Environmental Management and Monitoring Report

March 2016

June – December 2015

SRI: Integrated Road Investment Program

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

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Ministry of Higher Education & Highways

Road Development Authority

Asian Development Bank Funded

Integrated Road Investment Program

iROAD – Southern Province

ADB Loan No - 3171

ANNUAL ENVIRONMENT MONITORING REPORT

JUNE – DECEMBER 2015

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MGC-ECL (JV)

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Ministry of Higher Education & Highways
Road Development Authority

MGC - ECL JOINT VENTURE

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LIST OF ABBREVIATIONS

ADB Asian Development Bank
AIDS Acquired Immunodeficiency Syndrome
ARE Assistant Resident Engineer

CEA Central Environmental Authority
CRCs Conventional Road Contracts
CSD Context Sensitive Design

DE Design Engineer
DPM Deputy Project Manager

EARF Environmental Assessment and Review Framework
ECOP Environmental Code of Practice
EMAP Environmental Management Action Plan
EMC Environmental Monitoring Checklist
EMP Environmental Management Plan
EO Environmental Officer
ES Environmental Specialist
ESDD Environmental & Social Development Division

FFPO Fauna & Flora Protection Ordinance

GAP Gender Action Plan
GIS Geographical Information System
GND Grama Niladari Division
GoSL Government of Sri Lanka
GRM Grievance Redress Mechanism

HIV Human Immunodeficiency Virus

IA Implementation Agency
IEE Initial Environmental Examination
iROAD(SP) Integrated Road Investment Program Southern Province

LARP Land Acquisition and Resettlement Plan

ME Material Engineer
ME&RE Ministry of Environment & Renewable Energy
MMF Multi-tranche Financing Facility
MOHEH Ministry of Higher Education & Highways
MOHPS Ministry of Highways, Ports and Shipping

NEA National Environmental Act

OPRC Output & Performance Based Road Contracts

PAA Project Approving Agency
PE Project Engineer
PIC Project Implementation Consultants
PIU Project Implementation Unit
PLE Planning Engineer
PM Project Manager
PPT Power Point Presentation
PRDA Provincial Road Development Authority
PS Pradeshiya Sabha

RDA Road Development Authority
RE Resident Engineer
RF Resettlement Framework
RRDSE Rural Road Design & Safety Engineer
RSA Road Safety Audits

SE Site Engineer
SGRS Social Gender Resettlement Specialist
SLRM Sri Lanka Resident Mission
SO Safety Officer
SPS Safeguard Policy Statement

TL Team Leader
TO Technical Officer
TOR Terms of Reference

Introduction

1. INTRODUCTION

1. 1 Project Background

The Asian Development Bank's (ADB) **Multi tranche Financing Facility** (MFF) for the **Integrated Road Investment Program** (iROAD), provides loans to Sri Lanka in an aggregate amount of up to $800 million equivalent. The Government of Sri Lanka (GoSL) will provide counterpart financing of $106 million for feasibility study and engineering, tax and duties, and part of the contingency. The MFF will comprise a series of loans, to improve the access routes between rural areas and socioeconomic centers, in tranches. The investment program comprises five projects to be implemented between 2014 and 2024. Project 1 is in Southern Province with an estimated cost of $235 million. Tranche 1 is financing the first slice of project 1 in Southern Province amounting to $118 million, with ADB financing $100 million and GoSL providing the balance $18 million in counterpart funds.

The Loan 3171-SRI and project agreements for Tranche 1 became effective on 07 January 2015. Project 1 Slice 1 in Southern Province will improve and maintain 560 Km of rural access roads, including 510 Km of local roads and 50 km of provincial roads and a further 20 km of national roads. The rural access roads will be improved to all-weather standards, and be maintained for three years. The national roads will also be improved, and maintained for three years. The national roads will connect the rural access roads to adjacent socio-economic centers.

1. 2 Conventional Road Contracts (CRCs)

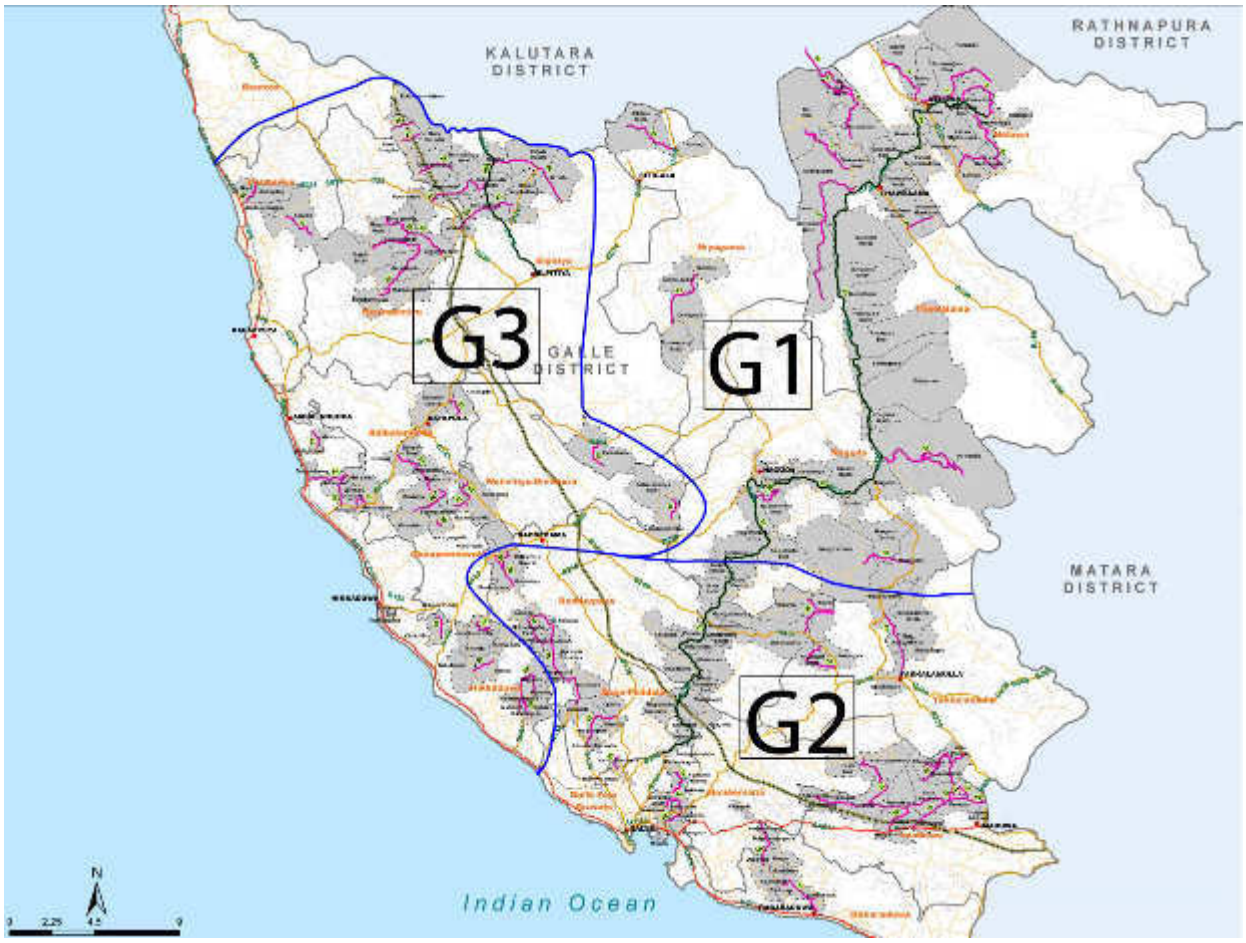
The 560 Km of rural roads and 20 Km of national roads covering the districts of Galle, Matara and Hambantota have been packaged in to three Contract Packages in each district resulting in a total of nine Contract Packages in Southern Province.

The three (3) CRCs in Galle District are listed in Tables 1-3. The local roads have been identified as Provincial Road Development Authority (PRDA) or Pradeshiya Sabha (PS) and the national roads as Road Development Authority (RDA).

Table 01. CRCs in Galle District

No.	Contractor	Accepted Contract Amount (LKR)	Commencement Date	RDA (Km)/ (nos.)	PRDA (Km)/ (nos.)	PS (Km)/ (nos.)	Total (Km) /(nos.)
G1	K. D. Ebert & Sons Holdings(Pvt) Ltd	1,458,055,706.14	18.05.2015	-	6.2/1	57.4/14	63.6/15
G2	K. D. A. Weerasinghe & Co(Pvt) Ltd	1,483,136,252.40	18.05.2015	-	13.0/3	48.8/19	61.8/22
G3	K. D. A. Weerasinghe & Co(Pvt) Ltd	1,733,440,933.20	18.05.2015	9.5/1	7.0/2	55.2/26	71.7/29
Sub Total Galle District		**4,674,632,891.74**	-	**9.5/1**	**26.2/6**	**161.4/59**	**197.1/66**

The locations of the 197.1Km (66 nos.) roads in Galle District are shown in **Map 1**.



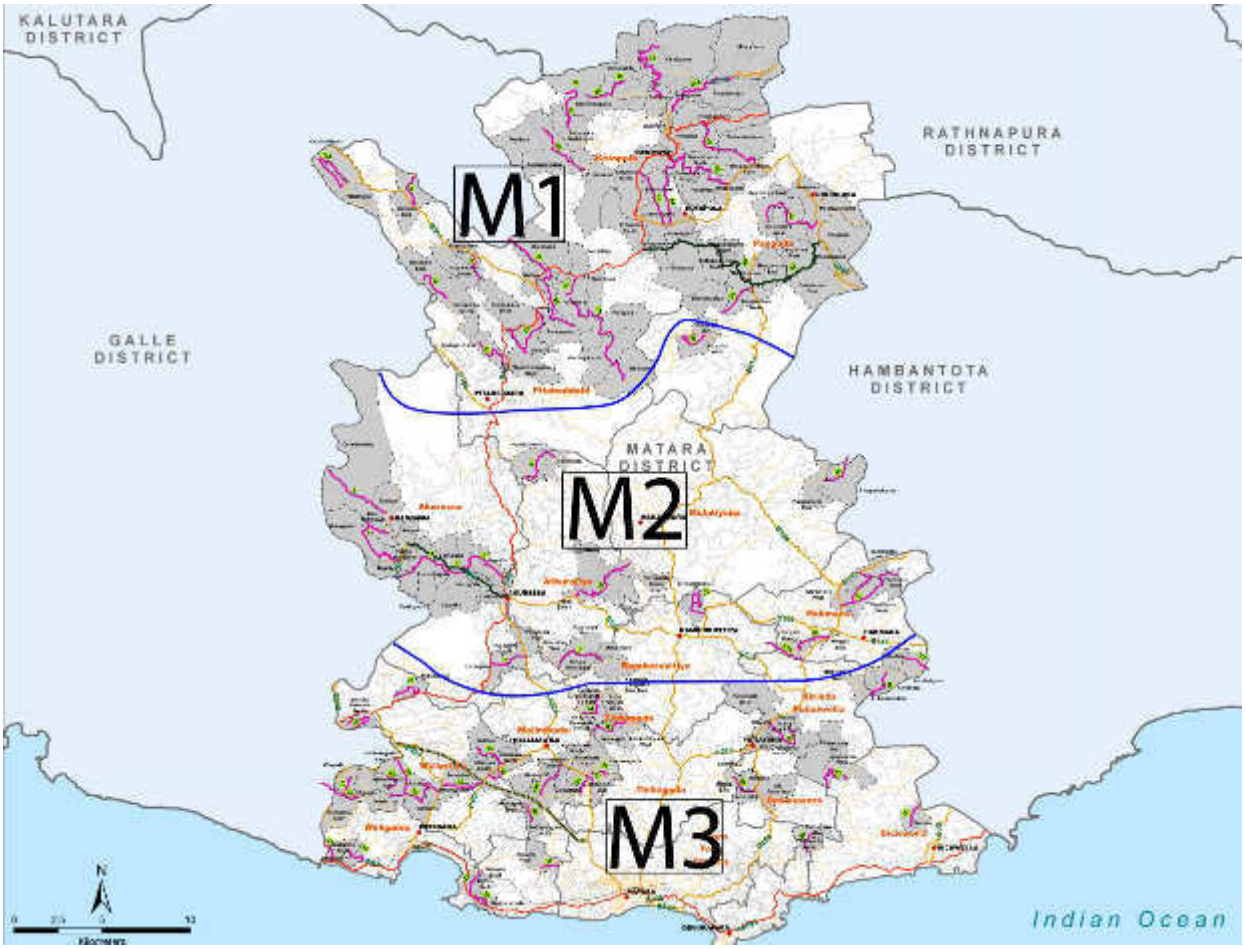
Map 01. Locations of 197.1Km (66 nos.) roads in Galle District.

The three (3) CRCs in Matara District are listed in Table 2.

Table 02. CRCs in Matara District

No.	Contractor	Accepted Contract Amount (LKR)	Commencement Date	RDA (Km)/ (nos.)	PRDA (Km)/ (nos.)	PS (Km)/ (nos.)	Total (Km) /(nos.)
M1	CML-MTD Construction Ltd	2,315,346,953.44	18.05.2015	6.3/1	29.7/5	60.9/16	96.9/22
M2	K. D. Ebert & Sons Holdings (Pvt) Ltd	1,803,301,712.60	18.05.2015	7.0/1	4.7/1	54.0/18	65.7/20
M3	K. D. Ebert & Sons Holdings (Pvt) Ltd	1,207,599,780.58	18.05.2015	-	2.3/1	52.6/24	54.9/25
Sub Total Matara District		**5,326,248,446.62**	**-**	**13.3/2**	**36.7/7**	**167.5/58**	**217.5/67**

The locations of 217.5Km (67 nos.) roads in Matara District are shown in **Map 2**.



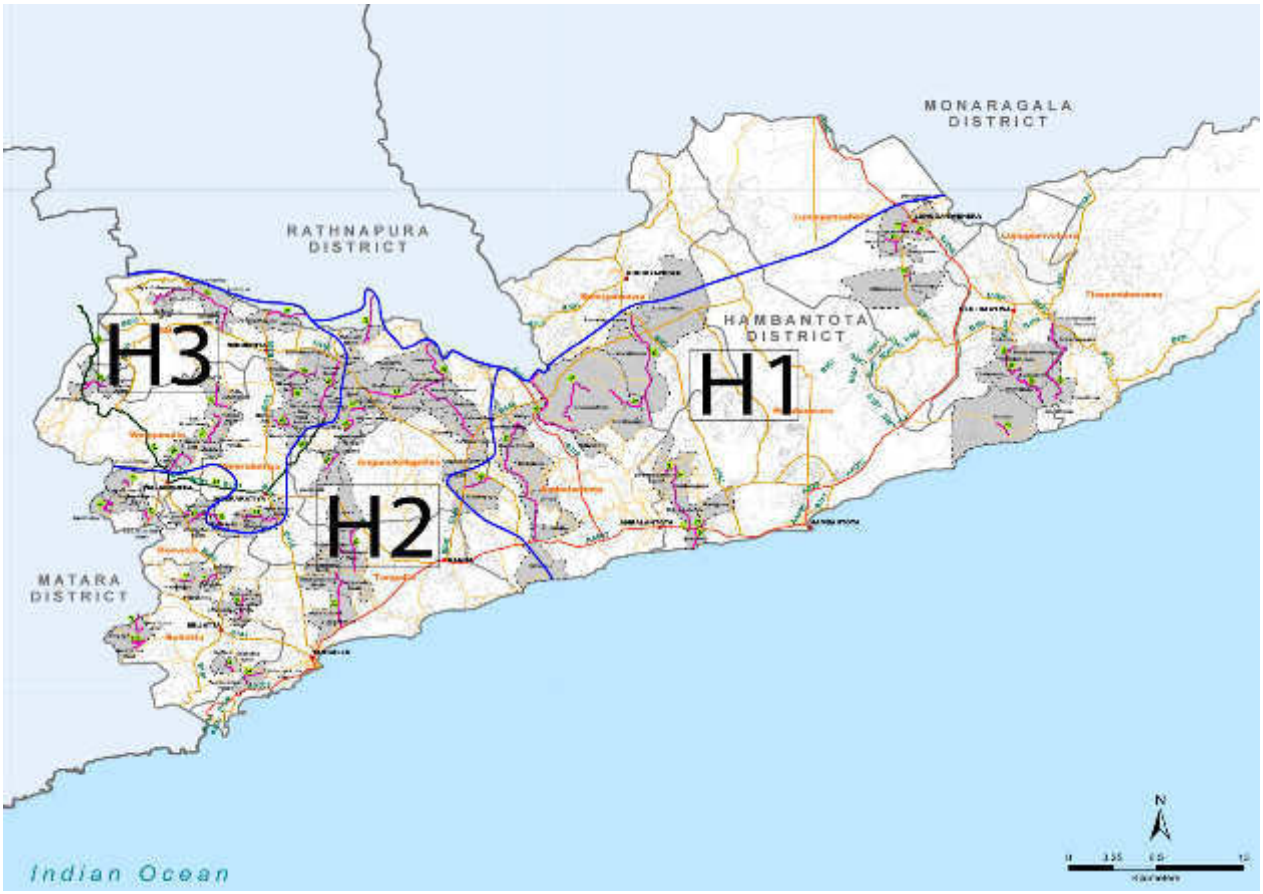
Map 02. Locations of 217.5Km (67 nos.) roads in Matara District.

