63

LIST OF ABBREVIATIONS

ABC	-	Aggregate Base Course
AC	-	Asphalt Concrete
ADB	-	Asian Development Bank
BIQ	-	Basic Information Questionnaire
CBO	-	Community Based Organizations
CEA	-	Central Environmental Authority
CW	-	Carriage Way
DCS	-	Department of Census and Statistics
DoF	-	Department of Forest
DOI	-	Department of Irrigation
DSD	-	Divisional Secretary Divisions
DWC	-	Department of Wildlife Conservation
EC	-	Environmental Checklist
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EPL	-	Environmental Protection License
ESDD	-	Environmental and Social Development Division
GDP	-	Gross Domestic Product
GEF	-	Global Environment Facility
GND	-	Grama Niladhari Divisions
GoSL	-	Government of Sri Lanka
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redress Mechanism
GSMB	-	Geological Survey and Mines Bureau
IEE	-	Initial Environmental Examination
iRoad	-	Integrated Road Investment Program
iRoad 2	-	Second Integrated Road Investment Program
LA	-	Local Authority
LAA	-	Land Acquisition Act
MC	-	Municipal Council
NAAQS	-	National Ambient Air Quality Standards
NBRO	-	National Building Research Organization
NEA	-	National Environmental Act
UP	-	Uva Province
NWS&DB	-	National Water Supply and Drainage Board
PIC	-	Project Implementation Consultant
PIU	-	Project Implementation Unit
PRDD	-	Provincial Road Development Department
PS	-	Pradeshiya Sabha
RDA	-	Road Development Authority
ROW	-	Right of Way
SSEMAP	-	Site Specific Environmental Management Action Plans
TOR	-	Terms of Reference

TEEMP	-	Transport Emissions Evaluation Model for Projects
UNEP	-	United Nations Environment Program

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EXECUTIVE SUMMARY

A. Introduction

1. The Government of Sri Lanka (GOSL) places a great emphasis on the improvement of rural road network in the country and to improve transport connectivity between rural communities and socioeconomic centers. In this regard, the Road Development Authority (RDA) under the Ministry of Higher Education and Highways, has proposed Second Integrated Road Investment Program (iRoad 2 Program) with the aim of developing rural communities as rural hubs according to their population and development potential. GOSL has given special emphasis on economic development in Uva Province (UP) by allocating both national and foreign fund resources under short, mid and long term plans.

2. The broad objective of the project is to improve the connectivity within the rural road network with the provincial and national road network in the UP and to reduce cost and journey time and improve reliability of access. In this manner it is intended to enhance opportunities for rural population for economic growth and income generation align with the nationwide economic and social development. In order to achieve these objectives, upgrading and maintaining the existing roads to all weather standards, surfacing the existing pavement with Asphalt Concrete (or concrete) if the present surface failures occurs, repair or reconstruct of damaged culverts and other cross drainages, introduce earth drains for all road sections and built up drains where necessary and remove any irregularities that are on the existing vertical profile, there by improve the vehicle operating speeds while ensuring safety of road users will be implemented. The proposed improvement will be limited along the existing Right Of Way (ROW).

3. Under the current program, around 1300 km of roads totaling to around 340 road sections located within Monaragala and Badulla Districts of UP will be upgraded and maintained to all-weather standards. Majority of these roads are currently governed by Pradeshiya Saba of all three Districts while rest are governed by the MC, UC, PRDA and RDA. The identified roads have not been rehabilitated properly for a prolong period, therefore the existing surface condition, drainage facilities, structures and width of the carriageway are not appropriate for long term usage and create many environmental and social issues such as soil erosion, sedimentation, stagnation of water, temporary flood and pollution of air quality in the area.

4. RDA has discussed with ADB to finance iRoad 2 program under a time slice Multi tranche Financing Facility (MFF) similar to iRoad program which is currently implemented in Southern, Central, Sabaragamuwa, North Central, North Western Provinces and Kalutara District in Western Province. The program will rehabilitate and update selected rural roads in Northern Province (NP), Eastern Province (EP), Uva Province and Western Province (WP). Rehabilitation and upgrading work will be carried out for 2 years in all roads while maintenance of PS, PRDA roads will be carried out for a period of 3 years and for RDA roads it will be for 5 years.

5. This report presents the findings of Initial Environment Examination (IEE) of UP. The report was prepared based on the field screening process of all identified roads in UP as a requirement of the Survey and Preliminary Engineering Work (SAPE work). Skills International (Pvt) Ltd on behalf of RDA was assigned to carry out all the field work and preparation of Environment Checklists and IEE Report of proposed roads of Uva Province.

6. The main objective of the IEE report is presenting a comprehensive account on existing environment condition of proposed project area in terms of Physical, Ecological, Economical and

Social environment. Further identification of both potential positive and negative environment and social impacts during the pre-construction, construction and operation stages of the project, propose suitable measures to be implemented against anticipated negative impacts and to enhance the positive impacts have been incorporated as specified in the ToR. The common Environment Management Plan (EMP) and Environment Monitoring Plan (EmoP) with recommended institutional arrangement for implementation, cost and monitoring throughout the project cycle is also included in the report. In addition public views and suggestions regarding the proposed project are also included in the IEE report to ensure the concerns of public are included during the detailed design of these roads.

7. Key national environmental laws and regulations followed during the environmental assessment includes; National Environment Act No. 47, National Environmental (Protection and Quality) Regulation No. 1 of 1990, National Environmental (Ambient Air Quality) Regulations,1994, National Environmental (Noise Control) Regulations No.1 of 1996, Fauna and Flora Protection Act No. 2 of 1937, Forest Act No. 34 of 1951, Felling of Trees Control Act No. 9 of 1951, Soil Conservation Act No. 25 of 1951, Explosives Act No. 36 of 1976, Water Resources Board Act, No. 29 of 1964, Urban Councils Ordinance No. 61 of 1939, Agrarian Development Act No. 46 of 2000 (Section 32). Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 and National Thoroughfares Act No. 40 of 2008 among many others. Apart from that several International Agreements and Conventions were considered during this investment program.

B. Methodology

8. Initially, the Environmental Checklist (EC) for each road was prepared based on the instructions given in the Environment Assessment Review Framework (EARF). Based on the findings, one Rapid Environmental Assessment (REA) checklist was prepared for the province as required by the ADB SPS and accordingly the proposed project was categorized as environmental category B. This was followed by preparation of IEE.

9. Field assessment of the projected roads was carried out during the period 1st of November 2016 to 15th March 2017. Under the environmental assessment procedures outlined in the EARF, following environmental criteria were used for road selection: i) no category A project was included; ii) no project roads in part or whole inside a protected area were selected under the program; iii) project roads adjacent to protected areas or sensitive location were only considered if there is no widening of the road ROW; iv) minimal impact of rehabilitation on sensitive ecological habitat. During the field survey both environmentally and public sensitive places located beside the roads and land use pattern of the project area were recorded. In addition, road side utilities and trees with 60cm Girth at Breast Height (GBH) or more located within 2 m corridor from the edge of the carriageway on either side were also documented.

10. Secondary data for the preparation of IEE was obtained from literature survey, information collected from Divisional Secretaries Divisions and relevant government agencies {RDA, CEA, Department of Wildlife Conservation (DWC), Department of Forest (DOF), Department of Irrigation (DOI), Department of Census and Statistics (DCS),Department of Coast Conservation (CCD)} and their authorized websites.

C. Description of the Existing Environment

11. This section describes the information on Physical, Biological and Social environment with respect to Uva Province.

1. Physical Environment

12. **Topography, Geology and Soil**: Badulla is located towards the East of the Central highlands. The physical landscape of the district is also complex with mountain ranges, divided plateaus and narrow valleys. Geologically the district belongs to the rock formation of highland series. Soil types in the district include Red Earth and Brown Loams, Red-Yellow Podsols and Reddish Brown soils. Topographically Monaragala district is in a transitional zone within central highlands to flat lowland. Three terrain types could be identified in the district which are highly mountainous, hilly- steep & rolling and undulating & flat terrain. There are two soil groups in the district, namely Reddish Brown Earth and Red Yellow Padzolic soils.

13. **Mineral resources**: The common mineral resources found in the province include sand, feldspar, dolomite, mica & gemstone. Monaragala district is rich with several types of mineral deposits such as feldspar, gold, graphite, granite, magnesite, mica, vein quartz, quarts and gem. Common mineral resources in Badulla district include sand, mica deposits and crystalline lime stone deposits. Moreover, metal quarrying, dolomite, lime-kilns and Gem mining are found within the district.

14. **Climate:** The average annual rainfall in Badulla district varies from 900 mm to over 2,500 mm. Rainfall receives in four season such as first inter monsoon (March-April), Southwest Monsoon (July-September), second inter monsoon (October-November) and Northeast monsoon (December-January). Partial drought occurs very often during the months of February to July. The average annual temperature of the district varies between 16- 30o C. The total rainfall in Monaragala district ranges from 1300- 1800 mm per year. The two rainy seasons extend from early October to late January and from late March to late May respectively. Over 84% of rain is received during the seven rainy months of October to January and March to May. The annual temperature varies from 21.6 – 35 ^{o}C. The mean annual relative humidity in the district varies from 75% at diurnal and 86% during the night.

15. **Water Resources**: Uva province is rich with water resources including small and large rivers, streams, and waterfalls. In Badulla district, many head streams of rivers such as Mahaweli, Walawe, Menik and Kumbukkan, Badulu and Loggal Oya start from hills such as Welimada plateau and Namunukula range and create important waterfalls such as Bambarakanda Falls, Diyaluma Falls, Dunhinda Falls and Rawana Ella. In Moneragala districts, there are seven major river basins namely Heda Oya, Kubukkan Oya, Wila Oya, Menik Ganga, Kirindi Oya, Malala Oya and Walawe.

16. **Air Quality, Noise and Vibration**: Majority of the Identified roads in the province traverses through rural, residential and agricultural areas. Currently there are several small and medium scale industries located within the province but effect of them on air quality is very low. The vehicular usage and other factors are also not considerable level. Therefore apparently, air quality standards in the area are within the national ambient air quality standards.

17. **Occurrence of Natural Disasters in the Project Area**: Land Slides: Landslides are a prominent natural hazards occur in Uva province during heavy rains. Their occurrence is resulted

by both natural causes such as earth movements, rock falls, cracks, creep movement, localized earth slips and partial slides. Other than the natural causes, manmade causes such as large scale sand-mining, gem mining, quarrying of dolomite have aggravated the process. These landslides have caused loss of lives, damages to structures, disruption of social stability, effect on education and health, economical failure, loss to farming, environmental degradation and pollution, etc.

18. **Drought & Floods**: Monaragala district has experienced some drought conditions during past years especially in the months of January to March and in August. With respect to spatial distribution of the country, people located in Anuradhapura, Kurunegala, Puttalam and Monaragala districts are the most affected. Lands located towards the north – east region of Badulla district was also affected partially by droughts. Floods occur in some areas of Monaragala district during heavy rains.

2. Ecological Environment

19. **Badulla District:** Considerable percentage of the district is covered by different types of forests including Montane, Sub Montane, Moist Monsoon and Dry Monsoon forests, Dry pathana grasslands and scrubland. The total forest cover has been estimated as 54,271 ha. Ravana Ella Sanctuary, Badulu Oya river basin and Gallanda Oya, Hakgala Mipilimana Forest Reserve, Thangamale Sanctuary, Namunukula forest reserve and Haputale Forest Reserve are other important ecosystems in Badulla district. Part of the Maduruoya National Park also lies towards the Eastern border of district.

20. **Monaragala District.** The total extent of land under protection in the district exceeds 158,070 ha with proposed areas covering an additional 11,900 ha. The forest cover is mainly comprise of tropical, dry, evergreen, mixed forest, savannah and grassland. Important wildlife areas within the district include Yala, Galoya, Uda Walawe and Lunugamvehera National Parks, few Sanctuaries (Lunugamvehera-Udawalawe, Sellaka Oya Sanctuary) and number of wildlife Corridors and Forest Reserves (Yala-Lahugala, Bakinigahawela FR, Daragoda FR, NF, and Bibilehela FR).

D. Forest Areas Located Within/Adjacent to the Roads of UP

21. Since large extent of forest areas are located within the UP, some of the long distance roads runs through or close to the forest areas. However, none of the proposed roads run through the national parks.

22. **Socio Economic Environment:** The UP is divided into two administrative districts; Monaragala and Badulla and the capital of the province is Badulla. There are 26 Divisional Secretary's Divisions (DS Divisions), 15 in Badulla and 11 in Monaragala 886 Grama Niladhari Divisions (GN Divisions). The population density of Badulla district is 288 persons per km^2 and in Monaragala district it is 82 persons per km^2. With respect to the ethnicity in UP, Sinhalese makes up a majority of the population in both districts. Apart from that, Indian Tamils, Moors & Sri Lankan Tamils represent the other ethnic groups.

23. **Main Economic Activities**: Economy of the province is mainly based on agriculture, livestock and tourism. Agriculture is dominated by tea, paddy, rubber and vegetable farming. Badulla is the third largest tea growing area in the island and the largest potato and vegetable growing district in the Island especially in higher elevation. Paddy is the most important crop in the Monaragala district. Apart from paddy, large proportion of population is engaged in sugar cane

cultivation, rain-fed paddy farming, vegetable, rubber and pepper cultivations. Minor crops of coffee, cocoa and cashew are grown as smallholdings in the province. Considerable number of families also engaged in livestock and poultry industry.

24. **Condition of Road Infrastructure:** Roads are the main transportation mode of Monaragala & Badulla district of UP. The existing road network of the province includes national, provincial and rural roads. A total of 1168.40km, A (472.40km) & B (696.00km) class roads are managed by the RDA under the Ministry of Higher Education and Highway and provincial roads belonging to C and D class category are managed by the Provincial Road Development Authority of UP.

25. **Religious, Cultural and Archeological significance**: UP is rich with religious, cultural and archeologically significant places. The ancient Mahiyanganaya Rajamaha Viharaya, Muthiyangana and Katharagama, Dowa Raja Maha Viharaya, Bogoda temple and Wooden Bridge of Bogoda, Bogoda Raja Maha Vihara Rock, Maligawila statue, Buduruwagala sculptures, Dematamal Viharaya are the important sites in the province.

26. **Tourism:** Uva province is an area full of natural ecosystems such as waterfalls, mountains, forest reserves, national parks and surrounded by manmade habitats such as tea and rubber plantations. Uva region is naturally heritage for many eco-tourism and adventure tourism potentialities with cold climate as well as many attractive locations. It is remarkable that many tourists find Uva region as a very attractive tourism location with many places to visit such as Edhisam bungalow, Dunhinda Falls, Diyaluma Ella, Rawana Ella, Dowa Temple, Muthiyangana Raja Maha Viharaya and places for adventure tourism such as hiking in Namunukula Mountains through Spring valley tea plantation etc.

E. Anticipated Environmental Impacts and Proposed Mitigation Measures

27. The proposed work under the project will include rehabilitation and upgrading of existing roads/sections (both rural and national) with improvement of road surface, construction of side drains, shoulders & embankments, widening or replacement of culverts, cause ways bridges etc. Both positive and negative benefits could be expected throughout the project.

28. During the pre-construction stage negative impacts such as shifting public utilities, preparing for construction in flood prone areas and during construction stage extraction transportation and storage of construction materials, impact on water resources, safety of workers and general public, disruption of traffic, Impact from dust, noise and vibration, ecological and biological impacts, disposal of construction and other wastes, soil erosion sedimentation and siltation, damages to archeological, cultural and religious places could be expected. During operation stage impacts such as safety of road users, impacts on air quality and noise, drainage congestion and encroachment of Right Of Way could be expected. However most of these negative impacts are temporary and could be avoided, minimized or mitigated by adopting the mitigatory measures described in the EMP of this IEER.

29. Apart from the negative impacts, many socio economic positive benefits such as improved connectivity, reduce travel time and cost, proper access to public sensitive locations (such as hospitals, schools and public administrative offices), poverty alleviation and boost for economic growth etc. will be expected after implementation of the project.

F. Institutional Requirements, EMP and Grievance Redress Mechanism

30. **Institutional Arrangement:** The Ministry of Higher Education & Highways (MOHE&H) is the Executing Agency (EA) and RDA is the Implementing Agency and within RDA there will be a provincial level PIU. This provincial level PIU will be responsible for implementing the project at provincial level. The Project Implementation Consultants (PIC) who will be appointed at provincial level will review the detail designs prepared by contractor, supervise implementation of civil works by the contractor and ensure that all environmental safeguard requirements in accordance with the EMP and other requirements as stated in the EARF.

31. The Provincial level PIU will be headed by a full time Project Director (PD) and supported by a team of engineers from RDA. The PIU will have an Environment and Social Unit (ESU) with one Senior Social Safeguards Officer and one Senior Environment Safeguards Officer and assistants (Environment and Social Officers) to cover the quantum and geographic distribution of works under the investment program. As indicated above the PIC will support the PIU for supervision of the design and construction works by the civil works of Contractor. The PIC team will include a team of Environment Safeguards Specialist, Social Gender Resettlement Specialist and Assistants for conduction of regular monitoring of safeguards implementation on site. From Contractor's side, there will be an Environment Officer and a Safety Officer. Other than these key environment and social staff the project engineers, site engineers and technical officers will also be trained and sensitized in environment and social safeguards compliance.

32. **Environmental Management Plan:** A general Environment Management Plan (EMP) was prepared as part of this IEE report taking in to account the impacts and mitigation measures discussed in chapter on "Impacts and mitigation measures". Once the contracts are finalized the contractors will prepare Site Specific Environmental Management Action Plans (SSEMAP) for each package with road specific details. The SSEMAPs will be based on the impacts and mitigation measures discussed in the general EMP. SSEMAPs should include road specific impacts, mitigation measures supported by site plans as indicated in the EARF.

33. All costs for implementing the mitigation measures will be included in the Bill of Quantities (BOQ) by the Contractor as implementation of the SSEMAP will be the responsibility of the Contractor. Contractors who implement road components will have a construction period of approximately two years and routine maintenance for three years for the rural roads, while rehabilitation works for national roads will also be for two years with five maintenance period. The EMP has been modified accordingly paying more attention on the environmental impacts and mitigation measures during the operational stage together with reconstruction stage.

34. Monitoring of EMP implementation will be carried out during the preconstruction, construction, and operation and maintenance stages of the project. Based on the EMP, Environmental Monitoring Checklists (EMC) will be prepared for each road by the contractor under the supervision of PIC for each of these stages. The EMC monitors the degree of compliance of the mitigation measures proposed in the EMP in all three stages. Every road must have at least one EMC completed during pre-construction, one to three during construction depending on the length of the road and one per year during operation and maintenance. Based on these records and site visits monitoring reports will be prepared during the construction and operation stage on an annual basis per Province and submitted to ADB for disclosure on the ADB website. Furthermore, the Contractor will also be responsible for updating SSEMAP if there are any significant changes in the project site conditions or engineering design.

35. Implementation of the mitigation action during the construction stage is a main and total responsibility of the Contractor. As a project proponent RDA holds the responsibility to carry out the mitigation measures during construction and operation stage. ESDD of the RDA will periodically monitor the implementation of EMP.

36. **Grievance Redress Mechanism:** The Grievance Redress Mechanism (GRM) is necessary to support general public to resolve their problems due to project activities through mutual understanding and consensus reaching process with relevant parties. The ADB safeguards policy 2009 also provide guidance to establish GRM to address the affected peoples' concerns, complaints, and grievances about the project's environmental performance. The proposed GRM for this project comprises three levels. Level one is at the grassroots level where contractor, PIU and PIC involve in handling grievances. Level two will be Grievance Redress Committee (GRC) which will be headed by Grama Niladhari (GN) and level three will be at Divisional Secretariat (DS) level. The IEE report outlines the system of GRM & GRC.

37. **Public Consultations and Information Disclosure:** As per the requirements of ADB SPS, and EARF for iRoad program, public consultation process for the project was carried out during the field environment assessment survey along the proposed roads. The aim of the public consultation was to understand the view point of the public about the environmental and social issues of the project roads and respond to their concern and suggestions during the early stage of the project. Incorporation of the environment and social concerns to the decision making process especially for design stage through the public consultation can avoid or minimize adverse impact during the implementation of the project. This approach follows the concept of "Context Sensitive Design" or CSD where roads are design and developed to sustain the unique environment and social features of a given area. During the public consultation sessions public were briefed about possible improvement work under the project. Community members in the project area including women and vulnerable groups participated for the public consultation sessions and expressed their views regarding the existing environment, social and economic situation of the proposed roads and expectations through the project.

38. **Consultation Findings:** Altogether road users and road side communities in the project influence areas are in favor of welcome this iRoad project because, most of the proposed roads are currently in highly dilapidated condition due to lack of maintenance and incapacity to rehabilitation in correct time. All the candidate roads are very important roads directed to economic centers, town areas, rural villagers, agricultural lands (paddy fields, tea and rubber estates), forest areas, irrigation systems, tanks, waterfalls, public and environment sensitive locations and other important places. All the candidate roads connect with other rural, provincial or national roads located in the project affected area and finally directed to external areas of the province. Therefore, improvement of selected roads under this project is very important.

39. Generally existing condition of the rural roads located within Badulla district is better compare to Monaragala district. Some of the rural candidate roads have not been properly rehabilitated during last two decades by relevant government authorities except location specific improvement. Some of the candidate roads sections temporally inundate during the rainy season and storm water runs along or cross in many roads during heavy rains and some occasion water stagnate within the surface. Earth roads are vulnerable to soil erosion due to insufficient drainage facilities. Most of the selected rural roads of UP, include gravel/earth roads with slightly undulating, undulating and hilly roads. Majority of the people in Monaragala district suggest asphalt concrete and they reject concrete surfacing. Human-elephant conflict is also another

critical issue in the project affected areas of all Monaragala districts and several DSDs of Badulla district.

40. **Conclusion:** The environmental impacts related with the proposed project activities are insignificant and manageable as they are mostly construction related impacts which are temporary. Project activities will not cause significant issues and the potential adverse impacts are manageable through the implementation of the proposed mitigation measures. However slope stability is needed for areas along the hilly roads and roads that have been identified as landslide prone areas. In addition, careful monitoring of the implementation of mitigation measures is required. The mitigation actions for anticipated environment and social impacts are included to the EMP of the project.

41. Construction activities of the project are restricted to the existing ROW of the candidate roads; therefore project activities will not cause any public inconvenient due to land acquisition. Further most of the people in rural agricultural areas of the province are willing to grant required land for the improvement of roads without compensation. However in some roads the RoW has been restricted to the narrow carriageway due to encroachment by road side community.

42. Even though some project roads selected are located close to the national parks, sanctuaries, forests and other important ecological and biological important habitats the construction activities associated with subprojects will not cause any impact to the above habitats, since there will be no any land acquisition or removal of trees and green cover vegetation from above habitats.

43. Most of the people in the rural areas are farmers and they mainly depend on agricultural activities and use these roads for day to day activities even with the highly dilapidated situation. Hence improvement of proposed roads will help upgrade the living standards of the people.

44. **Recommendations:** Proposed construction should take into consideration the hydrological information in design and strengthen and/or increase capacity of existing culverts and causeways. Number of roads located within Badulla and Monaragala district located over the tank bunds, cross large number of irrigation canals, distributary canals of reservoirs, rivers and streams. Therefore, construction of these roads over tank bunds, cross drainages and other structures over the above sources should be done with the consent of Department of Irrigation, Mahaweli Development Authority, Provincial Department of Irrigation, Department of Agrarian Services and construction should be done close coordination and line with their recommendations.

45. Currently boundary marks are not available in number of rural roads and some cultivation also done by the people within existing ROW. Once these roads are rehabilitated, maintained and handed over to relevant authorities, they (the authorities) will be responsible to demarcate the boundary marks of ROW to avoid any future encroachment and any conflict with road side community.

46. Consideration of future plans of relevant service providers (CEB, SLT, NWSDB, DOI and community water supply projects) is important to avoid damage to the road surface, shoulders, earth and line drains in future.

47. Archeologically protected sites and monuments are observed adjacent to some candidate roads. The PIU of RDA will obtain prior consent from Department of Archaeology for road improvement and any recommendations should strictly follow during the construction stage.

48. Road maintenance program should be incorporated parallel to the iRoad program to sustain long term stability of roads.

49. Updating EMP and EMC for each package with road specific information and locations before commencement of construction activities and effective implementation of EMC in order to monitor application of the EMP is necessary.

I. INTRODUCTION

A. Background

1. Sri Lanka has experienced strong economic growth following the end of civil conflict in May 2009. It is envisaged that an improving external environment, higher investment, and a recovery in domestic consumption will sustain a rapid economic growth during 2014 – 2015. As a result of the robust growth, the national poverty headcount ratio fell to just below 6.7 % in 2013 – 2014 from over 8% in 2010 and over 15% in 2006 {Department of Census & Statistics (DCS)}. However, less-developed areas of the country have not shown consistently higher elasticity of poverty reduction. According to the latest population census data of DCS, the total population in the country is 20.3 million in year 2012 and about 85% lives in rural and peri-urban areas of the country. The poor transport infrastructure has hindered the spread of economic activities and access to basic social resources of the rural communities. The main challenges facing road connectivity are that most rural access roads, including provincial and rural roads, cannot provide access during all-weather conditions and part of the trunk road network is highly dilapidated and in a poor condition.

2. The Government of Sri Lanka (GOSL) places great emphasis on the improvement of rural road network in the country to promote poverty alleviation by improving access particularly to transport agriculture product to the economic centers and engage in social activities. In order to address this problem and improve transport connectivity between rural communities and socioeconomic centers, the Road Development Authority (RDA) under the Ministry of Higher Education and Highways, has proposed an Integrated Road Investment Program (iRoad Program). About 1,000 rural communities will be selected as rural hubs according to their population and development potential. As a first step for developing the rural hubs the government will enhance the connectivity by (i) improving rural access roads linking the rural hubs to trunk road network to all weather standards, and (ii) operating a sustainable trunk road network of at least fair condition. Hence number of social economic and cultural benefits to the rural communities can be achieved through the proposed project.

3. Under the ongoing iRoad program, about 3000 km length rural roads in Southern, Sabaragamuwa, Central, North Central, North Western provinces and the Kalutara district of the Western Province were studied and are in the process of being rehabilitated. RDA has proposed for the iRoad 2 program which covers another 3,600 km of rural roads in Northern Province (NP), Eastern Province (EP), Uva Province (UP) and Western Province (WP). RDA has discussed with ADB to finance iRoad 2 under a time slice Multi tranche Financing Facility (MFF) similar to iRoad program. The program will rehabilitate and upgrade selected rural and national roads in NP, EP, Uva and WP. As in iRoad, the road selected under iRoad 2 will be rehabilitated and upgraded during a period of 2 years. Maintenance of rural roads (i.e. Pradeshiya Saba and Provincial Road Development Authority Roads) will be for a time period of three (3) years, while RDA (i.e. national roads) will be maintained for a period of five (5) years.

4. This report focuses on the Initial Environment Examination (IEE) of UP, which is one of the provinces considered under iRoad 2 Program. The proposed roads for improvement are located within two districts of UP and covers around 1,300 km of rural roads and about 70 km of national roads. The rural roads are currently governed by the Pradeshiya Saba (PS) of Badulla and Monaragala Districts. Rest of the roads are governed by the Municipal Councils (MC), Urban Council (UC) and Provincial Road Development Authority (PRDA) of UP. Number of roads located within each district and the total length of roads are present in Table 1, while Table 2 presents the

details of national road sections considered in Uva Province. The total list of the roads located within two districts with administrative information is attached in Appendix I.1 including the maps.

Table 1: Total number and length of proposed rural roads of Uva Province

District	Number of roads	Length of roads (km)
Badulla	211	673.552
Monaragala	131	613.374
Total	**342**	**1286.926**

Table 2: National roads considered in Uva Province

Road section	Road ID	Length (km)
Diyathalawa, Welanhinna, Walgahawela Road	UBA061	2.50
Akiriya to Madolsima Road	UBA069	11.47
Demodara-Baddegama-Springwelly -Rockhill to Badulla	UBA081	20.62
Ella to 3rd Mile post (Ella Passara Road via Balleketuwa)	UBA084	3.09
Koslanda to Punagala Road	UBA101	11.13
Maligatenna to Bandarawela main Road	UBA242	9.77
From Pelwatta Junction to Passara Road	UMO059	11.57

5. As per the information of Project Coordinating Project Implementation Unit (PIU), there will be two to four contract packages per district which will be based on the geographic spread of the selected roads.

B. Objective of the Proposed Project

6. The broad objective of the project is to improve the connectivity within the rural road network with the provincial and national road network and to reduce cost and journey time and improve reliability of access. In this manner it is intended to enhance opportunities for rural population for social and economic growth and income generation align with the nationwide economic and social development.

7. Specific objectives of this project are;

- To improve the road condition of the proposed roads and thereby improve connectivity between rural communities and socioeconomic centers of the UP,
- To maintain the rehabilitated roads in UP connecting rural communities to economic centers
- To improve connectivity between production centers and market places and improve linkage with the other districts and Provinces,
- To facilitate the increase of mobility by improving road network which link up with other Provinces,
- To open up rural areas for development,
- To facilitate to generate efficiency gains by lowering the unit cost of individual producers through transport efficiency which will lead to increase their margins and profits thus making them generating another round of investments,
- To reduce rural poverty through improved access to (a) markets and economic centers (b) social infrastructure and (c) new employment opportunities

8. In order to achieve these objectives, the road network in Badulla and Monaragala districts will be rehabilitated and maintained with the following guidelines:

- Upgrade and maintain the selected roads to all weather standards
- Surfacing the existing pavement with Asphalt Concrete (AC) or Concrete (in special cases such as inundation) if the present surface is weak
- Repair or reconstruct damaged culverts
- Introduce earth drains for all road sections and built up drains where necessary
- Remove any irregularities that are on the existing vertical profile, thereby improving the road conditions for better vehicular movements while ensuring safety of road users.

C. Objective of the Initial Environment Examination (IEE)

9. The IEE report was prepared based on the Environment Assessment Review Framework (EARF), which was developed based on the guidelines of the ADB Safeguard Policy Statement (SPS) 2009. Skills International (Pvt) Ltd on behalf of RDA was assigned to carry out all the field work and prepare Environment Checklists and IEE Report of proposed roads of UP. This report has been prepared based on the field screening process of all identified roads in UP as a requirement of the Survey and Preliminary Engineering Work (SAPE work).

10. The main objective of the IEE report is preparation of comprehensive account on existing environment condition of proposed project area in terms of Physical, Ecological, Economical and Social environment. This IEE covers altogether around 1,400 kms of roads which will be selected for rehabilitation and maintenance of urban, semi urban and rural roads. This IEE report includes identification of both potential positive and negative environment and social impacts during the pre-construction, construction and operation stages of the project, propose suitable measures to be implemented against anticipated negative impacts and to enhance the positive impacts and finally preparation of common Environment Management Plan (EMP) with recommended institutional arrangement for implementation and monitoring throughout the project cycle.

11. In addition, public views and suggestions regarding the proposed project are also included in the IEE report to ensure the concerns of public during the design of these roads. These information will be essential in order to incorporate necessary safeguard in the design stage, determine appropriate mitigation measures during pre-construction, construction and operation stage of the project and finally to facilitate decision making of ADB. Accordingly, a single consolidate IEE report is submitted for UP covering all proposed roads located within two districts.

D. Approach and Methodology

12. Initially, the Environmental Checklist (EC) for each road was prepared based on the instructions given in the Environment Assessment Review Framework (EARF). Based on the findings, one Rapid Environmental Assessment (REA) checklist was prepared for the province as required by the ADB SPS and accordingly the proposed project was categorized as environmental category B. This was followed by preparation of IEE.

13. IEE methodology for the project was developed based on the requirements of EARF, which is developed based on the requirements of ADB SPS 2009, National Environment Act (NEA) and also in compliance with Environment and Social Safeguard Manual of RDA (2007), Road and Rail Development in Sri Lanka of Central Environment Authority (CEA, 1997). Field assessment of the projected roads was carried out during the period from 1st November 2016 up to 15th of March 2017.

14. Project roads for inclusion in province under this investment program were selected based on priorities for connecting selected Grama Niladhari Divisions1 (GNDs) to the main trunk roads. The project roads were further subjected to the following screening criteria on environment safeguards:

i. Roads that will cause significant and irreversible environmental impacts that would trigger classification as environment 'Category A' in accordance with the SPS will not be included in this investment program. A road project improvement work will be classified as environment 'Category A' if the road works are located fully or partially inside a legally protected area or critical habitat area[2] or have direct and irreversible impacts on cultural heritage sites of national and international significance.
ii. Roads falling in part or whole inside or within the buffer zone of a SNR, NP or NR will not be selected under the investment program.
iii. Roads falling adjacent to other protected areas (such as sanctuaries or protected wet lands) or eco-sensitive areas will be included only if there is no widening of the road "Right Of Way" or acquiring of land from the protected area or eco-sensitive area. For such project roads proper consultations will be held with the Department of Wildlife Conservation (DWC) , Forest Department (DoF), local community and other relevant stakeholders and appropriate clearances or endorsements should be sought if required.

15. Rehabilitation and improvement work of the any project road must have minimal or no long term impacts on other forms of sensitive ecological habitats such as marshes, natural streams, tanks and related wetland habitats. In compliance with the environmental assessment procedures highlighted in EARF following criteria were used for road screening process: i) no category A project was included; ii) no project roads in part or whole inside a protected area were selected under the program; iii) project roads adjacent to protected areas or sensitive location were only considered if there is no widening of the road ROW, iv) minimal impact of rehabilitation on sensitive ecological habitat.

16. The field assessment was followed by preparation of Environmental Checklist (EC) for each road based on the instructions given in the EARF. During the survey aquatic and terrestrial environmentally sensitive sites such as water bodies, forest reserves, sanctuaries, coastal habitats, public sensitive locations and their properties located beside the road and land use pattern were recorded. For this purpose, field observation and public information in a wider corridor was studied. In addition, road side utilities and trees with 60cm Girth at Breast Height (GBH) or more located within 2 m corridor from the edge of the carriageway on either side were also documented.

17. Following details were incorporated while summarizing the EC.

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[1] Grama Niladhari Division is a subunit of a Divisional Secretariat Division and is the smallest administrative unit of the country. A *Grama Niladhari* or "Village officer" is appointed by the central government to carry out administrative duties.

[2] Critical habitat according to the SPS is an area with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for restricted range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers individuals of congregatory species; areas with unique assemblages of species or that area associated with key evolutionary processes or provide ecosystem services; and areas having biodiversity of significant social, economic or cultural importance to local communities.

- General overview of the road
- Location information; administrative and Global Positioning System (GPS) coordinates
- Climatic conditions of the project area; temperature, humidity and rainfall
- Generic description of the surrounding environment; social, environment and geographic information
- Specific description of the road environment considering location of environmentally protected areas, occurrence of road related natural hazards, locations of road side trees, road side utilities and public properties etc.
- Public consultation; general view of the public and their suggestions
- List of photographs showing road condition, Carriage Way (CW) and Right of Way (ROW), utilities and surrounding environment
- Location maps indicating starting and endpoints, environment and public sensitive locations of the project area (1:50,000 topographic maps of Survey Department and Google maps were used for this purpose).

18. Sample ECs for all two district of UP are attached (Appendix I.2) to this IEE report for reference.

19. IEE Report was prepared for the UP based on the findings of road specific EC. Secondary data for the preparation of IEE was obtained from literature survey, information collected from Divisional Secretaries Divisions of UP and relevant government agencies {RDA, CEA, DWC, DOF, Department of Irrigation (DOI), DCS} and their authorized websites.

E. Proposed Schedule for the Implementation

20. SAPE work for iRoad 2 is in progress and scheduled to be completed in the 1st quarter of 2017. Civil work contracts are scheduled to be awarded by 4th quarter of 2017 including UP contracts.