The three (3) CRCs in Hambantota District are listed in Table 3.

Table 03. CRCs in Hambantota District.

No.	Contractor	Accepted Contract Amount (LKR)	Commencement Date	RDA (Km)/ (nos.)	PRDA (Km)/ (nos.)	PS (Km)/ (nos.)	Total (Km) /(nos.)
H1	K. D. A. Weerasinghe & Co (Pvt) Ltd	1,583,594,552.40	18.05.2015	-	15.7/2	55.2/18	70.9/20
H2	CML-MTD Construction Ltd	1,803,301,712.60	18.05.2015	-	-	58.6/18	58.6/18
H3	RR Construction (Pvt) Ltd	1,207,599,780.58	18.05.2015	-	-	41.4/14	41.4/14
Sub Total Hambantota District		**4,594,496,045.58**	**-**	**-**	**15.7/2**	**155.2/50**	**170.9/52**

The locations of 170.9Km (52 nos.) roads in Hambantota District are shown in **Map 3.**



Map 03. Locations of 170.9Km (52 nos.) roads in Hambantota District.

1.3 Objectives and Outline of the Project

The broad objective of this project is to improve the existing road surface to all-weather road surface in rural areas of Sri Lanka, so that rural population can be conveniently involved in the nationwide economic and social development.

Project 1 in Southern Province includes three components:

(a) Improvement of 560 Km of rural access roads to all weather standards and 20 Km of national roads, and maintained for a period of three years, under nine CRC. Further 110 Km of national road corridor will be improved and maintained for a period of seven years, under two Output and Performance Based Road Contracts (OPRC).

(b) Capacity development: This includes building the capacity of road agencies, including Ministry of Higher Education and Highways (MOHEH), Road Development Authority (RDA) and provincial and local road agencies, on road asset management, project management, and contract administration.

(c) Project preparation: This includes surveys, feasibility study, and engineering design for projects to be financed in the following tranches.

1.4 Environmental Safeguard Compliance Monitoring Complying with Environmental Assessment Review Framework (EARF)

Environmental safeguard is one of the major compulsory component of the iROAD(SP) project and the EARF has been prepared to guide selection, screening, categorization, impact assessments, project implementation and monitoring of environment safeguards according to requirements of the GoSL as well as the ADB Safeguard Policy Statement (SPS) for succeeding tranches and their project roads under the investment program. Following requirements must be fulfill in the as the part of the project;

1. The National Environment Act (NEA) No. 47 is the key environmental policy framework which is administered through the Central Environment Authority (CEA) of the Ministry of Environment and Renewable Energy (ME&RE).

2. Ensure that the Project is complying with ADB's SPS (2009) (TOR 15b (ii)) & EARF for the iROAD project.

3. Assist and guide the Implementing Agency (IA) to ensure compliance of environmental and social safeguards (TOR 15b (ii)).

4. If required, collect baseline data to prepare a Land Acquisition and Resettlement Plan (LARP) and other impact assessments carried out in accordance with ADB's SPS (2009) and relevant laws and regulations of the host country (TOR 15 b (iii), (iv) & (v).

5. If land donation is necessary, assist IA to prepare and supervise the implementation of the land donation and title transfer process as per Resettlement Framework (RF) (TOR 15 b(iii), (iv) & (v)) .

6. Help the Government in establishing a Grievance Redress Mechanism (GRM) and in its proper functioning and management (TOR 15b (vi)).

7. Monitor the implementation of gender action plan and ensure activities are carried out as planned and relevant baseline and monitoring database collected (TOR 15b (vii)).

8. Carryout the following duties related environmental safeguard: (a) ensure that all the environmental mitigation measures required to be implemented are incorporated in the Contract documents; (b) supervise and monitor the implementation of Environmental Management Plan (EMP); and (c) in the event of occurrence of any unexpected environmental impacts, coordinate with the Contractor and Employer to ensure that necessary mitigation measures are implemented; (d) provide technical advice to the Contractors, if necessary; (e) prepare periodic monitoring reports monthly and annually and submit to IA; and (f) facilitate grievance redress in the case of environmental related issues (TOR 15b (viii)).

9. Monitor Contractors compliance with and performance of required actions regarding Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS), human trafficking and labour core standards in accordance with the contract documents, such as awareness and education of labourers and workers (TOR 15b(vii) & (ix)).

1.5 Introduction of Context Sensitive Design (CSD) and Its Applications

The PIC has identified a gap in working knowledge of usage of Transect Walk and Context Sensitive Design, in the design and environmental staff engaged by Contractors of the nine CRC Packages. This was also well highlighted during the ADB Fact Finding Mission of 27 July to 07 August 2015.

As an immediate remedial measure two Safeguard Workshops have been held for PIC, RDA and Contractor's site staff to increase the awareness of utilizing the Transect Walk data, CSD process and safety requirements both at design and construction stages, including Road Safety Audits (RSA). The resource persons were Safeguard Specialists from ADB Sri Lanka Resident Mission (SLRM), Environmental and Social Development Division (ESDD) /RDA and PIC (annex 01).

Although the concept of public consultation has been done during road design and road construction, the concept of Context Sensitive Design (CSD) was new to the Project Implementing Unit (PIU), Project Implementing Consultant (PIC) and contractors mobilized in Southern Province under Tranche 1 (T1) of iROAD. Awareness creation on transect walk, focus group discussions, one on one interviews as means of public awareness about the project was considered important to the staff of Project Implementation Unit (PIU), PIC and contractors. At the same time it was important to see that the information collected during transect walks, one on one interviews, focus group discussions and through Environment Code of Practice (ECOP) checklists were considered in detailed designs.

With mobilization of PIC1 in Southern Province (SP) it was decided to conduct a series of awareness workshops mainly on the concept of CSD targeting professionals within PIU, PIC and Contractor. It has been Six workshops organized by PIC1 targeting various professional staff of PIU, PIC and contractors (Table 04) (Pictures 02-07).

Objectives of the Workshops

- Create awareness on CSD including methods used to collect data and how data to be best incorporated in to designs,
- Create awareness on public consultation and information dissemination,
- Create awareness on GRM and gender aspects, Gender Action Plan(GAP) for the project,
- Cerate sensitivity among staff of PIU, PIC and contractor on environmental impacts (including social impacts) of road construction.

Date, Location and Target Audience of Each Workshop

Workshops were held in Galle, Weligama and Matara in Southern Province. Below table 04 summarizes the dates on which the workshops were held, target audience.

Workshop Special Events

During the fourth workshop the design engineer of each contract package was requested to do a presentation on how they have incorporated details available in transect walk records, ECOP checklists in to design and information on any additional data which were collected through public during detailed designs. The workshop also had two group work activities.

Group work - activity 1

The audience was divided in to three groups representing the three districts (Galle, Matara and Hambantota).

Details of Transect walk records, ECOP checklist and video of a sample road taken from one district (each for Galle, Matara and Hambantota) were given to each group.

And each group was instructed to identify;

1. Need for any road widening (need justification if there is such requirement).
2. Locations where vegetation may need to be removed (need justification if there is such requirement).
3. Locations where drainage improvements may be required.
4. Location where road safety measures may be required.
5. Possible cross section which will suit best for the road.

Each group was allocated 10-15 minutes to do a power point presentation followed with a discussion.

Group work - activity 2

The audience was divided in to three groups representing the three districts (Galle, Matara and Hambantota).

Same sample road used in activity 1 was given to each group to identify;

1. Attributes related to the sample road (and impact/s).
2. Mitigation measure/s identified with location details.
3. Level of compliance by contractor.
4. Any additional measures suggested.

Each group was allocated 10-15 minutes to do a power point presentation followed with a discussion.

Group activity 1 was targeted to sensitize PIU, PIC and contractor staff (especially the design staff) on identifying information available in transect walk records, ECOP checklists and videos and incorporating them in to detailed design. The importance of keeping notes on why some suggestions made by public could not be included was also discussed during activity no. 1.

Group activity 2 focused on developing the Environmental Monitoring Checklists (EMC) and it targeted mainly the environmental staff of contractor.

Certificates were given to all participants as a means of motivation factor (Photo 04).

The fifth workshop the group activity was focused on the Technical Officers of PIC as they are directly working in the field and gets interacted with public.

Group work - activity 1

The audience was divided in to two groups. And each group was given details of Transect walk records, ECOP checklist and video of a sample road.

And each group was instructed to identify;

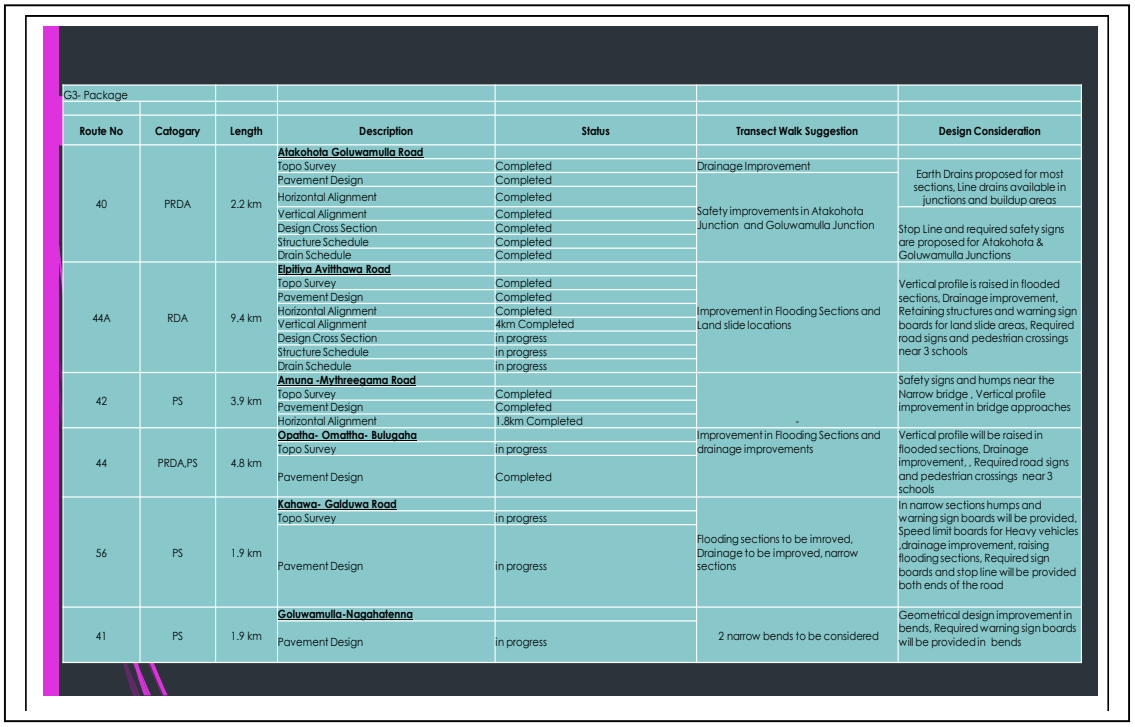
1. Locations where additional strips of land may be required (need justification if there is such requirement)
2. Locations where vegetation may need to be removed (need justification if there is such requirement)
3. Locations where drainage improvements may be required
4. Location where road safety measures may be required

Each group was allocated 10-15 minutes to do a power point presentation followed with a discussion.

Key Out Comes of the Workshops

1. The concept of CSD and its usefulness

During the initial two workshops it was clear that the design engineers of contractor and PIC were not much aware about the information available in transect walk records, ECOP checklists and Environmental Management Plans (EMPs). They were mostly doing the conventional method of road design. This situation changed after the 3rd workshop and now the design engineers and even technical officers are aware of the concept and it is being utilized (Please refer figures 1 and 2).



G3- Package

Route No	Catogary	Length	Description	Status	Transect Walk Suggestion	Design Consideration
40	PRDA	2.2 km	**Atakohota Goluwamulla Road**			
			Topo Survey	Completed	Drainage Improvement	Earth Drains proposed for most sections, Line drains available in junctions and buildup areas
			Pavement Design	Completed	Safety improvements in Atakohota Junction and Goluwamulla Junction	
			Horizontal Alignment	Completed		
			Vertical Alignment	Completed		Stop Line and required safety signs are proposed for Atakohota & Goluwamulla Junctions
			Design Cross Section	Completed		
			Structure Schedule	Completed		
			Drain Schedule	Completed		
44A	RDA	9.4 km	**Elpitiya Avitthawa Road**		Improvement in Flooding Sections and Land slide locations	Vertical profile is raised in flooded sections, Drainage improvement, Retaining structures and warning sign boards for land slide areas, Required road signs and pedestrian crossings near 3 schools
			Topo Survey	Completed		
			Pavement Design	Completed		
			Horizontal Alignment	Completed		
			Vertical Alignment	4km Completed		
			Design Cross Section	in progress		
			Structure Schedule	in progress		
			Drain Schedule	in progress		
42	PS	3.9 km	**Amuna -Mythreegama Road**		-	Safety signs and humps near the Narrow bridge , Vertical profile improvement in bridge approaches
			Topo Survey	Completed		
			Pavement Design	Completed		
			Horizontal Alignment	1.8km Completed		
44	PRDA,PS	4.8 km	**Opatha- Omattha- Bulugaha**		Improvement in Flooding Sections and drainage improvements	Vertical profile will be raised in flooded sections, Drainage improvement, , Required road signs and pedestrian crossings near 3 schools
			Topo Survey	in progress		
			Pavement Design	Completed		
56	PS	1.9 km	**Kahawa- Galduwa Road**		Flooding sections to be imroved, Drainage to be improved, narrow sections	In narrow sections humps and warning sign boards will be provided, Speed limit boards for Heavy vehicles ,drainage improvement, raising flooding sections, Required sign boards and stop line will be provided both ends of the road
			Topo Survey	in progress		
			Pavement Design	in progress		
41	PS	1.9 km	**Goluwamulla-Nagahatenna**		2 narrow bends to be considered	Geometrical design improvement in bends, Required warning sign boards will be provided in bends
			Pavement Design	in progress		

Figure 01. A PPT (a slide) done by a design engineer in G3 package explaining how they incorporate CSD in to their road designing component in workshop 04.

Figure 02. A PPT (a slide) done by a technical officer H2 package showed practical application of CSD in to one of their road considering conservation of a religious place in workshop 04.

2. Constant dialog with the people

It was evident that more public awareness and consultations are done by project engineers, PIC staff and contractor. The importance of recoding the outcomes of these dialogues was highlighted during the workshops. As a result there is an improvement in recording such information and including them in to design works.

3. Sensitizing the project staff in identification of road sections where additional land strips will be required with justification of such requirement. Creating more awareness among project staff on land donation process and consultation as per the requirements of Resettlement Framework (RF).

4. Developing the Environmental Monitoring Checklists

The formats for preparation of Environmental Monitoring Checklists were finalized including the environmental attributes that need to be monitored. Frequency in preparation of the monitoring checklists was also finalized and instructions were given to the contractor staff.

5. Establishment of GRCs and recording public complaints

Format for registering public complaints was introduced to contractor staff and responsibilities of project engineers, contractor's environmental officers in handling GRCs was cleared off during the workshops.

6. The workshops also created more sensitivity among project staff on environmental aspects and the need to sustain the environment (Picture 01).