II. DESCRIPTION OF THE PROJECT

A. Location of the Project

21. All the roads selected for the project located within urban, semi urban and rural areas with the trunk road network in two districts of Badulla and Monaragala in UP. A total length of 1300 km of urban, semi urban, rural roads (including 673.552km in Badulla and 613.374km in Monaragala districts) and about 70 km of national roads will be upgraded and maintained under the proposed project.

22. The administrative information in both districts of UP; category of roads, Divisional Secretariat Divisions (DSD) falling within particular sections are presented in Appendix I.1. The respective Grama Niladhari Divisions (GND) crossed by each road are presented in the specific ECs prepared for the project. The location maps attached in the Appendix II.1 presents the general location of the proposed roads sited within Badulla and Monaragala districts. The topographic maps of 1:50 000 scale of all project roads are attached to the relevant ECs.

B. Need of the Project

23. Following 30 years of civil war that ended in 2009, Sri Lanka's economy has grown at an average 6.4 percent between 2010-2015, reflecting a peace dividend and a determined policy thrust towards reconstruction and growth. Sri Lanka is currently focused to be a strategically important economic center by means of maritime, aviation, commercial, energy and knowledge hub serving as a link between East and West using its geographical location effectively. Accordingly, an accelerated development program is undertaken by the GOSL by means of socio-economic and social infrastructure development. The economy of the country has grown the composition of its Gross Domestic Production (GDP) moving from agriculture to high value added industry and service sector.

24. In par with above activities, the Government has given priority to rebuild required infrastructure including access roads, electricity, drinking and irrigation water, market facilities, public parks, sewerage and waste disposal systems to boost economic opportunities in all province of the country including Uva. The government has also been pursuing large-scale reconstruction and development projects in the province after 2009. These projects helped to meet the basic, immediate needs and the medium term requirement of the people as well as provided sustainable employment opportunities for the people in respective areas.

25. Distribution of population by district in year 2012 shows that majority of the people in UP (85.5%) live in rural areas (DCS). The population distribution in rural areas in Badulla district is 73% and Monaragala 98.3%. To increase the effectiveness of the development, it should be assured that the benefits of such programs should penetrate to the rural regions of the province.

26. Reflecting the overall developments taking place in the country's economic environment, all provinces recorded healthy nominal growth rates in their GDP in 2014, ranging in between 5.9% to 11.1%. The GDP of Uva in year 2013 and 2014 is Rs. 471 and 511 Billion (4.9 % & 5 %) respectively. The GDP composition of the Provinces shows that the service sector is dominant and is 60.2% & 60.6% in year 2013 and 2014 respectively. Industries and agriculture also play a significant contribution to the province GDP where in 2014 it was 21.81% and 11.4% respectively.

27. Based on the Labor force survey, DCS 2014, majority of the people in Badulla (63.3%) and Monaragala (56.9%) districts engage in agriculture compare to industrial and service sector. In order to obtain a reasonable price for the agricultural products such as tea, rubber, coconut, paddy vegetables etc., it is necessary to transport them to better markets which are mostly located in urban centers such as Bandarawela, Haputhale, Badulla, Mahiyanganaya, Welimada, Monaragala, Badulkumbura, Siyambalanduwa, Wellawaya, Buththala etc. In this regard, connectivity of these areas with the trunk road network is significant. However it is found that the rural road network in the province is in a dilapidated condition. Most of the roads in the Pradeshiya Shabas are not paved and the condition is unsatisfactory. Internal road network mainly consists of sandy soil which tends to deteriorate during rainy season. This affects the mobility of the community for their daily needs to markets, visiting religious places, hospitals, schools and other business places. Further according to the existing financial situation, Local Authorities (LA) may be able asphalt about 5 km of roads per year. This situation fails to facilitate an efficient connectivity.

28. Therefore after identifying the existing situation, the government intends to develop rural areas according to the population, development potentials, and the distance to trunk roads which will extend the development benefits to rural areas and reduce the connectivity issues of these communities.

C. Analysis of Alternative

1. No Project Alternative

29. As mentioned above, the GOSL made special emphasis to allocate required financing resources for developments projects in UP. Currently government has given high priority to develop infrastructure facilities specially access roads, electricity, irrigation etc. At present there are number of ongoing and proposed projects under foreign financing projects.

30. Sustaining and maximizing the socioeconomic benefits from the above investments in different areas of the Province, is not feasible without connecting of rural agricultural and livestock farming areas with town centers and other developed areas of the province and the other parts of the country. Without iRoad 2 project these flagship projects will not grasp the expected benefits and Province will continue to stagnate. Further from the total population of two district of UP, majority (85.5%) is living in rural areas with poor access to infrastructure facilities and other socioeconomic benefits and opportunities. The Poverty Head Count Index of the Badulla, and Monaragala districts were 12.3% and 20.8% during year 2012/ 2013 (Household Income and Expenditure survey 2012/2013, DCS). The benefits derived from iRoad 2 project will be multi-fold for the rural communities of Uva Province and create low cost and faster transport facilities and thereby improving their access to economic opportunities and social services.

31. Most of the identified roads within the Province has not been rehabilitated properly during the last 15 years or more. The existing surface condition, drainage facilities, structures and width of the carriageway are not appropriate for long term usage of roads. If the roads are being continuously used without any improvement, it will result in further deterioration of these roads. Soil erosion, sedimentation, stagnation of water, temporary inundation and floods are the significant environment issues due to continuous usage without upgrading. Further poor roads will result in increasing fuel consumption, gas emission and emission of dust which will result in poor air quality in the area. Therefore without construction of rural roads, there will be physical

obstacles for access to the people and safety, which means that people and the environment are not protected against existing social and environment issues.

2. With Project Alternative

32. iRoad 2 project will upgrade about 1,300 km of rural, provincial and about 30 km of national roads in UP. This will improve surface conditions and other required facilities of the above roads which will reduce travel time and cost, helping to regenerate transport in the UP. Improvement of the rural and provincial roads will help to increase connectivity within the Province as well as other areas of the country. Further the project will improve accessibility of rural communities to socioeconomic centers and will influence new economic opportunities with income generation activities. Improvement of the road with surfacing, widening, slightly adjustments of bends, drainage facilities, slop protection with erosion control measures will have positive environment benefits with smooth traffic flow. Anticipated increase in traffic may escalate noise, air emission and road accidents.

D. Magnitude of the Operation

1. Project Activities

33. The iRoad 2 program will rehabilitate and maintain selected roads/sections in UP to all – weather standards. Selected rural roads for the improvement are currently governed by the LA's (Municipal Councils, UC and PS), of Badulla and Monaragala districts and PRDD of UP, while the national roads are managed by RDA.

34. The identified roads for the improvement are varying in length, Right of Way (ROW), width of the Carriage Way (CW), surface conditions and material type of the surface. The details of these roads are given in the ECs prepared for each road section. All selected roads in Badulla and Monaragala districts will update all-weather standards under iRoad project. At the SAPE level, several typical cross sections (TCS) have been developed and are attached in appendix II.2. Under the road information booklet, the SAPE team will propose suitable TCS for a given road. During level 2 design (DD), based on these initial TCS the contractor will develop road specific TCS incorporating the findings of Transect walk surveys and ECs to the extent possible. The proposed cross sections will be modified based on the available ROW.

35. Rehabilitation and improvement works for PS and PRDA roads will be carried out within a ROW from 2.5 m to 5.5 m, while RDA roads will be improved within a carriageway from 5.5 m to 8.0 m, with no acquisition of land[3]. The proposed improvement of selected roads is as follows.

1. Clearing of overgrown vegetation
2. Clearing of existing roadside drainage
3. Shoulder and embankment work
4. Repairing and reconstruction of culverts and bridges
5. Construction of road side drainage
6. Sub-base work
7. Pavement work

[3] Small strips of land from land lots adjacent to roads may be required to improve road side drainage or to include shoulders for safety needs. Such small strips of land will be taken through the process of "Voluntary Land Donation" as elaborated in the Resettlement Framework of iRoad 2.

8. Road marking & installation of sign board

36. Improvements to road side and cross drainage of a particular road will be considered in locations where structures have been damaged or rectification of the drainage is significantly required. Several road sections as listed in Chapter IV of this report are prone to flood during rainy seasons. The proposed road design in these sections will be modified based on the several TCS proposed to withstand frequent inundations (please refer appendix II.2).

37. The proposed improvement will be limited along the existing ROW, no building or temporary structure will be fully or partially affected by the Program. However temporary lands for setting labour camps, yards, plants and disposal sites will be selected with the help of LA and DS of the area based on the availability of public lands and on requests received from the residences in the area.

38. The rehabilitated and improved roads will be maintained by the contractor for another three (3) years in the case of rural and PRDD roads, while RDA roads will be maintained for five (5) years. The maintenance works will essentially include the following activities;

- Maintaining the road side vegetation;
- Cleaning of road side drains and structures;
- Maintaining the shoulders and attending to any repairs on the pavement.

2. Requirement of Construction Material

39. Material required for construction will be explored from the project area of UP. Existing sites which are operated with relevant licenses and approvals will be used especially for extraction of gravel, metal and sand. Sand mines with relevant licenses and approvals are located within both districts of the province as shown in table 3. Offshore sand could also be used for construction subjected to confirmation of quality. If new material extraction sites will be opened for this project, necessary licenses and approvals will be obtained from relevant agencies.

Table 3: Sand extraction sites located in UP

District	Location
Monaragala	Hada Oya - Siyambalanduwa
Monaragala	Vila Oya - Siyambalanduwa
Monaragala	Kuda Oya Balaharuwa
Monaragala & Badulla	Maduru Oya
Badulla	Mahaweli River Mahiyanganaya

40. Table 4 shows the approximate quantities of construction materials required for the proposed UP roads

Table 4: Approximate quantities of construction materials

District	Soil/cum	Sand /cum	Aggregate/cum	Bitumen/mt
Badulla	452,600	22,700	524,400	15,300
Monaragala	489,600	26,400	408,100	11,300
Total	**942,200**	**49,100**	**932,500**	**26,600**

41. Associated facilities for the project activities include water supply, operation of quarries, sand mines, use of borrow pits and disposal sites etc. Approval for the above activities will be obtained from relevant government agencies such as NW&DB, GS&MB etc. with the help of LAs during the pre-construction stage.

III. LEGAL AND POLICY FRAMEWORK

A. Legal Framework

1. National Environmental Act and other Applicable Regulations

42. The National Environment Act (NEA) No. 47 is the key environmental legal framework in GOSL which is administered through the CEA of the Ministry of Mahaweli Development and Environment (MMD&E). NEA No. 47 was enacted in 1980 and NEA amendment Act No. 56 of 1988 stipulated the regulations for assessing and managing environmental impacts and obtaining the environmental clearance in a timely and systematic manner. It also provides guidelines for environment management, management of natural resources, fisheries, wild life, forestry, soil conservation, environment quality, environment protection and approval of projects. The environmental clearance process is implemented through the designated Project Approving Agency (PAA) as prescribed by the Minister under section 23 Y of the NEA. The procedure that should be followed for obtaining environmental clearance is described under section 23CC and 32 of the NEA.

43. The environmental clearance process should be initiated by submitting the completed Basic Information Questionnaire (BIQ) to CEA with preliminary information about the project including exact locations of the project components, extent and environmental sensitivity related to project activities. Based on this CEA decides whether the project is a “Prescribed Project”4 or not and who the PAA will be for administering the IEE or EIA process to obtain environmental clearance if the proposed project is a prescribed project. For Prescribed project CEA or the designated PAA will issue a TOR for the IEE or EIA required.

44. The scope of the investment program includes rehabilitation and upgrading of existing rural roads with no widening. According to the Gazette Extra-ordinary No. 772/22 of 24th June 1993 and subsequent amendments all rehabilitation works for existing roads and roads do not fall within the category of Prescribed Projects. Hence, it is likely that the project roads under the investment program will not be required to prepare an IEE or EIA for securing an environmental clearance. However, further amendments to the NEA on requirements for material extraction, emissions, noise and vibration levels that are relevant for the project will need to be followed. Necessary revisions will need to be made within the project to meet the new requirements if there are any.

45. Roads which are located within Wildlife parks, Sanctuaries and designated Forest areas have not been selected for improvements under this program. However, if a project road falls adjacent to the boundary of a protected area or a designated area of Forest Department, necessary clearance will need to be sought from the Department of Wildlife Conservation (DWC) and Department of Forest (DoF) even if there will be no widening of the road ROW.

46. Depending on the sensitivity of the protected area, the DWC may require conduction of an IEE or EIA study for the respective road.

47. Apart from NEA, there are a number of other environmental laws and regulations under GOSL that are applicable to the investment program as given in Table 5 below.

Table 5: Applicable national laws and regulations for the investment program

Legislation	Relevance and Main Content	Authorizing Institution
National environmental protection and quality regulations under Extraordinary gazette notification No. 1534/18 and No. 1533/16 of 2008 under NEA section 32 & 23A, 23B	This regulates the discharge and deposit of any kind of waste or emission into the environment and stipulates requirements for an Environmental Protection License (EPL) depending on the project activity. Examples of activities requiring and EPL are: asphalt processing plant, concrete batching plants, treatment plants, sewerage networks, mechanized mining activities etc.	CEA
National Environmental (Protection and Quality) Regulation No. 1 of 1990 published in Gazette Extraordinary No. 595/16 of February, 1990	Provides standards for discharging effluents into inland surface water during proposed project activities.	CEA
National Environmental (Ambient Air Quality) Regulations, 1994, published in Gazette Extraordinary, No. 850/4 of December, 1994 and amendment gazette No. 1562/22 of 2008	Provides standards for emissions to the air during proposed project activities.	CEA
National Environmental (Noise Control) Regulations No.1 of 1996 and its amendments	Regulates maximum allowable noise levels for construction activities during proposed project activities.	CEA
National Environmental (Vehicle Horns) Regulations, No. 1 of 2011	Regulates maximum allowable noise emanating from vehicular horns on a highway or road any motor vehicle use during project construction activities.	CEA
National Environmental (Municipal Solid Waste) Regulations, No. 1 of 2009	Regulates dumping municipal solid waste along sides of any national highway or at any place other than places designated for such purpose by the relevant LA's during proposed project activities.	CEA
Fauna and Flora Protection Act (FFPO) No.2 of 1937 amended in 1993 and 2009	The act specifies that any development activity taking place within one mile from the boundary of a National Reserve declared under the Ordinance requires an EIA/IEE which provide for the protection and conservation of fauna and flora of Sri Lanka and their habitats; for the prevention of commercial and other misuse of such fauna and flora and their habitats for conservation of biodiversity of Sri Lanka; and to provide for matters connected there with.	Department of Wildlife Conservation
Forest Act No. 34 of 1951	This act is to consolidate and amend the law relating to the conservation, protection and management of forest and forest resources for the control of felling and transport of timber and Forest and for matters connected therewith or incidental thereto.	Department of Forest Conservation
Felling of Trees Control Act No. 9 of 1951 as amended through Act No. 30 of 1953	This Act sought to prohibit and control felling of specified trees (mainly intended to stop indiscriminate felling of specified trees) in the country.	Department of Forest Conservation

Water Resources Board Act, No. 29 of 1964 and (Amendment) Act, No. 42 of 1999	The act controls and regulates developments (including conservation and utilization) of water resources; prevention of pollution of rivers, streams and other water resources; formulation of national policies relating to control and use of water resources.	Ministry of Irrigation and Water Resources Management
Soil Conservation Act, No. 25 of 1951 and Amended No. 24 of 1996	This Act makes provisions for the enhancement of productive capacity of soil; to restore degraded land for the prevention and mitigation of soil erosion; for the conservation of soil resources and protection of land against damage by floods, salinity, alkalinity, water logging; and to provide for matters connected therewith or incidental thereto.	Department of Agriculture
Explosives Act No. 36 of 1976	To provide control of explosions and regulations of matters connected with explosive activities related with the project.	Ministry of Defense
Municipal Councils Ordinance No. 29 of 1947, the Urban Councils Ordinance No. 61 of 1939 and the Pradeshiya Sabha Act No. 15 of 1987 as amended in 2010	Regulates and control actions pertaining to socioeconomic development such as roads, culverts, bridges, ferries, waterways and other means of local transport and related site clearance for constructing worker camps, site offices etc. and methods taking place within the command area relevant to government laws and regulations.	Ministry of Local Government And Provincial Council
Flood Protection Ordinance No. 04 of 1924, No 22 of 1955	An ordinance for protection of areas subjected to damage from floods. This includes declaration of flood areas, preparation of schemes for flood protection and other rules and regulations regarding flood in the country.	Irrigation Department
Crown Land Ordinance Act No. 1947	An ordinance to make provision for the grant and disposition of crown lands in Sri Lanka; for the management and control of such lands and the foreshore; for the regulation of the use of the water of lakes and public streams; and for other matters incidental to or connected with the matters related to proposed project.	Land Commissioners Department
Agrarian Development Act No. 46 of 2000 (Section 32)	This act regulates using paddy land for a purpose other than agricultural cultivation without the written permission of the Commissioner General.	Agrarian Services Department
Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 as amended by Act No 52 of 1982	This act established Sri Lanka Land Reclamation and Development Corporation which grants permission for the public to fill marshy land subject to provision of storm water drainage.	Sri Lanka Land Reclamation and Development Corporation
National Thoroughfares Act, No. 40 of 2008	This act is known as RDA act which provide for planning, design construction, development, maintenance and administration an integrated public road network in Sri Lanka.	Road Development Authority
Urban Development Authority (UDA) Law No 41 of 1978 and Urban Development Projects (Special Provisions) Act No 2 of 1980	This law provides for the establishment of an UDA to promote integrated planning and implementation of economic, social and physical development of certain areas as may be declared by the minister to be urban development areas and for matters connected with the relevant project activities.	Urban Development Authority (UDA) under the ministry of Mega Polis & Western Development

	Urban Development Projects (Special Provisions) Act No 2 of 1980 is an act to provide for the declaration of lands urgently required for carrying out urban development projects and to provide for matters connected there with relevant project activities.	
Town and country planning ordinance No. 13 of 1946 and The Town & Country Planning (Amendment) Act, No. 49 of 2000	This regulates the National Physical Plan with transport as the main component.	National Physical Planning Department (NPPD) under the Ministry of Mega polis & Western Development
Buddhist Temporalities Ordinance No. 19 of 1931	This act provides necessary assistance to administer and protect the property of Viharas, interventions to settle disputes regarding property of Viharas and makes recommendations to release money to be paid as compensation in respect of property of Viharas acquired by government for any development project.	Department of Buddhist Affairs
Cemeteries and burial grounds ordinance No. 9 of 1899 and amendments	The act regulates any disturbance, removal of burial, monuments and use of such areas for development project	Local Government Authority
Antiquities Ordinance No. 9 of 1940 and amendments	The act regulate activities of projects located in close proximity of any archeological reserves.	Department of Archaeology

48. Under the NEA and some of the laws and regulations listed in Table III.1 above, there are specific requirements for clearances, permits and licenses required for road projects as listed in Table 6 below.

Table 6: Applicable approvals required for the investment program

Project stage	Approvals	Project Related Activity	Relevant Agency
Pre- Construction Stage Note: Although clearances and approval should be obtained during preconstruction stage it is valid throughout the project cycle. However this should be renewed before expiry date	Environment clearance	Implementation of the project activities	Central Environment Authority
	Industrial Mining License (IML)	Operation of quarries, borrow areas and other material extraction sites	Geological Survey and Mines Bureau
	Environmental Protection License (EPL)	Operation of material extraction site including operation of asphalt plants, treatment plants etc.	CEA
	Local Government Authority Trade license and machinery permits	Deciding waste disposal sites, material storage and sites for worker camps and other project stations Trade license should be obtained for asphalt plants, batching plants, quarries etc.	Respective Provincial Council, LA's and respective Pradeshiya Sabha
	Explosive Permits	Blasting activities	Ministry of Defense

Project stage	Approvals	Project Related Activity	Relevant Agency
	Approval for removal of trees	Road clearance for construction	Forest Department, CEA and Local Authorities
	Disturbance to Paddy Lands	Ground preparation for ROW and side drains	Commissioner of Agrarian Services
Construction stage	Consent from relevant government agencies	Construction of bridges, culverts and other drainage systems, land filling, dredging activities	Department of Irrigation, Department of Agrarian Services, Local Government Authority, Land Reclamation and Development Cooperation
	Approval from relevant state /local agencies for the removal/ temporary disturbances for existing utilities	Surfacing, construction of bridges and side drains, embankment filling works	NWSDB for water lines, Ceylon Electricity Board for Electric cable/poles, Sri Lanka Telecom for land line telephone cables, poles, Pradeshiya Sabha, other LA's for drainage, sewer systems etc.

2. Environmental Protection License (EPL)

49. The Environmental Protection License (EPL) is a regulatory/legal tool under the provisions of the National Environmental Act No: 47 of 1980 amended by Acts No 56 of 1988 and No 53 of 2000. Industries and activities which required an EPL are listed in Gazette Notification No 1533/16 dated 25.01.2008. Industries are classified under 3 lists i.e., List "A","B" and "C" depending on their pollution potential.

50. Part "A" comprises of 80 significantly high polluting industrial activities and Part "B" comprises of 33 numbers of medium level polluting activities. EPL for industries in lists "A" and "B" have to be obtained from the relevant Provincial Offices or district Offices of the CEA.

51. Part "C" comprises of 25 low polluting industrial activities which have been delegated to Local Government Authorities, namely Municipal Councils (MC), Urban Councils (UC) and Pradeshiya Sabha (PS). EPL for the industries in List "C" has to be obtained from the respective LA's. The LA's carry out issuing of EPLs and related functions such as follow up, monitoring and law enforcement.

52. **Objectives of the EPL:**

- To prevent or minimize the release of discharges and emissions into the environment from prescribed (industrial) activities in compliance with national discharge and emission standards.
-
- To develop an approach to pollution control that considers discharges from prescribed (industrial) processes to all media (air, water, land) in the context of the effect on the environment.
- To contain the burden on industry, in particular by providing guidance on pollution control for polluting processes.

- To ensure that the system responds flexibly both to changing pollution abatement technology and to new knowledge such as cleaner production, waste minimization etc.

3. International Agreements and Conventions

53. Sri Lanka is also a signatory to a number international agreements and conventions related to environmental conservation. Those that are relevant for this investment program are provided below:

- Conventions on Wetlands of international importance especially as waterfowl habitats/ Ramsar (entered into force in Sri Lanka in 1990).
- Convention concerning the protection of the World Cultural and Natural Heritage (Sri Lanka accepted the Convention in1980)
- Convention on International Trade in Endangered Species of Wild Fauna & Flora/ CITES (entry into force in Sri Lanka in 1979)
- Convention on the conservation of Migratory Species of Wild Animals/ CMS (1990)
- United Nations Framework Convention on Climate Change/ UNFCCC (Sri Lanka ratified it in November 1993)
- UN Convention on Biological Diversity/ CBD (Sri Lanka ratified in 1994).
- Plant Protection Agreement for Asia and the Pacific region (Sri Lanka ratified in 1994).

B. Policy Framework

1. ADB Safeguards Policy Statement, June 2009

54. ADB's safeguard policy framework consists of three operational policies on the environment, Indigenous People, and involuntary resettlement. All three safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The safeguard policies require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. The policies apply to all ADB-financed projects, including private sector operations, and to all project components.

55. The objective of environment safeguards policy is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.

56. Proposed projects are screened according to type, location, scale, and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts.

57. From the environment perspective projects are classified into the following four categories:

- **Category A.** A proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect

an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an EMP, is required.

- **Category B.** The proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.
- **Category C.** A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
- **Category FI.** A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

58. **Policy Principles**: Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.

59. Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential trans-boundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.

60. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.

61. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.

62. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.

63. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected

people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.

64. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.

65. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.

66. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.

67. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

68. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.

IV. DESCRIPTION OF THE EXISTINNG ENVIRONMENT

69. Identified roads to be improved under the iRoad Investment Program are located within two districts; Badulla and Monaragala of UP. In terms of land area of the country, Uva province and Monaragala districts are the second largest province and the second largest district in Sri Lanka respectively. Uva is bordered by the Eastern, Southern and Central Provinces. Badulla is the capital city of the Province and Monaragala, Bandarawela, Haputale, Mahiyanganaya and Wellawaya other commercial towns located within the Province. Uva's symbolic mountain is Namunukula which stands tallest of the mountain range surrounding the Badulla town.

70. The following section describes the current situation of Physical, Ecological, Social and Economic background of both districts of UP including project affected areas in brief. In addition, ECs prepared for individual road sections provide environment and social background of each road section with location specific information, photographs, public utilities, road side trees, public and environmental sensitive locations etc. Sample ECs are provided in appendix I.2.

A. Physical Environment

1. Topography, Geology and Soil

71. Badulla district: Badulla belongs to diverse geographical region of Sri Lanka and is located towards the East of the Central highlands. The physical landscape of the district is also complex with mountain ranges, divided plateaus and narrow valleys. Dunhinda, Diyaluma, Ravana, Kanduru Oya and Bomuru are the famous water falls originate from the highlands of the district. Geologically the district belongs to the rock formation of highland series which occupies a board belt running across the center of the Island from Southwest to Northeast. The highland series is composed of meta sediments and closely associated charnockite geneisses. The meta sediments comprise quartzites, fine-grained acid geneisses, granulites calc geneisses, marble and type khondalite, which is a sillimaniticgarnet -graphite schist. The drier lower areas of the district have Red Earth and Brown Loams. The relative wet higher slopes are characterized by highly leached Red-Yellow Podsols, while their lower slopes have Lateritic Reddish Brown soils.

72. Monaragala district: Topographically Monaragala district is in a transitional zone within central highlands to flat lowland. Moneragala is bordered by four districts namely Ampara on Eastern and Northern side, Badulla on Western and Northern side, Hambantota on Southern side and Ratnapura on the Southwestern side. According to landscape, three terrain types could be identified in the district which are highly mountainous, hilly- steep & rolling and undulating & flat terrain. Highly mountainous terrain covers the western boundary towards Badulla and Ratnapura districts. The elevation of this terrain is between 550 to 1400 meters and the underlain parent rocks belong to highland series. Hilly, steep and rolling terrain is situated between the western boundary area and undulating & flat terrain situated within an elevation range of 160 to 550 meters. According to the great soil groups of Sri Lanka there are two soil groups in the district, namely Reddish Brown Earth and Red Yellow Padzolic soils. The Reddish Brown Earths are present in dry and semi-dry intermediate areas while Red Yellow Padzolic soils are found in wet and semi-wet intermediate areas.

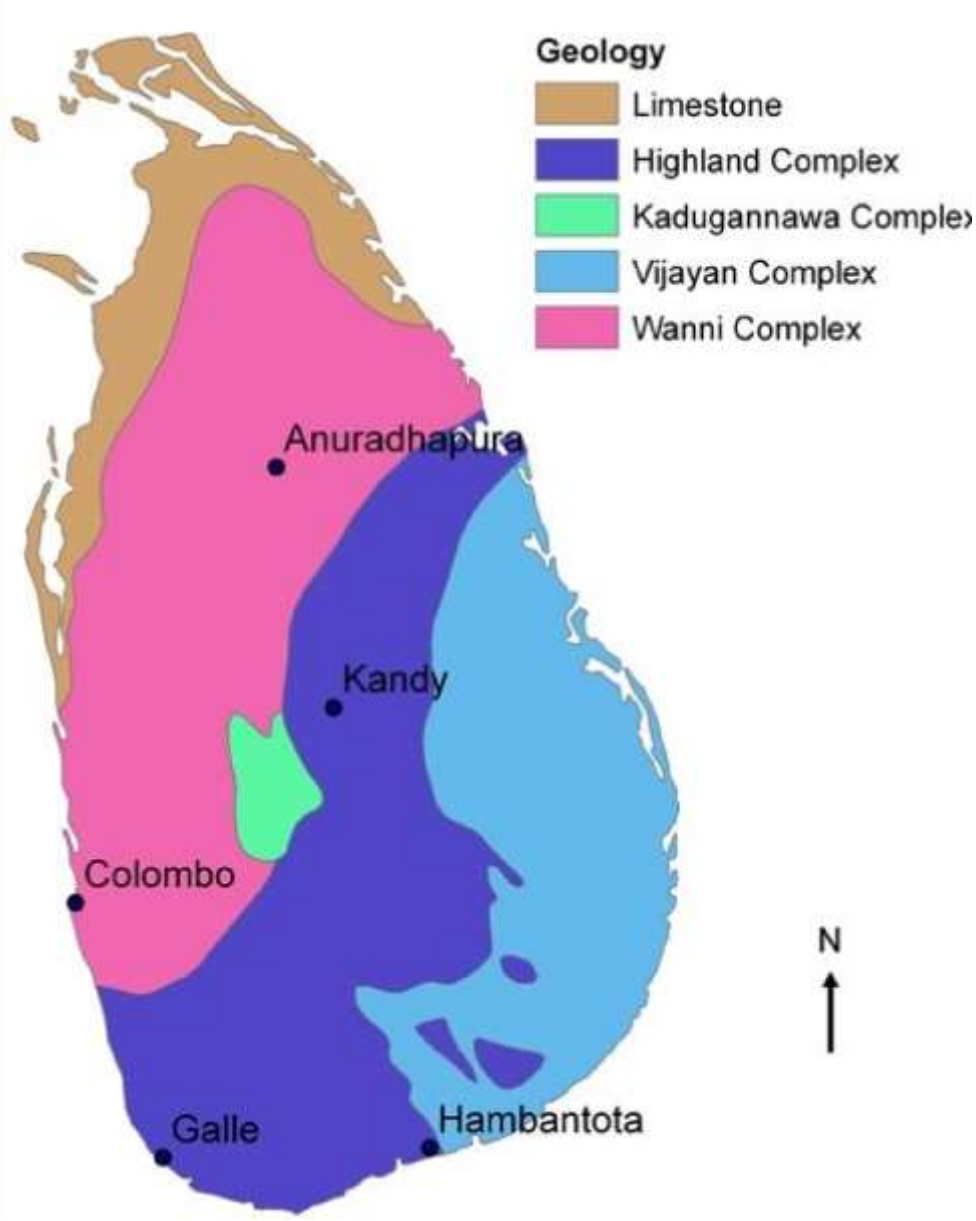


Figure 1: Geology Map of Sri Lanka

73. The Agro-ecological characteristics of the proposed roads are shown in Table 7.

Table 7: Agro-ecological characteristics of the proposed roads

District	Agro Ecological zone	Road (ID) falls in to Agro Ecological zone	75% expectancy value of rainfall (mm)	Description (Land use, terrain, soil group)
Badulla	DL1c	303	> 900	Rain fed upland Crops, paddy, scrub, Natural forests, Forest plantations, Sugar cane, undulating RBE & LHG soil
	IU3b	198,351,046	>1700	Tea, Natural Forests, Forest Plantation, Mountainous, Steeply dissected, hilly RYP, Mountain Regosol & Lithosol soils
	IM2b	312,087,124,076,077,135,162,101,268,249,182,178,008	> 1,600	natural forests, mixed home gardens, paddy, tea, vegetables very steep, hilly & rolling, RBL, IBL,RYP,LHG, & Lithosol soils
	IM1a	3, 3.1, 9, 20, 21, 22, 26, 27, 31, 32,l33, 34, 35, 40, 54, 65, 67, 67.1, 67.2 ,68, 74, 81, 91, 94 ,96, 97, 98, 99,107,112, 118, 125, 129, 130, 131, 132, 147,151, 151.1, 151.5,151.6, 151.7, 151.8, 161, 172, 173, 173, 195, 199, 200, 208, 214, 224, 229, 240, 250,252, 254, 257, 266, 279, 282, 287, 289, 291, 295,301, 316, 321, 327,329,334,346,356, 358,362, 366, 400	> 2000	Tea, Vegetables, mixed home gardens, paddy, forest plantations, very steep & hilly RBL, RYP, IBL, LHG & Lithosol soil
	IU3a	15,17,8,101,115,228,228.1,231,259,261,278	> 1900	Tea, forest plantations, steeply dissected, hilly & rolling, RYP & Mountain Regosol soils
	IU3b	141, 142, 148, 170, 273, 349	> 1700	Tea, Natural Forests, Forest Plantation, Mountainous, Steeply dissected, hilly RYP, Mountain Regosol & Lithosol soils
	IM1c	47,95,127,132,199,208,212, 238, 254, 327, 331	> 1300	Natural forests, vegetables, very steep, hilly & rolling, RBL, IBL, Mountain Regosol & Lithosol soils
	IL2	1, 1.2, 1.3, 1.4, 1.6, 2,4, 5,11, 11.1, 47, 53, 65, 72, 95, 104, 105,113,119, 127, 133, 165, 165.1, 181, 212, 218, 248, 295, 299,345	>1600	Mixed home gardens, Paddy, Rain fed upland crops, Scrub, Sugar cane, Citrus, Rolling, hilly & undulating RBE, LHG &RBL
	IU3e,	12, 13, 15, 16, 43, 45, 51,59, 61, 63, 78, 102,116, 122, 134, 167,174, 177, 198, 201, 204, 228.1, 242, 259, 271, 272, 278, 290, 310, 310.1, 314, 315, 324, 336, 348, 350, 361, 362, 365	> 1400	Tea, vegetables, paddy, mixed home gardens, steeply dissected, hilly & rolling RYP & LHG soils

	IU3c	3 , 3.1 , 13 , 19, 23, 24, 55, 56 , 57, 67, 75, 81, 84, 88, 89, 90, 96, 109, 120, 130, 137, 139, 146, 151, 151.1, 151.2, 151.3, 151.4, 151.5, 151.6, 151.8,153, 154,155, 159,160, 163, 182, 189, 200, 201, 219, 223, 242, 244,245, 249, 253, 257, 258, 258.1, 266, 271, 272,276, 279, 281, 289,.293, 297, 308, 309, 315, 322, 337, 341, 344, 346, 357, 362, 373, 374, 386, 388, 389, 391, 394, 397, 398, 400	> 1600	Tea, vegetables, paddy, steeply dissected, hilly & rolling RYP & LHG soils
Monaragala	IM1a	006	> 2000	Tea, Vegetables, mixed home gardens, paddy, forest plantations, very steep & hilly RBL, RYP, IBL, LHG & Lithosol soil
	DL2a	096,131,057	>1300	Rain fed upland crops, paddy, Natural forests, Sugar cane, Scrub Undulating, NCB,RBE, LHG, Old alluvial soil
	DL5	042,064	> 650	Scrub, natural forests, rain fed upland crops, paddy Undulating & flat RBE soil with high amount of gravel in sub soil. LHG & solodized – solonets soil
	DL1a	7, 11, 17, 19, 19.1, 20, 21, 21.1, 22, 47, 55, 62, 68, 69, 69.1, 70, 72, 75, 79, 87, 89, 90, 95, 97, 99, 101, 117, 120, 121, 121.1, 121.3, 121.4, 121.5, 127, 139	> 1,100	Mixed home gardens, paddy, forest plantations, scrub, sugar cane, Natural forest rolling & undulating RBE & LHG soils
	DL1b	3 , 12, 23, 24, 34,52, 56, 57, 74, 77, 86, 101, 115, 121.1, 121.2, 121.3, 130, 131, 138	>900	Rain fed upland Crops, paddy, Scrub, Mixed home gardens, Forest plantations undulating, RBE &LHG soils
	IL 1 c	1, 2,8 ,10, 13, 15,18, 28, 29,30, 31, 33, 35, 38, 39, 40, 41, 43, 48, 49, 50, 54, 55, 59, 60, 61, 61.1, 61.2, 65, 72, 76, 80, 81, 85, 92, 93 , 94, 102, 103, 103.1, 106, 107, 108, 111, 112, 116, 118, 121, 122, 123, 123.1, 124,125, 126, 128, 129, 129.1, 137, 139, 140	>1,300	Mixed home gardens, rubber, paddy, sugar cane, rolling, undulating & flat RBL, RBE, LHG & IBL soils
	IL 2	1, 5, 6, 39, 54, 55, 57, 66, 71, 77, 91, 92, 104, 112, 124, 130, 133	>1600	Mixed home gardens, Paddy, Rain fed upland crops, Scrub, Sugar cane, Citrus, Rolling, hilly & undulating, RBE, LHG &RBL
	IM2b	58, 14, 4, 82 , 10, 40, 16, 82.1, 105.1, 106, 88, 93, 18, 44, 94, 38, 105, 76, 142, 29, 43, 143, 25, 46, 110, 81, 28, 128, 2, 58.1, 129.1, 98, 31	> 1,600	Natural forests, mixed home gardens, paddy, tea, vegetables very steep, hilly & rolling, RBL, IBL,RYP,LHG, & Lithosol soils

2. Mineral resources

74. The common mineral resources found in the province include sand, feldspar, dolomite, mica & gemstone. Monaragala district is rich with several types of mineral deposits such as feldspar, gold, graphite, magnasite, mica, vein quartz, quarts and gem. Apart from that the district has considerable amount of granite deposits which is mainly export for international market.

75. Common mineral resources in Badulla district include sand, mica deposits and crystalline lime stone deposits. Large scale sand-mining sites are found in Badulla and Hali-ela AGA divisions and in Badulu-oya between Madiriya and Deiyannewela bridge, In Hali-ela AGA division sand-mining is most evident in Hathapma, Medagama and Hali-ela gramasevaka divisions. Metal quarrying is found along the Badulla - Mahiyangana road. Quarrying of dolomite is most evident in the Soranatota AGA division. Moreover, lime-kilns and Gem mining is mainly found in the two AGA divisions of Badulla and Passara. Other gem mining areas are Mahiyangana and Hasalaka AGA divisions.

3. Climate

76. The average annual rainfall of the Uva Basin, which is protected on all sides by highlands, is approximately 1,700 mm. A large section of the Badulla district belongs to the intermediate zone of Sri Lanka. The average annual rainfall in the district varies from 900 mm in the Northern and Southern extremities of the district to over 2,500 mm in the Eastern flanks the Central highlands, Namunukula and Lunugala ridges. Rainfall receives in four season such as first inter monsoon (March-April), Southwest Monsoon (July-September), second inter monsoon (October-November) and Northeast monsoon (December-January). Partial drought occurs very often during the months of February to July. The average annual temperature of the district varies between 16- 30 ^{0}C depending on the altitudes. The period of greatest diurnal temperature range occurs during the Southwest monsoon due to influence of wind. Local winds have an impact on the temperature and humidity.

77. The dry zone environment of Monaragala is basically determined by the seasonal spell of rains, resulting in two rainy seasons. A total rainfall in the district ranges 1300- 1800 mm per year. The two rainy seasons extend from early October to late January and from late March to late May respectively. Corresponding to these long and short rainy seasons there is also a long and short dry seasons (June - September and February - March). Over 84% of rain is received during the seven rainy months of October to January and March to May. There are also minor but significant regional differences in the amount and distribution of annual rainfall within the district. Mean daily temperatures of the district vary little over the year, as the altitude within the vast low country of the district does not exceed 91 m. The annual temperature varies from 21.6 - 35 ^{o}C. The mean annual relative humidity in the district varies from 75% at diurnal and 86% during the night.

4. Water Resources

78. Uva province is rich with water resources including small and large rivers, streams, and waterfalls. In Badulla district, many head streams of rivers such as Mahaweli, Walawe, Menik and Kumbukkan, Badulu and Loggal Oya start from hills such as Welimada plateau and Namunukula range and create important waterfalls such as Bambarakanda Falls, Diyaluma Falls, Dunhinda Falls and Rawana Ella. Out of which, Bambarakanda fall is the highest seasonal waterfall (240 m) in the country while Diyaluma fall is the highest perennial waterfall (170 m) in Sri Lanka and sixth highest in the world. Dunhida water fall attracts many tourist because of its beauty.

79. In the Moneragala districts, there are seven river basins namely Heda Oya, Kubukkan Oya, Wila Oya, Menik Ganga, Kirindi Oya, Malala Oya and Walawe Ganga which originate in the West central highlands and flow towards East, Southeast and South. Most of these rivers originate outside the district boundary and strengthen the volume by several tributaries within the district and then flow outside the district to meet the Indian Ocean. Menik Ganga has the largest river basin in the district representing 20.8% of the district's land area with 117,480 ha. This river basin provides excess water and good soil for lowland cultivations. Kubukkan Oya is the second largest river in the district, which has a river basin of 112,930 ha while Walawe Ganga is the third largest river in the district. Malala Oya represents the smallest river basin with only 11,400 ha representing 2% of the district's land area.

80. Table 8 shows the proposed road sections that cross or located near water sources in the province.

Table 8: Road sections that cross or located near water sources

Road ID	Sections that cross or located near water sources
Badulla District	
UBA013	Road cross Makulella natural stream around 1.4km.
UBA018	Small stream crosses the road at 0.700km.
UBA101	Small streams cross the road at 1+900 and 2+900km.
UBA135	Several natural streams around 4.5km, 6.4km and Dunhida Oya around 7.4km.
UBA162	The road crosses several natural streams around 3.3-3.4, and Heewelkandura at two locations 5.6-5.7 and 6.4-6.5km.
UBA174	Stream cross the road around 0.400 -0.500km.
UBA196	Road crosses Diyaluma Oya around 3km.
UBA261	Small stream crosses the road at 0.500km.
Monaragala District	
MO006	Mallhewa kandura crosses the road at 2+000km, small stream at 3+500km & Gal Oya at 4+100-4+200km.
UMO001	Stream crosses the road at 1+500-1+600km
UMO003	Irrigation canal located at the starting point of the road.
UMO005	Gal Oya crosses the road at starting section and small stream at 2+800km.
UMO007	Kuda Oya crosses the road at 0+700km.
UMO010	Small stream crosses the road at 1+800-1+900km, 2+700km, 4+100km, Mullekadura Ara around 4+300-4+400km, Gonathulawa Oya at 5+400-5+500km & Hulandawa Oya at 6+900km.
UMO011	Kuda Oya crosses the road at 0+500km.
UMO011	UMO019: Aluthhela tank located at 0+700Km RHS and 4+300Km crosses small stream. UMO019.1: Small streams crosses at 0+300-0+400Km, 1+100-1+200km and 2+100-2+300km.
UMO012	Small stream crosses the road around 0+100km, Sooriya Ara around 1+700-1+800km.
UMO012	Kilimunna tank is located at 0+900km RHS of the road.
UMO014	A stream crosses the road at 0+000 – 0+100km.
UMO018	Small streams crosses the road at 0+100-0+200km, 2+100-2+200km and road runs over the tank bund of Katupelella at 3+250km.
UMO020	Dambewewa tank located at 0+000-0+100km, irrigation cannel crosses the road at 0+700-0+800km and Athiliwewa tank at 2+00km LHS.
UMO021	UMO021.1: road cross the several streams such as Spill Ara, Wela Ara, Gomadiyawala Ara and Karamatiya Ara in different locations.
UMO022	Irrigation canals cross the road at 0+800 – 0+009 and 8.900-9+00km. Road cross Mahaara at 6+900 and Kuda Oya at 9+900-10+00km.
UMO023	The road runs over the tank bund of Wattarama at 2+600km.

Road ID	Sections that cross or located near water sources
UMO024	Streams crosses the road at 0+800-0+900km and 3+00km, Matta wewa located 2.200 – 2.300km RHS, Wila Oya cross the road at 2+500 – 2+600km and Irrigation canal cross the road at 7+100km.
UMO025	A streams crosses the road at 3+000 – 3+100 and 3+200 – 3+300km.
UMO028	Gal Ella kandura crosses the road at starting point and another stream at 6+600-6+700km
UMO031	Maha Ara (6+400 – 6+500km), Manic ganga (8+800 – 8+900km) and small stream (10+100 – 10+200km) cross the road in different locations.
UMO033	Small tank is located LHS of the 1+700km.
UMO034	More than 1km from 0+100km road runs through the Habaraluwewa tank bund.
UMO035	Number of small and medium size streams cross the different locations of the road at 0+500km, 0+600-0+700km, 2+100-2+200km, 5+100-5.+200km and 5+700km.
UMO038	A stream crosses the road at 6+100km.
UMO039	Galoya crosses the road at 0+700-0+800km and small stream at 1+800km.
UMO046	Small stream crosses the road around 0+700 – 0+800km of the road.
UMO049	Road cross the small water stream around 1+200-1+300km
UMO050	Stream crosses the road at 0+600km.
UMO052	A natural water stream runs across the road at 1+900km.
UMO054	Hada Oya cross the road around 4+800 km.
UMO055	Small streams cross the road at different locations 2+300 – 2+400, 9+100 – 9+200 and irrigation canal at 10+300km.
UMO056	Road crosses the stream at 0+100 - 0.200km and Irrigation canal cross the road at 0+500 – 0+600km.
UMO057	Stream crosses the road at 4+100-4+200km.
UMO058	UMO058.1, Small stream crosses the road at 0+100-0+200 km.
UMO059	Streams cross the road at 1+400-1+500km, 2+000km & 8+100-8+200 km.
UMO060	Stream (Maha Ara) crosses the two times within 2+100-2+200km, Kirindi Oya at 4+600-4+700km.
UMO061	UMO061: Small stream crosses the road at 1+100 – 1+200km. 61.1 Road runs close to the Rathupasketiya tank at 0+000 – 0+100km RHS.
UMO066	Road cross small stream around 2+200 – 2+300km.
UMO068	Handapanagala tank is located around 3+200km LHS and Kuda Oya crosses the road around 7+000km.
UMO069	UMO069.1: Stream (Ara) cross the road around 1+800km.
UMO070	Ingurugaswewa tank is located 1+600km RHS of the road.
UMO071	Small streams at 0+200km, 2+000km and Dabakanaella around 4+000km crosses the road.
UMO072	Road cross Bathalakoteara at 0+600-0+700km & Suduwathuara at 1+600-1+700km.
UMO077	Streams crosses the road at 2+100km, 4+500km and Muthukandiya tank is located around 3+400km RHS of the road.
UMO081	Badullagolla Oya crosses the road at 1+100km.
UMO085	Small stream crosses the road around 0+700km
UMO086	Road runs parallel to the irrigation cannel around 2+300-2+800Km.
UMO089	Road cross Balaharuwa Ara around 2+000 – 2+100km and irrigation canal at 2+100 – 2+200km.
UMO091	Meeyaloya crosses the road at 2+000km.
UMO093	Allaara crosses the road at 0+200-0+300km.
UMO095	Irrigation cannel crosses the road at 0+200-0+300km and small stream cross the road at 0+600-0+700km.
UMO096	Gigiriella tank is located around 0+800 to 1+200km along the road.
UMO097	Road runs over tank bunds Kandiyapita at 0+400km, 1+100km and 4+500km, Mahapalassa, medium tank at 8+800-8.900km. Two irrigation canals cross the road at 2+800 – 2+900km and 6+200 – 6+300km.

Road ID	Sections that cross or located near water sources
UMO098	A stream crosses the road at 0.100 – 0.200km.
UMO099	Two Irrigation canals cross the road at 0+100-0+200km & 0+400km respectively
UMO099	Road runs over the Raththrewewa tank bund from 0+400 to 0+800km.
UMO104	At 6+100km Pissa Oya, 6+500km Meeoya Ara and 10+300 km small streams crosses the road.
UMO105	Irrigation canal 14 Ela is located at the starting section of the road.
UMO110	Manik Ganga crosses at 8+900 – 9+000km and small stream cross the road at 10+100–10+200km.
UMO112	A small stream crosses the road at 4+000 - 4+100km section of the road.
UMO115	Irrigation canal is located parallel to the LHS of the road at the starting section.
UMO116	Road crosses Hulandawa Oya at 1+300-1+400km.
UMO117	Small stream crosses the road at 1+300-1+400 km
UMO118	Streams crosses the road at 1+300km and 2+100km.
UMO120	Irrigation canal crosses the road at 0+800-0+900km & stream cross the road at 0+900km.
UMO121	Road enters to tank bund around 1+400km of UMO121.1 Sec ii. The tank of the Minindoru Kolaniya is located around 3+000km RHS of the road UMO121 Sec i.
UMO123	123.1: Irrigation canal crosses the road at 0+100km.
UMO126	Irrigation canal located at 0+000-0+100km and 0+500km.
UMO128	A stream crosses the road at 3+400km and Bellan Oya cross the road at 6+700km.
UMO129	129: Streams crosses the road at 0+500-0+600km and 1+300-1+400km of the road. 129-1 Irrigation canal crosses the road at 1+200-1+300km and Maha Ara crosses the road at 1+500-1+600km.
UMO131	0+100-0+200km Kalu Ara crosses the road, 0+700-0+800km Koongas aara, 3+300-3+400km small stream, 3+700-3+800km irrigation canal, 9+100-9+200km and 11+100km small streams cross the road.
UMO133	Dada Oya crosses the road at 3+400-3+500km.
UMO135	Stream crosses the road at 1+800 – 1+900km of the road.
UMO138	Irrigation canal 14 Ela is located at the starting section of the road.
UMO140	Small streams cross the road at different locations including 0+500 – 0+600km, 0+700-0.800km and 4+000km.
UMO142	Kotamuduna Ela is located LHS of the end section of road.
UMO143	A stream crosses the road at 1+200-1+300km.
UMO143	Wahugoruwa Ara crosses the road at 0+600-0+700km, Kudi Ara 0+800km and small stream around 1+600km.
UMO145	Irrigation canal is located at end of the UMO145.1 road.
UMO148	148.1 road crosses small stream around 0+200 to 0+300km.
UMO149	UMO149 section crosses the irrigation canal at starting point.
UMO150	150 & 150.1, sections start close to the irrigation canal.
UMO153	Pinthaliya tank is locating LHS of the road of UMO153.1.
UMO153	A natural stream crosses the road at 2+200 – 2+300km.

5. Air Quality, Noise and Vibration

81. Majority of the Identified roads in Badulla & Monaragala districts traverses through rural, residential and agricultural areas, which are not highly populated, commercialized or industrially superior areas. Currently there are several small and medium scale industries located within the province but effect of them on air quality is very low. The vehicular usage and other factors, which are responsible for decreasing the quality of air and increase the level of noise is not in that much of considerable level. Therefore apparently, air quality standards in the area are within the national ambient air quality standards. Table 9. Presents the National Environmental (Ambient Air Quality)

Standards, declared in 1994 by the CEA, and table 10 presents the 2005 "World Health Organization Air Quality Guidelines" which offers a global guideline on thresholds and limits for key air pollutants that pose health risks[5]. However vehicular traffic found within town areas of Badulla, Monaragala, Bandarawela and Mahiyanganaya can affect air quality and noise to some extent.

Table 9: National Ambient Air Quality Standards

Parameter	Average time (hrs.)	NAAQS (mg m^3)	NAAQS (ppm)
Carbon Monoxide	8	1	9
Nitrogen Dioxide	24	0.10	0.05
	8	0.15	0.08
Sulphur Dioxide	24	0.08	0.03
Lead	24	0.002	-
TSP	24	0.03	-
PM10	8	0.35	-

Source: Gazette of the Democratic Socialist Republic of Sri Lanka, 850/4 (20 December 1994).

Note: PM 10- Particulate matter<10 µm; NAAQS- National Ambient Air Quality Standards.

Table 10: WHO Ambient Air Quality Guidelines, 2005

Parameter	Averaging Period	Guideline value in mg/m^3
Sulphur Dioxide (SO_2)	24 hour	125 (Interim target 1) 50 (Interim target 2) 20 (Guideline)
	10 minute	500 (Guideline)
Nitrogen Dioxide (NO_2)	1 year	40 (Guideline)
	1hour	200 (Guideline)
Particulate Matter (PM_{10})	1 year	70 (Interim target 1) 50 (Interim target 2) 30 (interim target 3) 20 (Guideline)
	24 hour	150 (Interim target 1) 100 (Interim target 2) 75 (Interim target 3) 50 (Guideline)
Particulate Matter ($PM_{2.5}$)	1 year	35 (Interim target 1) 25(Interim target 2) 15 (Interim target 3) 10 (Guideline)
	24 hour	75 (Interim target 1) 50 (Interim target 2) 37.5 (Interim target 3) 25 (Guideline)
Ozone	8 hour, daily maximum	160 (Interim target 1) 100 (Guideline)

6. Occurrence of Natural Disasters in the Project Area

1. Land Slides

[5] These guidelines are adopted by the Word Bank under their General EHS Guidelines.

82. Landslides are a prominent natural hazards occur in Uva province during heavy rains higher and according to past records of Disaster Management Centre (DMC) highest incidence of landslides could be seen within the Uva Province.

83. In Badulla the past incidence of landslide were mainly recorded in several AGA divisions such as Badulla, Bandarawela, Haputale, Kandaketiya, Migahakivula, Passara, Soranatota, Uva Paranagama and Welimada. Their occurrence is resulted by both natural causes such as earth movements, rock falls, cracks, creep movement, localized earth slips and partial slides. Other than the natural causes, manmade causes such as large scale sand-mining in Badulla and Hali-ela AGA divisions, gem mining in AGA divisions of Badulla, Passara, Mahiyangana and Hasalaka AGA divisions, quarrying of dolomite in the Soranatota AGA division and metal quarrying along the Badulla - Mahiyangana road have aggravated the process.

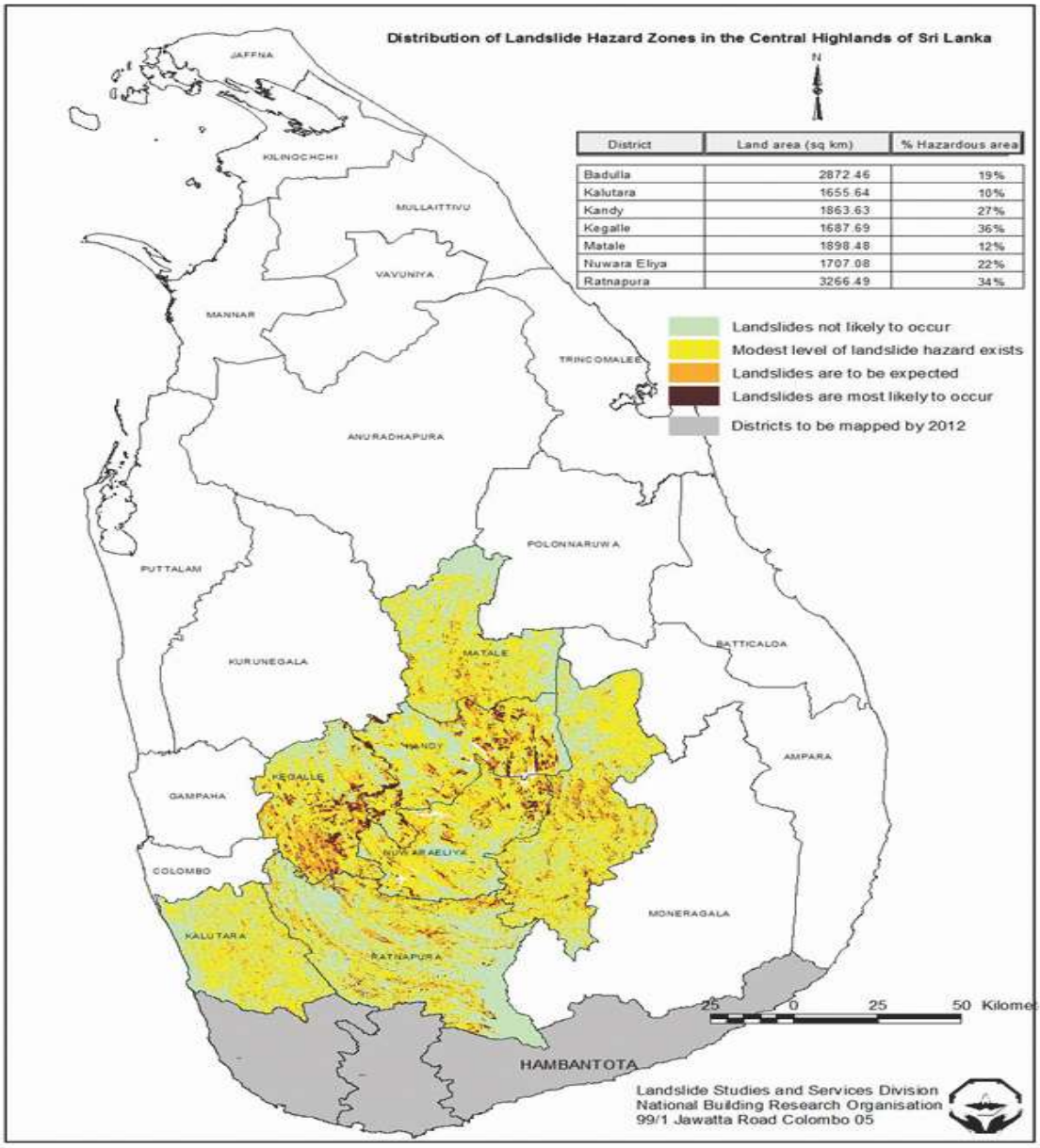


Figure 2: Distribution of landslide hazard zone in central highlands of Sri Lanka

84. These landslides have caused loss of lives, damages to structures, disruption of social stability, effect on education and health, economical failure, loss to farming, environmental degradation and pollution, etc. The number of people affected and dead by landslides in the country from 1994-2008 is given below in the following figures. Out of which the highest effected families and deaths were experienced in the districts of Nuwara Eliya, Kegalle, Badulla and Rathnapura (Figure 3).

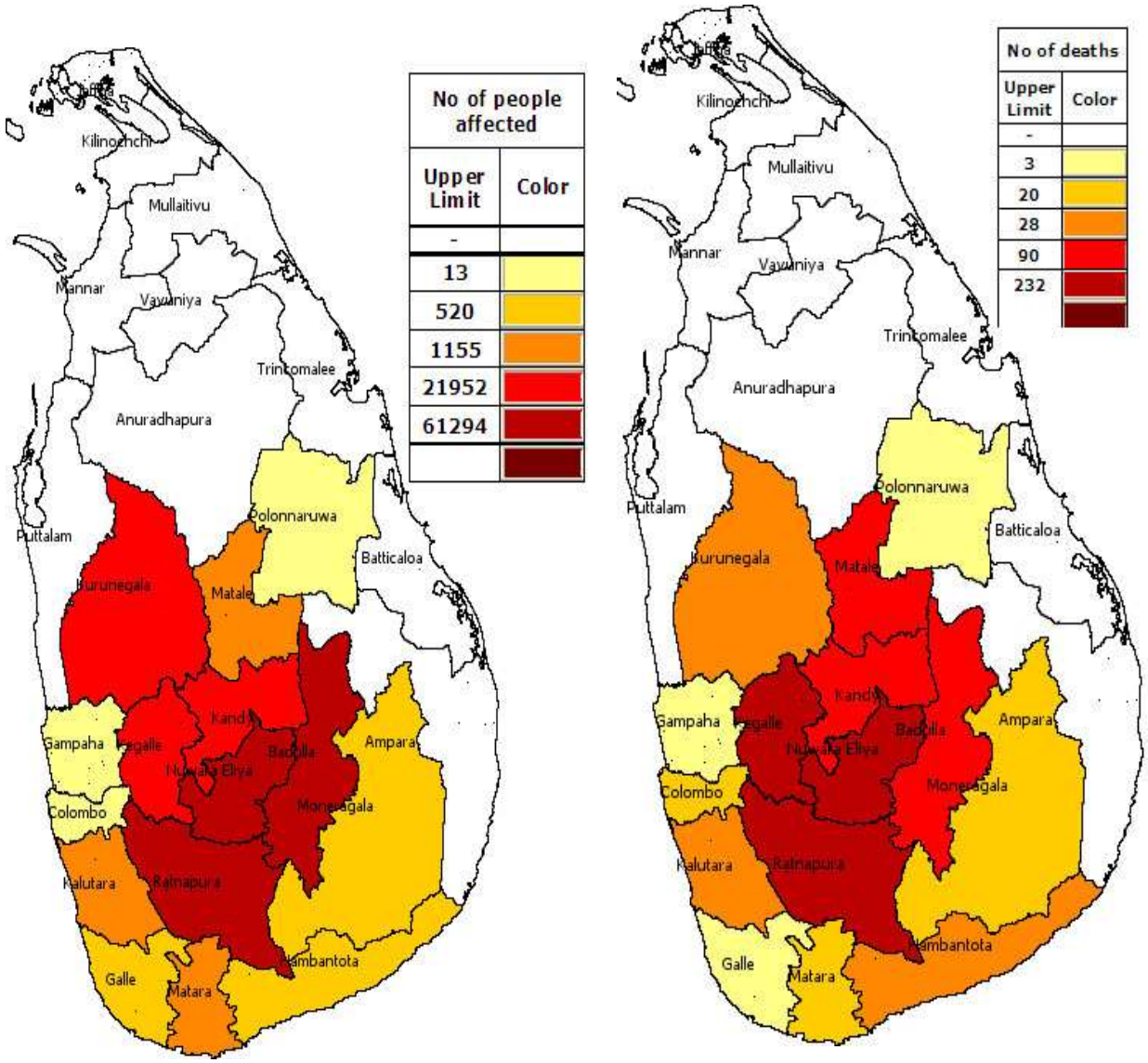


Figure 3: Deaths Occurred due to Landslide in Sri Lanka, 2009

Source: Sri Lanka National Report on Disaster Risk, Poverty and Human Development Relationship, Disaster Management Centre, UNDP, 2009.

2. Drought

85. Monaragala district has experienced some drought conditions during past years especially in the months of January to March and in August. With respect to spatial distribution of the

country, people living in Anuradhapura, Kurnegala, Puttalam and Moneragala are the most affected. Badulla has also affected partially in some parts of Badulla district (Figure 4).

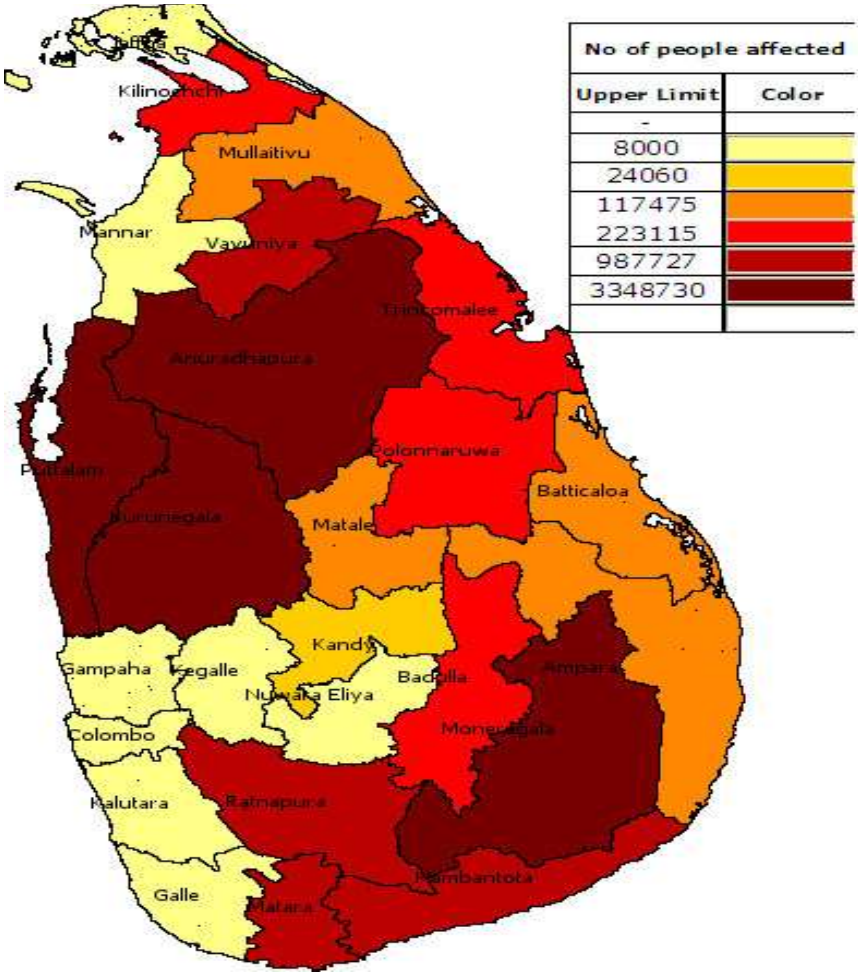


Figure 4: Drought Hazardous map of Sri Lanka, 2009

Source: Sri Lanka National Report on Disaster Risk, Poverty and Human Development Relationship, Disaster Management Centre, UNDP, 2009.

86. Floods are visible in some areas of Monaragala district during heavy rains. Table 11 shows the road that get inundated during heavy rains in Monaragala District.

Table 11: Flood prone areas along project roads

No	Road ID	Flood prone area
Mnaragala District		
1.	UMO0151	The area around 0+300km section of UMO150.1 is going under inundation during heavy rains.
2.	UMO69	UMO69.1: Section of 0+500-0+600km and 1+900km going under inundation during the rainy season.
3.	UMO070	Section between 0+100 – 0+200 inundate during the rainy season.

B. Ecological Environment

1. Existing Habitats with Respect to Flora, Fauna and Protected Areas

87. **Badulla District:** Considerable percentage of the district is covered by forest with different types including Montane, Sub Montane, Moist Monsoon and Dry Monsoon forests. The total forest cover has been estimated as 54,271 ha, out of which the dense and open forestlands comprise 19.6% and forest plantations cover 4.6%. Dry pathana grasslands can be seen especially in the crests and upper slopes of hills in Passara, Ella, Haldummulla and Migahakivula and covers around 10,230 ha. Scrubland are concentrated predominantly in Mahiyangana and Ridimahaliyadda (14,240 ha) and are result of the abandoning of chena lands after constant cultivation.

88. Ravana Ella Sanctuary, Badulu Oya river basin and Gallanda Oya are the main ecologically important sites in the district. About 1,932 ha of Ravana Ella Sanctuary is located around Ravana Ella falls. The famous Ravana Ella Cave lies 1,370 m (4,490 ft.) above sea level on the foundation of a cliff. Large number of mammals, birds and reptiles distributed within the sanctuary of Ravana Ella. Hakgala Mipilimana Forest Reserve and Thangamale Sanctuary, Namunukula forest reserve are other important ecosystems in Badulla district. The latter is famous for hidden Waterfalls, Eucalyptus Forest and Rain Forest. Haputale Forest Reserve provides greater diversity of avifauna in this area.

89. Part of the Maduruoya National Park also lies towards the Eastern border of district and it is important elephant habitat distributed in the area. Different habitats of the park provided refuge for large number of terrestrial and aquatic species of wildlife including a variety of endemic species. Other than elephants, leopards, sloth bears, Sambhur, spotted and barking deer, wild boar and wild buffalo are also found here. Torque macaque, Purple-faced leaf monkey and nocturnal Slender loris are also found in the park. Lesser adjutant, Woolly necked stork, Openbill, Painted stork, Racket tailed drongo, Yellow-fronted barbet, Sri Lanka jungle fowl and spur fowl and over 100 species of birds found within the park.

90. **Monaragala District:** Monaragala district is rich in forest cover and about one-third of total area is covered by natural forests including national parks and/or sanctuaries. The total extent of land under protection in the district exceeds 158,070 ha with proposed areas covering an additional 11,900 ha. The forest cover is mainly comprise of tropical, dry, evergreen, mixed forest. Weera (Drypetes sepiaria), Kanumella (Diospyros ovalifolia) Palu (Manilkara hexandra) Halmilla (Berrya cordifoila), Kuma (Gleniea umjuga), Burutha (Chloroxylon swietenia), Kaya (Memecylon spp) Kaluwara (Dispyrous ebenum) are the prominent species found in the high forests. A considerable extent of vegetation cover (25 %) in the district comprises savannah and grassland (pathana), especially the West and Northwestern area of the district; The common species found are Aralu (Terminalia belerica), Bulu (Terminalia chebula), and Nelli (Embilica officinalis). The ground strata of savannah are dominated by grass varieties like Mana (Cymbopogon confertiflorus). The grasslands are found in Southern dry areas of Buttala and Thanamalwila divisions, bordering forest areas, and they are locally known as “Dry Pathana”. The dominated species of Dry Pathana are guinea grass (Panicum maximum) Illuk (Imperata cylindrica) and Mana.

91. Important wildlife areas within the district include Yala, Galoya, Uda Walawe and Lunugamvehera National Parks, few Sanctuaries (Lunugamvehera-Udawalawe, Sellaka Oya Sanctuary) and number of wildlife Corridors and Forest Reserves (Yala-Lahugala, Bakinigahawela FR, Daragoda FR, NF, and Bibilehela FR). These areas provide habitats for

different fauna, including endangered (Elephant, Leopard, Red face Malkoha, Estuarine Crocodile, Bengal Monitor and Python etc.) and threatened species (Purple Faced languor and the Togue Macaque). Endemic animals inhabit in the district include fish, amphibians, reptiles and mammal species. A majority of the 251 resident bird species found in the country are also found in the district during the winter period.

92. Gala Oya National Park serves as the main catchment area for Senanayake Samudraya. Associated protected areas of the park include Senanayake Samudraya Sanctuary, Gal Oya valley Northeast Sanctuary and Gal Oya valley Southeast Sanctuary which account for 63,000 ha of land. Danigala, Nilgala, and Ulpotha are the mountains of the park. The national park contains a substantial area of Savanna and mountainous grasslands known as Pathana. The park with its thick green canopy is a haven for species of birds both resident and migratory such as painted storks, pelicans, cormorants, teals grey dove, Malabar pied hornbill, grey hornbill, koel etc,. In addition to elephants, the park is home to leopards, bear, spotted deer, sambur, wild boar etc. Among other fauna, several species of monkeys, porcupine, a number of fish species, reptiles and butterflies have been recorded.

93. Lunugamvehera National Park was established for protection as a corridor for elephant migration from the Yala National Park to the Uda Walawe National Park‟s Western region and for the protection of the catchment areas of the Lunugamvehera Reservoir. The park is a habitat for a large number of wild elephants and wild Buffaloes. In addition avifaunal species and other mammals such as fishing cat, grey mongoose, bear, wild boar, spotted deer and mouse deer are found here.

94. Udawalawe National Park includes the Udawalawe Reservoir, together with much of its catchment area. More than 2/3 of the land area of the park lies within the Moneragala district of the Uva province. The park comprises grasslands and thorn scrubs. The park is important for elephants, leopard, sloth bear, spotted dear, wild boar and sambhur including small mammals are found within the park. Over 140 species of birds have been recorded within the park. Changeable hawk eagle, Crested serpent eagle, Malabar pied hornbill, Jungle fowl, Painted stork, White Ibis and Black necked Stork are commonly seen in the park. Yala National Park is the most visited and second largest national park in Sri Lanka. The park covers 979 square kilometers. The park is best known for its variety of wild animals. It is important for the conservation of Sri Lankan elephants, Sri Lankan leopards and aquatic birds. Yala harbors 215 bird species including six endemic species of Sri Lanka. The number of mammals that has been recorded from the park is 44, and it has one of the highest leopard densities in the world.

2. Forest Areas Located Within/Adjacent to the Roads of UP

95. Since large extent of forest areas are located within the UP, some of the long distance roads runs through or close to the forest areas. However, none of the proposed roads run through the national parks or sanctuaries. Table 12 and Figure 5 present the details of roads which runs through or adjacent to the forest with necessary information.

96. Roads falling in part or whole inside or within the buffer zone of a SNR, NP or NR will not be selected under the investment program. Roads falling adjacent to other protected areas (such as sanctuaries or protected wet lands) or eco-sensitive areas will be included only if there is no widening of the road “right of way” or acquiring of land from the protected area or eco-sensitive area. For such project roads proper consultations will be held with the Department of Wildlife Conservation, Forest Department, local community and other relevant stakeholders and appropriate clearances or endorsements should be sought if required.