Picture 01. Environmental officer of H2 package has rescued a snake.

Conclusion and Recommendations

• The workshops created a base to increase the sensitivity of PIU, PIC and contractor staff towards a project which is more environmentally & socially oriented.

• The design engineers were opened to a system of road design which will not strictly follow the design standards (to which they have been used to) but to come up with various design options that will best suit the ground situation.

• A key short coming of these workshops was that no handouts (at least of the presentations) were distributed among the participants. It is recommended that in future workshops such handouts will be distributed, especially the workshops that will be organized by the CSD team.

• As PIC1 coordinated all the workshops in southern province, it is recommended that the PIC establish a database with all presentations and workshop materials which could be accessed by any staff of PIU, PIC or contractor. This information could now be shared with other provincial staff of PIU, PICs and contractors.

• It is recommended that the language should not be a barrier for discussions and presentations. Methods should be used to improve the interactions between participants and presenters (this was effectively done by Mr. Somathilake- SGRS, during the workshop held on 21 October, 2015.

• It would be best if a certificate of participation is given as a motivation factor. This could be done in the future workshops conducted by CSD team.

• Future workshops presentations should include practical oriented titles with theory sections and case study examples.

Table 04. CSD workshops conducted for project staff.

Date	Title	Context discussed	Resource Persons	Target Audience	# of Participants
14.07.2015	Workshop on safeguard	1. Integrated investment program-SP Project overview 2. Context Sensitive Design & safeguards compliance. 3. Environment safeguards compliance monitoring. 4. Safety, health & environmental protection. 5. i Road project SP. 6. Concerning environment and safety at i Road.	Anil Perera, Saranga Gajasinghe, Malaka Wijesinghe, Roshan K Rodrigo, Lakmali Liyanage	REs, AREs, PMs ,DPMs ,DEs ,EOs ,SOs, SEs, PLEs & PEs	39
28.07.2015	i Road Project SP	1. Environmental safeguards for i Road. 2. i Road project in Sri Lanka. 3. Social safeguards. 4. Context sensitive design & safeguards.	Anil Perera, Aruna Nanayakkara, Crufo Bin, P. K. Kar, Dr. Deepak Kumar Tripathi, Subhash Nigam, Saranga Gajasinghe,	REs, AREs, PEs, PLEs PMs, DEs, MEs, EOs & SOs	41

			Jenifer Weerakoon		
29.07.2015	Workshop on safeguard	1. Environmental safeguards for I Road. 2. Evolving community participation in providing safe all weather connectivity to rural population in ADB funded iRoad project in Sri Lanka. 3. Social Safeguards. 4. Context Sensitive Design & safeguards compliance few examples.	P.K. Kar, Dr. Deepak Kumar Tripathi, Subhash Nigam & Saranga Gajasinghe	ES, PE's, PLE's, DE's, EO's SO's & Hyrologist	36
25.08.2015	Workshop for Awareness on Implementing Context Sensitive Design (CSD)	1. CSD knowledge gathered by contractors. 2. CSD in rural road design and lesson learn. 3. Environmental monitoring checklists. 4. GRC and its practicality.	Saranga Gajasinghe, Malaka Wejesinghe, Roshan K Rodrigo, Lakmali Liyanage.	TL, RE's, ARE's, SE's TOs, EO's, SO's & SGRS	64
21.10.2015	Workshop for Awareness on Implementing Context Sensitive Design (CSD)	1. i Road project and CSD. 2. Contextual sensitivity design adapted in all Packages – i Road Program-SP, done by contactor's EOs. 3. Environmental monitoring checklist. 4. EMC and its application for CSD. 5. Southern province aquatic life. 6. Lessons learnt on GRM.	Anil Perera, Saranga Gajasinghe, Somathilaka Kidelpitiya, Malaka Wejesinghe, Lakmali Liyanage, Amith Bandara,	EO's and TO's	41

			Roshan K Rodrigo		
20.11.2015	Training workshop on implementing context sensitive design.	1. CSD cross learning workshop. 2. Environmental safeguard. 3. Road safety aspects.	P. K. Kar, Dr. Deepak Kumar Tripathi, Subhash Nigam & Saranga Gajasinghe	TL, Res, AREs, ES, SGRS, Structural engineer, RRDEs, Monitoring officer, PEs, PLE, DPMs, EOs, SOs & Hydrologist	54

Picture 02. Mr. Anil Perera (TL) formally opened the 1st safeguard workshop.

Picture 03. Mr. Crufo Bin explaining the importance of safeguard in i Road.

Picture 04. Group activity on safeguard.

Picture 05. Certificate produced for Safeguard workshops.

Picture 06. Successful candidate obtained his certificate at safeguard workshop.

Picture 07. Dr. Deepak delivering his knowledge on environmental safeguard.

1. 6 Project Implementation and Environmental Safeguards

- National Environmental Act (NEA) & other related law policies.

The National Environment Act (NEA) No. 47 was the key environmental policy framework which was administered through the Central Environment Authority (CEA) of the Ministry of Environment and Renewable Energy (ME&RE). 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. The environmental clearance process was implemented through the designated Project Approving Agency (PAA) as prescribed by the Minister under section 23 Y of the NEA.

The iROAD(SP) project environmental clearance has been obtained from CEA and granted the permission for environmental clearance iROAD(SP) (annexure 06, CEA letter).

- ADB policy on environmental safeguard.

ADB's environmental safeguards aim to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. The SPS requires borrowers to identify project impacts and assess their significance.

EARF outlines procedures for the preparation of environmental assessment documents for a project to ensure environmental impacts are appropriately addressed and mitigated.

- Southern Province Environment and iROAD(SP) Project

The project was classified as environmental category B based on the ADB Rapid Environmental Assessment Checklist for roads and highways. This Initial Environmental Examination (IEE) report was prepared consistent with the ADB SPS 2009 and the Environmental Safeguards Compliance Manual of RDA. Key national environmental laws and regulations that guided the environmental assessment includes: National Environment Act (NEA) No. 47; Coast Conservation Act No 57 of 1981, National environmental protection and

quality regulations; 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 Ordinance (FFPO) 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; Buddhist Temporalities Ordinance No. 19 of 1931; and Antiquities Ordinance No. 9 of 1940, among other.

Roads for inclusion in projects under the investment program has been selected based on priorities for connecting select Grama Niladari Division's (GND) to the main trunk roads. The project roads were further subjected to the following screening criteria on environment safeguards:

(i) no project roads that cause significant environmental impacts that would trigger classification as an environment 'Category A' project in accordance with the ADB's SPS (2009) included;

(ii) No project roads falling in part or whole inside a protected area selected under the investment program;

(iii) Project roads falling adjacent to protected areas or eco-sensitive areas included only if there is no widening of the road "Right of Way" (ROW) or acquiring of land from the protected area or eco-sensitive area. For such project roads proper consultations held with the Department of Wildlife Conservation, local community and other relevant stakeholders and appropriate clearances or endorsements should be sought if required; the rehabilitation work of the 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.

A review of international agreements and conventions were Sri Lanka is a signatory was conducted to ensure compliance. These agreements are: Conventions on Wetlands of International Importance Especially as Water Fowl habitats (Ramsar), Convention concerning

the protection of the World Cultural and Natural Heritage, Convention on International Trade in Endangered Species of Wild Fauna & Flora (CITES), Convention on the conservation of Migratory Species of Wild Animals (CMS 1979), United Nations Framework Convention on Climate Change, Convention on Biological Diversity, and Plant Protection Agreement for Asia and the Pacific region.

1.7 Supervision and Responsibilities for Environmental Safeguard Implementation

The Project Implementation Unit (PIU) under RDA, MOHEH is responsible for overall conduction of environmental assessments, implementation and monitoring of environment safeguards for specific project roads under the investment program. Within RDA there is a separate unit, the Environment and Social Development Division (ESDD) to cover social and environment safeguards. ESDD was established in response to capacity building needs identified in earlier ADB projects such as the Southern Transport Development Project. This division comprises of approximately 7 environment safeguard officers and 9 social safeguard officers who are well experienced in implementing ADB projects. The division is responsible for developing manuals and guidelines, providing assistance in conduction of proper safeguard assessments, and implementation and monitoring of environment and social safeguards in accordance with environmental policies of GoSL and donor agencies.

However since ESDD is responsible for all projects under RDA and given the large scale of the investment program this division does not have adequate time and resources to implement and monitor safeguards for the investment program. Therefore, a separate safeguards team dedicated to the investment program will be created within the PIU for managing safeguards. ESDD was provided technical support and monitor the implementation of safeguards under the investment program on bi-annual basis as necessary.

The safeguards team was comprised of sufficient social and environment safeguards officers as necessary to cover the quantum and geographic distribution of works in all provinces under the investment program. The safeguards team supported by a team of environmental consultants under the Project Implementation Consultants (PIC) for daily monitoring of EMP implementation and compilation of monitoring checklists and reports.

A detailed safeguards training workshops conducted for the PIU, safeguards team, SAPE and PIC to clarify the roles and responsibilities of each party, method of consultation and record keeping and reporting requirements before the conduction of environmental assessment studies for each tranche. After the award of civil works contract and before the start of

physical works training workshops conducted for the PIU, safeguards team, PIC and contractor on roles and responsibilities of each party for Environmental Management Action Plan (EAMP) implementation and monitoring methods, record keeping and reporting requirements (Table 04). Thereafter other subject specific or on the job training organized by the PIU and PIC on a need basis.

1.8 Purpose of the Report

Environmental Assessment and Review Framework (EARF) which has been prepared during the **Project Preparatory Technical Assistance (PPTA)** sets out guidelines and procedures that need to be complied under environmental safeguards of the project. As section VII of EARF on "Monitoring and Reporting" it is required to prepare an annual monitoring report on the progress of environmental safeguards compliance of the project.

This report is prepared to serve as the annual monitoring report on environmental safeguards and the reporting period is from July to December 2015.

General Environmental Conditions of iROAD Project -SP

2. General Environmental Conditions of iROAD Project Southern Province

2.1 Physical Environment

Southern Province situated on major climatic zones of the country, roads are in Galle District located in low- and mid-country wet zones while project roads in Matara District are located within either wet zone or intermediate to mid- country intermediate zones. Furthermore road sections in Hambantota District are located in low- to mid- wet zone, low- to mid-country intermediate, and low-country dry zones.

Surrounding land use also differs with tea, rubber, and paddy dominating the landscapes of Galle and Matara while coconut, paddy, scrub, natural forest and rain fed rice are mostly seen in Hambanthota. Rainfall pattern in the Southern Province of Sri Lanka is influenced by two monsoons; southwest and northeast. The rainfall in the wet zone in which parts of Galle, Matara and Hambanthota districts are located is governed by southwest monsoon experiencing heavy rainfall from May to September. Dry zone in which a part of Hambanthota district falls is fed by the northeast monsoon and wet from December to February. In the dry zone, the period from May to September is generally dry however, localized sporadic rainfall events are possible during this period due to the effect of local convections.

2.2 Hydrology

The Benthara Ganga and Gin Ganga are the major streams that drain Galle District. The Wakwella and Usgoda in Baddegama Divisional Secretary Division are located within the Gin Ganga flood prone area and flood protection bunds have been constructed to protect these areas. There are 3 project roads that are located near the Gin Ganga and another 3 project roads near Benthara Ganga. The Nilwala Flood plain of the Nilwala River is the most hydrologically sensitive area in Matara District with a long history of flooding. The Nilwala River is the third longest river in Sri Lanka which originates from Rakwana hills, encompassing a catchment area of 960 Km^2 and empties to the sea at Thotamuna after crossing Matara Township. The Walawe Ganga and Kiridi Oya are major rivers which run through the Hambanthota District. Among them Kiridi Oya has a major impact to Magama road which

caused river bank erosion. This is caused by the water release from the Lunugam vehera reservoir.

A total of 145 project roads are located within or near natural and man-made drainage systems and are prone to flooding. There are 4 project roads that are located in the coastal zone, 3 are No. 64 of Galle district, 27 and 29 of Matara district and 12 of Hambanthota district.

2.3 Air Quality and Noise.

Majority of the project roads are located in rural areas where the air quality is better due to the lack of major air pollution sources. Still, there are short-term instances when the ambient air quality deteriorates due to vehicular emissions, fugitive dust from unpaved road travel, burning of forest patches for Chena cultivation (slash and burn cultivation), and use of wood and for cooking.

2.4 Ecological Environment

Ecologically sensitive areas that include forest reserves, national parks, sanctuary, managed elephant reserves, and coastal area are found along or near the project roads. In Hambantota District, the Boondala-Meda Para road (1.4 Km) is located within 100m of the Bundala National Park which provides foraging habitat and wintering grounds for migratory birds, the first wetland to be declared as a Ramsar site in Sri Lanka, designated UNESCO biosphere reserve, and also a known habitat of crocodiles. The Koggala - Sooriyawewa (7.3Km) road is adjacent to the Madunagala sanctuary where several endemic species are found like the Sri Lankan Grey hornbill (*Ocyceros gingalensis*), Sri Lankan Jungle fowl (*Gallus lafayetti*), Sri Lankan Spur fowl (*Galloperdix bicalcarata*), Sri Lankan Lorikeet (*Loriculus beryllinus*) and the Sirkeer Malkoha (*Phaenicophaeus leschenaultii*). The Piyapala Mawatha road (2.1Km) is adjacent to proposed Hambantota Managed Elephant Reserve (MER) whose boundaries are to be defined but know to harbour about 400 elephants. Sections of Denuwala - Kapuwatta Jaya Wijayagama road and Udupila Junction – Udupila Vihandagoda – Bandaramulla road,

Galduwa Aranya road, and Godawaya junction to temple road are located within the coastal zone and are prone to storm surge and coastal erosion. In addition to these roads, there are 13 roads sections with a total length of 10.7 Km that are located inside forest reserves or unclassified forest.

2.5 Major Natural vegetation Types Found in Southern Province

a). Tropical rain forests

Tropical rainforests are characterized by a multi- story vegetation where the crowns of dominant trees form a closed canopy, that covers the full forest, at 25m to 30m on top with with taller species growing to rise up to about 45m. These forests have a relatively sparse undergrowth but are rich in epiphytes and lianas. Epiphytes are those plants that hang on to a big tree, which is its host. It takes its food from the air. On the other hand, a parasite takes its food from the host plant itself. The interior of these forests are dark and dense. They have an understory made of small trees and shrubs and the ground layer consisting of herbs. The tallest trees that rise above the canopy is called the emergent layer. They have a high temperature and a high humidity. They also have a high annual rainfall which exceeds 3000 mm. Sri Lanka's lowland rainforests covering 2.1% of the land area harbour many endemic and threatened species. More than 60% of the 306 tree species that are endemic to Sri Lanka are found only in the lowland rainforests and some more are shared with montane and dry zone forests. Of the twelve endemic genera of flora of the island, eleven are confined to rainforests. The best known tropical rainforest in Sri Lanka is Sinharaja, internationally recognized as a world heritage site. Kaneliya, Dedugala, Nakiyadeniya complex known as the KDN forests are some of the other reserves.

b). Sub Montane Forests

The sub montane forests are distributed at between 1000-1500m and those above that, 1500-2500m, are the montane forests. They are also known as cloud forests. The hot air of the lowlands rise during the morning hours and condense creating huge clouds, which become so heavy that they result in afternoon rains. They cover a total of 1.1% of our land area. The montane forests are characterized by dense growth of epiphytes and lichens. These forests have a lower canopy and dense undergrowth. In these forests twisted, stunted trees are full of orchids, mosses, lichens, climbers and ferns. At lower elevations, the cloud forests give way to a variety of vegetation, consisting of both temperate and tropical plants, and grassland savannas. Half of Sri Lanka's endemic flowering plants and more than 34% of its endemic trees, shrubs and herbs are restricted to these diverse montane forests. These forest ecosystems are found in some high altitudes of the Sinharaja rain forest.

c). Dry Mixed Evergreen Forests and Riverine Forests

Dry mixed evergreen forests are the most extensive type of forests and are found in the dry zone. They are characterized by monsoon forests and thorn scrub lands. Evergreen forests represent the tropical dry forests covering a major part of the dry zone adding up to 16.8% of the land area except for the southwestern quarter, the central mountain range, and the Jaffna Peninsula in the extreme north. Dry mixed evergreens receive about 1,500-2,000 mm of annual rainfall in December to March Northeast monsoon period but are mostly dry during the rest of the year. The strong seasonality in rainfall has prompted these forests to be referred to as monsoonal forests. Yala and Bundala national parks are well known for this kids of vegetation types.

d). Intermediate Forests / Tropical Moist Evergreen Forests

These forests are located in the transition zone or between the tropical rain forests and dry mixed evergreen forests. There are some species that are common to both types of forests, but some are found only in the semi evergreen forests.

e). Tropical Thorn Forests / Arid Zone Forests

These forests cover the extreme Southeastern and Northwestern regions of the country, which have very long dry periods. They have low trees and thorny undergrowth dominated by thorny shrubs. They are called Tropical Thorn Forests. Temperatures here are high being over 34^0C and the rainfall is below 1250 mm. The thorny shrubs have adaptations to store water and are able to live on very little water.

f). Mangroves

A mangrove is a swampy area found in the coastal areas and at river mouths. They are periodically inundated by sea water. Rich mangrove forests exist in the Kalametiya, Rekawa, Kahada modara and Bundala. Fourteen mangroves species and 12 associated species have been recorded. Mangrove trees have many adaptations to survive in water logged, saline soil with very little aeration. Stilt and prop roots for support, pneumatophores, which are roots for breathing air and which stick out of the water to take in air, salt and to relieve excess salt are such adaptations.