97. Department of Forest granted a general approval for improvement of all roads under this project which are falling within or adjacent to sensitive forest areas through letter No. EMD/EIA/RD/rural roads/2014 dated 27 Aug 2014 (attached in appendix IV.1). However, for any roads or section of roads falling within Forest Reserves, road specific approval should be obtained before construction.

Table 12: Forest located within/adjacent to the proposed roads of the UP

Road ID	Road length	Name/Type of the forest area	Length of the road within/adjacent to the roads
UMO069	4+777km	Hambegamuwa	Forest reserve is located at the end section of the road UMO069.1 around 1.8km
UMO068	7+893km	Handapanagala forest	Forest is located RHS close to the starting section
UMO087	2+889km	Handapanagala forest	From 500m, up to end section Handapanagala forest is located LHS of the road
UMO018	4+257km	Kohilagoda forest	Located at 2+800-2+900km RHS of the road.
UMO043	5+128km	Savannah forest.	Considerable length of the road runs true the savana forest.
UMO050	2+000km	Protected forest	Forest area is located LHS of the road from starting point up to end point.
UMO001	5+949km	Savannah forest	Road runs through the savanna forest from 0+700 up to 1+400km.
UMO088	3+002km	Protected forest	Forest area located from starting point up to mid-section LHS of the road.
UMO123	123: 5+645km & 123.1: 3+549km	Protected forest	123: Starting point up to 0+900km forest area is located RHS of the road. 123-1: Forest area is located end section of the road around 3+300km RHS.
UMO085	2+001km	Protected forest	Forest areas are located around 0+400km up to 1+000km beside the road
UMO142	3+676km	Pathana forest	Forest located around 2km LHS located.

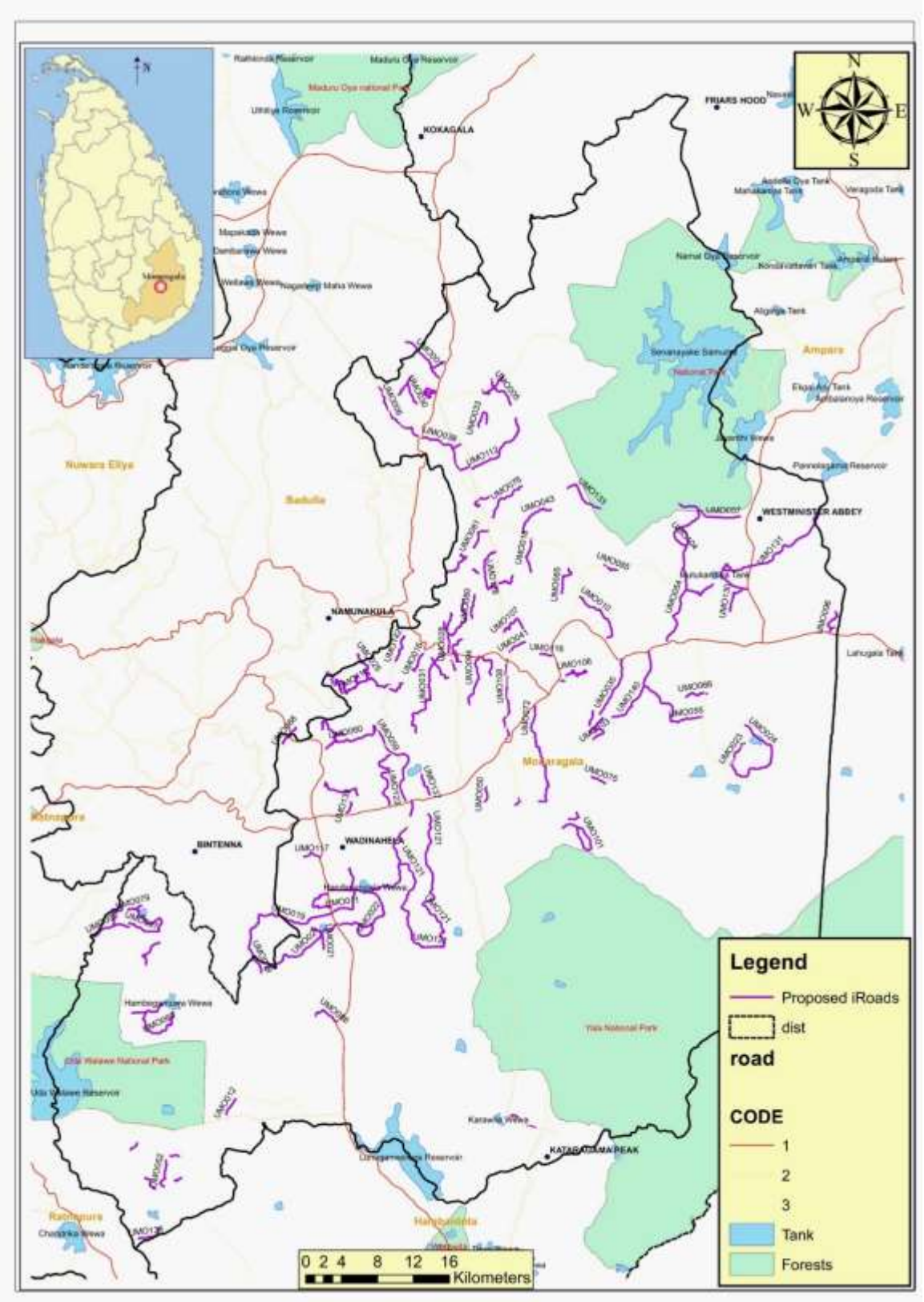


Figure 5: Ecological sensitive areas with respect to proposed roads

C. Socio Economic Environment

1. Population and Population Density

98. The UP is divided into two administrative districts; Monaragala and Badulla and the capital of the province is Badulla. There are 26 Divisional Secretary's Divisions (DS Divisions), 15 in Badulla and 11 in Monaragala 886 Grama Niladhari Divisions (GN Divisions). From the total population in the province, majority are living in rural areas (Badulla 73% & Monaragala 98.3%). The population density of Badulla district is 288 persons per km^2 and in Monaragala district it is 82 persons per km^2. Table 13 shows that, distribution of population by sector and population density.

Table 13: Distribution of population by district (2012)

District	Total population	Population by District			Population density (Persons/km^2)
		Urban	Rural	Estate	
Badulla	815253	8.6	73.0	18.4	288
Monaragala	448210	-	98.3	1.7	82

Source: Census of Population and Housing, Department of Census and Statistics, 2012.

2. Population by Ethnicity:

99. According to the distribution of population with respect to the ethnicity in UP, Sinhalese makes up a majority of the population in both districts. Around 73 % & 94% belongs to Sinhalese in Badulla and Monaragala districts respectively. Indian Tamil & Moor represent the second and third places in Badulla district. Moor & Sri Lankan Tamil represent the second and third ethnic groups in Monaragala district. Badulla district is more ethnically diverse than Monaragala district. Table 14 indicates the population of Badulla and Monaragala districts to UP with respect to ethnic groups.

Table 14: Distribution of population by ethnicity (2012)

District	Sinhala		Sri Lankar Tamil		Indian Tamil		Moor		Burger		Malay		Other	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Badulla	595372	73	21880	2.7	150484	18.5	44716	5.5	992	0.1	1351	0.2	610	0.1
Monaragala	428104	94	8206	1.6	5001	1.1	9508	2.1	116	0.0	63	0.0	60	0.0

Source: Department of Census and Statistics, 2015.

3. Main Economic Activities

a) Agriculture

100. **Badulla District**: Economy of the district is mainly based on agriculture, livestock and tourism. Agriculture of the district is dominated by tea, paddy and vegetable farming. Badulla district is divided into two portions as upper region and lower region according to climatic and geographical characteristics. Upper division of the district is famous for tea plantations and vegetable cultivation while lower division is well known for paddy cultivation. Badulla is the third largest tea growing area in the island and both tea estates and smallholdings concentrated to the district. The predominant tea growing areas in the district are Passara, Hali Ela, Badulla, Ella and Haputale. Out of the entire land area of Badulla district, which is 2,861 km^2, the extent under the

permanent crops of the district is 33786, which include tea (30639 ha), rubber (432 ha), and coconut (2715 ha).

101. Paddy is the second most important crop in the district, which is grown in 7.1% of the area. Total of 27,637 ha is cultivated during Maha season and the harvested extent of the season is 24742 ha in 2013/2014. Total of 12,843 ha is cultivated during Yala season and the harvested extent of the season is 12,731 ha in year 2014. During the Maha season majority of paddy lands in the district are cultivated but during the Yala, the cropped area is reduced.

102. Minor crops of coffee, cocoa and cashew are grown in the district as smallholdings. Only 4% of all the minor export crops grown in Sri Lanka are found in the Badulla district. Coffee, Cocoa, Cardamoms etc. are grown in only 0.5% of the total land area. Minor food crops such as cereals (Maize, Kurukkan) pulses, legumes, chillies and vegetables are grown in market gardens or chena. Badulla is the largest potato and vegetable growing district in the Island especially in higher elevation of Bandarawela, Haputale, Uva Paranagama and Welimada. Considerable number of families in Badulla district engaged in livestock and poultry industry. The main animals and birds herded are chicken, goat, cattle, and buffalo.

103. **Monaragala district**: Monaragala is mainly an agricultural district. Out of total land area which is 5,639 km², total extent under the permanent crops is 13488, which include tea (922 Ha), rubber (1,865 Ha), and coconut (10,701 Ha). Minor crops of coffee, cocoa and cashew are grown in the district smallholdings. The subsidiary food crop extent, which varies year by year, and season by season contribute to about 13,000 ha together with home gardens and permanent highland cultivation. Paddy is the most important crop in the Monaragala district. Total of 34,814 ha is cultivated during Maha season and the harvested extent of the season is 23,637 ha in 2013/2014. Total of 8,815 ha is cultivated during Yala season and the harvested extent of the season is 7,769 ha in year 2014.

104. Currently, most agricultural activities confined only to Chena cultivation fed by rain water due to lack of irrigation water as large number of ancient tanks/reservoirs existed to serve hundred thousand paddy fields in Wellassa was completely destroyed by Great Britton. Apart from paddy, large proportion of population of the district is engaged in sugar cane cultivation, rain-fed paddy farming, vegetable, rubber and pepper cultivations. Livestock and poultry industry is very popular in most parts of Monaragala district. The main animal and bird herded are chicken, goat, cattle, and buffalo. Inland fishing is a main livelihood of a large number of families in Monaragala district where a number of ancient tanks exist. Most fishermen use traditional methods for fishing.

b) Manufacturing industries

105. Badulla and Monaragala are not industrially developed areas and majority of the existing industries are predominantly agro based. Less than 12% employed population of both districts is engaged in industrial activities. Table 15 represents the percentage distribution of employed population by major industry group of both districts in year 2014. As shown in table, out of the total employed population of the Province, the highest share is reported under agriculture sector (60.1%), whereas the lowest is from Industries sector (11.4%). Also the estimated share of service sector employment is 28.4 percent.

106. Poor urbanization in Badulla and Monaragala districts indicate the possible rarity of industrial establishments in the district and the economy is dominated by agriculture and services. Both districts are highly concentrated with agricultural sector employment and no significant different between two districts regarding the percentage distribution of employed population by

major industry group. Livestock based industries also provide significant financial support to the population in Monaragala district. Number of livestock farms in 2015 in Badulla district is 8,727 and Monaragala district 7,007.

107. The existing manufacturing establishments include kithul treacle and jaggery production, production of processed food, bee honey, Ayurveda medicine, fishery, curd, milk, food packaging and supplying. Apart from that people engage in traditional craftsmanship, tailoring of garments and manufacturing of furniture.

Table 15: Percentage distribution of employed population by major industry group 2014

District	Total	Major Industry Group		
		Agriculture (%)	Industries (%)	Service (%)
Uva Province	100.0	60.1	11.45	28.4
Badulla	100.0	63.3	9.9	26.7
Monaragala	100.0	56.9	13.0	30.1

Source: Sri Lanka Labour Force Survey Annual Report: 2014

4. Household income

108. The table 16 shows the monthly mean and median household income of Badulla district and Monaragala districts. Both mean and medium household income of the province are less compare to countries mean and medium household income which are Rs.45, 878 and 30,814 respectively.

Table 16: Mean and Medium Monthly Household Income by Sector, Province and District – 2012 - 2013

District	Household Income	
	Mean (RS)	Median (RS)
Uva Province	35,638	24,228
Badulla	36,119	25,067
Monaragala	34,804	20,686

Source: Household Income and Expenditure Survey 2012/13, Final Report, Department of Census and Statistics.

5. Poverty Situation

109. Poverty head count index is the percentage of population below the poverty line in Sri Lanka. Based on the results of year 2013/2014, 5.3% household are poor in the country. The result indicates that highest percentage 18.8% of poor household represent from Monaragala district of the province in 2012/2013 (Table 17).

Table 17: Percentage of Poverty Headcount Index (HIC) and Poor Household of Province and Districts

Province/District	Year 2012/2013	
	Poverty Headcount Index (%)	Percentage poor household (%)
Uva province	15.4	13.5
Badulla	12.3	10.4
Monaragala	20.8	18.8

Source: Household Income and Expenditure Survey 2012/13, Final Report, Department of Census and Statistics.

6. Education

110. Most of the government and private schools and high educational centers & institutes are located in Badulla, Bandarawela, Guruthalawa and Monaragala of Uva Province. A total of 589 and 292 government schools and 40 and 23 pirivenas are located within Badulla and Monaragala districts respectively. In addition higher education institutes such as Uva Wellassa University at Badulla and Institute of Surveying and Mapping at Diyathalawa are also located within the province. The literacy rate of the province is 90.3%. The education level of the people within the province is shown in table 18.

Table 18: Percentage distribution of population (5 years and over) according to educational attainment by District

District	Educational Attainments (%)						
	No schooling	Primary	Secondary	G.C.E (O.L)	G.C.E (A.L)	Degree and above	Literacy %
Badulla	7.2	27.0	96.6	13.6	11.0	17.0	89.2
Monaragala	6.1	26.6	46.9	12.0	6.7	1.6	91.4

Censes of population and housing of Sri Lanka 2012 (Provincial data based on the 5% sample).

7. Existing Infrastructure Facilities

Condition of Road Infrastructure:

111. Roads are the main transportation mode of Monaragala & Badulla district of UP. The existing road network of the province includes national, provincial and rural roads. A total of 1168.40km, A (472.40km) & B (696.00km) class roads managed by the RDA under the Ministry of Higher Education and Highway and provincial roads belong C and D class category are managed by the Provincial Road Development Authority of UP. Majority of the roads under category of class E are managed by the Local Authorities. In terms of the 13th Amendment to the Constitution, except national highways and rural roads belonging to Local Government institutions, around 1738 km remaining roads falling under C.D.E, categories belong to the Provincial Council.

112. In addition to the road network, rail transport is common and very popular mode of transportation from Colombo to Badulla via Peradeniya Junction. Kinigama, Heeloya, Kitalella, Ella, Demodara, Uduwara, Hali-Ela are the railway stations located along the line up to Badulla witch provide both passengers and freight service for the people. No railway lines located within Monaragala district of the UP.

113. Different road development projects have been undertaken by the government under RDA, PRDD and Local Authorities in recent past and ongoing road development activities can be seen in different areas of the Province. The existing condition of the A & B class roads of the province are satisfactory level and most of the road recently rehabilitated, improved or upgraded. Provincial road network is also fairly good however improvement of number of roads within both districts is necessary.

114. During the field survey, it was observed that majority of the rural roads in the Province have not been rehabilitated. Condition of those roads in the PS level is in unsatisfactory condition as they are not paved and most are under dilapidated condition. Internal road network mainly consists of sandy soil which tends to deteriorate during rainy season. This affects the mobility of

the community for their daily needs. In addition, there are several bridges and culverts to be repaired or newly constructed. Further in some candidate roads, there are no proper structures to cross the streams along the roads.

Energy Sources and Household:

115. The electricity facilities along the selected roads are apparently good compare to other infrastructure facilities such as telephone and pipe born water supply. The Ceylon Electricity Board has supplied electricity to most of the people around selected roads. Table 19 indicates that electricity is the main source of lightning where 76.5% of the household in the province obtain electricity from the national grid. From the total households in Badulla and Monaragala around 84.5% & 68.5% are using electricity from the national grid. Kerosene is the second main source of lightning and 14.6 % of household in Badulla and 27.4% in Monaragala district depend on it.

Table 19: Principle type of household lightning source – 2012

District	Total household	Electricity from national grid	Electricity from rural hydropower project	Kerosene	Solar power	Bio gas	Other
Badulla	209,956 (100%)	84.5%	0.2%	14.6%	.6%	0%	0%
Monaragala	120,546 (100%)	68.5%	0%	27.4%	4.1%	0%	0.1%

Source: Census of Population and Housing, Department of Census and Statistics, 2012.

Drinking Water:

116. As shown in the table 20, majority of the households in Badulla district (45.3%) use rural water supply and water from river, tank, streams/spring as drinking water sources. From the total number of household in Monaragala districts, 38% use protected well within and outside the premises as their main drinking water sources.

Table 20: Number of Household in Occupied Housing Units by Main Source of drinking Water and district

Households and type	Main source of drinking water	
	Badulla	Monaragala
Total households	209,956	120,546
Total	100.0	100.0
Protected well within premises	13.1	21.0
Protected well outside premises	10.2	17.0
Un protected well	5.9	5.3
*Tap within unit	13.2	13.0
*Tap within premises but outside it	6.8	13.5
*Tap outside premises	3.8	4.0
Rural water supply	22.3	16.4
Tub wells	0.6	3.5
Bowsers	0.0	0.1
River/tank/streams/spring	23.0	5.1
Rain water	0.1	0.1
Bottled water	0.0	0.0
Other	0.9	1.1

Source: Census of Population and Housing of Sir Lanka – 2012 (Provincial data base on the 5% sample)

Sanitary Facilities:

117. Table 21 shown that majority of household in Badulla and Monaragala districts use water seal septic tank type. From the total household in Badulla and Monaragala, 89.7% and 85.3% use exclusive water seal septic tanks toilets facilities. From the total population of two districts Badulla and Monaragala around 0.7% & 1.7% do not use any type of toilet facilities.

Table 21: Household in occupied housing units by type of toilet facility and district

Households and type		**Badulla**	**Monaragala**
Total household		**209,956**	**120,546**
Total		100.0	100.00
Water seal (septic tank)	Exclusive	77.1	74.7
	Shared	12.2	10.6
	Common	0.4	0.0
Water seal (sewer tank)	Exclusive	2.6	2.9
	Shared	0.3	0.2
	Common	0.0	0.0
Pour flush (Not water seal)	Exclusive	1.6	1.2
	Shared	0.4	0.3
	Common	0.0	0.0
Direct pit	Exclusive	3.9	7.6
	Shared	0.8	0.6
	Common	0.0	0.0
Other	Exclusive	0.1	0.0
	Shared	0.0	0.0
	Common	0.0	0.0
Not using a toilet		0.7	1.7

Source: Census of Population and Housing of Sir Lanka – 2012 (Provincial data base on the 5% sample).

D. Religious, Cultural and Archeological significance

118. UP is rich with religious, cultural and archeologically significant places where some of were originated from Ravana Era. The ancient Mahiyanganaya Rajamaha Viharaya is located close to Badulla - Mahiyanganaya road within the town limits of Mahiyanganaya. This is the 1st site of Lord Buddha from his three visits to Sri Lanka. In addition to Mahiyanganaya, the two main ancient temples located within UP are Muthiyangana and Katharagama. Muthiyangana is one of the sixteen most venerated religious places for Buddhists in Sri Lanka located within the town limits of Badulla. Katharagama is another important temple complex dedicated to God Kataragama and is one of the important religious sites in Sri Lanka that is venerated by Sinhala Buddhists, Hindus, Sri Lankan Tamils, Sri Lankan Moors and Vedda people.

119. Dowa Raja Maha Viharaya is another important religious place which lies few km away from the Bandarawela town on the Bandarawela - Badulla Road. This temple is thought to be done by King Walagamba in the first century BC. This is one of the many temples built by the king while taking refuge in the UP after an Indian invasion. The temple has a beautiful ornamental gateway that attracts visitors. It has a 38 feet Buddha image sculptured from a rock. Bogoda temple and Wooden Bridge were another important sites which were built in 16th century during the period of King Valagamba of Dambadeniya era. The bridge of the Bogoda said to be the oldest surviving wooden bridge in Sri Lanka. All parts of this bridge were constructed from wood, including the use of wooden nails as fixing material. The roof tiles show the influence of Kingdom of Kandy. The bridge was built across the Gallanda Oya, which linked Badulla and Kandy on an

ancient route. Other than that, the Bogoda Raja Maha Vihara Rock Temple has pre Christian era inscriptions and old murals and images.

120. Maligawila lies about 15 km off the Buttala town towards Okkampitiya and is famous for its giant free standing Buddha statue of the 7th century, carved out of a single limestone rock and stands about 14.5 m high. This is the tallest free standing Buddha image in the country. This statue is thought to be done by a prince called Aggabodhi in the 7th century. Buduruwagala is a historic Buddhist rock temple located on the Tanamalwila road in Moneragala district. About 5 km south of Wellawaya and off the beaten track surrounded by a beautiful manmade ancient lake is the relatively unknown mysterious historic rock sculptures name “Buduruwagala” (rock of Buddhist sculptures). Archaeologists have determined that these work of art are of the 9th or 10th Century AD. Dematamal Viharaya is located at Helagama on the Buttala-Okkampitiya road. The temple lies about 4 km from the Buttala town. Located in the middle of paddy field, the dark colour stupa and the boo-tree surrounded by the green paddy from the road itself is the temple. According to folklore, it is the place which provided safety to Prince Saddhatissa, who was attempting to flee after losing the fight with his elder brother, Prince Dutugamunu.

E. Tourism

121. Uva province is an area full of natural ecosystems such as waterfalls, mountains, forest reserves, national parks and surrounded by manmade habitats such as tea and rubber plantations. Uva region is naturally heritage for many eco-tourism and adventure tourism potentialities with cold climate as well as many attractive locations. It is remarkable that many tourists feel Uva region as a very attractive tourism location as having many places to visit such as Edhisam bungalow, Dunhinda Falls, Diyaluma Ella, Rawana Ella, Dowa Temple, Muthiyangana Raja Maha Viharaya and places for adventure tourism such as hiking in Namunukula Mountains through Spring valley tea plantation etc.

122. Badulla is a significant place for different types of tourist attractions, such as natural healthy environments, variety of ecosystems and number of old temples and other important religious places. Surrounding tea plantations have potential to promote tea tourism. Adventure tourism could experience by hiking in mountains, climbing waterfalls and other adventure experience. In Monaragala district, large numbers of natural based tourism significance sites are located and attract many local and international tourists annually. Sanctuaries and national parks in the district with virgin tropical forests, rich wildlife and beautiful landscapes including mountain ranges, water streams, and abandoned ancient irrigation tanks have the potential to attract many tourists. Some of the naturally based tourism significant sites of the district include Maragala and Geelone Mountain range, Yala, Galoya, Udawalawe and Lunugamwehera National Parks, Nilgala Medicinal Forest and sanctuary, Maligatenna Sanctuary, Arawakumbura Waterfall, Pareyyan Ella, Menik Ganga, Kumbukkan Oya, Senanayake Samudraya, Hambegamuuw and Urusita Wewa, Handapanagala Lake and Elephant corridor etc.

123. The climate of Bandaraweala, Ella, Haputale and Welimada is regarded by many local and foreign tourists as the most favorable climatic area in Island. Badulla town is one of the oldest towns in Sri Lanka with proven traces of the earlier settlement and surrounded by tea estates, paddy fields along the banks of the Badulu oya and Namunukula Mountains. Dowa temple, Demodara station, Bogoda wooden bridge, Kataragama Kiri Wehera, Muthiyangana Raja Maha Viharaya, Indigenous communities living in the region, floriculture, handicrafts and handloom industries, Uva herbarium a garden dedicated to grow herbs & reestablishing indigenous forest are other important tourist attractions in the province.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

124. The proposed work under the project will include rehabilitation and upgrading of existing roads/sections with improvement of pavements, road surface, construction of side drains & embankments, widening or replacement of culverts, cause ways bridges etc. In addition during the construction period, construction related activities will involve removal and re-establishment of public utilities, removal of road side trees, extraction of construction materials and transportation, disposal of waste and other unsuitable materials, establishment of construction material processing plants, labour camps etc. These activities may cause negative impacts to the surrounding environment of the project area during the construction stage.

125. The anticipated environment impacts during the preconstruction, construction and operation periods of the project and feasible mitigation measures to the impacts identified during the Environment Assessment process are described in this chapter. Since the propose project involve in rehabilitation of urban, semi urban and rural roads, the given impacts and proposed mitigation measures are common for construction activities of all these roads.

A. Pre-Construction Stage

1. Shifting of Public Utilities

126. Public utilities closer to the CW of proposed roads/sections include electric posts, power supply lines, pipe born water supply facilities, telephone post and transmission lines. Electricity is available in many subproject roads while telecommunication and pipe borne water supply facilities are also available in some road sections. The utility facilities located within proposed road sections are given in each EC. Depending on the requirement some of these utility lines will need to be shifted. Shifting operations will affect the communities as there will be disruptions to the supply (especially electricity and water). Even if this is a temporary impact it could be significant since disruptions will affect day to day activities of people.

127. Prior to proposed improvement work proper coordination and consent will be taken from service providers if utility lines are to be shifted. Advance notice to the public about the time and the duration of utility disruption will reduce public inconvenience and provide time to adjust the situation and obtain alternative facility. Use of experience and well-trained machinery operates will reduce accidental damage and ensure reestablishment of utilities with minimum time period.

2. Requirement of Lands for the Project

128. The existing ROW of the majority of the candidate roads/sections is adequate for the proposed construction activities. Therefore acquisition of lands will not be carried out for this project. However if lands are required for activities such as realignment of bends or construction of cross drainages in some road sections, that has to be undertaken by negotiation with property owners and involvement of a third party. Although people in the project area are willing to give their lands for such special cases, specified process for land donation in Resettlement Framework of iRoad program should be followed for taking lands. Further the necessary actions to secure lead-away canals beside the road will be done with the assistant from PS, divisional secretary and PRDA.

129. Further some construction related activities such as stockpiling, disposal sites, material processing plants, labour camps, vehicle parking yards etc., will require temporary lands within the project affected areas of the Province. Selection of lands for such purposes has to be carried out in a way that reduces the social and environmental impacts. Further an agreement will be signed with the LA and land owners. Conflict between workforce and villagers, removal of green cover vegetation from private lands, impact to the natural ecology, inconvenience due to dust, noise and vibration, disposal of solid waste, contamination of water and soil etc. are the expected social and environmental issues due to use of temporary lands.

130. Best construction management practices would be in place to ensure the protection of environment and public around temporary use lands for the construction related activities. Removal of soil, vegetative cover should be kept at minimum and should only be carried out if there is absolute necessity. To avoid contamination of soil, oil contaminant into water bodies, a system for the proper collection and disposal of lubricants at sites should be maintained. In the absence of a sewage system, septic tanks or pit latrines should be located away from ground water sources.

3. Construction in Flood Prone Areas

131. Some of the proposed roads/sections of Badulla and Monaragala districts are located within flood prone areas. No proper earth or line drains beside the roads causes water stagnation during the rainy season. During the Southwest (July- September) and Northeast monsoon (December-February) period those areas get inundated and the situation is vital to the development activities in the area.

132. Design of culverts, causeways and bridges based on the existing hydrological values in the exact locations of the roads, erection of embankment and design of new cross drainages to the flood prone areas in consultation with Department of Irrigation are essential.

133. Hydrological structures and the design for the road will be carried out during detailed design phase based on the findings of the SAPE work reports including Environmental Checklists, Transect walk reports etc. since comprehensive assessments such as hydrological studies are not available for this project. Therefore, the design engineer is supposed to go through the above documents and he should incorporate relevant findings if found feasible. For this purpose, design engineer will conduct field verification together with a relevant team of experts from PIU, PIC and the contractor which is essentially supported by information extracted from the public. Therefore the output will be highly location specific which should match to solve the issue observed in the particular location. The “Context Sensitive Design” or CSD approach will be extensively used to determine and design these structures.

B. Construction Stage

1. Extraction Transportation and Storage of Construction Materials

134. Construction materials for the project are available within two districts of the UP, Badulla and Monaragala. Large numbers of approved sand mining sites are available within the province and currently transport outside to the province for large number of projects. Hadaoya, Vilaoya (Siyambalanduwa), Kudaoya (Balaharuwa), Maduruoya (Bibile), Mahaweli river (Mahiyanganaya) etc. are the main areas with sand mining sites within the province. In addition metal for the proposed construction are available within both district of the province, however large quantities can be obtained from Badulla district Haliela and Attampitiya area. In addition number of mettle

quarries are located close to the boundary of Monaragala district around Sooriyawewa area of southern province. Extraction of material for the construction works will have a permanent-irreversible impact to the natural resources. Modification of natural drainages, increase soil erosion, siltation, destabilization of slops, habitat loss, loss of potential productivity of lands etc., are the negative impacts related to extraction. In general extraction, transportation, loading, unloading and storage of construction materials on a large scale, will cause negative impacts to the environment due to dust, noise and vibration, water and soil pollution, reduction of scenic beauty, impact to the human health and impact on the natural ecosystem. Stagnation of water in material extraction sites (borrow pits and quarries) create breeding sites for mosquitoes and cause accidental damage to the people and wild animals. Soil erosion, lowering of river beds, damage to the river banks, reduction of sand replenishment of coastal beaches, coastal erosion and salt water intrusion during dry season are the main consequences due to sand mining.

135. The impact could be mitigated by extraction of construction materials from approved quarries and mines by GS&MB, use of existing sites for the material extraction, avoiding wastage of construction materials at sites, identification of alternative sources, selection of new material extraction sites away from public and environment sensitive locations with the approval of GS&MB, following of rules, regulations and requirements issued by CEA, GS&MB and LAs, transportation of construction materials with proper covering, loading of the construction materials according to carrying capacity of the trucks, rehabilitation of the material extraction sites at the end of the use, stock piling of materials away from environment and public sensitive locations, covering of sand, rubble, mettle bitumen and cement to ensure protection from dust and other emissions.

2. Effect on Water Resources

136. Seasonal tanks, streams, rivers, irrigation canals, waterfalls and community water supply facilities are located adjacent/across the proposed project roads. Therefore, excessive use of water for construction activities may impact on aquatic ecology and water resources especially during the dry season. Construction of cross drainages may temporarily block or divert streams, disturbance to the natural drainage pattern and create flooding and will affect the water sources use by the local community. Surface water runoff and ground water close to construction sites can be polluted with various materials such as cement, bitumen and chemicals etc.

137. In such situation, the method statement with mitigation action for anticipated impacts should be submitted by the contractor and approval should be obtained prior to construction activities. Since water related issues are significant during the construction activities of roads, priority should be given for the community requirements. Construction work affecting surrounding water bodies by erosion, silting and sedimentation should be prevented using silt traps, sedimentation basins and work should be scheduled during the dry season. Necessary steps should be taken to avoid entering waste water directly in to water bodies. Contractor will organize awareness program for employees regarding water conservation, pollution and minimization of water usage.

138. Excavation of beds of any streams, irrigation systems and other water resources should be avoided by the Contractor. If temporary flooding or stagnation of water is caused due to negligence of Contractor, the Contractor should take total responsibility and rectify all the damages with his own cost.

139. Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect downstream intakes without approval from the Engineer and relevant government agencies or Farmer Organizations (FO). Contractor shall restore the water sources to its original status once such diversion or closer or blockage occur during the site.

140. Temporary storage of material should be done in approved sites by the Engineer where natural drainage is not disturbed. All toxic and hazardous materials required for construction should be as much as possible sited away from water bodies with the instruction of engineer and should prevent their entering into such places. Water that contaminate with fuel, oil and grease shall not be directly released to storm water or natural water drainage system. Cement, bitumen, grease, lubricant and chemicals should be stored on an impervious surface above the ground level and should be handled without contamination of soil and water.

141. Vehicles and equipment used for the construction activities should be maintained in good condition, ensuring no undue leakage of fuel and lubricants is released to water sources. Servicing and repairing of vehicles, machineries and equipment should be carried out only in designated locations and service stations with the approval of Engineer. Equipment and vehicles should not be allowed to wash with drinking water wells or streams. Waste oil, petroleum products and untreated wastewater shall not be discharge to the ground without proper treatment.

3. Safety of Workers and General Public

142. Construction activities may lead to accidental damage to the general public and work force. Construction of earth drains, culverts, causeways, bridges, and removal of road side structures, trees etc., as well as use of heavy equipment, machineries, extraction and transportation of construction materials will increase the accidental risk.

143. Contractor shall comply with requirements for safety of the workers as per the International Labour Organization (ILO) convention No. 62, Safety and Health regulations of the Factory Ordinance of Sri Lanka to the extent that are applicable to his contract. Contractor should organize awareness programs about personal safety of workers with proper briefing and training on safety precautions.

144. Use of well experienced, licensed and trained operators for plants, machineries and heavy vehicles, use of flagmen and supervisors for construction sites and other necessary locations, provision of Personal Protective Equipment (PPE) protective footwear, helmets, goggles, eye-shields and jackets specially high visibility jackets for night time work with necessary lighting arrangements, if construction activities are taking place at night. Contractor should also provide necessary equipment; safe scaffoldings, ladders, working platforms etc., for the construction sites to make convenient to the workforce.

145. Excavated areas for construction should be barricaded using barricading tapes. Installation of sign boards and placement lights where necessary are recommend to avoid accident. Quarry operations, roadway excavations and blasting should be carried out and supervised by trained personnel. Explosives for the project activities should be stored in a secure location in a protected way.

146. Arranging regular safety inspection of construction sites and other related locations, prohibition of alcoholic drinks and other substances which may impair judgment of workers engaged checks for vehicles and equipment, allocation of responsibility to relevant personnel,

arrangement of proper first aid facilities with trained paramedical personnel and transport facilities for injured people to the nearest hospital, provision of fire extinguishers and appropriate positions for required locations for both safety of work force and properties, installation of warning signals in both local languages and in English to the construction sites and other particular locations are the important actions that need to practice during the construction stage.

4. Disruption of Traffic

147. The proposed construction activities: improvement of the road surface and pavements, reconstruction of culverts, bridges and causeways etc. may cause accidental risk and disturbance to the current traffic flow in the project affected areas of the Province.

148. Transportation of construction materials from outside, phase construction, temporally diversion, loading and unloading of construction materials etc., will increase traffic congestion especially around urban centers, public sensitive locations and construction sites of culverts bridges and causeways. This will negatively impact to the road users and cause delays in travel time, increase noise and exhaust emissions too.

149. Advance notice to the public regarding the schedule of construction, providing of safe and convenient passage to vehicles and passengers away from construction sites, implementation of traffic management plan close coordination with local police, use of flagmen and/or temporary traffic signs for construction sites are important measures that have to be undertaken during construction period to minimize the impact on traffic.

5. Impact from Dust, Noise and Vibration

150. Generation of dust, noise and vibration from construction activities, material extraction and processing plants etc., will negatively impact to the surrounding communities and their properties by means of creating respiratory problems, nuisance and structural damages to properties respectively. In general emission of dust, Volatile Organic Compound (VOC) and gases, particulate matter, smokes/fumes are most immediate pollution effect experienced from the construction machineries, vehicles and equipment, blasting sites material extraction and processing plants. The impact of dust noise, vibration and emissions will be mitigated by following measures.

151. Construction activities closer to public sensitive locations (Schools, hospitals, religious places, urban centers and residential areas) shall be scheduled in close coordination with relevant authorities to avoid continuous disturbances. Contractor should limit working time that creates noise from 6.00 am to 6.00 pm.

152. Machinery, equipment, vehicles and material processing plants should be maintained in a good condition with regularly maintenance. Crushers, hot mix and batching plants should be established away from residential and environment sensitive areas with the approval of Engineer, CEA and LAs. Dust extraction units, exhaust silencers and noise reduction devices should be fitted to the material processing plants, construction vehicles and other machineries and equipment to reduce noise, vibration and dust emissions. Such devices shall be properly serviced and maintained.

153. Emission of dust due to transportation of construction materials and other construction operations can be controlled by enforcing speed limits to the vehicles, providing of dust barriers

to the public sensitive locations, sprinkling of water along the transportation roads, construction sites and material processing yards at regular intervals. Tarpaulin covering is mandatory on trucks/lorries which are used for the transporting of construction materials.

154. Along the rural roads, possibility of living differently abled persons, children who need special attention is high therefore due consideration should be paid if any of such location is found.

6. Ecological and Biological Impacts

155. Number of forest reserves, mountains, important elephant habitats, natural parks, sanctuaries, reservoirs under the accelerated Mahaweli Development Program is located within the province. Selected roads for the improvement run through urban, semi urban, rural residential and agricultural areas of the UP. Majority of the roads identified for the improvement runs mainly through rural residential and agricultural areas. Therefore, common home garden species as well as wild species including terrestrial and aquatic flora and fauna are distributed in project affected area. Different species of fauna including endangered species like Elephant, Leopard, Red face Malkoha, Estuarine Crocodile, Python, threatened species including Purple Faced languor and the Togue Macaque as well as fish, amphibians, reptiles, birds and large number of mammal species distributed within the province. Most of the forests located beside the roads include secondary or scrub vegetation. Some identified roads run close or through the several protected forest and is given in Chapter IV.

156. Activities during construction stage will cause potential impact to breeding, foraging, and migrating behavior of different species of fauna and flora. However most of the impact related to the project activities are temporally and can be mitigated using following actions.

157. Awareness programs should be organized for the workforce about Importance of flora, fauna and their habitats. Contractor should take necessary action to prevent his workforce from disturbing flora, fauna including hunting of animals, poaching, gathering fire wood from the surrounding habitats and fishing in water bodies. Removal of trees should be avoided as much as possible during the construction. Strict supervision should be carried out by the Contractor especially during the construction around environment sensitive locations. Contractor is responsible to modify the design based on the location with the approval of the engineer in order to conserve existing faunal and floral habitats.

158. Construction activities in roads listed in table IV-shall be carried out under the instructions of Forest Department. Construction activities should be limited to daytime around above locations and should be completed within short period of time. Material extraction sites, processing plants and waste disposal sites should not be located around above locations too.

159. Construction of new culverts or rehabilitation of existing culverts will temporarily disturb the water level of streams which impact movements of fish along the stream. However, this impact will only be there during the construction period.

7. Establishment of Labour Camps and Sanitation Facilities

160. Improper management of the labour camps may create an unhealthy environment causing health hazards to both workers and nearby residents. Stagnation of water around labour camps can create mosquito breeding sites and vector for communicable diseases. Migration of laborers

from outside areas for the construction activities also creates conflict situations among the workers and settlers near worker camps.

161. It is essential to establish labour camps away from water bodies, highly residential and environment sensitive areas. Majority of skilled and unskilled workers should be selected from the project influence area to avoid generation of waste and sanitation problems from labour camps. Provision of proper sanitary facilities including drinking water, urinals, toilets bathing facilities and mosquito nets will minimize spreading of communicable diseases and other health issues. Provision of proper drainage facilities to the labour camps will minimize stagnation of water and prevent breeding of mosquitoes and flies.

162. Frequent toolbox meetings on safety and worker awareness programs on community and cultural aspects should also be carried out as means of reducing any conflicts among migrant labour and communities.

8. Disposal of Construction and Other Wastes

163. Solid waste associated with construction and other related works may impose several negative environmental and social impacts. Significant amount of construction wastes and garbage will also impact on ecology, public health and scenic beauty in the area. Labour camps, garbage disposal sites and material storage yards provide favorable habitats for vectors and decaying wastes attract pests. Contamination of water bodies with wastewater, construction debris and spoil will create significant impact on aquatic lives. Disposal of wastewater from plants specially from batching plants should be identified by the contractor with the instruction of engineer

164. Selection of unproductive lands with adequate capacity for disposal sites away from public and environment sensitive locations is necessary. Disposal sites should be selected with the approval of the PIC which should be followed by the approval of Local Authority and mitigation measures required for the relevant location of disposal sites should be implemented by the contractor as directed by PIC, PIU and LA. Excavated materials from the construction shall be used to backfilling with the approval of PIC. Debris and residual spoil should not be sited to the agricultural lands, irrigation canals, water bodies, wetlands or to the marshy areas. Management of the waste generated from construction sites, offices and labour camps by the Contractor without contamination of surrounding environment is essential. Provision of garbage bins to labour camps, construction sites and dumping of waste regularly in a hygienic manner should be practiced.

9. Floods and Inundation

165. During the field Environment Assessment of the project identified that, some of the proposed road sections are prone to flood / inundation during rainy season.

166. Lack or insufficient & dilapidated drainage facilities, positioned of roads in low elevation, over flow of streams and spill of tanks, obstruction to the drainage and natural water ways are the main factors contribute for flooding and inundation of roads. Impact associate with flood and inundation should avoid or minimize during the construction stage by following measures.

167. All the construction activities should be planned to avoid flood and inundation. Field observations which are verified with public consultation and other field surveys carried out under the project will be used to determine the structures and designs.

168. Construction activities should be minimized during the rainy season and drains should be kept clean all the time without any obstruction. Reconstruction of damage culverts, causeways and bridges based on the existing hydrological values in the exact locations of the roads, construction of new cross drainages, storage of construction materials away from experienced flood and inundation areas are the proposed mitigation actions for the foreseen impacts.

10. Soil Erosion, Sedimentation and Siltation

169. Soil erosion, sedimentation and siltation due to construction and other related activities can cause negative impacts to the environment especially during monsoon and inter-monsoon rains. Soil erosion, sedimentation and water pollution should be minimized by the Contractor as soon as possible. Top soil generated from construction sites should be stored properly for the reuse without runoff to the water bodies, treatment of clearing and filling areas against flow acceleration, avoid works that lead to heavy erosion during rainy seasons, use of silt traps and erosion control measures close to water bodies, provision of drainage facilities to the required location properly to drain water will be required to prevent from soil erosion, sedimentation and siltation impacts.

11. Slope Protection

170. Roads selected for rehabilitation within the hilly terrain of Badulla district and several areas of Monaragala district is vulnerable to landslides and earth slips. At the time of the survey also land slide could be observed beside the several candidate roads. Further clearing of green cover vegetation, removal of road side trees, big boulders, deep roots, rock blasting, preparation of sites, compaction of soil, cutting of slopes, construction of drains and cross drainages specially at hilly terrain are the main causes to develop landslides and earth slips. The impact associated with land slide due to above activities and soil erosion can be mitigated through following actions.

171. Clearing of green cover vegetation and cutting of trees should be minimized in upper and down slope of hilly roads, restriction of cut and fill operation around land slide areas, provision of retention structures to the road side slope based on the geotechnical investigation, avid construction work around hilly areas during the rainy season, use of manual labours rather than heavy machineries for construction of roads in deep hilly terrines and restriction of blasting activities within the area vulnerable to landslides. Generally slopes of 1:2 will be maintained at site depending the availability of land. If required, the contractor through PIC and PIU will get assistance from National Building Research Organization (NBRO) and GS & MB for additional measures of slope stabilization.

12. Protection of Archeological, Cultural and Religious Places

172. Some of the proposed rods/sections run at the vicinity of archeological and culturally important sites. In addition, large number of rods/sections runs close to the locally important religious and cultural locations. Proposed project activities will not cause any significant impact to the above site and most of the impacts are temporary and restricted only to the construction period. However, during the construction stage above sites should be protected with feasible mitigation actions without any physical damage

173. If there are any valuable items (fossils, coins, articles of value antique, structures etc.) or archeological, cultural and religious structures discovered during the construction, Contractor should inform to the Department of Archeology (DOA) through the Engineer and work should be carried out according to the instruction of DOA at the particular location. Construction activities around religious, archeological, and culturally significant locations should be carried out with the consultation of religious leaders or relevant officials to minimize disturbance especially during the festival season.

C. Operation Stage

1. Safety of the Road Users

174. Improvement of road surface, widening and slightly adjustments of bends will increase the speed of vehicles and incidents of the accidents. Enforcement of speed limits, traffic rules and regulations, installation of warning signs, pedestrian crossings, sign boards for animal crossings, guard railings for essential locations are need to avoid road accidents. On the other hand convenient passages of these roads with safety measures will reduce number of accidents and risk to the pedestrians and drivers.

2. Air Quality and Noise

175. Improvement of the road reduce traffic congestions specially in urban centers, allow smooth traffic flows and reduce travel time with minimum accelerations and decelerations. The project is therefore expected to have a positive effect on overall air quality compare to current situation. Noise generation during operation period can be managed by enforcing proper traffic rules and installation of sign boards to the particular locations. Maintenance activities will also potentially result in the release of air and dust, both directly and through obstructing traffic. Therefore maintenance work should be schedule during off peak hours or during night time to avoid negative impacts.

3. Blockage of Drainage Structures

176. During the construction stage road side drainages and cross drainages (Culverts & bridge) will be improved for the smooth water flow during the rainy season. Throughout the operation stage stagnation or blocking of water flow may occur due to sediments, disposal of rubbish due to maintenance activities or ignorance of public by disposing spoil and garbage. These activities will obstruct road side drainage, culverts, bridges and manholes. Blockage structures provide suitable breeding habitats for mosquitoes, rats and mice and also situation will critically impact to the public around the roads. Therefore, routine maintenance will be needed to avoid drainage congestions and impact to the human health.

4. Encroachment of Right Of Way

177. Encroachment can be taken place any time after completion of construction works and this practice is common around public and environment sensitive locations. This will cause impact to the pavements, road side drains, pedestrians and rooting maintenance of roads. Regular checking and removal of unauthorized structures from ROW by the Client as well as enforcement of rules and regulations is essential to avoid encroachment of road reservations.

D. Positive Impacts of the Project

178. **Socio - Economic Benefits.** Road transport provide conclusive socio-economic benefits to the whole society by providing access to the territory and allowing poverty alleviation and better living standards through employment and other type of economic activities. Socio-economic benefits will be expected to the public through the iRoad Program is as follows.

- Improvement of roads within the province is significant part of overall economic and human development. Active transport facilities reduces poverty by improving economic efficiency, as it decreases costs of production, prices of goods and enhances trade and employment opportunities.
- Poverty is very often far worse in rural areas than in urban centers of the province, as a result of lack of integration with urban centers due to lack of adequate accessibility and mobility. Proper access will be affectively linked poor regions to rapidly growing domestic markets. This will create opportunities for the poor people to contribution of poverty alleviation
- Income level of the population living in rural areas of the province will be improved as a result of the project. Improved access for farmers and fishermen to higher price urban markets and support production of higher value crops, improvement of farming practices and new employment opportunities will be expected to increase income level of the people through the project.
- Effective transport systems to the rural agricultural areas reduce regional disparity; enable people access to the socioeconomic centers, such as new market, healthcare, education and other social services. This will be ultimately contributed to achieving equity in a country.
- In the long term, new access to the education will improve level of education in rural society. Improvement of associated life values of the people with education level will become more competitive in the labor markets in finding their talents outside the community and province.
- Road network improvement in urban and rural areas of province will provide transport of rural people and goods with improved travel time and route selections. No need to spend a large amount of time and effort on transport activities to fulfill their basic needs. Low cost transport facilities, reduction of transport cost and travel time is the main benefits received by the rural communities through the project.
- Development of road transport provide significant effect on movement of food surplus, reduction of food prices, improvement of farming practices, helping the transition from subsistence farming to cash crops and market economy. In addition road network improvement will increase economic growth with the improvement of number of industries tourism, fishing, agriculture, mini-hydro, garment factories, food processing etc.

E. Climate Change Impacts and Risks

179. Improvement in road infrastructure and growth in vehicle traffic are indicators of people moving in to better living conditions or poverty reduction. However, growth in vehicular traffic and energy use will also lead to increased Green House Gas (GHG) emissions which directly affect global warming. According to “International Energy Outlook 2016” (IEO2016) prepared by U.S. Energy Information Administration, the energy use in the transportation sector includes energy

consumed in moving people and goods by road, rail, air, water, and pipeline. Transportation sector has accounted for 25% of total world delivered energy consumption in 2012. And it is forecasted that transportation energy use to increase by 1.4% per year from 2012 to 2040 in the IEO2016 Reference case.

180. The evaluation study by ADB's Independent Evaluation Department (IED) in year 2010 (Evaluation Knowledge Brief, July 2010 – EKB) on reducing Carbon emission for transport projects has indicated the need of a shift in ADB's investments on transport sector in to low Carbon growth across Asia and the Pacific regions.

181. Improving the surfaces (pavements) of existing rural roads in Uva Province may increase the traffic volume in these roads. However, changes in vehicle operation speeds with respect to present conditions will have an impact on emission levels of the gases emitted by such vehicles. Most common types of vehicles that would move on these roads are bicycles, bullock carts, motor cycles, three wheelers, cars, vans, buses and light commercial vehicles. Thus, emission of Carbon Dioxide (CO_2) from motorized vehicles which is a GHG needs to be analysed to evaluate the overall contribution of this investment program in terms of the change in CO_2 emissions.

182. The EKB has developed a set of spreadsheet-based models to evaluate the CO_2 impacts of rural roads, urban roads, bikeway projects, expressways, light rail and Metro Rail Transit (MRT) projects, Bus Rapid Transit (BRT) projects, and railways. These Transport Emissions Evaluation Models for projects (TEEMPs) consider passenger and freight travel activity, the shares of trips by different modes and vehicle types (structure), fuel CO_2 efficiency (intensity), and fuel type, validated by more detailed emission factor models. The models directly estimate CO_2 emissions for a business-as-usual case (a no-action alternative) vs. one or more alternative modal investment interventions (including improvement to road pavement) and calculate scenario differences. The models consider induced traffic demand generated by changes in the generalized time and money cost of travel by different modes, building on best practice analysis techniques.

183. The TEEMP model for rural roads was used for the analysis with using default parameters for base fuel consumption, emission factor and upstream emission percentage. Occupancy-loading, average trip lengths of each type of vehicle, vehicle type growth and roughness factors (before and after improvements) were fed to the model based on the details of traffic and economic analysis for roads in Uva Province. A summary of these input parameters are presented below.

Table 22: Input parameters for TEEMP model for roads in Uva Province

Parameter	Input value
Occupancy/loading	
Two wheeler	1.7
Three wheeler	2.0
Passenger car	3.0
Light Commercial Vehicle	2.5 Ton
Bus	30.0
Heavy Commercial Vehicle	7.5 Ton
Bullock cart	0
Bicycle	1.0
Roughness	
Before improvement	8.0 m/km
After improvement	3.0 m/km

Parameter	Input value
Lane configuration	
Before	Single lane @ 2.5 m pavement
After	Single lane @ 3.0 m pavement

1. Model predicted CO2 emission levels

184. Three case scenarios were analyzed using the model based on the traffic analysis in Uva Province which categorized the traffic levels as rural, urban and provincial. Model output includes CO_2 emissions at Business as Usual (BAU) or without project; with project (i.e. with improvements) and with induced traffic; and with project and without induced traffic.

Table 23: CO2 emission at BAU, Project & induced traffic and Project without induced traffic

	Emission of CO_2 in Ton/km/year (net change in emission)		
	Rural	**Urban**	**Provincial**
BAU	3.2	22.8	20.6
Project with induced traffic	3.0 (0.2)	20.1 (2.7)	17.6 (3.0)
Project without induced traffic	3.0 (0.2)	20.1 (2.7)	17.6 (3.0)

185. As indicated in the model output and summarized in above table the proposed improvement to existing road pavements will bring a reduction in CO_2 emission even with a growth of traffic. However, this analysis is based on the assumption that the roughness of improved road surface will be maintained during the project life. Therefore, it is important that the road maintenance program is maintained throughout the project span (i.e. during operational stage). The total length of roads to be improved in Uva Province is around 1,500 km based on the minimum (0.2 T/km/year) and maximum (3.0 T/km/year) net change in CO_2 emissions or CO_2 savings of the proposed investment program in Uva Province will be between 300 and 4,500 Tons/year.

2. Mitigation measures for floods

186. Climate change in a global perspective has brought about a change in rainfall pattern and especially the intensities of rainfall. Therefore, special attention shall be paid to road side drainage and cross drainage in designing of the improvements for these roads. Structures such as culverts, causeways and bridges with small spans will be constructed along with road side drains (either earth or concrete based on the requirement) to facilitate the existing flow regime as well as future discharge volumes as predicted by drainage analysis during level one designs. All hydraulic structures constructed on these roads will be of reinforced concrete. Based on the Preliminary Survey and Engineering works an approximate amount of 2664 million has been allocated in the Bills of Quantities (BOQs) to construct new structures and rehabilitate existing structures in selected roads. This allocation is about 6 % of the total construction cost estimated for Uva Province Considering the percentage of allocation (which is generally 5% - 10% of construction cost) for Environment Management plan which includes mitigation of flood impacts this allocation will be sufficient to mitigate impacts due to floods in selected roads in Uva Province.

VI. INSTITUTIONAL REQUIREMENTS, ENVIRONMENTAL MANAGEMENT PLAN AND GRIEVANCE REDRESS MECHANISM

A. Institutional Arrangement

187. Ministry of Higher Education and Highways (MoHEH) will be the Executing Agency (EA) of this investment program. Secretary to the ministry will be responsible for decisions on overall approvals and operational policies of the project. RDA will be the Implementing Agency (IA) of the program. A project coordinating PIU (PCPIU) with a full time Project Director (PD) will be established under DG/ RDA for coordinating overall program work starting from SAPE works. Provincial level PIUs will be established in the four provinces considered under iRoad 2 program.

188. The Provincial level PIU will also be headed by a full time Project Director (PD) and supported by a team of engineers from RDA. The PIU will have an Environment and Social Unit with a Safeguards Team including a Senior Social Safeguards Officer and Senior Environment Safeguards Officer and Social/ Environment Officers assistants (as required) to cover the quantum and geographic distribution of works under the investment program. Project Implementation Consultants (PIC) will support the PIU for supervision of the design and construction works by the civil works of Contractor. The PIC team will include a team of Environment Safeguards Consultant, Social Gender Resettlement Specialist and Assistants (stationed at each district) for conduction of regular monitoring of safeguards implementation on site. From Contractor's side, there will be an Environment Officer and a Safety Officer. As per the preliminary arrangements there will be two to four contract packages for each district. Other than these key environment and social staff the Project Engineers, Site Engineers and Technical Officers will also be trained on environment and social safeguards compliance requirements. Possible themes for training and awareness are listed below;

- The application of Context Sensitive Design (CSD)[6] in rural road development;
- Effective consultation and handling of public grievances;
- Land donation process;
- Developing of environment management plans based on a site or cluster specific requirement;
- Preparation of environment monitoring checklists;
- Monitoring and reporting of environment safeguards compliance.

B. Environmental Management and Monitoring Plans

189. A standard EMP was prepared as part of the IEE report is shown in appendix VI-1. However, specific EMP's for each contract package will be prepared by the contractor with reference to the standard EMP. Since its contractor's responsibility to implement the EMP, all costs for implementing the mitigation measures will be included in the Bill of Quantities (BOQ) by the contractor. Contractors who implement rural road components will have a construction period of approximately two years and routine maintenance for three years.

190. Monitoring of EMP implementation will be carried out during the preconstruction, construction, and operation and maintenance stages of the project. Environmental Monitoring Checklists (EMC) will be prepared by the Contractor/s based on the EMP for each of these stages

[6] CSD refers to roadway standards and development practices that are flexible and **Sensitive to Community Values.** CSD allows roadway design decisions to better balance economic, social and environmental objectives. - Minnesota Department of Transport

(Sample EMC is attached in appendix VI-2). ES of PIC will review and approve the EMCs. The EMC monitors the degree of compliance of the mitigation measures proposed in the EMP in all three stages. Every road must have one EMC completed during pre-construction, one to three during construction depending on the length of the road and one during operation and maintenance. Based on these records and site visits monitoring reports will be prepared during the construction and operation stage on an annual basis per province and submitted to ADB for disclosure on the ADB website. The contractor/s shall prepare package or road cluster specific EMPs and submitted to PIC for approval. These EMPs will have road/ site specific information with mitigation measures.

191. Apart from the EMP common Environment Monitoring Plan (EMoP) has been prepared and attached as appendix VI-3. It is expected that the bidders will keep a provision of 5-10% of total construction cost as cost to carry out mitigation measures as listed in the EMP. The cost of implementing mitigation measures during construction and maintenance period (3 years for rural roads and 5 years for national roads) will be a responsibility of the contractor while RDA will bear the cost of implementing mitigation measures during pre-construction period. Once the roads are handed over to the relevant local authorities it will be their responsibility to implement any mitigation measure.

C. Grievance Redress Mechanism

192. Grievances from the affected people on social and environmental issues during project implementation will be addressed mainly through the existing local administrative system. Depending on the nature and significance of the grievances or complaints, grievances will be addressed at three (3) levels. The first will be at the grass roots level where complaints will be directly received and addressed by the contractor, PIC and PIU representatives on site. Grievances which are simple but still cannot be addressed at the grass roots level will be addressed at the Grama Niladhari (GN) level or level two. More complex grievances which cannot be addressed at the GN level will be addressed at the Divisional Secretariat (DS) level which is considered as level three. There will be a Grievance Redress Committee (GRC) at the GN and DS levels. Minimum composition of GRCs at GN and DS levels are discussed below.

193. At the GN level the GRC members will be:

i)	Grama Niladhari of the area	Chairman
ii)	Representative of PIU	Secretary
iii)	Representative of PIC	Member
iv)	Representative of Contractor	Member
v)	A community member/religious leader	Member
vi)	Woman representative from the local community	Member

194. At the DS Level GRC members will be:

i)	Divisional Secretary of the area	Chairman
ii)	Representative of PIU	Secretary
iii)	Grama Niladhari	Member
iv)	Representative of PIC	Member
v)	Representative of Contractor	Member
vi)	Representative of a social organization (Non-Governmental Organization/ Community-Based Organization) of the area	Member

vii) A community member/religious leader Member
viii) Woman representative from the local community Member

195. To make the Grievance Redress Mechanism (GRM) process gender responsive the GRC will include one woman member to represent the local community women. Further, when grievances or complaints are submitted to the GRC, both women and men complainants will be treated equally and necessary measures will be taken to address the grievance in the best way possible.

196. Recommended steps with timeline on the operation of the GRM is provided in figure 6. Adjustments may be made to the GRC composition (i.e. inclusion of more members) during the implementation of the program in each Province.

197. Public notices will be put up at each road before commencing of civil works providing information on GRM, contact persons in case of such grievance. Suggestions, requests and complain boxes will be installed at suitable locations within each project road. The online method developed under iRoad will also be implemented as a means of collecting public grievances in iRoad 2. A request, suggestion and complain register will be maintained at contractor's office by the Environment Officer (EO) the respective contractor. All suggestions, requests and complains shall be recorded in this register with actions taken.

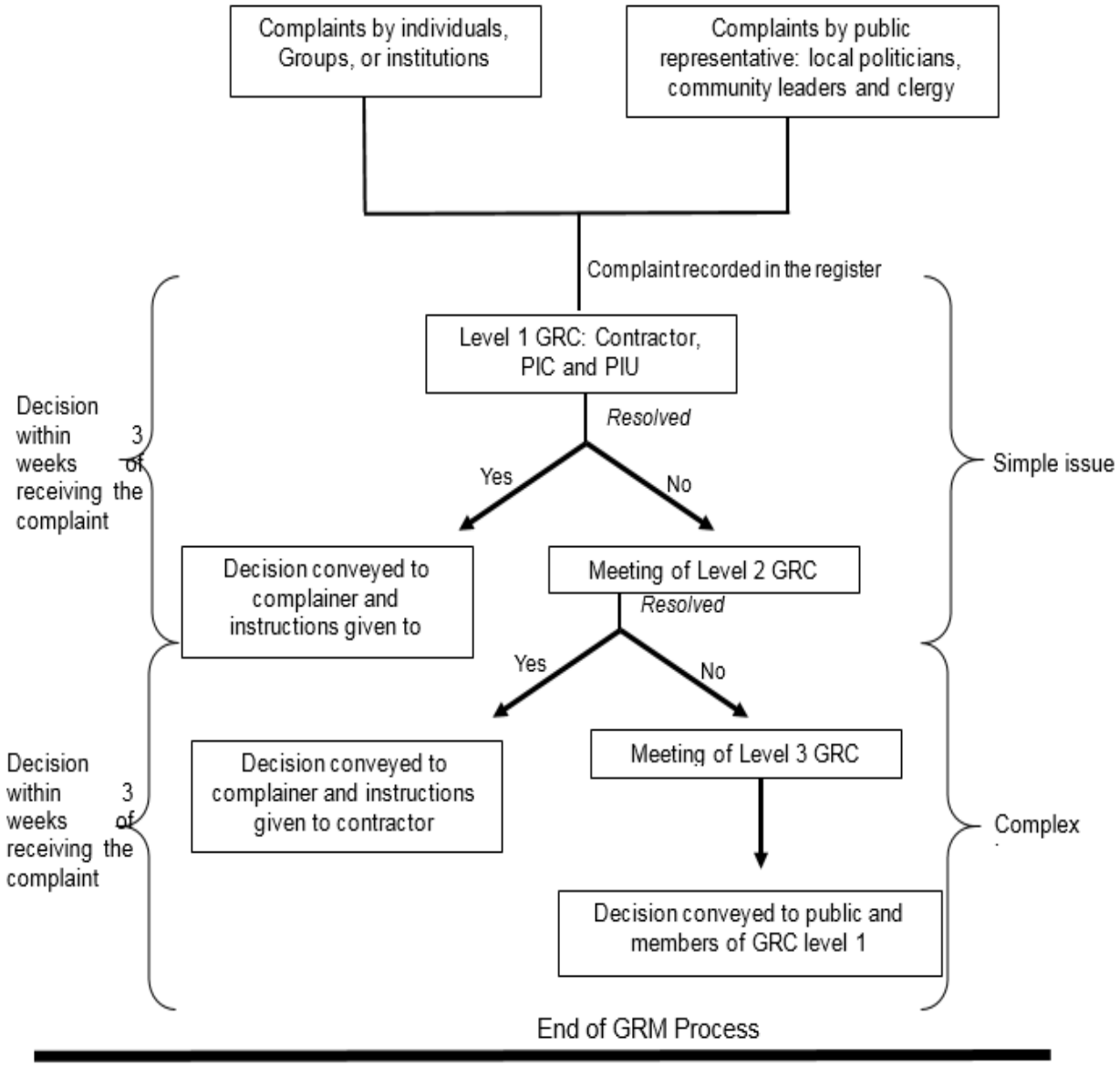


Figure 6 : Summary of GRM process

VII. PUBLIC CONSULTATIONS AND INFORMATION DISCLOSURE

A. Public Consultation

198. Based on the ADB Environmental Guidelines, public consultation and information disclosure is main activity carried out during the initial stage of the project. Public consultation process for the project was carried out during the field Environment Assessment survey on 1st November 2016 to 15th March 2017 along the proposed roads for the preparation of ECs.

199. The aim of the public consultation is to understand the view point of the public about the environmental and social issues of the project roads and respond to their concern and suggestions during the early stage of the project. Incorporation of the environment and social concerns to the decision making process especially for design stage through the public consultation can avoid or minimize adverse impact during the implementation of the project. During the public consultation process public were brief about improvement work under the project. Community members of each project roads, including women and vulnerable groups participated for the public consultation sessions and expressed their views regarding the existing environment, social and economic situation of the proposed roads and expectations through the project. Information of public consulted (name, age and address) during the field survey for each project road is given in Annex 1 of ECLs.

200. Most of the proposed roads for the upgrading within the UP are very important road sections which directly and indirectly connect to the provincial road network or national road network. The key benefit perceived by the general public due to upgrading of the proposed roads is improving their living standards. Further reduction of road accidents, easy access, ability to use roads in all weather conditions, increase land values etc. are the other benefits of the proposed project.

Public consultation of roads located within the Sevanagala DSD of Monaragala district

Public consultation of roads located within the Wellawaya DSD of Monaragala district

Public consultation of roads located within the Haldumulla DSD of Badulla District

Figure 9: Group discussion made during the field survey of UP roads

B. Information Disclosure

201. Information disclosure at the initial stage of the project mainly through public notices, public discussions etc. provided an opportunity to discuss with the public and other organizations regarding the environment and public issues that could be aroused due to the proposed project . Disclosure of information to the village level will be forward through Divisional Secretaries (DS), Grama Niladari (GN) and other community based organizations(using standard information flyers). Disclosure of information is also important to avoid or minimize misunderstanding regarding the project. In accordance with the ADB's Information disclosure policy, the client will submit the draft IEE report to the ADB for disclose on RDA as well as ADB web site.

C. Consultation Findings

202. Altogether road users and road side communities in the project influence areas are in favor of this iRoad project because, most of the proposed roads are in highly dilapidated condition due to lack of maintenance and incapability to rehabilitate in correct time. All the candidate roads are very important roads directed to economic centers, town areas, rural villagers, agricultural lands (paddy fields, tea and rubber estates), forest areas, irrigation systems, waterfalls, public and environment sensitive locations and other important places. All the candidate roads connect with other rural, provincial or national roads located in the project affected area and finally directed to external areas of the province. Therefore improvement of selected roads under this project is very important.

203. During the review it was found that few selected roads for the rehabilitation under this project has already been properly constructed recently (UMO088: Kurugama - Saadinnawela road, UMO034: Below the Habaraluwawa bridge to Waliaara road, UBA281 Pallewela-Cannel road, UBA259 Nayabadda waththa Meiyan Lower Division road, UBA170 Idalgashinna need wood Haldummulla road, UBA349 Walhaputenna, Kirimetiya road remaining area etc). Some sections of the selected roads from the total length proposed under this project also already have been constructed; (UMO006: 5th Mile post Yalkubura road, UMO025: Radiliyadda Ussaagala road, UMO068: Hadapanagala Junction-Hadapanagala road, UMO024: Unawatuna, Pasal Mawatha, Abakolawawa, Akkara 50, Lunugala janapadaya, UBA278 Pahalakadurugamuwa road etc). On-going constructions with asphalt surfacing was also observed in some candidate roads such as UMO001: Abagolla-Sinhapura road, UMO019: Athiliwawa- Aluthhela road Sec.i, UMO035: Beraliyapola-Kolonwinna road, UMO072: Horambawa-Suduwathura aara-Galtemandiya road, UBA272 North Kebilwela circular road etc. In addition, in number of occasions on-going concreting of sections of candidate roads (about 25 – 50m) is commonly observed during the field survey.

204. In general, rural road development projects are limited to improvement of road surface with gravel or concrete, improvement of existing culverts, causeways, surfacing of eroded areas, repairing of damaged structures etc. Poor maintenance, Insufficient drainage facilities both cross and line drains, low carrying capacity, use of unsuitable earth for surfacing, concreting of roads without considering quality and durability, construction of cross drainages culverts and causeway without considering hydrological investigation, heavy vehicular lords, use of inexperienced contractors etc., are the major factors contributing to the rapid deterioration of rural roads. Since the carrying capacity of the rural roads is not up to Standard level, it is frequently observed depressions, cracks, damage edges and potholes in concrete and inter logged paved road sections.

205. Lack of coordination between Local Authorities and other service providers specially Telecom and CEB has created inconvenience to road users as well as construction and operation activities of candidate roads. Establishment of electric and telephone posts close to carriageway edges are common along number of rural candidate roads even if there are adequate spaces to establish those away from the carriageway edges within ROW.

206. Generally existing condition of the rural roads located within Badulla district is better compared to Monaragala district. Some of the candidate roads have not been properly rehabilitated during last two decades except location specific improvement. However roads run through number of rural agricultural villages with highly productive agricultural areas and residential areas (E.g. UMO129, 129.1: Siyabalagunaya Ulahitithanna, Kiwula, Across Hawankadura to Meedeniya Sec.i and Sec. ii., UMO106: Monaragala Jiloan road, UMO116: Nearby Sirigale Hospital to Magandana Mulla road, UMO096: Mahakalugolla Pallegama road Sec. I, UMO064: Galahitiya Road, Katharagama road, UMO043: Dabagalla 3rd Mile Post, Tabaana road, UBA067 Etampitiya Gawela Main road Sec.i, ii, UBA009 Adiyarawatta to Ellanda, Rambukhella, Ilukwela road, UBA397 Neludanda Main road etc). Therefore priority should be given for rehabilitation and improvement of those roads/sections through the proposed iRoad project.

207. Some of the candidate roads sections temporally inundate during rainy season, storm water runs along or cross in many roads and in some occasion water stagnate within the surface. Earth roads are vulnerable to soil erosion due to insufficient drainage facilities and collection of water within surface create big pot holes. Heavy vehicular loads and tractors make massive damaged to earth and concrete surfaces of the roads. Therefore candidate roads must be designed with adequate carrying capacity and sufficient drainage facilities.

208. Most of the selected rural roads of UP, include gravel/earth roads with slightly undulating, undulating to hilly terrain. Emission of dust during dry season and muddy condition during rainy season due to prevailing soil type, create severe impact to the road side community, all road users and to the existing environment in different ways. Improvement of the road surface with asphalt concrete will reduce both dust and muddy situation of the candidate roads and benefit to the people and surrounding environment. Majority of the people in Monaragala district suggest asphalt concrete and they reject concrete surfacing.

209. During the field inspection, elephant roaming around the candidate roads was a common observation (UMO007: Junction, across the Neluwagala Village to Hadapanagala Malwaththawela, UMO068: Hadapanagala Junction - Hadapanagala Road, UMO087: Kukurampola Junction - Janawasa 4-9- 11- Hadapanaagala, UMO121 Old Buththala Junction to Walimadayaya - Kukurampoala Junction Sec I - Sec vi etc). Dependent on their feeding patterns and water requirements, elephants use seasonal migration patterns. During dry period, they tend to congregate closer to perennial streams, tanks, reservoirs and riverine forests. During wet season, they generally disperse and enter in to other areas for feeding. Since home range of the elephants is considerably high which is 40-60km per day, elephant roaming is a common incidence around some of the candidate roads in the province as well as other areas of the country. Therefore, human-elephant conflict is a critical issue in the project affected areas of all Monaragala districts and several DSDs of Badulla district. Since people have encroached forest areas for development projects and cultivations (mainly for sugar, Chena and tea cultivation), this situation has significantly impacted on the elephant habitats and lives of both people and elephants.

VIII. CONCLUSION AND RECOMMENDATIONS

A. Conclusions

210. This is the IEE report prepared for the proposed road rehabilitation and improvement works in Uva Province under proposed iRoad 2 program. The environmental impacts related with the proposed project activities are temporary as they are mostly construction related impacts. Project activities will not cause significant issues and the potential adverse impacts are manageable through the implementation of the proposed mitigation measures. However, slope stability is needed for areas along the hilly roads and roads that have been identified as landslide prone areas. In addition, careful monitoring of the implementation of mitigation measures is required. The mitigation actions for anticipated environment and social impacts are included to the EMP of the project.

211. Environment pollution during the construction period due to construction activities and use of natural resources are the anticipated negative impacts to the environment. Since project has both positive and negative impacts, anticipated positive environmental and social impacts will clearly outline the negative impacts of the project.

212. Construction activities of the project are restricted to existing ROW of the candidate roads; therefore, project activities will not cause any public inconvenient due to land acquisition. Further most of the people in rural agricultural areas of Monaragala and Badulla districts are willing to grant required land for the improvement (for widen or realignment of roads) without compensation. In some occasions, existing ROW of the candidate roads are restricted to the narrow carriageway due to encroachment by road side community.