2.6 Natural Disasters

The project districts are all located in coastal area and prone to Tsunami, storm surge, coastal erosion, and sea level rise. In 2004, coastal zone of these districts were severely affected by Tsunami which resulted immeasurable damage. The highlands of Galle and Matara districts are susceptible to landsides particularly during peak rainfall from May to September.

Compliances on Environmental Safeguards Requirements

3. Compliance on Environment Safeguard Requirements

Project roads under the investment program followed environmental assessment procedures to meet the requirements of GoSL and the ADB SPS as described in this following section. Project road which is not subjected to these procedures will not be put forward for consideration or inclusion under the investment program.

3.1 Staffing of Contractor on Environment and Safety

Staffing of contractors environment and safety officers were done in systematically manner. Firstly, Curriculum Vitas (CV's) of environment and safety officers were approved by the PIC. Then PIC have given an induction to all officers regarding environmental safeguard. Finally onsite trainings were carried out in their related contact packages. Following table 05 is shows the recruited environment and safety officers of each contactor packages.

Table 05. Staffing of the contractors.

Contact package	Name of the officer	Designation	# of training done/workshops	Participation for onsite training
G1	Mr. Udara Senananyake	Env & Safety Officer	6	Participated
G2	Mr. T.P Tharanga	Env. & Safety Officer	6	Participated
G3	Mr. Rasanga Weligala	Env. Officer	6	Participated
	Mr. I. V. Samantha	Safety Officer	6	Participated
M1	Mr. Ajith Kumara	Env. Officer	6	Participated
	Mr. P.D. N.N Janaka	Safety Officer	6	Participated
M2	Mr. R. Dayarathne	Env. Officer	6	Participated
	Mr. O.M Senarathne	Safety Officer	6	Participated
M3	Mr. Prasanna Gunasekara	Env. Officer	6	Participated
	Mr. P.D.S Nissanka	Safety Officer	6	Participated
H1	Mr. Manjula Andrahendri	Env. & Safety Officer	6	Participated
H2	Mr. Roshan Wejesuriya	Env. & Safety Officer	6	Participated
H3	Mr. Chaturanga Hatnagoda	Env. & Safety Manager	6	Participated

3.2 Review and Approval of EMAP

General format for EMAP was distributed among contactors and informed them to fill up the information requested by PIC. After received drafted EMAP reports it was commented and reviewed by PIC Environmental Specialist (ES). Final EMAP reports were approved by PIC ES for construction activities (Picture 08).

Picture 08. Approved EMAP's of contract packages, G1, M1 and H1.

3.3 Preparing of Environmental Monitoring Checklist (EMC)

EMC's were prepared for each and every road in pre-construction and construction stages for all contact packages. Pre-construction stage EMC's were approved for all roads in each packages. Construction stage EMC's were prepared in four segments according to road construction progress, which was 25%, 50%, 75% and 100%. Reports were due in January 2016 (Table 06).

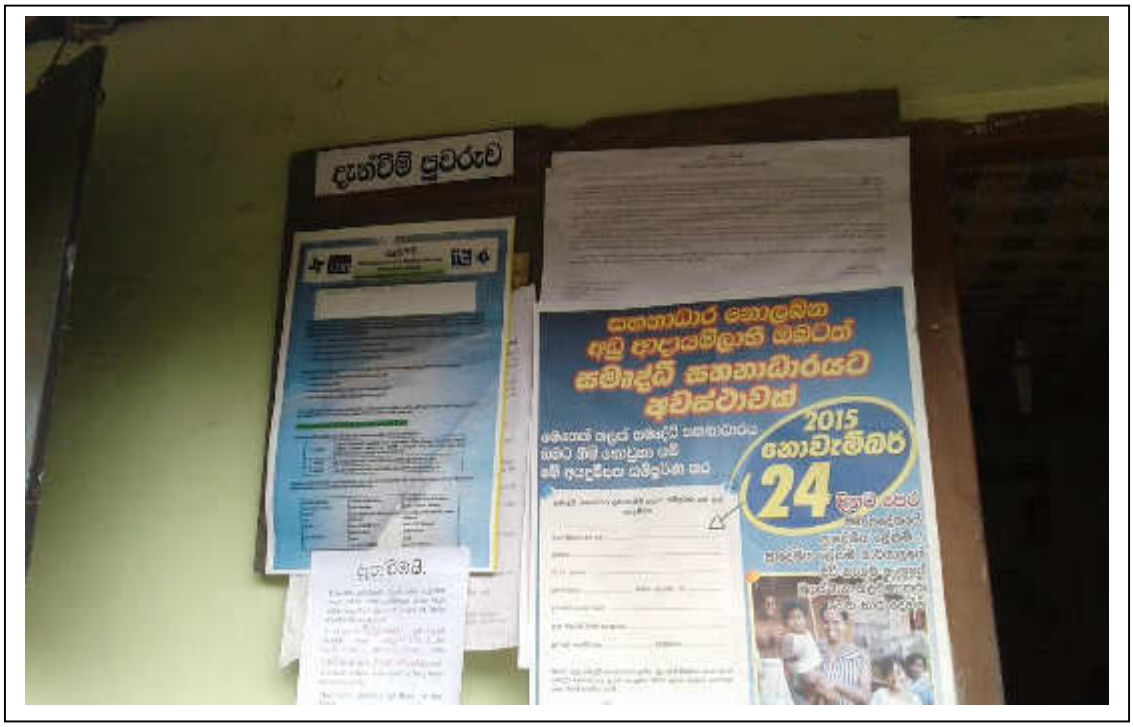
Table 06: Summary of EMAP and EMC completed (June- December 2015).

Package	# of Roads	EMAP	EMC					
			Pre-Construction Stage	Construction stage				Post-construction stage
				25%	50%	75%	100%	
G1	15	Completed	Completed in each road.	2 roads completed	None	None	None	None
G2	22	Completed	Completed in each road.	None	None	None	None	None
G3	29	Completed	Completed in each road.	1 road completed	1 road completed	1 road completed	None	None
M1	22	Completed	Completed in each road.	1 road completed	1 road completed	1 road completed	None	None
M2	20	Completed	Completed in each road.	1 road completed	1 road completed	None	None	None
M3	25	Completed	Completed in each road.	None	None	None	None	None
H1	20	Completed	Completed in each road.	1 road completed	None	None	None	None
H2	18	Completed	Completed in each road.	1 road completed	1 road completed	None	None	None
H3	14	Completed	Completed in each road.	None	None	None	None	None

3.2 Establishing of public notice

- Public awareness

In addition to the community awareness meetings held at the commencement of the project, a public notice developed in local language is being displayed at community attracted places in the project area. The main purpose of the notice is to create awareness among communities on the project, understand to what extent the community can involve in project activities and how to make complains, suggestions, grievances and requests to the project. The public notice brings the key information about the project and contact numbers of relevant officers of the project whom to be contacted regarding social and environment issues (Picture 09).



Picture 09. Public Notice Displays at Grama Niladhar office – Imbulgoda, Matara.

- Channels of receiving public Grievances

A system of channels has been established to receive public suggestions, requests, complaints and grievances by the project. The public is clearly informed that they can follow any of the following channels in submitting their complaints/ grievances/ suggestions or requests to the project.

- Complaints box & suggestion

Availability of complain & suggestion box at the site has been identified as one of the effective methods to share views of communities prior to the designing stage. Complaint & suggestion boxes are installed at Contractor's site offices in all Contract packages and public are expected to put their written grievances in to the Complaint & Suggestion box. Complains/ suggestions are being collected from the box at the end of each day (Picture 10).

Picture 10. Complaint/suggestion box installed at Grama Niladari's office-Talawa South, H3 package.

- Office of Grama Niladhari (GN)

Grama Niladhari is the Government Administrative Officer at Grama Niladhari Division (GND). GN also plays the role of the Chairman of the Grievance Redress Committee (GRC) established under the project at GND level. A public notice is also displayed at each GND offices in the project area.

- Office of the Divisional Secretary

Divisional Secretary (DS) is the Government administrative officer at Divisional Level. DS is also plays the role of chairman of Grievance Redress Committee (GRC) established under the project at Divisional Secretary level (DSD)). A public notice is also displayed at each GND offices in the project area.

In addition to the above channels, all the field staff of the project is instructed to accept public grievances and hand them over to the Project Engineer (PE)/ Environment Officer (EO) /Social Safeguard Officer (SSO) on the same day or in failing which the following day for further action.

- Maintenance of Records for Public Grievances

Maintenance of relevant records is considered as a prime requirement. All the received complaints/suggestions are being registered at the Project Manager's office of the Contractors and attended.

It was evident that this mechanism is very effective and shown better results. All the grievances received are classified according to the nature.

Summary of progress of public grievances including; number of complaints received, solved, pending and number which was sent to GRCs shown in appendix 08.

Environment Monitoring

4. Environmental Monitoring

Monitoring of EMAP implementation is carried out during the preconstruction, construction, and will be in operation and maintenance stages of the project. Based on the EMP, monitoring checklists are prepared for each of these stages. Every road must have at least one monitoring checklist completed during pre-construction, one to three during construction depending on the length of the road and one per year during operation and maintenance. Records of these completed monitoring checklists are systematically maintained within the PIC and/or PIU office. Based on these records and site visits monitoring reports will be prepared during the construction and operation stage on an annual basis and will submitted to ADB for disclosure on the ADB website. Following table is a summary of EMC completed up to 31st December 2015.

4.1 Construction Activities During the Reporting Period

Summary of critical roads construction activities which were carried out in iROAD(SP) are listed in table 07.

Table 07: District level road construction activities and roads which were monitoring carried out.

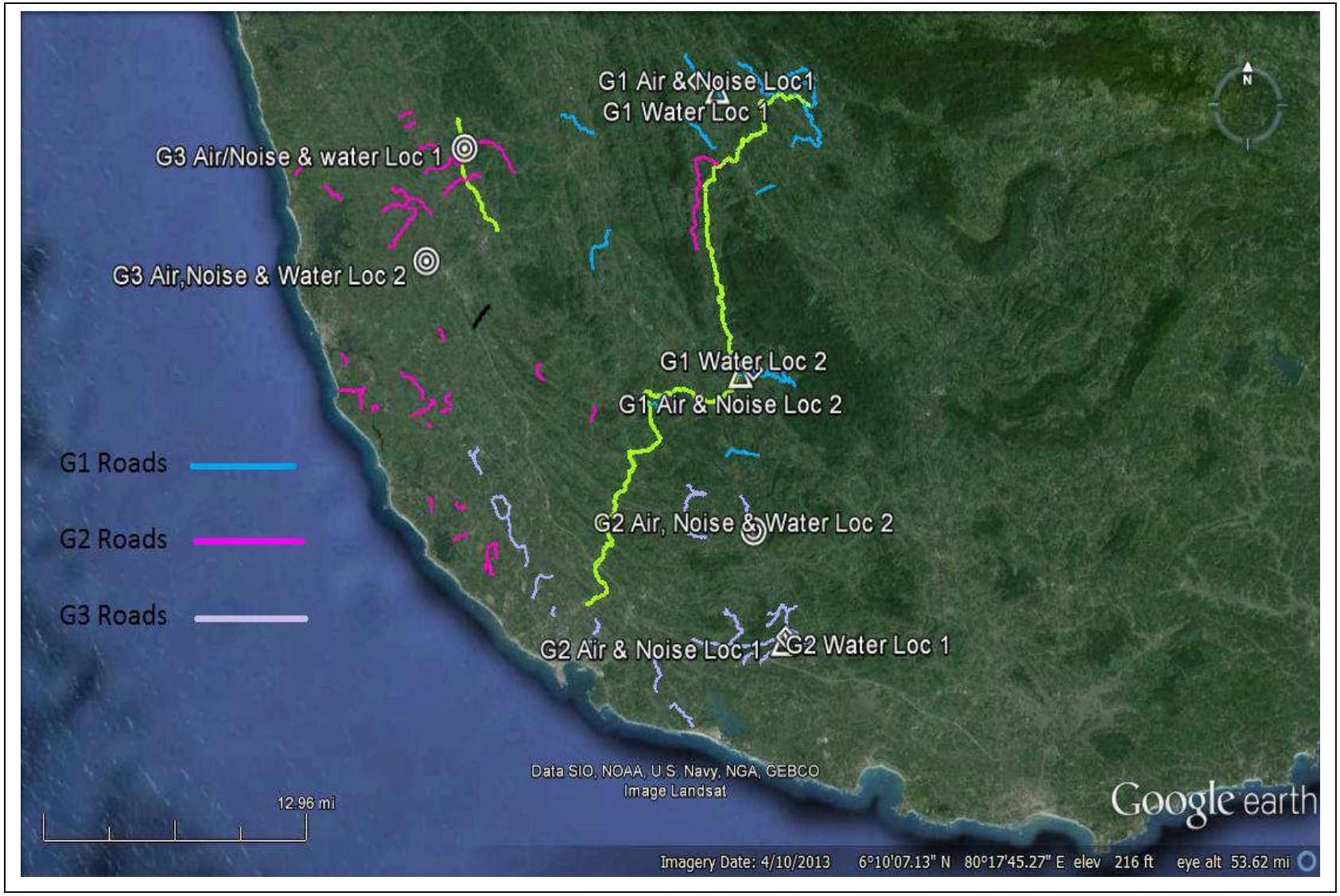
District	Activities carried out									Roads which were monitoring carried out (RD ID No.)
	Clearing and Grabbing	Excavation for widening	Embankment for widening	Sub-base for widening	Structures construction	Shoulder construction	ABC laying	Priming	Asphalting	
Galle	√	√	√	√	√	√	√	√	√	G1-(1,2,34,5,8,11,28,29,30); G2-(13,16,22,23,36,3); G3-(40,41,42,44,65,65A,66,670
Matara	√	√	√	√	√	√	√	√	√	M1-(8,9,10,10A,12,13,14,15,17,21,23,24,64,65,66); M2-(2,4,5,6,41,42,56,57A); M3-(26,30,31,32,33,34,35,39,58,60)
Hambanthota	√	√	√	√	√	√	√	√	√	H1-(10,11,12,13,14,16,28,36); H2-1,6,22,23,25,33,34,35); H3-(45,49,51,52)