213. Even though some project roads are located close to national parks, sanctuaries, forests and other important ecological and biological important habitats the construction activities associated with subprojects will not cause any impact to above habitats, since there will be no any land acquisition or removal of trees and green cover vegetation from above habitats. Proper planning of the project with appropriate construction practices and recommended mitigation actions are needed to achieve the success of the project.

214. Majority of provincial, rural and estate roads selected for the project are currently in highly dilapidated condition. Mainly rural and estate roads are unpaved with gravel and earth surface which directed to agricultural lands through residential areas. Most of the people in the rural areas are farmers and they mainly depend on agricultural activities and use these roads for all day to day activities even in the present situation. In some occasion, it is impossible to use existing roads for transportation of agricultural products using three wheelers or motor bikes. In such situations, people need to head-carry those to markets or to nearest transport points by themselves. If people obtain transport facility from service providers even with the existing bad situation of the roads, they should pay high traveling cost to overcome transport difficulties. Hence improvement of proposed roads through the project is very important to upgrade living standards of people.

B. Recommendations

215. Existing hydrological information and strengthening & increasing capacity of existing culverts and causeways should be highly considered during proposed construction. In addition rehabilitation of culverts, causeways and bridges, construction of new culverts and causeways to the required locations of roads as well as construction of new bridges over streams in few road

sections such as UMO021 Athiliwawa Junction, Wasanagama, D.S.Gama, across the Dabeara to Balahauwa Sec.ii are also essential.

216. Number of roads located within Badulla and Monaragala district locate over tank bunds, cross large number of irrigation canals, distributary canals of reservoirs, rivers and streams. Therefore, construction of these roads over tank bunds, cross drainages and other structures over above sources should be undertaken with the consent and recommendations of Department of Irrigation, Mahaweli Development Authority, Provincial Department of Irrigation, and Department of Agrarian Services.

217. During the construction stage, rehabilitation, improvement or new construction with culverts, causeways, bridges will create issues for the road users (Engage in all day to day activities including schooling of children, farming, animal husbandry, fluking of tea leaves, tapping of rubber, collection of tea leaves, milking etc.) due to lack of alternative access and unable to cross critical locations of the roads. Therefore, immediate attention could be drawn to short term constructions, stage construction in critical locations or provision of alternative access for the affected parties.

218. Currently boundary marks are not available in number of rural roads and in some roads cultivation are undertaken within existing ROW. Therefore, demarcation of boundaries of ROW is recommended to avoid encroachment and conflict with road side community in future.

219. Lack of coordination with relevant service providers for electricity, water and telephone facilities has created significant safety and social issues along the roads which will also create impact during rehabilitation and maintenance of roads. Therefore, consideration of future plans of relevant service providers (CEB, SLT, NWSDB, DOI and community water supply projects) is important to avoid damage to road surface, shoulders, earth and line drains in future. This will also help to minimize relocation of electric, telephone posts and pipe borne water supply lines during rehabilitation and upgrading of roads in future.

220. Archeologically protected sites and monuments were observed adjacent to some candidate roads. Prior consent should be obtained from Department of Archaeology for road improvement and their recommendations should be strictly followed during construction stage of some candidate roads E.g. UMO117 near the Buduruwagala School to Buduruwagala road, UMO057 - From 9th mile post to Buddama, UMO76: - Kahatiyanwela Mellagama Road and UMO047: Development of Saddhathissa road in Maligawila etc,.

221. Lack of maintenance of rural roads after rehabilitation is the main reasons for rapid and severe deterioration of rural roads. Under this program the roads which are rehabilitated and improved will be maintained for a period of 3 to 5 years. However, it is important that these roads are maintained after this period of initial maintenance by the respective local authority.

222. The IEE recommends to update EMP and EMC for each package with road specific information and locations before commencement of construction activities. In addition, EMC should be effectively implemented in order to monitor application of the EMP.

APPENDIX 1: LIST OF ROADS TO BE UPGRADED UNDER THE IROAD PROGRAM

Monaragala District

iRoad_ID	Road_Name	km	DS Divition	GN Divition
UMO001	Abagolla-Sinhapura Road	5.949	Rideemaliyadda	Dehigama, Ambagolla
UMO002	11 Kanuwa, Madugahapitiya Road	1.601	Badalkubura	Maugahapattiya
UMO003	1st Lane, Bogaha Junction	1.229	Sewanagala	Kiriwewa
UMO004	2nd Mile Post, Meegahayaaya via Bogahapelessa Road	3.632	Badalkubura	Madugasmulla
UMO005	5th Mile Post to Thiththawalkula	4.264	Bibila	Hammnpola
UMO006	5th Mile post Yalkubura Road (Via Kotagama Mallhewa)	8.236	Bibila	Malhewa, Kotagama
UMO007	68 Junction, across the Neluwagala Village to Hadapanagala Malwaththawela Sec.i	2.876	Wellawaya	Neluwagala
UMO008	8 Mile Post Dahagoniya Nakkalagoda Road	1.45	Madagama	Dahagoniya
UMO010	Abalanda alupathagala Road	7.166	Madulla	Dabagalla , Gonathulawa
UMO011	Across Handapanagala School to Randenigodayaya,Kammala Janction	4.573	Wellawaya	Randeniyagodayaya
UMO012	Agunakolapalassa 17 to Wijayapura School	2.287	Thanamalvila	Sooriya Ara
UMO013	Aiwela, Senapatiya Road	1.205	Medagama	Aiwela/ Senapatiya
UMO014	Alana Koswaththa Road	0.93	Medagama	Alana
UMO015	Alhena 8 Mile Post Road (Near Anandaraama Temple)	1.395	Madagama	Alhena
UMO016	Alupotha Junction to Kalugaha Wadiya Road	2.918	Badalkumbura	Madugasmulla/ Alupotha
UMO017	Aluthwawa Idigahapalassa, via Gurumada to Kilimbunna	4.1	Tanamalvila	Aluthwewa 149 D
UMO018	Araluvinna junction to Katupelella Road	4.257	Madulla	Pangura, Thampalawela
UMO019	Athiliwawa Aluthhela Road Sec.i- Sec ii	9.345, 7.758	Haldumulla/ Wellawaya	Aluthwala/ Mahalanda
UMO020	Athiliwawa- D.S. Gama Road	4.177	Wellawaya	Athiliwewa Siripuragama
UMO021	Athiliwawa Junction, Wasanagama(Near the athiliwawa), D.S.Gama, Across the Dabeaara to Balahauwa Sec.i	1.856, 8.789	Wellawaya. Haldumulla	Aluthwewa
UMO022	Athiliwawa-Mahaaragama Ulkanda-Hadapanagala Road	11.65	Wellawaya	Pubudugama, Maharagama, Athiliwewa
UMO023	Athimale waththarama Road, Near the bridge to Waththarama wawa Udapara	3.429	Siyambalanduwa	127 Wattarama
UMO024	Atimale Kotiyagala via 22	8.652	Monaragala/ Siyambalanduwa	Kaudawa/ Wijepura/ Athimale
UMO025	Atpattiya- Karagaskadura- Meyanakadura-	4.929	Passara	Bibilegama, Athpattiya

	Ranugalla			
UMO028	Badalkubura-Karawilaella Road	7.91	Badalkubura	Karawila , Madama
UMO029	Badalkumbura,Medagama, Mahagangoda Gama, Kanegalamulla Road	1.079	Madagama	Kadawinna
UMO030	Badullagammana Temple Road	2.73	Bibila	Wegama South ,Badullagammana
UMO031	Balakumbura-Bogahapelassa (Lunugala Janapadaya) Road	12.184	Badulkumbura	Lunugala Colaniya, Moratuwegama, Narawaththa, Bogahapalassa, Vasipotha
UMO033	Bediyawa Temple Road	3.55	Madagama	Bediyawa, Gangodawatta
UMO034	Below the habaraluwawa bridge to waliaara Main Road	1.287	Sevanagala	Habaraluwewa
UMO035	Beraliyapola-Kolonwinna Road	7.2	Monaragala	Kaudawa/ Kolonwinna/ Beraliyapola
UMO038	Bibila Mulla Yalkumbura Road	6.568	Medagama	Kohukumbura,
UMO039	Bibila Watta Road	2.961	Bibila	Kotagama, Malhewa, Wegama south
UMO040	Bikinigahawela 15 Mile Post via Raththanadeniya	2.801	Medagama	Amunekadura, Keenagoda
UMO041	Buthsaranapitiya-Guruhela Road	2.359	Monaragala	130-Nakkala , 130F-Guruhela
UMO042	Cross Road in Diyawara Gammamaya	1.004	Karivile	Kandasurindugama
UMO043	Dabagalla 3rd Mile Post, Tabaana Road	5.128	Medagama	Pambura, Pambana
UMO044	Dawata Junction to Meegahamada Ihala Madugaspitiya Road	1.446	Badalkubura	Madugahapattiya, Athala
UMO046	Development of road from Bogahapelessa to Welanhinna, Kirigalpoththa	2.573	Badulkumbura	Ranugalla
UMO047	Development of Saddhathissa road in Maligawila	1.993	Buththala	Maligawila
UMO048	Development of the Keppetipola lane	0.599	Monaragala	Viharamulla
UMO049	Development of the road from near by Mr. Proyantha's boutique to Wedikumbura across Mosam kolaniya of Hulandawa left road	1.983	Monaragala	Kaudawa
UMO050	Development of Weliara Ilukpitiya Road	2	Buththala	Mahagodayaye
UMO052	Diwlana to Kiriibbanara	3.711	Sevanagala	Kiriibbanara/Habaragala
UMO054	Dombagahawela-Dematabedda-Maria Arawa Road	8.05	Medulla	Mariarawa , Neelabadda, Kotiyagoda
UMO055	Dombaghawela-Ampitiya-Pahatha Arawa-Wiloya Road	14.157	Monaragala	126 a, Wiloya/Pahathaarawa/Ampitiya/Dombagahawela

UMO056	Ethimale-22nd Kolany-Kotiyagala Road	3.665	Monaragala	Kotiyagala
UMO057	From 9th mile post to Buddama	7.542	Siyabalanduwa	Thalagangoda , Buddama, Waragammana
UMO058	From Madamagama Junction to Yatimulla,Karadawatta via 4 Mile Post junction Sec.i- Sec ii	2.845, 1.28	Badalkubura	Karadagama Madamagama
UMO059	From Pelwatta junction to Passara Road	11.567	Badalkubura, Buttala	137B-Keliwesse,Udaarawa,Horabokka, Hingurukaduwa, Pelwatta
UMO060	From Randeniya Statue to Siyambalagunaya Road	5.189	Wellawaya	Siyabalagune, 153B-Randeniya
UMO061	From Rathupasketiya to Kawdulla Road (Near Dramma Pradeepa School to Ratupaskatiya via Kawdullagammana Road), Sec I & sec ii	2.9, 1504, 1.333	Bibile	Kaudulla/Rathupasketiya
UMO062	From Weherayaya Janction to Siripuragama via to delgas Junction	5.337	Wellawaya	Weherayaya
UMO064	Galahitiya Road, Katharagama	1.149	Kandasurindugama	Karivile
UMO065	Galbokka to Therela	2.991	Madulla	Therala , Galbokka
UMO066	Galkadahela Road	3.03	Monaragala/ Siyambalanduwa	Athimale/ Pahathaarawa/ Kadurugoda
UMO068	Hadapanagala Junction-Hadapanagala Road	7.893	Wellawaya / Buththala	Rahathangama /Pubuduwewa/ Hadapanagala
UMO069	Hambegamuwa Janapada Junction to Rathwalawa Road Sec.i- Sec ii	4.777, 2.9	Tanamalvila	Hambegamuwa Janapadaya
UMO070	Hambegamuwa Temple junction to Rathabalawa	2.545	Thnamalvila	Hambegamuwa
UMO071	Higura Road near by Kande Uda Panguwa Temple	1.549	Siyabalanduwa	Barawaya
UMO072	Horambawa-Suduwathura aara-Galtemandiya Road	13.058	Buththala	Galtammandiya, Horambawa
UMO074	Indikolapelessa first road school to Indikolapelessa Second Village Road	2.157	Sevanagala	Indikolapalassa
UMO075	Kahambana Kalugammulla Road	1.985	Monaragala	Kahambana
UMO076	Kahatiyanwela Mellagama Road	5.807	Madagama	Mellagama ,Nagahawatta
UMO077	Kandauda Panguwe 6 mile post Kongaspitiya	7.574	Siyabalanduwa	Yakkadurawa, Samanalabedda, Barawaye
UMO079	Kandiyapita-Bogaswewa junction to Diulana	1.855	Tanamalwila	Kandiyapita
UMO080	Karawila thanneyaya Raththanadeniya	2.933	Badalkubura	Pallegama , Karawila
UMO081	Kendavinna-Illukkumbura Road	3.283	Madagama	Ilukkubura
UMO082	Kendawinna Alaana Peessa Road Sec.i	2.599	Madagama	Halana

UMO085	Kubukgolla, Aratugaspitiya Road	1.321	Madulla	Alpitiya
UMO086	Kudaoya Purana Balaharuwa Road	2.001	Wellawaya	Uwa Kudaoya 150 D Debara Ara
UMO087	Kukurampola Junction - Janawasa 4-Janawasa 9 - Janawasa 11- Hadapanaagala	2.889	Buttala	Rahatangama
UMO088	Kurugama Saadinnawela Road	3.002	Wellawaya	Kurugama, Karandagolla
UMO089	Laginagala Road Galeramankada to Bogaswawa	3.272	Thanamalwila	Kotaweheramankada
UMO090	Laginagala-Damwelodaya Road	4.575	Tanamalvila	Kotaweheramankada
UMO091	Maariarawa Buddama Road	2.536	Siyabalanduwa	Mariarawa
UMO092	Maariarawa Muthukandiya 6Mile Post Road	4.216	Madulla	Alugalge , Polgahagama
UMO093	Madukotan Arawa to Udagangoda Road	3.448	Badalkubura	Yakkurawa , Madukottan aarawa
UMO094	Madukotan Arawa Tuntala Athlaamulla Road	6.389	Badalkubura	Aththalamulla , Yakkurawa, Madukottanarawa
UMO095	Mahaaragama Grama Niladari Wasame Road	1.496	Wellawaya	Mahaaragama
UMO096	Mahakalugolla Pallegama Road Sec.i- Sec ii	0.924, 2.908	Siyabalanduwa	Pallegama
UMO097	Malakadura, Namadapalassa, Mahapalassa, Across Kiwula to Kandiyapita	10.072	Tanamalwila	Kandiyapita/Aluthwewa
UMO098	Maligathanna Road	2.258	Badalkumbura	Karavile, Maligathenna
UMO099	Maligawila Dabeyaaya Road, Minipuragama	0.628	Buththala	Minipuragama
UMO101	Maligawila-Niyadella-Rathriwewa Road	8.142	Buththala	145-A Maligawila,
UMO102	Marakkanawa Diggalayaya Road	1.092	Madulla	Magandana
UMO103	Marawa Kiuleara Weheragala Sec.i – Sec ii	2.62, 3.079	Monaragal	Marawa/ Bohitiya
UMO104	Mariarawa-Ritigahawatta-Buddama Road	11.059	Medulla , Siyabalanduwa	Mariarawa, Galkotuwa, Ambagahapitiya
UMO105	Miyakadura Buutawaththa Road Sec.i – Sec ii	0.785, 1.003	Miyanakandura	Buutawaththa
UMO106	Monaragala Jiloan Road	5.29	Monaragala	Aliyawaththa, Maragala
UMO107	Nakkala Kotigalhela Road	4.579	Monaragala	Dehihindagama,Guruhela,Thenwatta
UMO108	Nakkala Mediriya Kubukkana Road4.	9.804	Monaragala, Badalkubura	Kubukkana, Badalkubura, Maduruketiya, Therappawa
UMO110	Namunukula- Miyanakadura Road	14.722	Badulkumbura	Ranugalla, Miyanakandura, Dewathura, Thannekumbura
UMO111	Nannapurawa - Bibilamulla Road	1.469	Medagama	Kohukumbura
UMO112	Nannapurawa Dahamgama Alutwela Road	9.185	Medagama	Dahamgama, Nanapurawa, Kotabowa
UMO115	Near by Kiriibbanwewa Bandaranayaka School to Left Bank Road	1.107	Sevanagala	Habaragala

UMO116	Near by Sirigale Hospital to Magandana Mulla Road	1.527	Madulla	Raththanapitiya 130
UMO117	Near the Buduruwagala school to Buduruwagala road	2.176	Wellawaya	Buduruwagala
UMO118	Near the Waligamwehera Temple To Rabukkatiya, Gampanguwa, weeraththagala, across Batahelayaya to Warunagama	5.745	Wellawaya	Anapallama/ Sandapanawila
UMO120	Okkampitiya Dabeyaya	1.372	Buththala	Buruthagalla, Pahalagama
UMO121	Old Buththala Junction to Walimadayaya minindoru Kolaniya, 20 gammanaya, janawasa 10/15/16, wandama, janawasa 14/09/11,janawasa 06, thalakolawawa, janawasa 04/05, Kukurampoala Junction Sec i-Sec vi	10.526, 8.066, 5.092, 2.931 2.373, 10.147	Buththala	Mahasenpura, Kumaragama Rahathangama, Minindoru Kolaniya
UMO122	Palwatta Co-operative via Gonagodalla-Kukurampola Road	1.953	Buttala	Mahasenpura
UMO123	Pethiyanaara to Walapanegama, janawasa 01, Bubula Vilage to Udaaraawa Passara Sec.i – Sec ii	5.645, 3.549	Buttala	Udaarawa-143/2 , Pelwatta
UMO124	Pitakubura Haamaapola Road (Thotillaketiya via 4 Mile Post)	4.632	Bibile	Kokunnewa/ Thotillaketiya
UMO125	Radiliyadda Ussaagala Road	1.714	Bibile	Ussaagala
UMO126	Randeniya-Siyabalagune Higurukaduwa Road	2.356	Badalkubura	Higurukaduwa
UMO127	Rathabalagama Junction to Degal Aara Road	1.625	Hambegamuwa	Thanamalwila
UMO128	Rattanadeniya-Polgahapitiya-Bakinigahawela Road	7.11	Medagama	Polgahapitiya
UMO129	Siyabalagunaya Ulahitithanna,Kiwula, Across Hawankadura to Meedeniya Sec.i – Sec ii	2.404, 3.849	Wellawaye	Siyabalagunaya
UMO130	Siyabalanduwa Ampara (4 Village, 2 Village)	3.61	Siyabalanduwa	Muthukandiya, Barawaya
UMO131	Siyabalanduwa Kolongaspitiya Road	11.555	Siyabalanduwa	Wearagoda , Nawgala, Kuuragammana
UMO133	Thambana-Deliwa Road	5.336	Madulla	Ruwalwala,116-Daliwa,Thambana
UMO135	Udawadiya Village Road	1.971	Badulkumbura	Dewathura
UMO137	Unawatuna,Pasal Mawatha, Abakolawawa, Akkara 50, Lunugala janapadaya	2.814	Buttala	Abakolawewa, Unawatuna
UMO138	Via Pokunuthanna to Thanamalwila/weelioya Main Road Join	3.315	Sevanagala	Mahagama Janaoadaya
UMO139	Watahelayaya to Heenapahuwa junction in Warunagama	1.639	Wellawaya	Warunagama, Watahelayaya
UMO140	Weheragala-Ampitiya Road	5.677	Monaragala	127. B, Bohitiya
UMO142	Wradola Ankada Kotamuduna	3.676	Badulkumbura	Ankada wasama
UMO143	11 Kanuwa, Madugahapitiya Road	1.439	Baddalkubura	Madugahapattiya
UMO144	Batugammana Waralanda Nawugala Road	2.776	Madulla	Iluklanda
UMO145	dalukkatiya watarawuma Road Sec.i – Sec ii	2.179, 0.482	Sevanagala	Muthuminigama
UMO146	Habaraththawela Diwulmandiya Main Road Sec.i – Se ii	2.698, 0.446	Habaraththawela	Sevanagala
UMO147	Madukotan Arawa Helathunthala Punsisigama Junction Road	2.712	Badalkubura	Punsisigama, Athala

UMO148	Mahagama Bandara Mawatha Sec.i – Sec ii	0.407, 0.667, 1.077	Sevanagala	Mahagama Janapadaya
UMO149	Mahagama Ranaviru Mawatha Sec. i- Sec v	1.721, 1.029, 0.709, 0.456, 0.724	Sevanagala	Mahagama Janaoadaya
UMO150	Mahagama Saliya Mawatha Sec.i - Sec vii	1.473, 0.303, 0.302, 0.216, 0.274, 0.823, 1.027	Sevanagala	Mahagama Janaoadaya
UMO151	Mihidugama Main Road Sec.i- Sect ii	0.939 1.542	Sevanagala	Bahirawa
UMO152	Mihidupura Main Road	2.596	Sevanagala	Indikolapalassa
UMO153	Samadipura Main Road Sec.i- Sec iii	1.415, 1.13	Sevanagala	Habaragala
UMO154	Somadevi School Road Sec.i Sec iii	1.238, 0.562, 0.595	Sevanagala	Mahagama
UMO155	Thalapatha ginigala Road	2.814	Sevanagala	Muthuminigama

Administrative Information of Badulla District

DSD	iRoad_ID	GID	Road_Name	km	GND_Name
Badulla DS Division	UBA003	3	3 mile post to Diyagala Division Road Glen Alphin Estate Sec.i	3.428	Udawela Wewessa Glen Alpin
	UBA020	20	Andeniya Ittebokka Road	0.860	Andeniya
	UBA021	21	Andeniya Kurugahapathana Main Road	1.235	Andeniya
	UBA022	22	Andeniya Main Road (Pansala Mawatha)	0.935	Andeniya Kailagoda
	UBA026	26	Approach road to Badulla Weeriyapura Bishop's road	0.501	Hingurugamuwa
	UBA031	31	Badulla Jayagama Road	0.655	Rambukpotha
	UBA032	32	Badulla Kalanwatta Road	0.538	Sirimalgoda Andeniya
	UBA033	33	Badulla Meda Pathana Rad	1.110	Kailagoda Medapathana
	UBA034	34	Badulla nadukara Kanda Road	1.311	Badulla Central
	UBA040	40	Badulupitiya Road	0.683	Badulupitiya
	UBA074	74	From Atabagahakadura to Kendagolla Dabagasgoda Bridge	2.851	Thelbedda Kendagolla Hinnarangolla Ilukthenna
	UBA091	91	From Hindagoda water tank road to Badulusirigama to Passara main road	0.997	Rambukpotha Hindagoda

UBA094	94	From Kailagoda Wadu School to Kshethrarama Temple via Mahiyangana Main Road	0.602	Kailagoda
UBA096	96	From Kendagolla Cemetry Junction to Muthumala Guru Bittiya	3.126	Thelbedda Kendagolla
UBA097	97	From Kendagolla Maha Vidyala to Vadipola Kanda Arawa Road	3.775	Damanwara Hinnarangolla
UBA098	98	From Kendagolla Yodun Ulpatha Bridge to Gurubiththiya Junction	2.291	Hinnarangolla
UBA099	99	From Keppetipola Road to Wimaladarma Road via Daya Gunasekara Mawathan	1.162	Badulla Central Katupelella Badulla West
UBA112	112	From Nelumgama School to kalan Kovil Road	1.257	Sirimalgoda
UBA118	118	From Thelbedda Kankaniliyma to Malangamuwa Road	2.330	Thelbedda
UBA125	125	From Welibissa to Atabagahakadura Road	0.633	Ilukthenna
UBA147	147	Goradiyawaka - Ampitiya-Kandearawa Road	2.291	Kanupelella
UBA161	161	Heennarangolla Meemamalahinna Road	2.603	Thelbedda Kendagolla
UBA172	172	Ihala Aluth Ela Road	0.673	Pitawelagama Badulla West Badulla North
UBA195	195	Katupelellagama Main Road	1.923	Badulla West Katupelella
UBA240	240	Malangamuwa Road	3.325	Malangamuwa

					Udawela
					Glen Alpin
					Rambukpotha
					Thelbedda
					Wewessa
	UBA252	252	Moragolla West molan Road	1.883	Thelbedda
	UBA291	291	Pilipothagama Road (From Serandiib Junction to Nadukara Junction via Bandarawela Main Road)	1.210	Badulla Central
	UBA301	301	Rilpola- Kalugalpitiya Road	2.882	Hingurugamuwa
					Hindagoda
	UBA346	346	Vineethagama Wewessegama via 4th mile post road	1.378	Viyadiguna
					Vineethagama
					Wewessa
	UBA356	356	Weeryapura Main Road Sec.i	1.546	Glen Alpin
					Hingurugamuwa
	UBA366	366	Yalpanawatta Internal Road	0.511	Badulla East
Bandarawela DS Division	UBA012	12	Allethota to South Kebillawala Piriwena Road	1.262	Inikambedda
					Karagahawela
					Beddekumbura
					Kebillewela South
	UBA013	13	Allimale junction to Ambadandegama road	6.200	Makulella
					Liyangahawela

				Bambaragama
UBA015	15	Alwatta, Obada Ella via Gonamatawatta Road	3.252	Obadella
				Nayabedda Estate
UBA016	16	Ambegoda-Galahitiyawa Road	0.758	Ambegoda
UBA051	51	Cregewaththa lower division Jana Udanagam Road	0.616	Creig Watta
UBA057	57	Dickulpotha-Kirioruwa Road	6.415	Ettalapitiya
				Kirioruwa
				Icelab Watta
				Bindunuwewa
				Watagamuwa
UBA089	89	From Hapathgamuwa Oya to Pahangala Minumwewa	1.118	Konthahela
UBA120	120	From Udaperuwa to Railway Line Road	1.324	Udaperuwa
				Kinigama
UBA160	160	Heeloya Makulella Road	4.805	Makulella
				Egodagama
				Weheragalathenna
UBA174	174	Inikambedda Irrigation Lodge to South Kebillawala Piriwena Road	0.898	Kebillewela South
				Inikambedda
UBA177	177	Jalasha Kanda Galwala handiya Road	1.694	Inikambedda
				Bandarawela East
				Kebillewela South

UBA201	201	Kinigama junction to Mahaulpotha-Kandearawa-Heeloya Road	3.801	Creig Watta
				Kinigama
				Mahaulpatha
				Egodagama
				Thanthiriya
UBA228	228	Liyangolla Hospital Road Sec.i	1.220	Beddearawa
				Liyangahawela Watta
	228.1	Liyangolla Hospital Road Sec.ii	3.483	Liyangahawela Watta
				Creig Watta
				Beddearawa
				Liyangahawela
UBA242	242	Maligatenna to Bandarawela main Road	9.766	Diganathenna
				Icelab Watta
				Bandarawela West
				Kirioruwa
				Ettalapitiya
				Wewathenna
UBA245	245	Mathatilla-Daluk Ella Road	2.369	Mathetilla
				Diganathenna
UBA259	259	Nayabaddawaththa Meiyan Lower Division Road	1.249	Beddekumbura
				Kebillewela South

					Darahitawan agoda
					Mahaulpath a
					Nayabedda Estate
	UBA261	261	Nayabaddawaththa Near Church Road	0.704	Nayabedda Estate
	UBA271	271	North Kebillewela-Bindunuwewa Road	2.816	Gediyaroda
					Bandarawela West
					Bandarawela East
					Kebillewela North
	UBA272	272	North Kebilwela circular road	1.694	Bandarawela East
					Kebillewela North
	UBA324	324	Sumudugama, Sholand Road	1.420	Karagahawel a
					Obadella
	UBA350	350	Warakarodawaththa Approach Road	0.672	Bandarawela West
	UBA357	357	Weheragalathenna to Kurudugolla	1.584	Weheragalat henna
Ella DS Division	UBA055	55	Demodara, Gawarawela,Beddewela via Balla ketuwa Road	2.505	Gawarawela
	UBA084	84	From Ella to 3rd Mile post (Ella Passara main Road via Balleketuwa)	3.085	Yahalewela
					Newberg
					Ella
	UBA088	88	From Halpe junction to Maduragama via Demodara Bogaha junction Road	3.364	Madhuraga ma

					Halpe
					Demodara
	UBA109	109	From Millagama junction to Piyarapandowa via Welsiwattha Road	4.987	Piyarapandowa
					Millagama
	UBA137	137	Gawarakele-Nahawila-Hindagala Road	6.548	Galtenhena
					Nawela East
					Pupula
					Ballaketuwa
					Pupula West
	UBA155	155	Halpe Kandekubura Road	1.293	Millagama
					Halpe
	UBA258	258	Nawelagama Baddearawa Road Sec.i	3.134	Ballaketuwa
					Nawela West
		258.1	Nawelagama Baddearawa Road Sec.ii	3.929	Nawela West
					Medawela West
					Gawarawela
					Beddewela
	UBA293	293	Piyarapandowa Neluwa Road	5.146	Halpe
					Piyarapandowa
					Millagama
	UBA297	297	Pupula Temple Road	1.848	Pupula
	UBA322	322	Springvally to Gawarakale Nahawilla Road	3.737	Beddewela
	UBA017	17	Ampitikanda to Ampitikanda Lover Division	1.540	Koslanda

Haldummulla DS Division	UBA018	18	Ampitikanda to Diyagala Mahakanda Road	1.673	Koslanda
	UBA076	76	From Badulla-Colombo main road to Bathgoda Okwel Road	1.185	Beragala
	UBA077	77	From Badulla-Colombo main Road to Bathgoda Ranwanguhawa Road	1.042	Beragala
	UBA086	86	From Hallatuthenna-Ranwanguhawa main road to Eliya Junction to Wa Eliya Pathha Road	0.988	We Eliya
					Medawela
	UBA087	87	From Hallatuthenna-Ranwanguhawa main Road to Kithulgahaarawa Road	0.986	Harankahawa
					Kithulgahaarawa
	UBA101	101	From Koslanda to Punagala Road	11.132	Ampitithenna
					Koslanda
					Mahakanda
					Poonagala
	UBA124	124	From We Eliya junction to School Road	0.931	Soragune
	UBA135	135	Gampaha, Kolongastenna Road	8.146	Gampaha
					Mahalanda
					Kolongasthenna
	UBA148	148	Haalatutenna, Idalgashinna road remining area	6.248	Beragala
					Haldummulla
	UBA162	162	Heewelkadura, Nikapitiya Road	7.194	Divulgasmulla
					Bambara Pokuna
	UBA170	170	Idalgashinna need wood Haldummulla Road	2.303	Walhaputhenna

					Haldummulla
	UBA196	196	Kelipanawela Road	3.825	Kelipanawela
					Ampitithenna
					Gampaha
	UBA273	273	Ohiya Udaweriya Kalupahana Road	4.817	Weerakongama
					Kalupahana
	UBA312	312	Seelathenna Madola Road	1.843	Seelathenna
	UBA349	349	Walhaputenna, Kirimetiya road remaining area	1.914	Kalupahana
					Walhaputhenna
Hali-Ela DS Division	UBA003	3.1	3 mile post to Diyagala Division Road Glen Alphin Estate Sec.ii	4.313	Imbulgoda
					Imbulgoda
	UBA019	19	Ampitiya Kandagolla Road	3.291	Udagama
					Neludanda
					Udagama
					Niliathugoda
					Gawela
	UBA023	23	Anthuduwawela Queenstown Road to Mahakubura	0.942	Anthuduwawela
	UBA024	24	Anthuduwawela-Amudaweli Road	2.203	Dickwella
					Anthuduwawela
	UBA054	54	Dematawalhinna via Dalukhinna Road	4.077	Dematawelhinna
					Mahawattagama
					Welikemulla

	UBA056	56	Dickbadada - Warakadana Agri Road	1.362	Warakadanda
	UBA067	67	Etampitiya Gawela Main Road Sec.i	8.210	Gawela
					Etampitiya
					Deegalla
	UBA075	75	From Attampitiya Estate one Division Kovil to Paratugolla A.T.P. Division	1.449	Gawela
					Etampitiya
	UBA081	81	From Demodara-Baddegama-Springwelly -Rockhill to Badulla	20.622	Kandana
					Imbulgoda
					Imbulgoda
					Wewelhinna
					Springvalley
					Beddegama
					Bulathwatta
	UBA090	90	From Hathakama Waralkatiya to Serandip Waththa (Gongalthanna Estate)	2.851	Ketawala
					Hethekma
	UBA139	139	Gawela-UdakaleeRoad	1.927	Gawela
	UBA151	151	Hali Ela Outer Circular Road Sec.i	16.187	Etampitiya
					Ketawala
					Dehivinna
					Udagama
					Pahamunuthota
					Deegalla
					Hethekma
					Pattipola
					Gawela
		151.1	Hali Ela Outer Circular Road Sec.ii	6.942	Maligathenna
					Pallegama

		15 1.2	Hali Ela Outer Circular Road Sec.iii	4.217	Wepassawela
					Kudumahuwela
					Maligathenna
					Hinnarangolla
		15 1.3	Hali Ela Outer Circular Road Sec.iv	5.611	Kirinda
			Hali Ela Outer Circular Road Sec.iv-Part.B	2.147	Hapuwalakumbura
		15 1.4	Hali Ela Outer Circular Road Sec.v	4.849	Mugunumatha West
		15 1.5	Hali Ela Outer Circular Road Sec.vi	5.579	Mugunumatha West
					Mugunumatha East
					Uduwara
		15 1.6	Hali Ela Outer Circular Road Sec.vii	3.972	Mugunumatha East
					Medapitigama
					Godegama
		15 1.7	Hali Ela Outer Circular Road Sec.viii	2.442	Mahawattagama
					Welikemulla
		15 1.8	Hali Ela Outer Circular Road Sec.ix	5.829	Beddegama
					Medagama
					Wewelhinna
	UBA153	153	Haliela, Egodagama, Pitawatiya Road	0.861	Medapitigama
					Dickwella

					Hali-Ela
	UBA154	154	Haliela, Hathakma, Malithakandura, Landekumbura Road	1.252	Hethekma
	UBA159	159	Hathakma Werakatiya Meegahaella Landekumbura	0.777	Ketawala
					Hethekma
	UBA200	200	Ketawela-Panakanniya-Medagedara Road	6.162	Deegalla
					Panakanniya
					Jangulla
					Bogoda
					Landewela
	UBA214	214	Kottagoda 6 Division-Springwelliwatta-Kottagoda Kadana Road	1.916	Kandana
					Imbulgoda
	UBA219	219	Kudumahawela-Heenanarangolla	2.716	Hinnarangolla
					Kudumahuwela
	UBA223	223	KurukudegamaPost Office toWarakadanda Pitakadura Bridge Road	1.681	Warakadanda
					Kurukude
	UBA229	229	Madagaga Weliwaththegama	0.909	Medagama
	UBA244	244	Malpola to Ambewela bypass Road	0.980	Neluwa
	UBA253	253	Morethota St. James Muniyandi Kovil Junction to Abewela School Road	2.022	Morethota
	UBA266	266	Near Degalla Sarath Stores to diglla Temple Road	1.154	Deegalla
	UBA276	276	Oththekade-Katawala Road	2.081	Ketawala
					Jangulla
	UBA281	281	Pallewela-Cannel Road	1.022	Maligathenna