4. 2 Monitoring of Physical and Chemical Factors, and Biodiversity

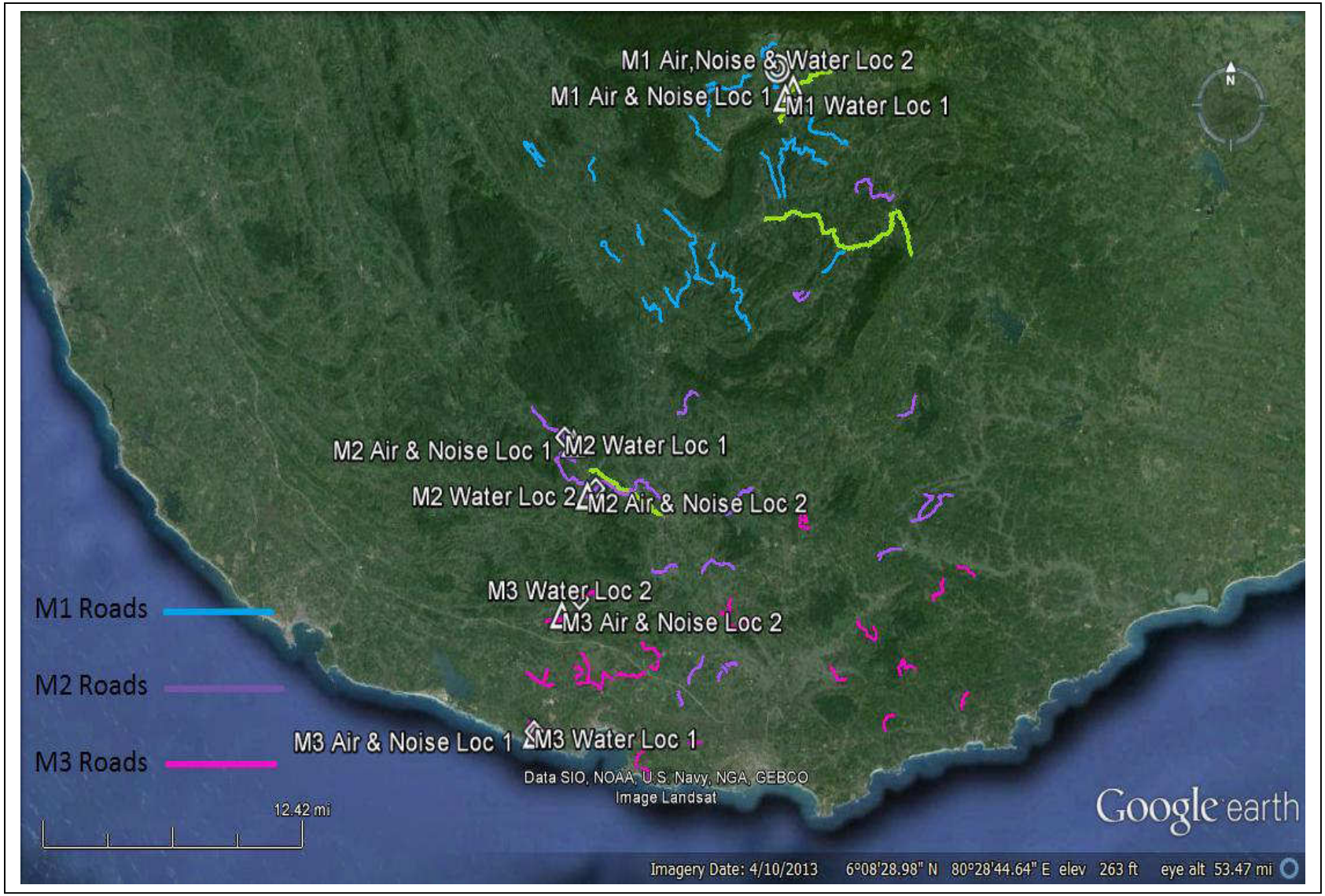
Following selection criteria were used for site selection in each district; sites should be within the contact package, water gullies and water ways considered, average maximum affect by the construction activities, GIS used, IEE-SP report recommendations considered and site easy access.

a). Site Selection for Air Quality, Noise Level and Water Quality

Sampling sites were carefully selected according to the average affect shows by the construction activities to the air quality, water quality and noise levels. Locations were selected after a joint inspection with PIC environmental specialists and contractor environmental officer. Sampling was carried out by the National Building Research Organization (NBRO).



Map 04. Air & water quality, & noise level monitoring sites – Galle



Map 05. Air & water quality, & noise level monitoring sites – Matara District.

Map 06. Air & water quality, & noise level monitoring sites – Hambanthota District.

Picture 11. Environment parameter monitoring location selection with PIC staff and contractor staff member, G2 package.

Picture 12. Environmental parameter monitoring location information board, G3 Package.

Sampling Methodology of Air, Water and Noise Level

Air samples were collected from selected locations as per the methods stipulated in National Ambient Air Quality Standards on eight (8) hours basis for the analysis of SO2, NO2 and CO. Sampling duration for PM10, PM2.5 and Pb analysis were 24 hours. The sampling receiver height was about 3m from the ground level and sampling rates were 0.7 l/min for SO2, NO2 and 1 l/min for CO. The sampling rate for PM10, Pb were 1.0 m3/min and 16 l/min for PM2.5 CO levels were measured at the site. Samples collected for the analysis of SO2 NO2 were stored in a cooler box and PM 2.5 and Pb samples were stored in filter cassettes. Then samples were sent to NBRO laboratory for analysis.

Water samples collected in each locations were measured for pH, Dissolve Oxygen (DO), Biochemical Oxygen Demand (BOD), Electrical Conductivity (EC). Total Suspended Solid (TSS), oil and grease, Lead (Pb) and Fecal Coliform (E. coli).

The sound levels measurements were carried out in accordance with the methods laid down in International Organization for Standardization (ISO) 1996 (part1,2 & 3) and BS 4142;1990 as stipulated in National Environmental Noise Control Regulations stipulated under the extraordinary Gazette No. 924/12-May 23,1996 by the Central Environmental Authority (CEA) of Sri Lanka. The chosen method was direct method, is that by measuring the equivalent continuous. A weighted sound pressure level (Leq,T) was measured for a period of T (5 minutes) with the integrated time of one (1.0) second in the fast selection mode of the meter. A set of 5-mimiute continuous time integrated noise levels was taken each locations during day and night time respectively. The receiver height of the noise level meter was at about 1.5 m from the ground level for all measurements. According to the NEA sound levels at boundaries of construction sites are as 75 dB (A) during the day time and 50 dB(A) during the night time.

Results

Table 08: Summary of air quality measured in pre-construction stage in each contract package.

District	Contract Package	Location		Time Average		Parameter Concentration (mg/m³) with standard concentration					
						SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	Pb
						8 hrs			24 hrs		
		L1	L2	8 hrs	24 hrs	**0.120***	**0.150***	**10.00***	**0.100***	**0.050***	**0.002***
Galle	G1	√		√		0.0001	0.00002	0.00114	-	-	-
		√			√	-	-	-	0.000013	0.000007	0.000001
			√	√		0.000012	0.000021	0.00014	-	-	-
			√		√	-	-	-	0.000016	0.000009	0.000001
	G2	√		√		0.014	0.027	1	-	-	-
		√			√	-	-	-	0.017	0.009	<0.001
			√	√		0.017	0.036	<1	-	-	-
			√		√	-	-	-	0.021	0.012	<0.001
	G3	√		√		0.013	0.023	<1	-	-	-
		√			√	-	-	-	0.027	0.014	<0.001
			√	√		0.012	0.020	<1	-	-	-
			√		√	-	-	-	0.048	0.026	<0.001
Matara	M1	√		√		0.019	0.033	<1	-	0.117	-
		√			√	-	-	-	0.031	-	<0.001
			√	√		0.010	0.025	<1	-	0.050	-
			√		√	0.012	-	-	-	-	<0.001
	M2	√		√		0.014	0.010	<1	-	0.121	-
		√			√	-	-	-	0.022	-	<0.001
			√	√		0.021	0.014	<1	-	0.080	-
			√		√	-	-	-	0.014	-	<0.001
	M3	√		√		0.022	0.013	<1	-	0.121	-
		√			√	-	-	-	0.050	-	<0.001
			√	√		0.028	0.014	<1	-	0.180	-
			√		√	-	-	-	0.060	-	<0.001
H'Thota	H1	√		√		0.007	0.012	<1	-	-	-
		√			√	-	-	-	0.017	0.006	<0.001
			√	√		0.009	0.014	<1	-	-	-
			√		√	-	-	-	0.024	0.013	<0.001
	H2	√		√		0.012	0.015	<1	-	-	-
		√			√	-	-	-	0.023	0.012	<0.001
			√	√		0.011	0.013	<1	-	-	-
			√		√	-	-	-	0.027	0.014	<0.001
	H3	√		√		-	-	-	-	-	-
		√			√	-	-	-	0.021	0.0113	
			√	√		0.0015	0.006		-	-	-
			√		√	-	-	-	0.024	0.0134	-

* National standards according to NEA no.47 of 1980

Picture 13. Air quality measuring, G2 package.

Picture 14. Air quality mearing and demonstration in a school location, G3 Package.

Table 09: Summary of water quality measured in pre-construction stage in each contract package.

District	Contract Package	Location		Parameter								
				pH	Tem. °C	EC dS/m	DO mg/L	BOD mg/L	TSS mg/L	Pb mg/L	Oil & Grease mg/L	E.coli MPN/100ml
		L1	L2	*6-8.5	-	-	*250	*30	*50	*0.1	*10	*40
Galle	G1	√		8.6	25.6	0.075	7.5	2.1	<1	<0.01	2.37	208
			√	8.0	26.4	0.042	7.5	1.8	1.8	<0.01	<1	284
	G2	√		7.6	24.8	0.131	6.8	0.8	7.3	<0.01	<1	1000
			√	8.4	25.3	0.054	7.8	1.1	13.5	<0.01	<1	800
	G3	√		7.2	29.3	0.038	6.5	1.5	27	<0.01	5.4	400
			√	6.6	27.3	0.074	5.7	1.9	2	<0.01	3.3	232
Matar	M1	√		8.0	26.2	0.064	7.8	0.8	<1	0.02	3.2	100
			√	9.0	24.2	0.034	8.1	3.9	<1	0.01	2.2	400
	M2	√		8.0	25.8	0.050	7.7	5.1	3.25	<0.01	5.2	1000
			√	7.8	27.0	0.076	7.4	0.6	<1	<0.01	4.6	100
	M3	√		7.7	26.4	0.002	3.9	2.3	8	<0.01	<1	200
			√	8.8	25.6	9.90	7.6	3.1	47	0.01	<1	700
H'Thota	H1	√		7.5	28.0	0.364	6.3	2.5	44	<0.01	3.7	300
			√	7.4	28.1	9.946	7.6	4.4	10	<0.01	3.6	800
	H2	√		7.4	27.2	0.265	6.8	4.4	18	0.01	2.9	800
			√	7.5	27.7	0.275	7.5	2.9	17	<0.01	2.8	400
	H3	√		8.0	26.1	0.264	5.6	2.3	18	<0.01	4.3	100
			√	7.7	26.0	0.076	5.0	2.2	<1	<0.01	3.9	3400

* National standards according to NEA no.47 of 1980.

Picture 15. A water sample collecting in concrete batching plant, G3 package.

Picture 16. Measuring water quality on site, G3 Package.

Table 10: Summary of noise level measured in pre-construction stage in each contract package.

District	Contract Package	Location		Time of the day (dB)	
				Day	Night
		L1	L2	* 75	*50
Galle	G1	√		38	38
			√	54	49
	G2	√		65	56
			√	55	54
	G3	√		56	42
			√	68	55
Matara	M1	√		75	50
			√	75	50
	M2	√		49	50
			√	46	42
	M3	√		47	46
			√	45	44
H'Thota	H1	√		53	55
			√	59	51
	H2	√		47	49
			√	46	47
	H3	√		47	53
			√	52	57

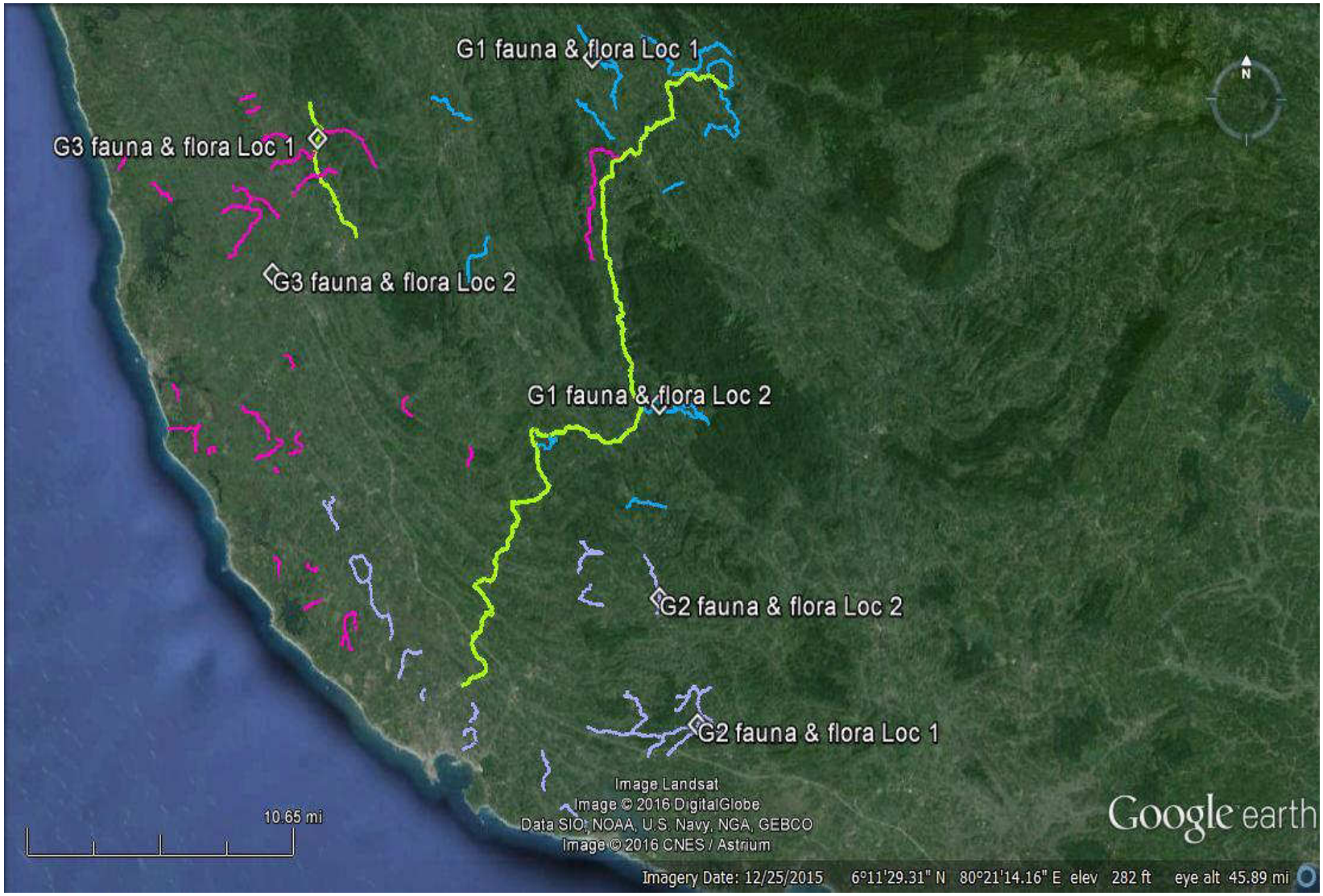
* National standards according to NEA no.47 of 1980

Picture 17. Noise level measuring in concrete batching plant and pre cast yard, G3 package.

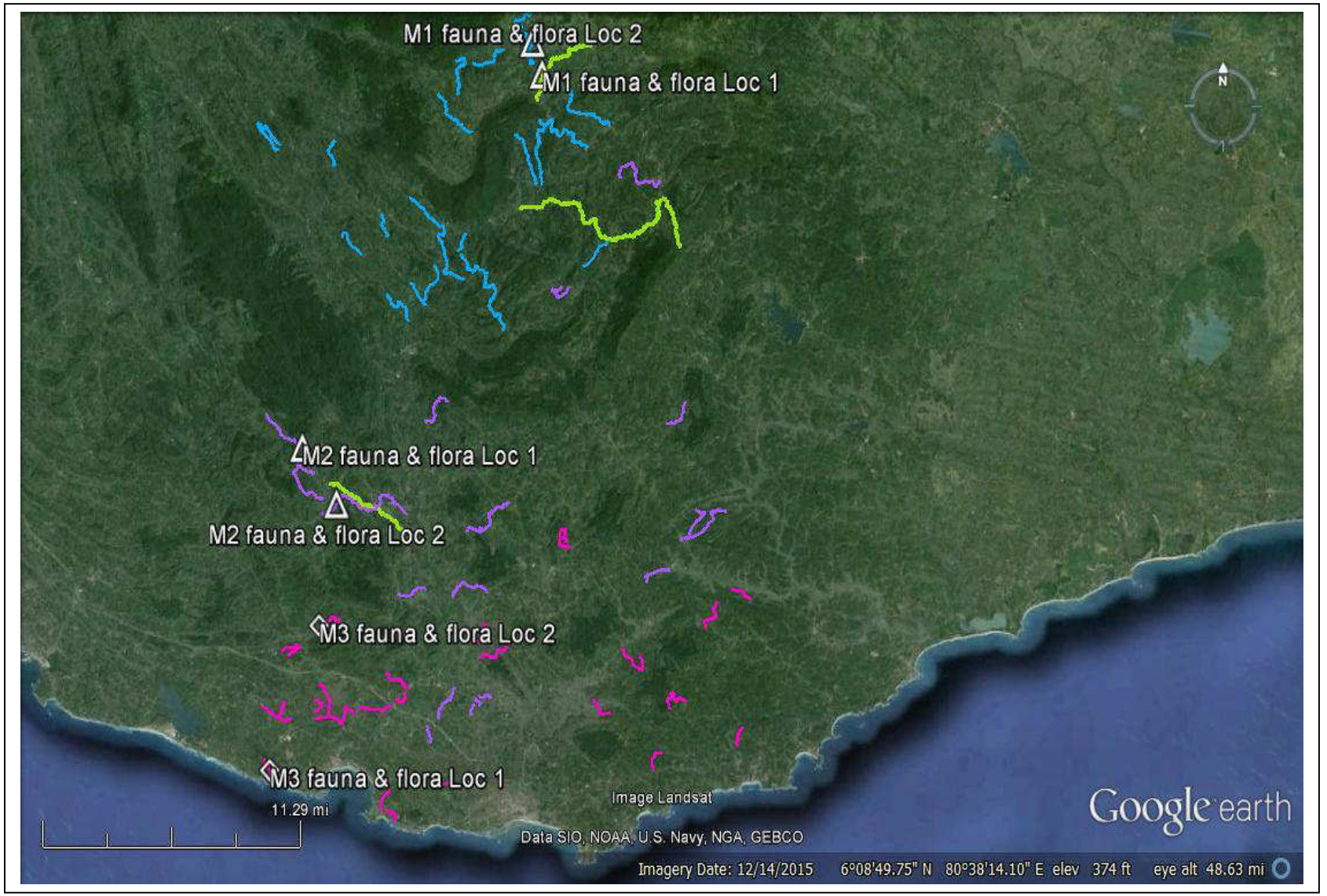
Picture 18. Noise level measuring at night, G3 Package.

b). Site selection for fauna and flora sampling

Fauna and flora sampling sites were selected in the same water quality testing locations to calculate maximum diversity in each contract packages. Sampling will be carried out by Dr. U.K.G.K. Padmalal, The Open University of Sri Lanka.



Map 07. Fauna & flora monitoring sites – Galle District.



Map 08. Fauna & flora monitoring sites – Matara District.

Map 09. Fauna & flora monitoring sites – Hambanthota District.

Sampling Methodology for Fauna and Flora

The key taxonomic groups will be sampled such as Dragonflies, Butterflies, Mammals, Reptiles and Amphibians, Birds, Freshwater fish and Plants, Vascular plants both in terrestrial and aquatic environments, if any.

The approach to sampling terrestrial /aquatic taxonomic groups (not freshwater fish) each habitat type, is Quadrates, measuring 100 m x 100 m, are located (Covering both side of the Road). Four replicate transects of 100 m x100 m, (covering both side of the Road) taking into account as much of the environmental variation (notably in, soil, aspect and altitude).

This sampling design provides the basis for examining relationships between plant and animal species or assemblages in the habitat given. We also will propose indicator species for each major taxa for future monitoring purpose in terms of changes of the habitats. This will be done after the base line survey.

Field sampling will be carried out from 13 January to 11 February 2016.

Table 11. Field sampling status of baseline data (June-December 2015).

Package	**Physical/Chemical**			**Biodiversity**	
	Noise level	**Air quality**	**Water quality**	**Fauna**	**Flora**
G1	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
G2	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
G3	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
M1	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
M2	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
M3	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
H1	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
H2	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016
H3	Completed	Completed	Completed	Scheduled in Jan 2016	Scheduled in Jan 2016

Environmental Impacts Observed in iROAD Project -SP

5. Environmental Impacts Observed

The proposed work under the investment program is involving rehabilitation and upgrading of existing rural roads under Pradeshiya Sabhas and national roads under RDA (B class road) to all weather standard status. Rehabilitation works include improving pavements/road surface, construction of side drains and embankments, widening or replacement of culverts, cause ways and bridges. For the rural roads the carriageway width is from 2.5 m to 5.5 maintained or more if there is available Right of Way (ROW). For the national road the carriageway width is from 5.5m to 6.5m.

During the construction phase activities such as removal and re-establishment of public utilities; removal of road side trees; mining of gravel and sand; quarrying of metal; transportation of construction materials; disposal of construction waste; establishment of construction material processing plants, storage yards, labour camps, vehicles and equipment service yards and other facilities were implemented. These activities caused several negative impacts on the local environment in the form of air pollution, water pollution, generation of noise, soil erosion, generation of solid waste, loss of vegetation and aesthetic splendor and safety issues as people and vehicles still be using the roads during construction (Pictures 19-24).

Mitigation measures as per the EMAP under the supervision of ES/ PIC were implemented to address these issues include but not be limited to: wet spraying to control dust; limiting working hours to minimize disturbance; regular maintenance of construction vehicles and equipment; proper disposal of construction debris; maintenance of proper hygiene and safety standards and facilities in the camps and working areas; development and implementation of erosion control and silt management measures, compensatory afforestation and enforcement of road safety measures for local people and traffic.

If any of the roads fall inside or near protected areas such as national parks, wildlife sanctuaries or other forms of conservation areas, proper consultation held with the respective national and local wildlife authorities. To the extent possible all efforts were made

to include technical measures in the road design to minimize or mitigate negative impacts on wildlife and enhance habitat conditions or migratory pathways for wildlife.

During the operation and maintenance phase minor physical works still be implemented such as clearing drains, filling of potholes, maintaining saplings that were planted and others. The improved road conditions will result in increased numbers as well as speed of vehicles. This can cause an increase in accidents and other safety issues. Minor increase in greenhouse gas (GHG) emissions and noise can also be expected from the increased traffic. The contractor will be responsible to ensure that all road safety measures such as speed breakers, safety signs and others are well maintained for a period of three years for the case of the rural roads and seven years for the case of the national roads. Compensatory afforestation is expected to offset the increased GHG emissions up to a certain extent. If noise levels exceed the prescribed standards the contractor will be responsible for implementing suitable mitigation measures such as construction of noise barriers and others.

The overall impact of the investment program is expected to be positive. Development of the roads to all weather standard status will improve rural access and link rural hubs to the national road network. The program will serve as a tool for poverty alleviation, allowing poor people in the area to directly access other areas of the country to engage in a number of social and economic activities. Additionally it will improve and strengthen the National Highways Network efficiency in Sri Lanka thereby establishing smooth traffic flow, reduced costs and travel time and increased lifetime of the roads through appropriate, periodic maintenance using the OPRC strategy.

Picture 19. Removed tree in G1 Package.

Picture 20. Removal of productive soil, H1 package, Magama Road, RD ID 14.

Picture 21. Disposal of construction wastes (concrete) in to a fresh water stream, Batching plant, G3 package.

Picture 22. Dust generation of B.C Abewickrama Road, RD ID 56, M2, Hakmana.

Picture 23. Fresh water stream side pollution by unplanned excavation, observed in H2 package.

Picture 24. Water gully disturbed by a cut and filling, observed at G1 package.

Environmental Issues and Mitigation Measures Implemented

6. Environmental Issues and Mitigation Measures Implemented.

Table 12. Summary of issues and mitigation measures taken.

Construction Activity	Impact	Location (Road ID and package)	Mitigation measure/s adopted	Mitigation measure/s proposed in the EMAP	Monitoring indicator	Recommend ations	Effectiveness	Example/s
Road side vegetation clearing.	Soil erosion, sedimentation, damage to flora and fauna.	All	Minimized of clearing vegetation, fauna and flora translocation, established of nurseries for very important plants.	Minimize tree removing & replanting trees 1:3 ratio for removing, Spreading water as required & removal of debris by manual, Reuse of soil as possible	Demarcation of very important areas, number of plants relocated, nurseries established	Daily	Contactors were given information to PIC regarding important fauna and flora locations and protected as much as possible. Locations were identified for plant nurseries.	Pictures 25, 26 & 27

Extraction of embankment materials.	Vegetation damaged, dust generation, sedimentation, earth slips,	G1, M1, M2, H1, H2 and H3	Top soil of burrow areas and any other productive stripped to a specified depth of 150mm and only the required quantity stored as stock piles, During dry season, water bowsers were employed for watering in dust generated areas as required. Cut done with slope and stepwise in order to maintain soil stabilization.	When any type of excavation is implemented in burrow pits, the matters related to soil erosion will be highly considered by adopting main & lateral drains, retaining walls or gabions or turfing with grass according to the necessity or requirement depending on the specific site conditions.	Pre identification of important vegetation types. Demarcation of extraction areas. Photographic monitoring of erosion and earth slip prone areas.	Daily	Environmental officers were not received complains on such kind of impacts. GRC has received comparatively less complains and suggestions.	Picture 28
Sub base preparation, shoulders	Road side dust generation.	All	Completed some road construction activities such as shoulder construction, sub	Appling of water as required	Public complain system established such	Daily	No dust observed at site.	Picture 29

construction, ABC laying and compaction,			preparation and ABC compaction in a short period. Frequently wetted the dust generative surfaces.		as GRC and complaint boxed established at site and public level places.			
Plant operation	Dust generation, noise, surface and ground water pollution	All	Covered the land fully by using corrugated sheets. Constructed "wind & dust barrier" using plants which were growing rapidly around the land. A wet system was functioned in the plant. Dust generated with the water was	Covering all the materials delivering vehicles to avoid spillage, All vehicles and equipment used in construction shall be fitted with exhaust silencers. During	Regular inspections carried out by the Environmental and public liaison officer to monitor the progress of the EMAP.	Daily	Direct complains received to RDA, PIC and contractor.	Picture 30

			deposited in the settling tanks. Reused the water. The generator has been fixed in a sound proof cabin and outlet of the silencer is 15m. It's directed upwards the cabin. Generators fixed with in a concrete floor by 6" thickness insulating rubber Electric motors installed with machine. Controlled the	routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced.				

			vibration/noise from vehicles and at unloading.					

Picture 25. Road side vegetation clearing, H1 package.

Picture 26. Soil erosion observed at Dooli Ella Road, RD ID 01, Neluwa, G1 package.

Picture 27. Floral vegetation Damaged, Paragala Road, RD ID 14, M1 package, Deniyaya.

Picture 28. Burrow pit operation in M2 package, Ketanvila, Akuressa.

Picture 29. ABC stock pile, G1 package, Neluwa.

Picture 30. Metal crusher, G2 package, Neboda.

6.1 Special issues

01. Critical environmental issues were raised and addressed, such as excavated soil dumped into a water gully in Medagama- Koppagoda (RD ID 3) in G1 Contract Package. The issue was habitat disturbance and it has a severe affect to the fresh water stream. Mitigation action was proposed to rehabilitate the habitat, and G1 contactor Environment Officer agreed to replant in the area. G1 contractor has attended to the issue and corrected according to the actions proposed by ES. Water gully was replanted with some native plants and bushes. Soil erosion was minimized by introducing cascade soil compaction system along the horizontal axis. Progress is monitoring continuously (appendix 02).

02. G3 contractor had a major issue as they were releasing waste water generated from concrete batching plant in to the nearby freshwater stream. Also they have dumped waste concrete in to the stream bank. This has been pointed out in a site inspection and advice given to the contractor to stop such kind of activities. A corrective proposal was requested by ES with a 24 hour deadline. According to the proposal sent to TL office, ES has agreed to corrective procedures with comments. G3 contractor has fulfilled the proposed migratory actions to minimize and prevent waste release to the fresh water stream. Progress is monitoring continuously (appendix 03).

Grievance Redress Mechanism

7. Grievance Redress Mechanism

Grievances from the affected people on social and environmental issues during project implementation is addressed mainly through the existing local administrative system. Depending on the nature and significance of the grievances or complaints, grievances is addressed at three levels. The first is at the grass roots level where complaints are directly received and addressed by the contractor, PIC or PIU representative on site.

Grievances which are simple but still cannot be addressed at the grass roots level is addressed at the Grama Niladhari Division (GND) level. More complex grievances which cannot be addressed at the GND level is addressed at the Divisional Secretariat Division (DSD) level. There is a Grievance Redress Committee (GRC) at the GND and DSD levels (appendix 07).

Composition of GND level the GRC members are Grama Niladari of the area (Chairman), Representative of PIU (Secretary), Representative of Supervision Consultant (Member), Representative of Contractor (Member), A community member/religious leader (Member), Woman representative from the local community (Member),

Composition of DSD Level GRC members are Divisional Secretary of the area (Chairman), Representative of PIU (Secretary), Grama Niladari (Member), Representative of Supervision Consultant (Member), Representative of Contractor (Member), Representative of a social organization (NGO/CBO) of the area (Member), A community member/religious leader (Member) and Woman representative from the local community (Member).

To make the GRM process gender responsive the GRC 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 are treated equally and necessary measures are taken to address the grievance in the best way possible.

Recommended steps with timeline on the operation of the GRM is provided figure 03. In addition a complaints contact person is designated within the PIU to help address all concerns

and grievances of the local communities and affected parties. Contact details of this person is provided in the project information display board that is placed at the project site.

The flow chart of the GRM is presented in figure 03.

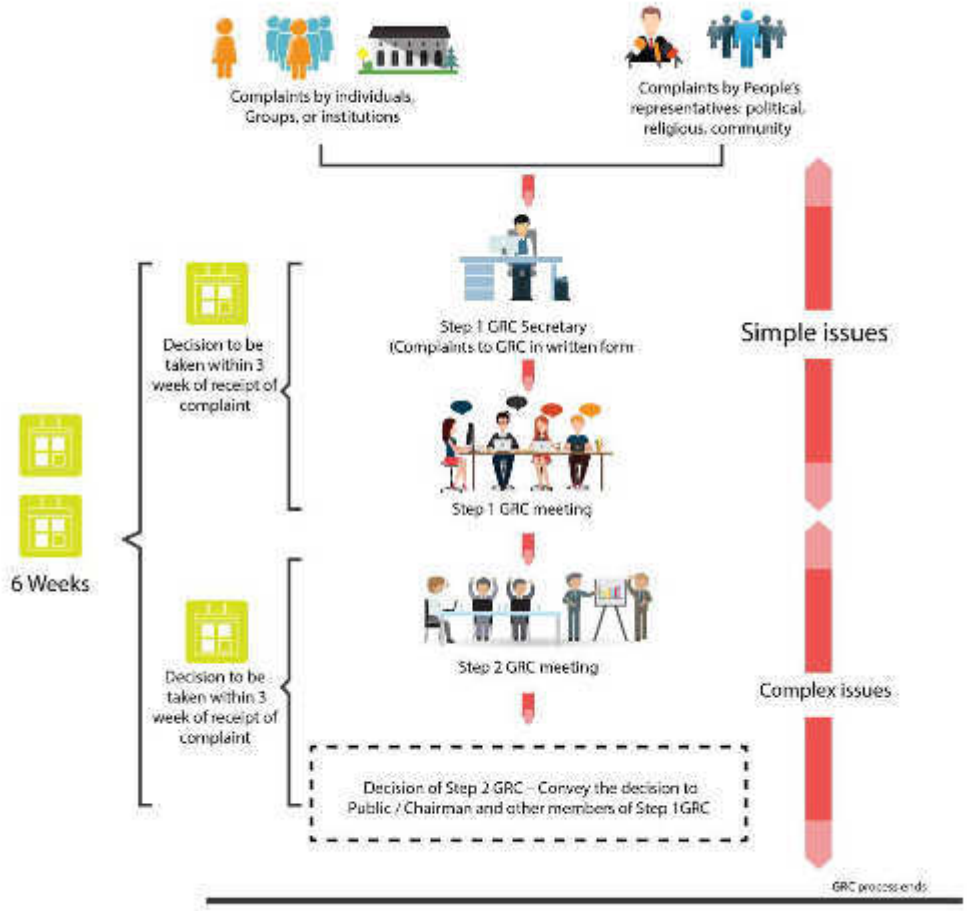


Figure 03. The flow chart shows of the GRM process adapted in to the iROAD(SP).