	UBA309	309	Samagipura Village Central Road	1.953	Samagipura
	UBA316	316	Silpolagama Road to Unagolla Road	2.210	Mahawattagama
					Unagolla
					Welikemulla
					Medagama
	UBA334	334	Udakohovila Sri Kali- amman Kovil Road	2.944	Udakohovila
	UBA337	337	Uduwara Gedara Kubura to Rosatwaththa Road	0.605	Uduwara
	UBA341	341	Unagolla to Hali-Ela Road	2.993	Mugunumatha West
					Medapitigama
	UBA344	344	Unagollawaththa Kovil to NewHousing Scheme Road	0.709	Medapitigama
	UBA373	373	Chelsiwatta - Lower Katugaha Road	3.538	Mahathenna
					Neluwa
					Katugaha
	UBA374	374	Degalla Main Road to Kosgolla Village Road	0.959	Ketawala
	UBA386	386	Kandagolla Lower Division to Dikwella Estate Road	0.373	Udagama
	UBA388	388	Kingrose-Siviyawelgolla Road	1.573	Uva Mahawela
					Niliathugoda
	UBA389	389	Kurukude - Huriella Road	0.790	Kurukude
	UBA391	391	Mahathanna Bypass Road	0.906	Mahathenna
	UBA394	394	Near Malwattha Bridge to Pitakadura Road	0.962	Mahathenna

	UBA397	397	Neludanda Main Road	3.489	Samagipura Neludanda
	UBA398	398	Neluwa - Mahakanda Road	1.673	Neluwa
	UBA400	400	Pallegama-Thawalamthanna to Tea Factory Road	1.384	Pallegama
Haputale DS Division	UBA043	43	Bandarawela Diyabibila Road	0.812	Eranawela Kahattewela
	UBA045	45	Bingetenna, Rathpaha Road	0.683	Kahagolla Bingethenna
	UBA059	59	Diyathala Gardinan Road	0.860	Dodamwatta Diyathalawa Umankandura
	UBA061	61	Diyathalawa, Welanhinna, Walgahawela Road	2.504	Welanhinna Pahala Kadurugamuwa Glenanore Haputhalegama
	UBA102	102	From Kottalbadda, Belugolla to Paradhiarawa	1.349	Kahagolla Ranjallawa
	UBA115	115	From Rohamtan Estate to Madawalakapalla Road	1.281	Panketiya
	UBA142	142	Glennoure Estate To Bauvais Division	2.188	Glenanore
	UBA163	163	Hela muduna-Atthalapitiya-Watagamuwa Road	2.276	Eranawela
	UBA231	231	Madawalakapalla entrance road to Karabadda Grama	1.835	Panketiya Viharakele

					Hela Kadurugamuwa
	UBA278	278	Pahalakadurugamuwa Road	2.998	Pahala Kadurugamuwa
	UBA315	315	Shantha Thomus Doun Road	0.518	Eranawela
	UBA365	365	Wewewatta to Karapinchagahawatta nearby 2nd Bridge	1.335	Jayaminipura
					Diyathalawa
					Ellagama
Kandaketiya DS Division	UBA047	47	Bubula , Mahathenna, Dadayamthalawa Road	2.339	Mahathenna
	UBA095	95	From Kandeketiya Badulu Oya junction to Wellewela Thennagammanaya Road	4.136	Kandaketiya
					Baduluoya West
					Baduluoya East
	UBA127	127	From Wewathenna to Thaldena (Old Kandy Road)	4.641	Wewathenna
					Maliyadda
	UBA129	129	Galauda-Ampitiya Road	3.949	Galauda
					Thalakumbura
	UBA130	130	Galauda-Bokkanoruwa Road	3.394	Bokanoruwa
	UBA131	131	Galauda-Labugasthalawa Road	3.574	Beramada
					Bokanoruwa
	UBA132	132	Galauda-Wasanagama Road	2.446	Wasanagama
					Godunna

	UBA181	181	Kadapoththawa Rural Entrance Road	1.909	Baduluoya West
	UBA331	331	Thunnewa Road	2.048	Godunna
					Dikkumbura
Lunugala DS Division	UBA008	8	Adawaththa Lunugala Division	4.668	Alakolagala
					Udapanguwa
					Arawakumbura
	UBA069	69	From Akiriya to Madolsima Road	11.469	Madulsima
					Wewabedda
					Gallulla
					Batawatta
	UBA178	178	Janathapura Road Sec.i	1.503	Janathapura South
					Janathapura
		178.1	Janathapura Road Sec.ii	2.489	Sumudugama
					Janathapura South
					Kottalbedda
					Janathapura
	UBA233	233	Mahadowa Estate to Lunugala Road	7.202	Mahadowa
					Yapamma
	UBA250	250	Metigahathenna-Akiriya-Megolla Road	7.068	Wewabedda
					Metigahathenna
					Ekiriya
Mahiyanganaya DS Division	UBA001	1	1B Grama Seva Wsama Ginnoruwa Road Sec.i	1.306	Ginnoruwa
		1.2	1B Grama Seva Wsama Ginnoruwa Road Sec.iii	1.022	Ginnoruwa

		1.3	1B Grama Seva Wsama Ginnoruwa Road Sec.iv	0.675	Ginnoruwa
		1.4	1B Grama Seva Wsama Ginnoruwa Road Sec.v	0.907	Ginnoruwa
			1B Grama Seva Wsama Ginnoruwa Road Sec.vii	0.792	Ginnoruwa
			1B Grama Seva Wsama Ginnoruwa Road Sec.vii-Adition	2.099	Viranegama
	UBA004	4	45 mile post-Elewela Road	1.645	Elewela
	UBA011	11	Alewela-Damarawa-Dehigolla Sec.i	2.717	Dambarawa Elewela
	UBA053	53	Dambana-Gurukumbura Road	5.864	Dambana
	UBA072	72	From Aluyatawela Temple to Dikpitiya Road	1.283	Hebarawa Aluyatawela
	UBA104	104	From Mapakadawewa 20th mile post Junction to 50 Acers Road	3.059	Mapakadawewa
	UBA105	105	From Mapakadawewa 20th Mile post Junction to Paharagammana Road	1.814	Pangaragammana Mapakadawewa
	UBA113	113	From Paharagammana Road (Bodiya) to Senanigama School Road	0.865	Mapakadawewa Senanigama
	UBA218	218	Kudagalayaya Main Road	1.038	Dehigolla
	UBA248	248	Meegahahena-Watawana Road	5.299	Thalangamuwa Meegahahena
	UBA303	303	Roberiyawa Ulhitiya Village entrance (No. 223/5 near Mr. Dissanayake' House) upto Ulpitiya Temple Road	1.439	Ulhitiya Hobariyawa

					Belaganwewa
Meegahakivula DS Division	UBA047	47	Bubula , Mahathenna, Dadayamthalawa Road-Addtion	0.596	Karametiya
	UBA065	65	Ellalanda Road	2.317	Ellanda
	UBA068	68	From 11th mile post to Wewathenna Kohena Road via Meegaspitiya Main Road	4.207	Kohana
	UBA199	199	Keselwatta Lunugala Road	1.746	Akurukaduwa
	UBA212	212	Komarika Galkada Road	1.690	Akurukaduwa
	UBA238	238	Makulgolla Welan Landa Road	1.828	Akurukaduwa
	UBA295	295	Polgaha Arawa Main Road	4.424	Kalugahakandura
					Polgaha Arawa
	UBA327	327	Thalde-Galgelanda Road	2.568	Thaldena
	UBA329	329	Thaldena-Bathalawatta Nagolla Road	3.825	Thaldena
Paranagama DS Division	UBA009	9	Adiyarawatta to Ellanda, Rambukhella, Ilukwela	1.752	Ellanda
					Ilukwela
	UBA027	27	Babarapana Mahakudura Road	1.249	Panagoda
					Thuppitiya
	UBA063	63	Downside to N.G. Division	2.578	Downside
					Lunuwatta
					Pallewela
					Kendagolla
					Kotawera Udagama
					Unapana

UBA067	67.1	Etampitiya Gawela Main Road Sec.ii	0.848	Thuppitiya	
				Panagoda	
	67.2	Etampitiya Gawela Main Road Sec.iii	0.764	Thuppitiya	
UBA116	116	From Sapugollagama to nahakadiya via Telembuwela Road	1.947	Pallewela	
				Sapugolla	
UBA282	282	Panagoda to Halabe Bridge	3.399	Thuppitiya	
UBA310	310.1	Sapukade junction to Ambagasdowagama Road Sec.ii	0.892	Ambagasdowa	
				Rathamba	
UBA314	314	Senanayaka Junction to Kirawanagama, Galketiya Mankada Road	7.761	Sapugolla	
				Ethkandawaka	
				Kirawanagama	
				Ambagasdowa	
				Kurundugolla	
				Busdulla	
UBA336	336	Uduhawara-Koradekumbura Road	2.916	Welamedagama	
				Koradekumbura	
				Uduhawara	
				Malapolagama	
UBA348	348	Waldimar to Alugala Junction	4.336	Voldemar	
				Mudanawa	
		Welimada-Yahalagaha Arawa Imbulgashinna Rahupola Road		Kendagolla	

	UBA362	362		14.076	Metiwalalanda
					Weliulla
					Ulugala
					Kotawera Pahalagama
					Kotawera Udagama
					Balagala
					Udaperuwa
					Hangiliella
					Downside
					Yahala Arawa
					Pitiyakumbura
					Rahupola
Passara DS Division	UBA146	146	Gonekela Factory to Top Division	3.369	Puhulwatta
	UBA173	173	Ilipathuthanna Kolongaspitiya Road	1.382	Demodara
	UBA173		Ilipathuthanna Kolongaspitiya Road Adition	1.507	Palawatta
					Demodara
	UBA182	182	Kanawaralla Idamegedara to Maussagolla Hingurugamawa Road	2.747	Kanawerella West
					Kanawerella
					Maussagolla West
	UBA232	232	Madolsima Road-6 Kanuwa-Maligathanna	1.394	Gerandiella
					Maligathenna
			Meeriyabedda Road		Dambewela

	UBA249	249		4.911	Ambathenna West
					Meeriyabedda
					Passara Town South
	UBA268	268	New Colony Road	0.933	Ambathenna
	UBA279	279	Pallegama via Udagama Road	5.673	Nikebedda
					Palagolla
					Passara Town East
					Sapuroda
					Pallegama
					Udagama
	UBA287	287	Passara Paramankada Road	0.700	Paramahankada
	UBA289	289	Pelgahathenna Nawa janapadaya Kirimaduthenna Road	2.521	Palagolla
					Pelgahathenna
					Sapuroda
	UBA308	308	Sagabo Mawatha Road	1.764	Passara Town North
					Kanahela
Rideemaliyadda DS Division	UBA002	2	2F South Keselpotha to Ikiraya Goda Road	12.632	Keselpotha South
					Ikiriyagoda
					Kandubedda
	UBA005	5	50th Mile Post-Keselpotha-Mapakada Road	10.279	Dikkendayaya
					Uva Thissapura

					Keselpotha South
	UBA011	11.1	Alewela-Damarawa-Dehigolla Sec.ii	1.286	Arawatta
	UBA119	119	From Thissapura Keselpotha Junction to Thekka Wagawa Aada Ulpatha Road	6.019	Gamakumbura North
					Andaulpatha
					Uva Thissapura
					Gamakumbura South
	UBA133	133	Galbokka to Gadaboketiya	2.639	Dehigama
	UBA165	165	Hewanwatta Kumbukgolla to Polwagawa Sec.i	1.707	Dehigama
					Pethiyagoda
	UBA165	165.1	Hewanwatta Kumbukgolla to Polwagawa Sec.ii	1.083	Dehigama
	UBA299	299	Rideemaliyadda Gamunupura Remnple Road	1.270	Uva Gemunupura
					Senevigama
	UBA345	345	Uraniya-Mahapitiya-Nagadeepa Road	4.119	Uraniya
					Nagadeepa
Soranathota DS Division	UBA035	35	Badulla Rideepanawaththa Ulpatha Left Road	0.942	Rideepana
	UBA107	107	from Meegahawela to Dabagahapitiya Road	2.568	Yatilellagama
					Rideepana
	UBA189	189	Kandegedara Weeragama Inner Road	1.163	Kandegedara Town
					Kirioruwa
	UBA208	208	Kohana-Budugekanda Soranatota Thennepanguwa Road	8.726	Pussellakanda

					Idamepanguwa
					Moragolla
					Budugekanda
					Pallekanda
	UBA224	224	Kuttiyagolla-Ethgala Road	2.898	Kuttiyagolla
					Ketakellagama
	UBA254	254	Nagolla Maliyadda Road	2.845	Idamepanguwa
					Pallekanda
	UBA257	257	Narangala Kovil To Meeriyagala	6.454	Ledgerwatta
	UBA321	321	Soranathota to Kirioruwa, Wathupitiwala	1.610	Kirioruwa
					Kithulwattagama
	UBA358	358	Wekada Kosgolla Road	3.151	Kosgolla
Welimada DS Division	UBA046	46	Boragas Kapuruwaththa Nuwara Eliya Road	1.805	Boragas
					Alakolagala
	UBA078	78	From Bandarawela Road to via Nawela Temple to Amunumulla Road	1.512	Nawela
	UBA122	122	From Wangiyakubura Kirinda junction to Kirinda (Boralanda-Haputhale main road from Pelvinna junction to Pelvinna Road)	1.276	Maligathenna
	UBA134	134	Gambadda Pihiniliya Road	2.052	Udakendagolla
	UBA141	141	Glanore waththa Idalgashinna Road	1.906	Maligathenna
	UBA167	167	Hinnarangolla-Gambedda-Galadanda Road	5.721	Hinnarangolla
					Rathkarawwa

				Udakendagolla
				Galedanda
UBA198	198	Keppetipola-Hewankumbura-Ambagasdowa Road	6.718	Ambewela
				Hewanakumbura
				Palugama Town
				Keppetipola
UBA204	204	Kirinda Road (From Wangiyakumbura-Kirinda junction to Boralanda-Haputhale road)	1.621	Boralanda
				Helayalkumbura
UBA290	290	Pelwinna Road (From Pelwinna Junction)	1.384	Keppetipola
				Erabadda
				Palugama Town
UBA310	310	Sapukade junction to Ambagasdowagama Road Sec.i	2.475	Welimada Watta
				Ambagahakumbura
				Dimuthugama
UBA351	351	Warwick Ambewela sathar kade Junction To muster Shed	1.875	Ambewela
				Alakolagala
UBA361	361	Welimada-Kerandimulla Road	7.155	Welimada Town
				Mavithikumbura
				Kabillegama
				Landegama
				Nedungamuwa

APPENDIX 2: SAMPLE ENVIRONMENT CHECKLISTS

INTEGRATED ROAD INVESTMENT PROGRAMME (iROAD), ROAD DEVELOPMENT AUTHORITY

Road Name : 5th Mile Post to Thiththawalkula
Road ID : UMO005
District Name: Monaragala
DSD & GNDs:

DSD	GNDs
Bibila	Hammanpola

Total length of the road: 4.264km.
General Overview of the road

The road of 5th mile Post to Thiththawalkula Starts close to the Gal Oya and then road runs through rural residential area with slightly undulating terrain. The land uses beside the road includes home garden and residences, mixed cultivation with coconut. The ROW of the road is 11-12m and the Carriageway is 3m to 3.5m. The road surface of the starting sections beside the bridge is properly constructed. The surface condition of the road is highly dilapidated with exposed bouldering surface and eroded in number of locations. A stream cross the road at 2.8km. road ends at 8th km post junction of Bibila Ampara road.

GPS coordinates	Starting point of the road	End point of the road
	N 07 07 800	N 07 09 420
	E 81 17 471	E 81 16 230

Climatic Conditions

Temperature-^{0}C (Average)	Minimum: 21.4 ^{0}C Max: 31.7 ^{0}C
Humidity	High: 74.8% Low: 69.6%
Rainfall (Average) Rainy Season	1852.9 mm/year Mainly from early October to late January (Maha) and less from late March to late May (Yala)

(Source: Department of Meterology, 2015)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many	√		In general the road traverse through a slightly undulating terrain. Altitude: Maximum elevation -2574m

No:	Type of Ecosystem	Yes	No	Explanation
	km of the road are located in the hilly area)			Minimum elevation - 204m
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		√	No naural habitats were located.
3.	Inhabited Area	√		Road runs through the residential area
4.	Agricultural Land	√		home garden with coconut plants, paddy fields and chena cultivation were observed beside the road.
5.	Barren Land		√	No barren lands were observed in the area

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)	√		According to the public view, no such previous incidences have been recorded in the project area. During the rainy season erosion issues there due to lack of drain facilities.
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)	√		Gal Oya cross the road at starting section and a small stream crosses the road at 2.8km.
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)	√		Drainage issues common along the road due to insufficient drainage facilities. Therefore improvement of drainage facility across and along the road is necessary.

No.	Parameter/ Component	Yes	No	Explanation
4.	Are there any trees with a GBH of 60 cm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)		√	No tress were found beside the road.
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	No faunal habitats were found in the area.
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	No threatened flora and fauna species were found in the area.
7.	Are there any utility structures[1] within 2 m on either side from the edge of the road carriageway or within the existing ROW of the road? (If yes, attach list with chainage)		√	No utility structures were located beside the road.
8.	Are there any religious, cultural or community structures/buildings[2] within 50 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	√		Buildings were located RHS of the road. *Please refer section D II for information* However none of these structures will be affected due to the road improvement. However, it is recommended to implement mitigation measures as specified in the EMP to minimize impacts due to degradation of air quality and noise at these sensitive receptors. In addition safety measures are recommended during both construction and operational phases of the project.

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	√		Public consultations were made during the field environment assessment. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	√		Public highlighted the need of proper improvement of the road with drainage facilities. *Please refer to the annex 1 for the list of public consulted and their views*
3.	If suggestions received, were they incorporated into the design?	√		The environment checklist will be forwarded to design team for further consideration.

D. Attached the following

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS)) as required under B.7.

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8

Chainage (km)	Location	Right	Left
1.1	Preschool Diggamuna	√	
3.2 – 3.3	Community hall	√	

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least 02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 60cm GBH or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4.

APPENDIX 3: GENERAL LOCATION MAPS

Annex 1. Public consultation of UMO016 Alupotha Junction to Kalugaha Wadiya Road

Name of the Respondent	Age	Sex	Address	Views
Mr. R. M Dissanayaka	43 years	Male	Kalugahawadiya, Alupotha, Badulkumbura.	Starting section of the road is not properly constructed and also current situation of the entire section highly inconvenient to using. water stagnating and surface become muddy also common along the surface during the rainy season. Widening of the carriageway and proper rehabilitation of the road will be benefited to the people.
Mr. M.H.M . Rishwan	32 years	Male	Alupotha, Badulkumbura.	Surface is vulnerable to soil erosion during the rainy season due to lack of side drains and culverts to the particular locations. Construction of culverts in low-lying areas are required to avoid erosion.

Annex 03. Photo gallery of UMO016 - Alupotha Junction to Kalugaha Wadiya Road

Starting point of the road Kalugaha Wadiya close to the Manik Ganga

Muddy surface and roadside environment at 0+000-0+100km

Fairly good gravel surface at 0+600-0+700km

Sandagiri viharaya temple at at 1+500-1+600km LHS

Road surface and roadside environment at 2+500-2+600km

End point of the road at Alupotha of Badulkumbura

INTEGRATED ROAD INVESTMENT PROGRAMME (iROAD), ROAD DEVELOPMENT AUTHORITY

Road Name : Allethota to South Kebillawala Piriwena Road
Road ID : UBA012
District Name: Badulla
DSD & GNDs:

DSD	GNDs
Bandarawela	Inikambedda, Karagahawela, Beddekumbura, Karagahawela South

Total length of the road: 1.262 km.

General Overview of the road

A total of 1.262km Allethota to South Kebillawala Piriwena road starts from Inikambedda to South Kabillawela road and runs through residential area of South Kabillaweala. The carriage way of the road varies from 2.5 to 3m and the ROW is 6 to 8m. The terrain of the road is hilly and undulating. The land use beside the road includes home gardens and residences with mixed and vegetable cultivations. The road cross Colombo – Badulla railway line around 0.700km and road runs parallel to the Allethota Oya at LHS of the road. Generally surface condition of the road is dilapidated with potholes, damage edges with uneven surface. The road ends at Badulla – Bandarawela road around 1.2km.

GPS coordinates	Starting point of the road	End point of the road
	N 6 49.043	N 6 49.120
	E 80 59.606	E 80 59.262

Climatic Conditions

Temperature-^{0}C	Minimum: 17.5 ^{0}C Max: 29.7 ^{0}C
Humidity	72.9 %
Rainfall Rainy Season	2164.4 mm/year Mainly from North-East Monsoons(From November to January)

(Source: Department of Meterology, 2015)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/	√		In general the road traverse through a hilly and undulating terrain.

No:	Type of Ecosystem	Yes	No	Explanation
	Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)			Altitude: Maximum elevation -1283m Minimum elevation - 1220m
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		√	Not located
3.	Inhabited Area	√		Road runs through the residential area
4.	Agricultural Land	√		Mixed home gardens
5.	Barren Land		√	No barren lands were observed in the area

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		√	According to the public view, no such previous incidences have been recorded in the project area. During the rainy season erosion issue there due to lack of drain facilities
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)		√	No.
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)	√		Drainage issues common along the road due to insufficient drainage facilities

No.	Parameter/ Component	Yes	No	Explanation
4.	Are there any trees with a GBH of 60 cm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)		√	No.
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	No faunal habitats were found in the area.
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	No threatened flora and fauna species were found in the area.
7.	Are there any utility structures[1] within 2 m on either side from the edge of the road carriageway or within the existing ROW of the road? (If yes, attach list with chainage)	√		A total of 8 electric poles located beside the road close to the edge of the road carriageway
8.	Are there any religious, cultural or community structures/buildings[2] within 50 m on either side from the centre line of the road alignment? (If yes attach list with chainage)		√	No.

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the	√		Public consultations were made during the field environment assessment.

[1]Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

No.	Consultation Activities	Yes	No	Remarks
	alignment. (Attach list of people met and dates)			*Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	√		Public highlighted the need of proper improvement of the road with drainage facilities *Please refer to the annex 1 for the list of public consulted and their views*
3.	If suggestions received, were they incorporated into the design?	√		The environment checklist will be forwarded to design team for further consideration.

D. Attached the following

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS)) as required under B.7. Yes

Chainage (Km)	**Utility structure**	**LHS**	**RHS**
0+100-0+200	Electric Post	-	2
0+300-0+400	Electric Post	1	-
0+500-0+600	Electric Post	1	1
0+800-0+900	Electric Post	2	1
Total	**Electric Post**	**4**	**4**

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8. No

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least 02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 60cm GBH or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4. No

Annex 02. Location Map

Alhena 8 Mile Post Road
(Near Anandaraama Temple)

UBA 012

Annex 1. Public consultation of UBA012 Allethota to South Kebillawala Piriwena Road

Name of the Respondent	Age	Sex	Address	Views
Mr. K.G Athula Rangith	55 years	Male	Ellethota Water Board, Bandarawela.	Improvement of the road is essential, because this part is consist with highly residential area. So considerable amount of people use this road to reach Bandarawela town as well as Badulla - Badarawela road.
Mr. R.M Upali Rathnayaka	50 years	Male	Iruwanapathana, South, Kabillawela, Bandarawela.	Large number of villagers, private and government sector workers, and schooling of children highly benefited due to improvement of the road.

Annex 03. Photo gallery of UBA012 Allethota to South Kebillawala Piriwena Road

Starting point of the road at Inikambedda to South Kabillawela road

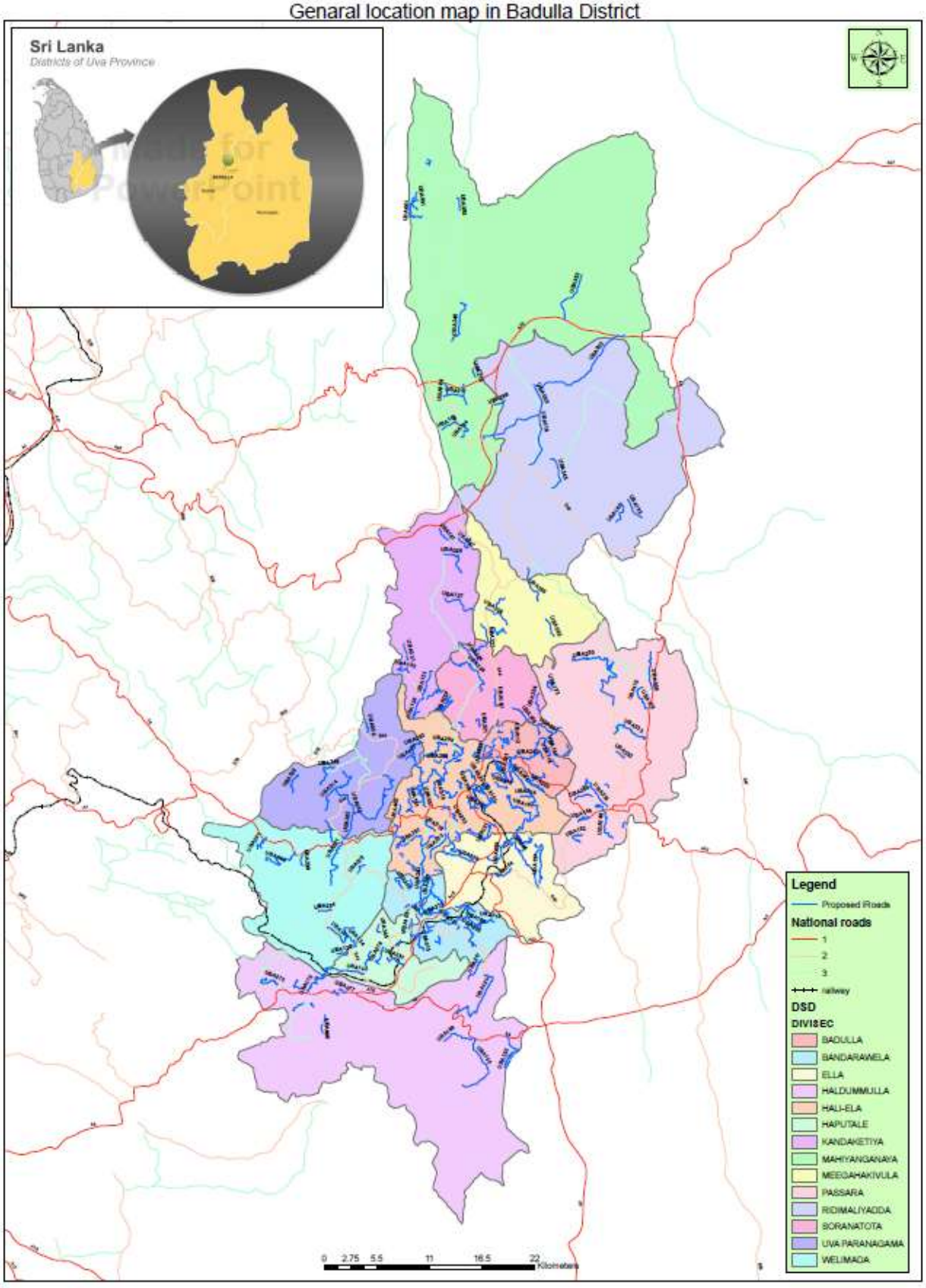
Roadside environment at 0+100-0+200km

Existing ROW and the carriageway at 0+400-0+500km

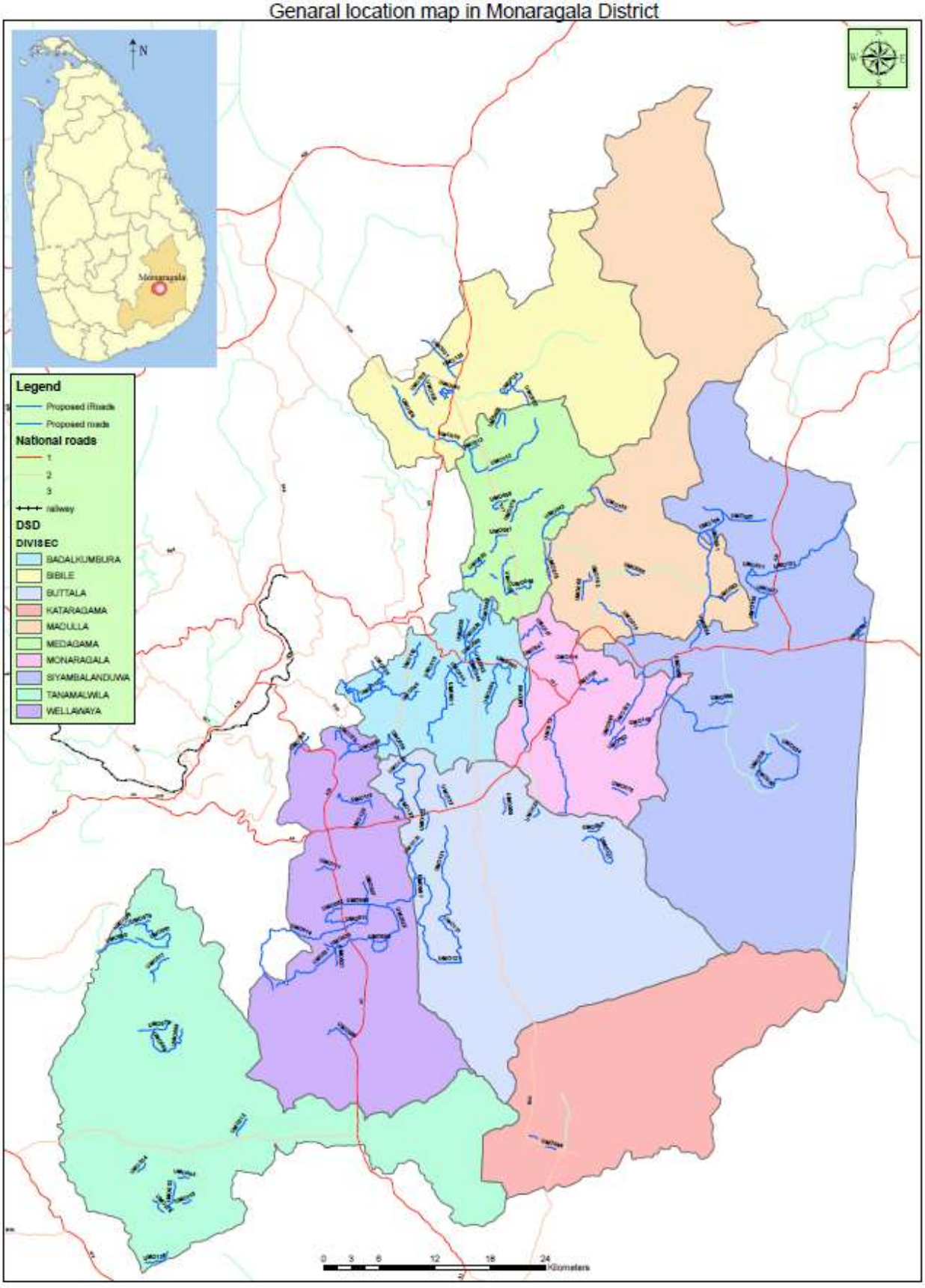
Road crosses the Badulla railway line at 0+700-0+800km

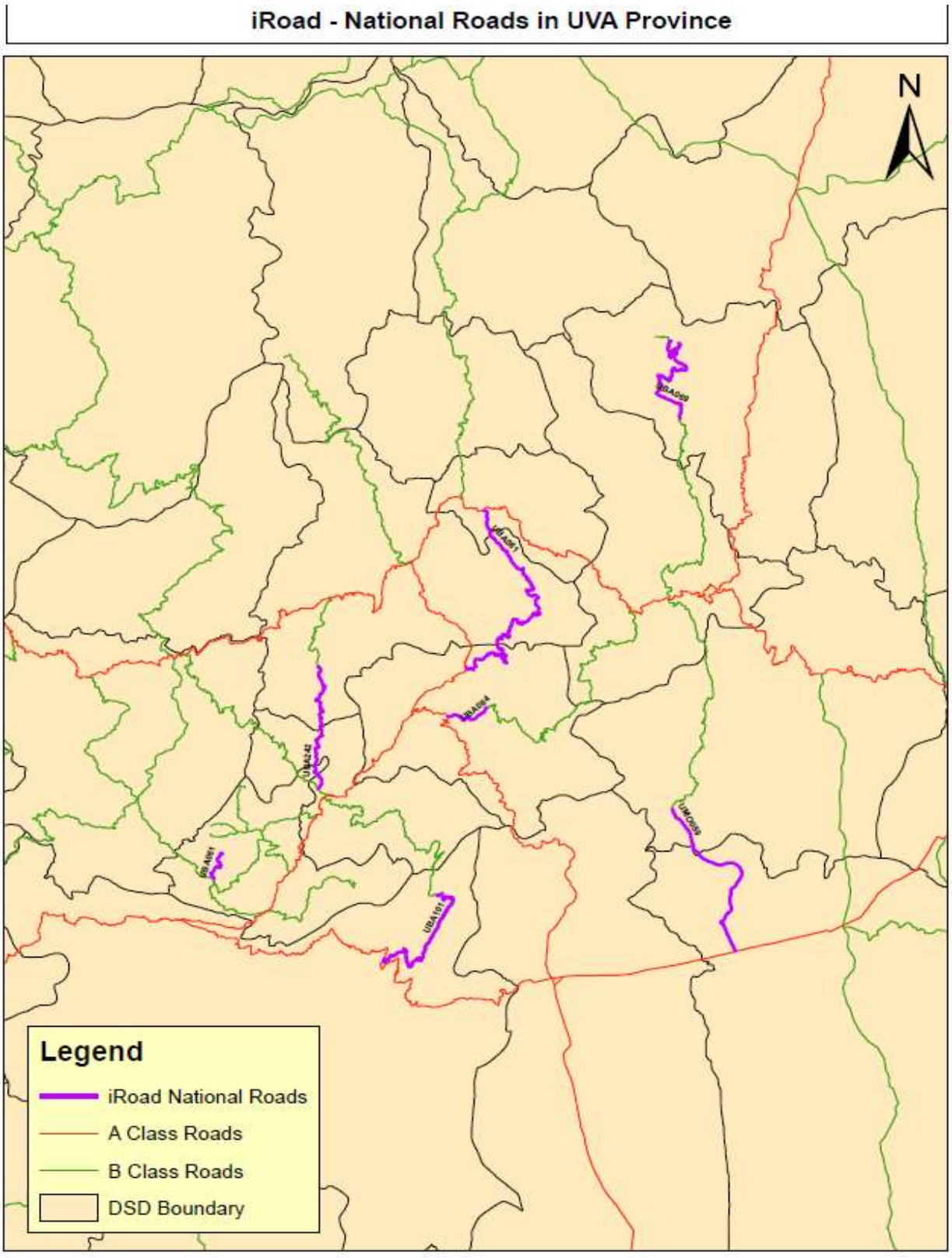
End point of the road at Badulla – Bandarawela road

Genaral location map in Badulla District



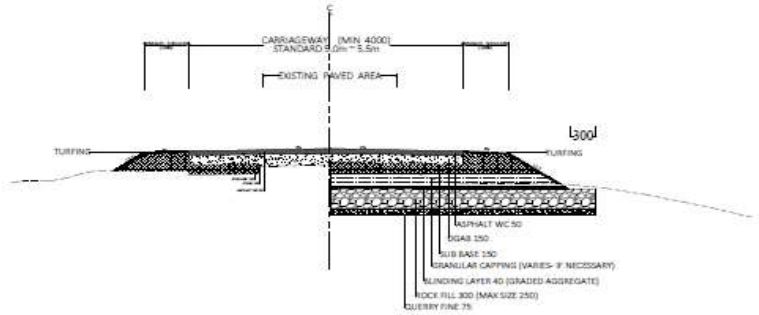
Genaral location map in Monaragala District



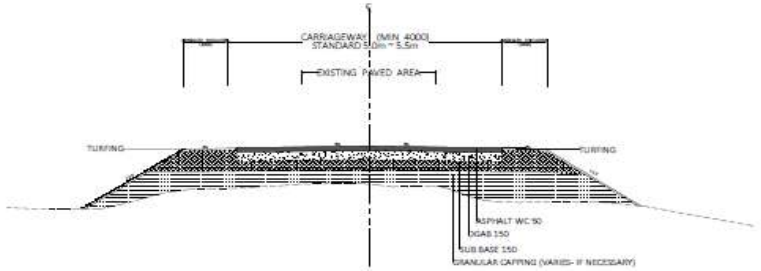

iRoad - National Roads in UVA Province
N
Legend
iRoad National Roads
A Class Roads
B Class Roads
DSD Boundary

APPENDIX 4: PROPOSED CROSS SECTIONS

PROPOSED TYPICAL SECTION (TS) FOR PRDA ROAD



TS -M (TYPICAL SECTION FOR MARSHY AND WEAK SOIL AREA)



TS - N (TYPICAL SECTION FOR EMBANKMENT AREA)

	ASPHALT WEARING COURSE	WC
	DENSE GRANULAR AGGREGATE BASE	DGAB
	GRANULAR SUB BASE (CBR > 30 %)	GS
	GRANULAR CAPPING (CBR > 10 %)	GC
	SHOULDER FILL	

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
4. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
5. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
6. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESS < 100mm USE GRANULAR SUB BASE.
7. SELECT DRAIN AS PER SITE CONDITION
8. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECTED TO THE APPROVAL OF THE ENGINEER
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PROOR TO EXSISTING PAVEMENT STRENGTHENING

ADB FUNDED
I ROAD PROJECT
NORTH CENTRAL PROVINCE

CLIENT: DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

No	REVISION	DATE

SKILLS INTERNATIONAL (PVT) LTD

DRAWING TITLE: TYPICAL CROSS SECTION FOR PRDA ROAD

DWG NO :

DES :
DRW :
CHK :
DATE :

APPENDIX 5: FOREST APPROVAL LETTER

වන සංරක්ෂණ දෙපාර්තමේන්තුව
வன பரிபாலனத் திணைக்களம்
FOREST DEPARTMENT

ප්‍රධාන කාර්යාලය, සම්පත්පාය, තැ. පෙ. 3, බත්තරමුල්ල, ශ්‍රී ලංකාව.
தலைமை அலுவலகம், "சம்பத்பாய", த. பெ. இல. 3, பத்தரமுல்லை, இலங்கை.
Head Office, Sampathpaya, P. O. Box 3, Battaramulla, Sri Lanka
දුරකථන / தொலைபேசி / Telephones 2866631, 2866632, 2875540
ෆැක්ස් / தொலை / Fax (94-1) 2866633
E-mail: Forest@slt.lk.