7.1 Consultation, information Disclosure and Grievance Redress Mechanism

The public consultation and information disclosure is an important part of the environmental safeguard requirements under ADB SPS (2009). In addition the NEA of GoSL also considers stakeholder engagement as a key element for successful management of environmental impacts.

Meaningful public consultations held early on and continuously throughout the project development stage to allow the incorporation of relevant views of the stakeholders in the final project road design, mitigation measures, implementation issues, and enhance the distribution of benefits. Stakeholders included project beneficiaries, local affected people, government bodies, and non-governmental organizations. The consultations must encourage participation of women and vulnerable groups (handicapped people, senior citizens, school children) and engage as many stakeholders as possible.

Consultations has carried out in an environment free of influences and done during conduction of transect walks while completing the environment checklists and/or through focus group discussions and/or household level or key person interviews which starts with the description of the project road design and initial identification of potential impacts. Feedback and recommendations received during the consultations have addressed and where relevant incorporated in the environmental assessment and EMP. These consultations is completed before finalization of the respective Periodic Financing Request (PFR) and all proceedings documented clearly in the IEE report.

7. 2 Environmental Monitoring Structure and Site Inspection

Daily monitoring was done in each contract package by environmental specialist (PIC), environment officer (PIC) and environmental and safety officers (15 nos., contractor).

Regular site inspections (every 4-6 week) were jointly conducted by ADB representative, RDA-ESDD team (Social and environment officer, hydrologist and monitoring officer) and PIC team Environmental specialist, Environment officer and Social, Gender and Resettling Specialist. At the end of the inspection progress review meetings were held. Two progress review meetings were held for the reporting period (22 Sep 2015, 5 Nov 2015).

Table 13. Monthly monitoring schedule for iROAD SP by PIC team.

Contract Package	# of roads	Approximate Length (Km)	# of days of monitoring
G1	15	64	2
G2	22	63	2
G3	29	73	3
M1	22	98	4
M2	20	66	3
M3	25	56	3
H1	20	72	3
H2	18	60	3
H3	14	42	2

Licenses and approvals

8.0. License and its status.

Table 14. Status of approval and license in each contractor package.

Package	Material/Plant	Location	Ownership	Capacity/Extent/Source	Details of the neighboring lands	Approvals
G1	Soil	Pamankada, Neluwa (Selected location)	Ms. Latha Athapattu	01 acre	North-Home garden, East-Natural Stream called Ranketa Ela, South-Home garden, West Neluwa -Palawatta main road	In progress
	Sand	Diganawatta, Hiniduma	G L Damith Rangana	Ging Gaga (500 m from location to both direction)	North-Small Tea land ,East- Home garden, South-Tea Land, West -Ging Gaga embankment	AL/B/MT/173/LR/03 expire on 16.09.2016
	Metal	Thudugala Estate,Thudugala Dodangoda	M/S Metal Quarry Sunbee Granite Project (Pvt) Ltd	16 acres	North-small water fall, East-Forest area , South-Asplt plant & crusher, West-Rubber estate	Available (No:00376) expire on 23.06.2016
	ABC	Thudugala Estate,Thudugala Dodangoda	K D Ebert & Sons Holding (Pvt) Ltd	3.5 acres	North-Quarry, East-Naboda-Dodangoda Road, South-Palm oil plantation, West-Rubber plantation	Request for renewal (04481)
		Thudugala Estate,Thudugala Dodangoda	K D Ebert & Sons Holding (Pvt) Ltd	3.5 acres	North-Quarry, East-Naboda-Dodangoda Road, South-Plam oil plantation, West -Rubber plantation	Available (No: 05067) expire on 15.03.2016
	Concrete	Not operate as a batching plant. Use concrete mixtures by manually.				
	Water	Batuwangala-Ehalapitiya Road, 2nd Natural Stream Just pass the School	Divisional Secretariat	Small stream	North-Batuwangala- Ehalapitiya Road & Small Tea land, East -Batuwangala- Ehalapitiya Road, South-Private road, West -Paddy field	Approval received from Divisional Secretary
		Neluwa-Palawatta road, Pamankada. Near our stock yard	Divisional Secretariat	Natural Stream called Rankata Ela	North-Home garden , East -Batuwangala-Ehalapitiya Road, South-Private road, West -Paddy field	Approval received from Divisional Secretary

		Mavita -Doolialla Road at 1st small bridge	Divisional Secretariat	Natural stream	North- Small tea lands, East - Road, South- Mavita -Doolialla road, West -Small tea land	Approval received from Divisional Secretary
	Disposal sites	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil.				
G2	Soil	Akmeemana	Akmeemana Pradeshiya sabhawa	0.5 acre	Road Abandoned land Barron land Disturbed forest	Approvals in progress
	Metal	Batapola	KDA Weerasinghe	2.5 acre	Disturbed forest Abandoned land	Approved and expire on 13/08/2016
	Asphalt	Batapola	KDA Weerasinghe	2.5 acre	Disturbed forest Abandoned land	Approved and expire on 13/08/2016
	ABC	Batapola	KDA Weerasinghe	2.5 acre	Disturbed forest Abandoned land	Approved and expire on 13/08/2016
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil.				
G3	Metal	Neboda Quarry	KDA Weerasinghe	3 acres	Rubber plantations and scrublands	Approved and expire on 16/02/2016
		Batapola Quarry	KDA Weerasinghe	-	Cinnamon plantations	Approved and expire on 13/08/2016
	ABC	Kumbaduwa Crusher Plant	KDA Weerasinghe	1.2 acres	Private Paddy field lands, approximately 100m away from the Quarry site	Approved and expire on 26/08/2016
		Neboda Quarry	KDA Weerasinghe	3 acres	Rubber plantations and scrublands	Approved and expire on 16/02/2016
		Batapola Quarry	KDA Weerasinghe	-	Cinnamon plantations	Approved and expire on 13/08/2016
	Asphalt	Neboda Quarry	KDA Weerasinghe	3 acres	Rubber plantations and scrublands	Approved and expire on 16/02/2016
		Batapola Quarry	KDA Weerasinghe	-	Cinnamon plantations	Approved and expire on 13/08/2016
	Concrete	Kurudugaha hathakma Batching Plant & Precast yard	KDA Weerasinghe	2.1 acres	Most of surrounding area is Cinnamon lands and Ambalangoda side of the land is having a bare land	In progress
	Water	Nearby 7/7 Bridge at Elpitiya - Awiththawa road	Government reserved area	Natural stream	Bare land and some paddy field area at down stream	In progress
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
M1	Soil	Paragala School Ground	Ministry of Education (Provincial Council)	50P	Road, school garden and tea estate	In progress
	ABC	Lakshawaththa, Thudugala, Dodangoda	CML-MTD	-	Bare lands	Approved and expire on 28/01/2016
		Samodagama Bandiyakanda, Hambantota	CML-MTD	-	Bare lands	Approved and expire on 11/02/2016
		Dankaluwa Pitabeddara	S. Kaluarachchi	-	Isolated forest area	Approved and expire on 11/03/2016
		Mawaralawatte, Mawarala	S.I Witharana	-	Tea estate and isolated forest area	Approved and expire on 18/02/2016
		Kalugalwilahena Kiriwelkale Darangala	M.P Sarathchandra	-	Cinnamon garden	Approved and expire on 18/05/2016

	Asphalt	Hambanthota	CML-MTD	-	Bare land	In progress
		Dodangoda	CML-MTD	-	Bare land	In progress
	Concrete	Produce on site by mixtures				
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
M2	Soil	Eramudugoda State (G.S.Division) Neraluwa Village	N.W.Gunasekara	2.3 acres	Road and bare lands	In progress
	Metal	Bangama, Akuressa	Upali Kodagoda	10 acres	Barren lands	In progress
	ABC	Pallaththara	A.M.Kapila Priyadarshana	3 acres	Barren lands	Approved and expire on 12/09/2016
	Asphalt	Modarawana, Beliatta.	K.D.Ebert & Sons Holding (pvt) Ltd	6.1 acres	Coconut and scrublands	In progress
	Concrete	Eramudugoda State (G.S.Division) Neraluwa Village	N.W.Gunasekara	2.3 acres	Scrublands and road	
	Water	Akuressa Katanvila Road 3+300	Irrigation department	River cannel	Bare lands	Irrigation department consent letter
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
M3	Soil	Kokmaduwa	Privet	-	Bare land	In progress
	Metal	Welipitiya	Gamage Metal Crusher	-	Bare land	Approved and expire on 10/12/2017
	ABC	Neboda	KDESH	2 acres		Approved
		Beliatta	Private (Kapila Metal Crusher)	2 acres	Coconut plantation	Approved
	Asphalt	Neboda	KDESH	2 acres		Approved
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
H1	Soil	Hatagala temple, Hungama	Hatagala temple	1.5 acres	Temple, road and secondary forest	Day permits by DS
	Metal	Rathna construction metal crusher, N0 09, Mayurapura, Hambantota	K.G. Rathna kumara, Rathna Metal Crusher, Bata ata, Hungama	2 acres	N-State land, E-State land, S-Metal quarry W-state land	Approved and expire on 23/03/2016
		Kariyamadiththa, Thalawa, Nugekoratuwa, Angunakolapelassa	Kamal Dharmajith Samarasinghe, Sinhagiri, Thalawa, Kariyamadiththa	1.5 acres	N-State land, E-State land, S-Access road, W-state land	Approved and expire on 28/09/2016
	ABC	Rathna construction metal crusher, N0 09, Mayurapura, Hambantota	K.G. Rathna kumara, Rathna Metal Crusher, Bata ata, Hungama	2 acres	N-State land, E-State land, S-Metal quarry W-state land	Approved and expire on 21/01/2016
		Kariyamadiththa, Thalawa, Nugekoratuwa, Angunakolapelassa	Kamal Dharmajith Samarasinghe, Sinhagiri, Thalawa, Kariyamadiththa	1.5 acres	N-State land, E-State land, S-Access road, W-state land	Approved and expire on 18/09/2015 (applied for extetion)

	Asphalt	Rathna construction metal crusher, N0 09, Mayurapura, Hambantota	K.G. Rathna kumara, Rathna Metal Crusher, Bata ata, Hungama	2 acres	N-State land, E-State land, S-Metal quarry W-state land	Approved and expire on 31/12/2015
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
H2	Soil	Debokkawa	Mr. Chinthaka	4 acres	Scrublands	Approval given by DS.
		Uswewa Binkama,Adjust land to B/Gurugodalla W.K.V	Hanguranketha, Weerasinghe Kanishta Vidyalaya	1 acre	North-Gurugodalla School, South-Houses, East-Priavte land,not functioning West- 100m away small stream	Approval have been received from Pradeshiya saba
	Metal	Samodhagama,Mahawali land,Bondiya Kandha.	C.K Dissanayake	2 acres	There is no residence in the circular area with the radius of 500m (forest area)	Approved and expire on 31/12/2015
	Concrete	K.A.P.M Weerasena, Kaluwalawewa Road,Bolhida, Koggala, Ambalanthota	CML-MTD Construction LTD.	-	There is no any houses in the circular area with the radius of 100m (duff area)	In progress
	Asphalt	K.A.P.M Weerasena, Kaluwalawewa Road,Bolhida, Koggala, Ambalanthota	CML-MTD Construction LTD.	-	There is no any houses in the circular area with the radius of 100m (duff area)	Approved and expire on 31/12/2016, extension applied
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				
H3	Soil	Debokkawa	Mr. Chinthaka	4 acres	Scrublands	Approval given by DS.
	Metal	Maha ellala, Hambanthota	Chanaka metal crusher	1 acre	surrounding area covered with scrub forest	Approved and expire on 03/11/2015, applied for extension.
	ABC	Ellalla, Hambanthota	Tharaka dilshan	1 acre	Surrounding area covered with secondary forest	Approved and expire on 11/03/2016
	Asphalt	Buweli ara	RRC	10 acres	Surrounding area covered with secondary forest	Approved and expire on 12/03/2016
	Concrete	Buweli ara	RRC	10 acres	Surrounding area covered with secondary forest	In progress
	Disposal	Sites were selected where the community and privet need fulfill of their will. Consent letters were taken before dump soil				

Tree Removal and Re-Planting Program

9.0. Tree removal and re-planting program

Table 15. Status of tree removal and re-planting program in each contractor package.

Package	RD/ID no.	Road name	To be Remove		Removed	Re-planting
			Native	Exotic		
G1	1	Mavita- Doolialla	3	10	10	Selection of re-planting locations were in progressed
	2	Batuwangala-Ahalapitiya	-	-	-	
	3	Madagama-Bopagoda	3	15	4	
	4	Danawala-Mawita	-	-	-	
	5	Batahena-Kudagalpola	1	20		
	29	Hattaka-Sasanathilaka M/W	4	20	15	
	30	Kurupanawa-Polkella	1	10	-	
G2	22	Hapugolla-Iriyagaha	1	-	-	Selection of re-planting locations were in progressed
	36	Wakwalla-Ginimallgaha	1	2	-	
	37	K.G.Palis M/w	2	-	-	
G3	44A	Alpitiya-Awithtahwa	8	100	-	Selection of re-planting locations were in progressed
	44	Opatha- Bulugaha	1	2	-	
M1	14	Morawaka Paragala	-	-	3	Selection of re-planting locations were in progressed
	21	Porupitiya-Annasigalavila	-	5	30	
	10	Morawaka-Millawa	-	1	40	
	23	Waliwa-Pahuruthota	-	12	5	
	65	Diyadawa-Bata Andura	-	-	5	
	64	Diyadawa-Kosmodara	-	6	-	
	24	Bengamuwa-napathella	-	-	4	
	13	Batayaya-Bewaraliya	-	45	-	
	9	Dangala-Dellwa	-	8	4	
	8	Alapaladeniya-Tipekkumbura	-	50	30	
	12	Darangala-Mahahena	-	34	20	
	66	Kalawenigama-Uggalpotha	-	-	-	
M2	41	Lewpottedeniya rd	5	25	10	Selection of re-planting locations were in progressed
	56	Kongala D.C.Abewicrama rd	2	1	-	
	4	Akuressa- Katanwala	5	20	15	
M3	26	Dehigahahena-Uduwaka	4	12	-	Selection of re-planting locations were in progressed
	30	Ibbawala-Andugoda	6	19	-	
	31	Ibbawala-Ranamadurugama	2	-	-	
	33	Jamburegoda-Bodirukkaramaya	2	3	-	
	39	Walipitiya Uduwara	2	11	-	
	58	Sri Piyarathana M/w	9	32	-	
H1	28	Hathagala rd	-	3		Selection of re-planting locations were in progressed
H2	6	Anamanduwa-Aranwela	1	-	-	Ten trees have been planted in Uswewa School.
	7	Pattiyawela Tarapeliya	2	-	-	
	22	Uswewa-Binkama	2	1	-	

	34	Kadurupokuna-Seenimodara	1	23	-	
	35	Pattiyapola-Talunna	1	-	-	
H3	Removal of trees not been identified.					

Conclusion and Recommendations

10. Conclusion and Recommendations

The iROAD(SP), have 9 contact packages which are distributed from coastal to highlands of the Sothern Province, Sri Lanka. The iROAD(SP) was the pilot project which was the CSD concept has been practicing and applying through above contact packages. The CSD concept is new and it was successfully introduced to the project by conducting several CSD related workshops and onsite practical sessions.

Environmental safeguard is the major component of the iROAD(SP) project, its compliance with Sri Lankan law and ADB safeguard policies. Regular monitoring of environmental conditions and compliances of the Southern Province road construction sites were enable to protect and conserve unique ecosystems. Educating and awareness programs conducted to public will keep up the safeguard of the environment.

Following are recommend to the iROAD(SP) to keep up its quality and assurance of the environmental safeguard.