මගේ අංකය / எனது இல. / My Ref. EMD/EIA/RD/rural roads/2014
ඔබේ අංකය / உமது இல. / Your Ref.
දිනය / திகதி / Date 2014.08. 27

අධ්‍යක්ෂ, (පාරිසරික සහ සමාජ සංවර්ධන)
මාර්ග සංවර්ධන අධිකාරිය.

ග්‍රාමීය පාරවල් වැඩිදියුණු කිරීමේ වැඩසටහන - මාර්ග සංවර්ධන අධිකාරිය

ඉහත කරුණට අදාළව ඔබේ අංක RDA/DG/07/113, හා 2014.07.25, යන ලිපිය හා අංක RDA/ESD/iroad හා 2014.08.04, හා 2014.08.26 දිනැති ලිපි හා බැඳේ.

02. මෙම වැඩ සටහන යටතේ වැඩි දියුණු කිරීමට යෝජිත මාර්ග වලට ඇතුලත් වන සංරක්ෂණ දෙපාර්තමේන්තුවේ පාලනය යටතේ පවත්නා වනාන්තර තුලින් වැටී ඇති මාර්ග සම්බන්ධව වෙන වෙනම පරීක්ෂා කර නිර්දේශ ඉදිරිපත් කිරීමට කලක් ගතවන බව දන්වමි.

03. මෙහි ඉදිරි අවශ්‍යතාවය සඳහා වනාන්තර තුලින් වැටී ඇති මාර්ගවල අමතර කිසිදු අළුත් හෙලි කිරීමකින් හෝ ගස් ඉවත් කිරීමකින් තොරව, දිසා වන නිලධාරී හේ අධීක්ෂණය යටතේ මෙම කාර්යයන් සිදු කිරීම සඳහා අවසර ලබා දීමේ නැකියාව ඇති බව කාරුණිකව දන්වමි.

මහින්ද සෙනෙවිරත්න
වන සංරක්ෂක
(පරිසර සංරක්ෂණ හා කළමනාකරණ)
වන සංරක්ෂක ජනරාල් වෙනුවට

වන සංරක්ෂක ජනරාල් / வன பாதுகாவலர் நாயகம் / Conservator-General of Forests 2866616
වන සංරක්ෂක / வன பாதுகாவலர் / Conservator of Forests
මෙහෙයුම් / நடவடிக்கை / Operations 2866624
පර්යේෂණ / ஆய்வு / Research 2866628
පරිපාලන / நிர்வாகம் / Administration 2866625

Translation of the letter

27.08.2014

Director
Environment and Social Development Division
RDA

Program for upgrading of Rural roads - Road Development Authority

This refers to the letter no. RDA/DG/07/113 dated 25th of July 2014 and subsequent letters no RDA/ESD/IROAD dated 4th of August 2014 and 26th of August 2014 on above.

It seems that it will take a long time to inspect and give specific conditions on roads that are within the forest areas.

Therefore, considering the urgency of this program, Forest Department is able to grant approval to carry out the road construction work without using additional lands and removal of any trees within sensitive forest areas and it is recommend to carry out the development work under the supervision of the relevant District forest Officer of the Department of Forest.

Mahinda Senevirathne
Forest Conservator
(Environment Management)
For Conservator General of Forests

APPENDIX 6: STANDARD EMP FOR RURAL AND NATIONAL ROADS

No	Action of the Project	Mitigation Measures	Approximate Location	Mitigation cost	Institutional responsibility	
					Implementing	Monitoring
A: Design and Pre construction stage						
01	**Land acquisition**	• Land acquisition will not be involved for the project except realignment of bends or construction of cross drainages in several locations based on the design requirements • If land need from the public, negotiation with property owners will be carried out with involvement of third party • All effort will be made to avoid land acquisition for the project	Several project roads	To be included under the total project cost	PIU and PIC	Client, PIC, DS
02	**Selection of temporary use lands**	• Effort shall be taken to minimize use of temporally land for the construction activities • Selection of temporary lands with considering of social and environmental background adhering to laws and regulations in the county • Approval for the temporally use lands shall be obtained from Engineer and need to sign agreement with the land owners.	Throughout the project roads if need to use temporary lands	To be included under the Contractors' cost	Contractor	PIU, PIC
03	**Removal of trees**	• Effort shall be taken to minimize removal of road side trees • No removal of religious and cultural important trees and avoid removal of trees from temporary use lands • Removal of tree should be based on the final design of the roads • Preparation of inventory prior to removal of potential trees and permission shall be taken from DS for removal • Remove trees shall be handed over to Timber cooperation or rightful owners	Throughout the all project roads	Removal cost of trees and compensatory tree planting	Contractor	PIU, PIC, Divisional Secretory (DS)

		• Provision shall be made to additional compensation tree planting program with native species • Organizing of tree planting program in compensation at least one tree cut with planting 3 trees • Tree planting should be done where ever possible with the help of DOFC, DS in the area, CBOs, NGOs etc.				
04	**Shifting of public utilities**	• Proper utility survey shall be carried out in order to identify the effected utilities and the exact locations • Consent & action shall be obtained from relevant service providers (CEB, NWS&DB, and SSLT) to minimize time and the duration of utility disruption • Approval shall be obtained from DOI for any proposed construction works on Irrigation canals • Advance notice to the public about time and the duration of utility disruption • Use of well trained and experienced machinery operators for the shifting/reestablishment of utilities to minimize accidental damage and functional purposes • Special attention shall be taken to provide relevant services to the public without long delay. • Water and other utilities shall be provided to the public if long delay to reestablish services with the instruction of PIC	Throughout the project roads: if those facilities are available and need to shifted for improvement activities	To be included under the total project cost	Contractor/Service providers	PIU, PIC, CEB, NWS&DB, SLT, DOI, Community water supply schemes
05	**Impact to the public properties**	• Construction activities are restricted to the existing ROW, no impact to the road side properties • Religious and culturally important structures within ROW will not be affected due to project activities • Action should be taken to minimize impact to the common properties within ROW	Throughout the project roads: if public properties are available	To be included under the cost of removing and repairing of common properties	Contractor	PIU, PIC
06	**Hydrology and drainage**	• Design of new culverts and other drainage structures by considering hydrological investigation report and consultation with Department of Irrigation and Provincial Irrigation Department • Provision of adequate drainage facilities to the	All cross drainages, streams and Aru cross the rods, inundation and	To be included under the project cost	PIU, contractor	PIU, PIC

		inundation and flood prone locations • Temporary diversion of water ways during construction should be ensured that no obstruction to natural water flow. • Construction work affecting water bodies should be prevented and work should be scheduled during the dry season. • Excavation of beds of any streams, irrigation systems and other water resources should be avoided by the Contractor. • Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect downstream intakes.	flood prone locations			
B: Construction stage						
01	**Flood and inundation**	• Construction activities should be scheduled to avoid flood and inundation as a result of construction e.g. blockage of drainage path • Construction should minimize during the rainy season and drains should keep clean all the time without any obstruction. • Increase height of embankment in flood prone and inundation sections, construction of new culverts and other cross drainages as required to above locations • If flood and inundation cause due to negligence of the contractor, contractor should rectify all the damages with his own cost	Throughout the project roads, special attention to flood prone and inundation sections	To be included under the Contractors' cost	Contractor	PIU, PIC
02	**Extraction of construction materials**	• Suitable quarry sites, sand mines and borrow pits shall be identified at the initial stage within project influence area • Use existing licenses quarries and borrow pits which are approved by the GSMB and CEA as much as possible • Prior approval should be obtained from GS&MB/CEA for new quarries/borrow pits or sand mines • Use alternative sources for river sand such as sea sand and screen crusher fines with the consent of PIC • Quarries and borrow pits should not be located in productive agricultural lands, environment and public	Throughout the project area including Identified material extraction sites for the project	To be included under the Contractors' cost	Contractor	PIU, PIC

		sensitive areas • Restoration of borrow pits and quarry sites once after extraction based on IML instructions of GS&MB				
03	**Transportation and storage of construction materials**	• Lording of construction materials should not exceed the caring capacity of tucks • Materials shall be properly covered during transportation with no spillage • Lording, unloading and transport of materials shall not be inconvenient to the road side community or road users • Selection of sites for stock piling with the approval of PIC away from environment and public sensitive locations • Storage of fuel, lubricant and chemicals use for the construction activities on paved surface without contamination to the environment and storm water runoff • Approval shall be taken prior to use of local roads from relevant authorities and need to maintenance during the use by the Contractor	Throughout the project area including Identified material extraction sites, transportation roads, stockpiling yards	To be included under the Contractors' cost	Contractor	PIU, PIC
04	**Establishment of construction camp, offices and other temporally facilities**	• Labour camps and other temporally facilities should be located away from water bodies, residential and environment sensitive areas. • Provision of proper drainage facilities to the labour camps and prevent breeding of mosquitoes, flies and other vector borne diseases. • Provision of proper sanitary facilities to the labour camps offices and other temporally facilities including water, urinals, toilets bathing facilities, mosquito nets with adequate capacity of septic tanks and soak pits. • Handling and disposal of domestic solid waste in acceptable manner without contamination of surrounding environment with consultation of Local authorities. • Provision of first aid facilities and health care facilities to the labour camps offices and other temporally	Throughout the project area including labour camps, offices, other temporally facilities	To be included under the Contractors' cost	Contractor	PIU, PIC, LAs

		facilities Provision of garbage bins to labour camps, construction sites and those should be dumped regularly in a hygienic manner.				
05	**Impact to the ground and surface water quality and quantity**	• Temporary storage of material should be done in approved sites by the Engineer where natural drainage is not disturbed. • Construction activities effecting the quantity of water sources should be carried out during the dry season • All toxic and hazardous materials should be sited at least 500m away from water bodies and should prevent their entering into these locations. • Water that contaminate with fuel, oil and grease should not be directly released to storm water or natural water drainage system. • Vehicles and equipment used for the construction activities should be maintained in good condition, ensuring no undue leakage.	Throughout the project roads including streams, Aru, marshlands, wetlands, community and public wells	To be included under the Contractors' cost	Contractor	PIU, PIC
06	**Soil erosion, sedimentation and siltation**	• Construction activates: excavation and earth work around vulnerable area for soil erosion, inundation and flood prone mainly restricted to the dry season and removal of green cover vegetation of above locations shall be minimized • Temporary soil dumps should be removed from the construction sites and top soil shall be prevented to use for tree planting or turfing activities • Use of erosion control measures to the particular locations; ripraps, fiber mats, planting of deep rooted grasses, shrubs or other suitable plant species • Proper drainage facilities shall be established to the construction sites, material stock piling sites and dumping sites to drain water to the law laying areas • Silt traps shall be placed to the erodible locations specially construction sites of bridges and culverts • Temporally land use for the construction relate facilities should be reestablished to its original status before handover to rightful owners	Throughout the project area including temporally use lands for the project	To be included under the Contractors' cost	Contractor	PIU, PIC

07	**Contamination of soil**	• All the vehicles, machineries and other equipment shall be serviced only in vehicle surviving yards • Oil soaking materials shall be used to the places where possible leakage • Collected waste oil and soaking materials shall be correctly stored and disposed to the approved location • Oil traps should be provided to the vehicle surviving yards and fuel pilling points • Fuel and lubricant should be properly stored in impervious surface with collecting point of spills	Throughout the project area including temporally use lands for vehicle surviving yards and fuel storage	To be included under the Contractors' cost	Contractor	PIU, PIC
08	**Impact on biodiversity**	• Awareness programs should be organized for the workforce about conservation of important terrestrial & aquatic habitats with their flora and fauna. • Construction activities near forested areas, elephant habitats or around migration paths should be carried out under the instruction of DOFC and DWLC. • Material extraction sites, processing plants and waste disposal sites should not be located around above locations. • Construction activities around these locations should be limited to daytime and completed within short period of time. • No introduction of invasive alien species to the project area due to construction and other related activities. • Avoid removal of religious, cultural and aesthetic important trees as well as removal should not be impacted to the breeding season of birds, important roosting sites of mammals and other species of fauna	Around environment sensitive, ecological important and forested areas	To be included under the Contractors' cost	Contractor	PIU, PIC
09	**Construction debris and wastes**	• Selection of unproductive lands for disposal sites with adequate capacity away from public and environment sensitive locations • Excavated materials from the construction shall be re used to backfilling with the approval of PIC • Top soil 20 to 25 cm depth should be stored in properly for tree planting and turfing • Debris, residual spoil & dismantled & demolished	Throughout the project area including Identified disposal yards	To be included under the Contractors' cost	Contractor	PIU, PIC

		structures should not be sited to the agricultural lands, irrigation canals, flood prone locations, water bodies and wetlands or to the marshy areas. • All debris and residual spoil materials including left earth should be disposed to the location approved by the LAs.				
10	**Traffic management and road safety**	• Traffic Management Plan should be implemented to required location based on daily traffic volume with close coordination of local police • Insolation of traffic warning signs, temporary traffic lights, or flagmen at the construction site or location of road diversion • Since number of proposed roads under the project cross the railway line in different locations warning signs shall be provided both side of the railway crossing • Road furniture including footpaths, crash barrier, traffic signs, speed limits, pavement markers, center line etc., should be provided to the essential locations with the improvement of roads • Stage construction or provision of safe convenient passage to the vehicles/ passengers and livestock from the road side during the construction • Avoid/limit peak hours for transportation of construction materials, movement of heavy vehicles through urban and other public sensitive areas and use of alternative roads to avoid traffic congestion	Throughout the project roads	To be included under the Contractors' cost	Contractor	PIU, PIC
11	**Air Quality**	• Sprinkling of water in material extraction sites, processing plants and construction area as well as, road which use for the transportation of construction materials in regular intervals • Dust extraction unit should be fitted to the construction vehicles equipment and plants (Crushers, Asphalt, Concrete & Batching plants) • Materials shall be properly covered during transportation and proper storage to ensure	Throughout the project roads including public sensitive locations	To be included under the Contractors' cost	Contractor	PIU, PIC

		protection from dust and other emissions • Regularly maintenance of construction vehicles, equipment and machineries to meet National Emission Standards • Erection of dust barriers to the public, religious and other social important locations • Metal quarries, crushers and all the plants should be located at least 500m from public sensitive and residential areas				
12	**Noise and Vibration**	• Implement of Noise Control Regulations for construction equipment, machineries and plants (Crushers, Asphalt, Concrete & Batching plants) • Construction activities that create noise should be limited to day time from 6.00am to 6.00pm and no work during night time specially around residential and public sensitive locations • Special approval should be obtained from CEA for night time work through PIC • Exhaust silencers should be fitted to heavy construction equipment (Loaders, Compactors, Cranes & Plants), limit the noise less than 75db • Regularly maintenance of all construction vehicles, equipment and machineries to limit generate of excess noise and vibration • Contractor should be taken proper action to safeguard road side properties due to vibration of construction equipment and machineries	Throughout the project road including public sensitive locations	To be included under the Contractors' cost	PIU, PIC	
13	**Occupational Health and Safety**	• Organize awareness programs about personal safety of workers with proper briefing and training on safety precautions. • Provision of Personal Protective Equipment (PPE) high visibility jackets for night time work with necessary lighting arrangements. • Providing firefighting equipment to the construction sites and arrangement of the workshop and training program about use of firefighting equipment in emergency situation • Regular inspection of construction sites and other related locations to ensure use of proper PPE by workforce and their safety.	Throughout the project roads	To be included under the Contractors' cost	Contractor	PIU, PIC

		• Arrangement of first aid facilities to the all construction sites, trained paramedical personal and transport facilities for emergency situation. • Organize awareness program of STD/HIV/ AIDS for the work force to avoid risk of speeding STD.				
14	**Planting of trees**	• Tree planting shall be done in compensation at least one tree cut with 3 trees along the road side if the space available or find the suitable locations of project affected area with the approval of PIC • Identification of the suitable nurseries with native species for the tree planting process with the consent of DOFC • Planting of trees should be carried out with close coordination of DOFC with participation of local communities/ CBO • Proper maintenance of planted saplings for a minimum of 3 years	Throughout the project roads	To be included under the Contractors' cost	Contractor	PIU, PIC
C: Post construction and Operational stage						
1	**Hydrology and drainage**	• Rooting maintenance, repairing, removal of sediments and rubbish to avoid drainage congestions and obstruction to storm water flow.	All the drainage structures of project roads	Maintenance cost	During the maintenance period by Contractor after handed over by RDA, PRDA, LAs UC or MC	PIU/RDA
2	**Air quality and noise**	• Construction of noise and dust barriers to the required location • Enforcement of speed limits, traffic rules/ regulations and installation of sign boards to the particular locations.	All the project roads	Maintenance cost	During the maintenance period by Contractor after handed over by RDA, PRDA, LAs UC or MC	PIU/RDA/ PRDA/ LAs /UC / MC
3	**Site restoration**	• Restoration of borrow pits, crusher plants and quarry sites based on IML instructions of GS&MB. • Re-establishment of material storage yards, material processing plants and temporary constructed offices , labour camps and toilets to the original situation as per the agreement by the land owners	Temporary constructed labour camps and offices, Material extraction sites, storage yards	To be included under the Contractors' cost	Contractor	PIU/RDA/ PRDA/ LAs /UC / MC

4	**Maintenance of roads**	• Implementation of proper maintenance program after handed over by the contractor	All the project roads	Maintenance cost	RDA, PRDA, LAs UC or MC	PIU/RDA/ PRDA/ LAs /UC / MC
5	**Encroachment of ROW**	• Rooting checking and removal of unauthorized structures	All the project roads	Maintenance cost	RDA, PRDA, LAs UC or MC	PIU/RDA/ PRDA/ LAs /UC / MC
6	**Replanting of trees**	• Upkeep planted saplings for a minimum of 3 years until proper establishment in the ground • Survivability assessment should be carried out by the Contractor and need report to PIU regarding the status of compensatory tree plantation • Supplementary sapling should be implanted for dead plants	All replanted areas	To be included under the Contractors' cost	During the maintenance period by Contractor after handed over by RDA, PRDA, LAs UC or MC	PIU/RDA/ PRDA/ LAs /UC / MC

APPENDIX 7: SAMPLE ENVIRONMENTAL MONITORING CHECKLIST FOR RURAL AND NATIONAL ROADS

No	Action of the Project	Mitigation Measures	Location	Compliance status	Corrective actions if any
A: Design and Pre construction stage					
01	**Land acquisition**	• Land acquisition will not be involved for the project except realignment of bends or construction of cross drainages in several locations based on the design requirements • If land need from the public, negotiation with property owners will be carried out with involvement of third party • All effort will be made to avoid land acquisition for the project	Several project roads		
02	**Selection of temporary use lands**	• Effort shall be taken to minimize use of temporally land for the construction activities • Selection of temporary lands with considering of social and environmental background adhering to laws and regulations in the county • Approval for the temporally use lands shall be obtained from Engineer and need to sign agreement with the land owners.	Throughout the project roads if need to use temporary lands		
03	**Removal of trees**	• Effort shall be taken to minimize removal of road side trees • No removal of religious and cultural important trees and avoid removal of trees from temporary use lands • Removal of tree should be based on the final design of the roads • Preparation of inventory prior to removal of potential trees and permission shall be taken from DS for removal • Remove trees shall be handed over to Timber cooperation or rightful owners • Provision shall be made to additional compensation tree planting program with native species • Organizing of tree planting program in compensation at least one tree cut with planting 3 trees • Tree planting should be done where ever possible with the help of DOFC, DS in the area, CBOs, NGOs etc.	Throughout the all project roads		

04	**Shifting of public utilities**	• Proper utility survey shall be carried out in order to identify the effected utilities and the exact locations • Consent & action shall be obtained from relevant service providers (CEB, NWS&DB, and SSLT) to minimize time and the duration of utility disruption • Approval shall be obtained from DOI for any proposed construction works on Irrigation canals • Advance notice to the public about time and the duration of utility disruption • Use of well trained and experienced machinery operators for the shifting/reestablishment of utilities to minimize accidental damage and functional purposes • Special attention shall be taken to provide relevant services to the public without long delay. • Water and other utilities shall be provided to the public if long delay to reestablish services with the instruction of PIC	Throughout the project roads: if those facilities are available and need to shifted for improvement activities		
05	**Impact to the public properties**	• Construction activities are restricted to the existing ROW, no impact to the road side properties • Religious and culturally important structures within ROW will not be affected due to project activities • Action should be taken to minimize impact to the common properties within ROW	Throughout the project roads: if public properties are available		
06	**Hydrology and drainage**	• Design of new culverts and other drainage structures by considering hydrological investigation report and consultation with Department of Irrigation and Provincial Irrigation Department • Provision of adequate drainage facilities to the inundation and flood prone locations • Temporary diversion of water ways during construction should be ensured that no obstruction to natural water flow. • Construction work affecting water bodies should be prevented and work should be scheduled during the dry season. • Excavation of beds of any streams, irrigation systems and other water resources should be avoided by the Contractor. • Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect downstream intakes.	All cross drainages, streams and Aru cross the rods, inundation and flood prone locations		

01	**Flood and inundation**	• Construction activities should be scheduled to avoid flood and inundation as a result of construction e.g. blockage of drainage path • Construction should minimize during the rainy season and drains should keep clean all the time without any obstruction. • Increase height of embankment in flood prone and inundation sections, construction of new culverts and other cross drainages as required to above locations • If flood and inundation cause due to negligence of the contractor, contractor should rectify all the damages with his own cost	Throughout the project roads, special attention to flood prone and inundation sections		
02	**Extraction of construction materials**	• Suitable quarry sites, sand mines and borrow pits shall be identified at the initial stage within project influence area • Use existing licenses quarries and borrow pits which are approved by the GSMB and CEA as much as possible • Prior approval should be obtained from GS&MB/CEA for new quarries/borrow pits or sand mines • Use alternative sources for river sand such as sea sand and screen crusher fines with the consent of PIC • Quarries and borrow pits should not be located in productive agricultural lands, environment and public sensitive areas • Restoration of borrow pits and quarry sites once after extraction based on IML instructions of GS&MB	Throughout the project area including Identified material extraction sites for the project		
03	**Transportation and storage of construction materials**	• Lording of construction materials should not exceed the caring capacity of tucks • Materials shall be properly covered during transportation with no spillage • Lording, unloading and transport of materials shall not be inconvenient to the road side community or road users • Selection of sites for stock piling with the approval of PIC away from environment and public sensitive locations • Storage of fuel, lubricant and chemicals use for the construction activities on paved surface without contamination to the	Throughout the project area including Identified material extraction sites, transportation roads, stockpiling yards		

		environment and storm water runoff • Approval shall be taken prior to use of local roads from relevant authorities and need to maintenance during the use by the Contractor			
04	**Establishment of construction camp, offices and other temporally facilities**	• Labour camps and other temporally facilities should be located away from water bodies, residential and environment sensitive areas. • Provision of proper drainage facilities to the labour camps and prevent breeding of mosquitoes, flies and other vector borne diseases. • Provision of proper sanitary facilities to the labour camps offices and other temporally facilities including water, urinals, toilets bathing facilities, mosquito nets with adequate capacity of septic tanks and soak pits. • Handling and disposal of domestic solid waste in acceptable manner without contamination of surrounding environment with consultation of Local authorities. • Provision of first aid facilities and health care facilities to the labour camps offices and other temporally facilities Provision of garbage bins to labour camps, construction sites and those should be dumped regularly in a hygienic manner.	Throughout the project area including labour camps, offices, other temporally facilities		
05	**Impact to the ground and surface water quality and quantity**	• Temporary storage of material should be done in approved sites by the Engineer where natural drainage is not disturbed. • Construction activities effecting the quantity of water sources should be carried out during the dry season • All toxic and hazardous materials should be sited at least 500m away from water bodies and should prevent their entering into these locations. • Water that contaminate with fuel, oil and grease should not be directly released to storm water or natural water drainage system. • Vehicles and equipment used for the construction activities should be maintained in good condition, ensuring no undue leakage.	Throughout the project roads including streams, Aru, marshlands, wetlands, community and public wells		
06	**Soil erosion, sedimentation and siltation**	• Construction activates: excavation and earth work around vulnerable area for soil erosion, inundation and flood prone mainly restricted to the dry season and removal of green cover	Throughout the project area including temporally use		

		vegetation of above locations shall be minimized • Temporary soil dumps should be removed from the construction sites and top soil shall be prevented to use for tree planting or turfing activities • Use of erosion control measures to the particular locations; ripraps, fiber mats, planting of deep rooted grasses, shrubs or other suitable plant species • Proper drainage facilities shall be established to the construction sites, material stock piling sites and dumping sites to drain water to the law laying areas • Silt traps shall be placed to the erodible locations specially construction sites of bridges and culverts • Temporally land use for the construction relate facilities should be reestablished to its original status before handover to rightful owners	lands for the project		
07	**Contamination of soil**	• All the vehicles, machineries and other equipment shall be serviced only in vehicle surviving yards • Oil soaking materials shall be used to the places where possible leakage • Collected waste oil and soaking materials shall be correctly stored and disposed to the approved location • Oil traps should be provided to the vehicle surviving yards and fuel pilling points • Fuel and lubricant should be properly stored in impervious surface with collecting point of spills	Throughout the project area including temporally use lands for vehicle surviving yards and fuel storage		
08	**Impact on biodiversity**	• Awareness programs should be organized for the workforce about conservation of important terrestrial & aquatic habitats with their flora and fauna. • Construction activities near forested areas, elephant habitats or around migration paths should be carried out under the instruction of DOFC and DWLC. • Material extraction sites, processing plants and waste disposal sites should not be located around above locations. • Construction activities around these locations should be limited to daytime and completed within short period of time. • No introduction of invasive alien species to the project area due	Around environment sensitive, ecological important and forested areas		

		to construction and other related activities. • Avoid removal of religious, cultural and aesthetic important trees as well as removal should not be impacted to the breeding season of birds, important roosting sites of mammals and other species of fauna			
09	**Construction debris and wastes**	• Selection of unproductive lands for disposal sites with adequate capacity away from public and environment sensitive locations • Excavated materials from the construction shall be re used to backfilling with the approval of PIC • Top soil 20 to 25 cm depth should be stored in properly for tree planting and turfing • Debris, residual spoil & dismantled & demolished structures should not be sited to the agricultural lands, irrigation canals, flood prone locations, water bodies and wetlands or to the marshy areas. • All debris and residual spoil materials including left earth should be disposed to the location approved by the LAs.	Throughout the project area including Identified disposal yards		
10	**Traffic management and road safety**	• Traffic Management Plan should be implemented to required location based on daily traffic volume with close coordination of local police • Insolation of traffic warning signs, temporary traffic lights, or flagmen at the construction site or location of road diversion • Since number of proposed roads under the project cross the railway line in different locations warning signs shall be provided both side of the railway crossing • Road furniture including footpaths, crash barrier, traffic signs, speed limits, pavement markers, center line etc., should be provided to the essential locations with the improvement of roads • Stage construction or provision of safe convenient passage to the vehicles/ passengers and livestock from the road side during the construction • Avoid/limit peak hours for transportation of construction materials, movement of heavy vehicles through urban and other public sensitive areas and use of alternative roads to	Throughout the project roads		

		avoid traffic congestion			
11	**Air Quality**	• Sprinkling of water in material extraction sites, processing plants and construction area as well as, road which use for the transportation of construction materials in regular intervals • Dust extraction unit should be fitted to the construction vehicles equipment and plants (Crushers, Asphalt, Concrete & Batching plants) • Materials shall be properly covered during transportation and proper storage to ensure protection from dust and other emissions • Regularly maintenance of construction vehicles, equipment and machineries to meet National Emission Standards • Erection of dust barriers to the public, religious and other social important locations • Metal quarries, crushers and all the plants should be located at least 500m from public sensitive and residential areas	Throughout the project roads including public sensitive locations		
12	**Noise and Vibration**	• Implement of Noise Control Regulations for construction equipment, machineries and plants (Crushers, Asphalt, Concrete & Batching plants) • Construction activities that create noise should be limited to day time from 6.00am to 6.00pm and no work during night time specially around residential and public sensitive locations • Special approval should be obtained from CEA for night time work through PIC • Exhaust silencers should be fitted to heavy construction equipment (Loaders, Compactors, Cranes & Plants), limit the noise less than 75db • Regularly maintenance of all construction vehicles, equipment and machineries to limit generate of excess noise and vibration • Contractor should be taken proper action to safeguard road side properties due to vibration of construction equipment and machineries	Throughout the project road including public sensitive locations		
13	**Occupational Health and Safety**	• Organize awareness programs about personal safety of workers with proper briefing and training on safety precautions. • Provision of Personal Protective Equipment (PPE) high visibility jackets for night time work with necessary lighting arrangements. • Providing firefighting equipment to the construction sites and arrangement of the workshop and training program about use	Throughout the project roads		

		of firefighting equipment in emergency situation • Regular inspection of construction sites and other related locations to ensure use of proper PPE by workforce and their safety. • Arrangement of first aid facilities to the all construction sites, trained paramedical personal and transport facilities for emergency situation. • Organize awareness program of STD/HIV/ AIDS for the work force to avoid risk of speeding STD.			
14	**Planting of trees**	• Tree planting shall be done in compensation at least one tree cut with 3 trees along the road side if the space available or find the suitable locations of project affected area with the approval of PIC • Identification of the suitable nurseries with native species for the tree planting process with the consent of DOFC • Planting of trees should be carried out with close coordination of DOFC with participation of local communities/ CBO • Proper maintenance of planted saplings for a minimum of 3 years	Throughout the project roads		
1	**Hydrology and drainage**	• Rooting maintenance, repairing, removal of sediments and rubbish to avoid drainage congestions and obstruction to storm water flow.	All the drainage structures of project roads		
2	**Air quality and noise**	• Construction of noise and dust barriers to the required location • Enforcement of speed limits, traffic rules/ regulations and installation of sign boards to the particular locations.	All the project roads		
3	**Site restoration**	• Restoration of borrow pits, crusher plants and quarry sites based on IML instructions of GS&MB. • Re-establishment of material storage yards, material processing plants and temporary constructed offices , labour camps and toilets to the original situation as per the agreement by the land owners	Temporary constructed labour camps and offices, Material extraction sites, storage yards		
4	**Maintenance of roads**	• Implementation of proper maintenance program after handed over by the contractor	All the project roads		
5	**Encroachment of ROW**	• Rooting checking and removal of unauthorized structures	All the project roads		
6	**Replanting of trees**	• Upkeep planted saplings for a minimum of 3 years until proper establishment in the ground • Survivability assessment should be carried out by the Contractor and need report to PIU regarding the status of	All replanted areas		

		compensatory tree plantation • Supplementary sapling should be implanted for dead plants			

APPENDIX 8: STANDARD ENVIRONMENTAL MONITORING PLAN FOR RURAL AND NATIONAL ROADS

Environmental component	Project Stage	Parameters	Frequency	Standard	Unit cost	Total Cost	Responsibility	
							Implementation	Supervision
Air Quality	Design stage	TSPM, PM_{10}, NO_2 , CO, So_2 , Pb	A single time	National Air Quality Standers of Sri Lanka	Rs. 22000.00	Rs. 22000.00	RDA/PRDA by engaging approved monitoring agency of GoSL	CEA
	Construction stage	TSPM, PM_{10}, NO_2 , CO, So_2 , Pb	Three times per year/ two years	National Air Quality Standers of Sri Lanka	Rs. 22000.00	Rs. 132000.00	Contractor by engaging approved monitoring agency of GoSL	CEA/ RDA/PRDA
	Operation	TSPM, PM_{10}, NO_2 , CO, So_2 , Pb	Single time Per year/ 3 years	National Air Quality Standers of Sri Lanka	Rs. 22000.00	Rs. 66000.00	By RDA/PRDA, by engaging approved monitoring agency by GoSL	CEA
Water Quality	Design stage	EC, pH, DO, TSS, BOD, Oil and grease, Lead, E. Coli	A single time	National water Quality Standers	Rs. 8500.00	Rs. 8500.00	RDA/PRDA by engaging approved monitoring agency of GoSL	CEA
	Construction Stage	EC, pH, DO, TSS, BOD, Oil and grease, Lead, E. Coli	Three times per year/ two years	National water Quality Standers	Rs. 8500.00	Rs. 51000.00	Contractor by engaging approved monitoring agency of GoSL	CEA/ RDA/PRDA
	Operation stage	EC, pH, DO, TSS, BOD, Oil and grease, Lead, E. Coli	Single time Per year/ 3 years	National water Quality Standers	Rs. 8500.00	Rs. 25500.00	RDA/PRDA by engaging approved monitoring agency of GoSL	CEA

Noise	Design Stage	dB levels	A single time	National Environmental Noise Control Regulations	Rs. 4200.00	Rs. 4200.00	RDA/PRDA, by engaging approved monitoring agency of GoSL	CEA
	Construction Stage		Three times per year/ two years	National Environmental Noise Control Regulations	Rs. 4200.00	Rs. 25200.00	Contractor by engaging approved monitoring agency of GoSL	CEA/ RDA/PRDA
	Operation stage		Single time Per year/ 3 years	National Environmental Noise Control Regulations	Rs. 4200.00	Rs. 12600.00	RDA/PRDA, by engaging approved monitoring agency of GoSL	CEA
Total						**Rs. 347000.00**		

TSPM: Total Suspended Particulate Matter
CO: Carbon Monoxide
EC: Electrical Conductivity
BOD: Biological Oxygen Demand
CEA: Central Environment Authority
Development Department

PM_{10}: Particulate Matter < 10
So_2: Sulphur Dioxide
DO: Dissolved Oxygen
E. Coli: Escherichia coli
RDA: Road Development Authority

NO_2: Nitrogen Dioxide
Pb: Lead
TSS: Total Suspended Solids
pH: Potential of hydrogen
PRDA: Provincial Road