- Regular monitoring of the road construction sites that the contractors are compliance with approved EMAP.
- Education and awareness programs to public on environment safeguard.
- Record keeping and reporting of environmental related activities.
- Dissemination of the knowledge.
- Onsite training regarding environment safeguard to the staff.
- Additional environmental officers/ assistants based in district level are recommended for district level monitoring.

Appendixes

9. Appendixes

Appendix 01. CSD workshop 01 attendance sheet front page.

PROJECT: LOAN 3171 – SRI: INTEGRATED ROAD INVESTMENT PROGRAMME – TRANCHE 1

REHABILITATION / IMPROVEMENTS OF RURAL ROADS IN
GALLE, MATARA & HAMBANTOTA DISTRICTS –
CONTRACT 1 INCLUDING PERFORMANCE BASED MAINTENANCE FOR THREE YEARS

WORKSHOP ON SAFEGUARDS
HELD ON 14TH JULY 2015 AT THE HERITAGE WELIGAMA

LIST OF PARTICIPANTS

NAME	DESIGNATION	ORGANIZATION (ADB / RDA / PIC / CONTRACTOR)	E-MAIL	MOBILE NO.	SIGNATURE
1. K.H. Gamar	CR	KDAW	077305308 @gmail.com	0777630834	
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4. Asanga Dharmadasa	EO	K.D. Ebert	asanga.kdr@gmail.com	0714400038	
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10. D. Thyambarawatta	RE	MGECL	residentengineer.matara @gmail.com	0717566570	
11. M.S.K. De Silva	ARE	MG-ECL	shashyahemachandra@yahoo.co.uk	0714966761	

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CSD workshop 02 attendance sheet front page.

LOAN 3171 - SRI INTERGRATED ROAD INVESTMENT PROGRAMME - TRANCHE 1

iROADS - SOUTHERN PROVINCE

ADB FACT FINDING MISSION – 27TH JUL TO 07TH AUG 2015

PROGRESS MEETING - ELPITIYA, GALLE DISTRICT - 28 JULY 2015

LIST OF PARTICIPANTS

NAME	DESIGNATION	ORGANIZATION (ADB / RDA / PIC / CONTRACT PACKAGE)	E - MAIL	MOBILE NO.	SIGNATURE
1. Arnue Nanayakkara	Transp. SP	ADB	ananayakkara.adb...		
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3. P K Kar	CSD (Social)	ADB	pkumarkar@gmail.com		
4. Subhash C. Nigam	CSD (Safety)	ADB	Subhash C. Nigam		
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7. Asiri Gunathilaka	SPE / iRoad	RDA	asiriem@gmail.com		
8. P. C. Ranasinghe	PE / iRoad - G2	RDA	pradeepcrh@gmail.com	0718140335	
9. H.S.U. Jayarathne	PE / iroad - Ham	RDA	upuljaya@gmail.com	0716190192	
10. A.G.R.D.A. Senevirathna	M.E (Galle)	MAC	...@gmail.com	0774466328	
11. Asanga Dharmadasa	EO	KD Ebert	asangadh@gmail.com	0712402038	
12. W.A. Premaratne	P.M - M2	KD Ebert & Sons	iroad...@gmail.com	0772053793	
13. P.D.S. Nishshanka	S/O - M-3	K.D. Ebert & Sons	pdsnishshanka@gmail.com	0776292095	

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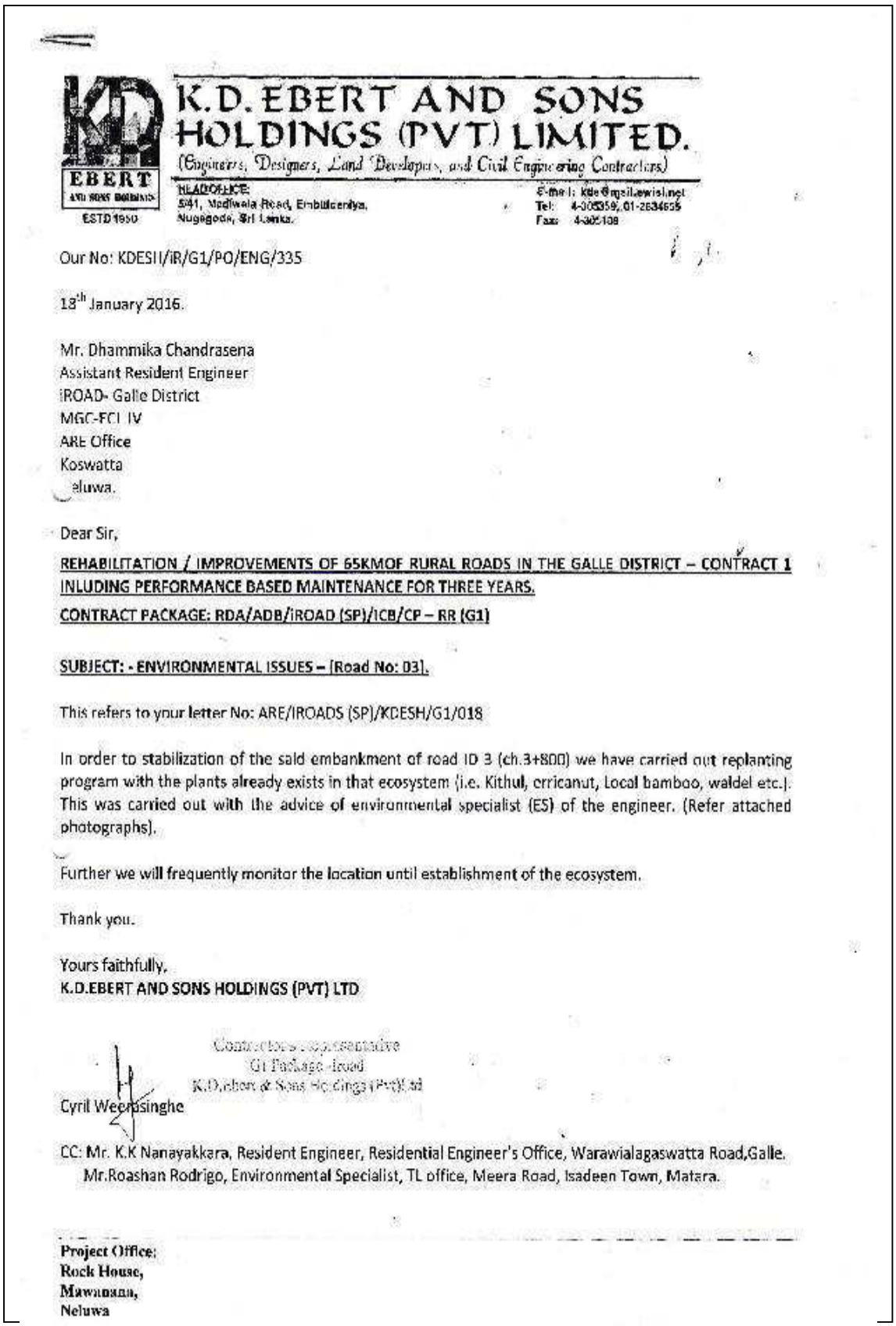
Appendix 2. Excavated soil dumped into a water gully in Medagama- Koppagoda (RD ID 3) in G1 Contract Package.



K.D. EBERT AND SONS HOLDINGS (PVT) LIMITED.
(Engineers, Designers, Land Developers, and Civil Engineering Contractors)

EBERT AND SONS HOLDINGS ESTD 1950

HEAD OFFICE:
541, Madiwela Road, Embilipitiya,
Nugegoda, Sri Lanka.

E-mail: kde@mail.ewisl.net
Tel: 4-305359, 01-2634655
Fax: 4-305109

Our No: KDESH/iR/G1/PO/ENG/335

18th January 2016.

Mr. Dhammika Chandrasena
Assistant Resident Engineer
iROAD- Galle District
MGC-FCI IV
ARE Office
Koswatta
Neluwa.

Dear Sir,

REHABILITATION / IMPROVEMENTS OF 65KMOF RURAL ROADS IN THE GALLE DISTRICT – CONTRACT 1 INLUDING PERFORMANCE BASED MAINTENANCE FOR THREE YEARS.

CONTRACT PACKAGE: RDA/ADB/iROAD (SP)/ICB/CP – RR (G1)

SUBJECT: - ENVIRONMENTAL ISSUES – [Road No: 03].

This refers to your letter No: ARE/IROADS (SP)/KDESH/G1/018

In order to stabilization of the said embankment of road ID 3 (ch.3+800) we have carried out replanting program with the plants already exists in that ecosystem (i.e. Kithul, erricanut, Local bamboo, waldel etc.). This was carried out with the advice of environmental specialist (ES) of the engineer. (Refer attached photographs).

Further we will frequently monitor the location until establishment of the ecosystem.

Thank you.

Yours faithfully,
K.D.EBERT AND SONS HOLDINGS (PVT) LTD

Contractor's Representative
G1 Package -Road
K.D.ebert & Sons Holdings (Pvt) Ltd

Cyril Weerasinghe

CC: Mr. K.K Nanayakkara, Resident Engineer, Residential Engineer's Office, Warawialagaswatta Road,Galle.
Mr.Roashan Rodrigo, Environmental Specialist, TL office, Meera Road, Isadeen Town, Matara.

Project Office:
Rock House,
Mawanana,
Neluwa


13.01.2016 10:56

Appendix 3. Concrete batching pant, G3 package, Kurudugaha Hetekkma.

During site visit held on 02/11/2015 it was identified some environmental issues in Kurudugaha hatakma concrete batching plant premises, so we are submitting this proposal to avoid those effects further by our construction related activities.

Place	Issue	Mitigation Proposal
concrete batching plant premises	Truck washing place is located so closer to stream and it may be contaminated by truck cleaning process and also by disposed debris of the plant complex to the same place. (Pic 01)	It is not suitable to continue this activities in this place so we terminated washing trucks and disposing debris to the place above mentioned and washing of trucks should be done at disposal yards. Further provide a gabion wall along the stream and cover disposals with soil layer to avoid mixing to the stream. (Pic 02)
concrete batching plant premises	In settlement tank area no proper system to collect waste water to the settlement tank, it may mix waste water to the stream, because it is located so closer to the stream. (Pic 03)	Here main effort is to prevent mixing waste water to the stream. The proposal is to provide RRM wall along the stream and avoid flowing waste water to the stream. And provide proper waste water collecting system to prevent mixing waste water to the stream, further increase the size of the settling tanks to prevent overflowing the tanks. (Pic 04)

Photo 01

Photo 02

Photo 03

Photo 04

During site visit held on 02/11/2015 it was identified some environmental issues in Kurudugaha hatakma concrete batching plant premises, so we are submitting this report to inform about the progress.

Place	Issue	Mitigation Proposal	Progress	Remarks
concrete batching plant premises	Truck washing place is located so closer to stream and it may be contaminated by truck cleaning process and also by disposed debris of the plant complex to the same place.	It is not suitable to continue this activities in this place so we terminated washing trucks and disposing debris to the place above mentioned and washing of trucks should be done at disposal yards. Further provide a gabion wall along the stream and cover disposals with soil layer to avoid mixing to the stream.	Now truck washing is not done here permanently and it is done in disposal yards. The stream has cleaned and remained debris has been covered by a soil layer. And wall has constructed	Photos 05. 06,07,08 & 09
concrete batching plant premises	In settlement tank area no proper system to collect waste water to the settlement tank, it may mix waste water to the stream, because it is located so closer to the stream.	Here main effort is to prevent mixing waste water to the stream. The proposal is to provide RRM wall along the stream and avoid flowing waste water to the stream. And provide proper waste water collecting system to prevent mixing waste water to the stream, further increase the size of the	Proposed wall has constructed it has provided proper waste water collecting system and it has increased the depth of the tanks to avoid overflowing water.	Photos 10 &11

		settling tanks to prevent over flowing the tanks.		
Generator Room	Noise of generator is high	Provide a silencer and cover it by sound proof material.	Proposed silencer has provided and generator has covered.	Photos 12, 13, 14 & 15

Photo 05

Photo 06.

Photo 07

Photo 08

Photo 09

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14

Appendix 04. Front page of the public complain register, H2 package.

PIC/SGRS/CR/2

INTEGRATED ROAD INVESTMENT PROGRAM (iROAD) TRANCHE 1, SOUTHERN PROVINCE
Biannual summary -Status of public Suggestions/Requests/Complaints/Grievances
01st July,2015 to December, 2015

District : Hambanthota
Contract Package : H2

No.	Serial No	Road ID No	Name of the road	Date of complaint	Complaint Received by (ie: Name and/or Designation of person/ Complaint Box/ GRC etc.)	Complaint made in Written/Verbal	Details of complainer (Name, Address, Contact Nos.) etc.	Nature of complaint(A brief description of complaint and Chain-age)	Status of action taken: Solution agreed	Status of action taken: Solution in progress	Status of action taken: Action completed	Remarks (Satisfaction of complainer with solution and/or other remarkable notes)
1	UB/01			25.08.2015	E.O	W	W.P.R Gunala, No 105/34/1, Amarathungagama, uswewa,Tangalle	Dust generation at site	✓		✓	Spread water over the location, increased the watering turnovers- Complainer satisfied
2	UB/02			11.09.2015	P.E/ ARE/ E.O	W	L.E.R.R Manarama, No 148, Binkama, Agunukolapelessa	Damaged to the existing access	✓		✓	Temporary access provided, Access will be permanently constructed during the road access are progressing at site with based to the Engineers decision - Solution agreed was informed to the complainer and they are satisfied with the agreed solution
3	UB/03			15.10.2015	P.E/ E.O	W	D L A Malini, No D 288, Binkama, Agunukolapelessa.	Requesting a proper drainage	✓	✓		Relevant approvals has been received from the Mahaweli authority and Divisional Secretariat. During the road drainages are progressing at particular location drainage will be provided based to the Engineers decision- Solution agreed was informed to the complainer and they are satisfied with the agreed solution
4	UB/04	22	Uswewa - Binkama	21.10.2015	E.O	W	K.G Jothipala, Principal, H/Uswewa College, Tangalle.	Improve the access road to school	✓		✓	Access road to the school has been rehabilitated - Requester Satisfied
5	UB/05			28.11.2015	P.E/ E.O	W	K.Sathyapala, Army, Common Service Force,Kutiagala,Padhalangala.	To fill the pot holes and to improve the access road to the camp	✓		✓	Road Maintenance Proceeding over the road, Requested access road will be repaired when the road works going at particular location with based to the Engineers decision - Maintenance works have done as the way requestee satisfied and informed them that the improving camp access will be considered when the constructions continuing at particular location.
6	UB/06			23.12.2015	P.E/ E.O	W	Uswewa Villagers	Request to widen the existing road from 8+600km to 10+000 km	✓	✓		Road works stopped due to the request of the villagers and GRC was called to discuss the matter. Estimation for the road widening has forwarded to the Engineer for approval- Relevant designs and drawings sent to the Mahaweli authority for the approvals- Informed to the complainers.
7	UB/07			08.01.2016	E.O	W	Karanawala-Hean Ara Villagers	Rehabilitate the concrete pavement as per the damages due to water bowser transportation	✓	✓		E.O visited the location and agreed to repair the road after utilizing the road for water bowser transportation- Complainer agreed with the solution
8	BF/01			22.05.2015	E.O	V	Gamunu Farmers committee	To reconstruct the removed retaining wall in a coarse way	✓	✓		Informed the Mahaweli authority and requested a relevant design proposal for the construction- Relevant design drawings sent to the approval of Engineer

Appendix 5. EMC, G3 package, Goluwamulla to Etakohota road, RD ID 40, Elpitiya.

Environmental Monitoring Checklist (EMC) - iROADS project- Southern Province
Design and pre- construction stages

District:	Galle	**Road ID:**	40
Contractor:	K.D.A.Weerasinghe & Co (PVT) Ltd	**Total length**	2.2 km
Package no:	G3	**Date:**	27/07/15
Road name:	Goluwamulla – Atakotota Road	**Completed by:**	EE/QAM

Environmental attribute	Location (change, GPS point, landmark)	Identified problem or feature	Proposed mitigation measure/action	Compliance status (complied, partly complied, To be completed.)	Corrective action proposed if any	Responsible person	Remarks
1. Climate change considerarion and vulnerability screening	0+092 RHS	RHS Head wall damaged	To be re-construct	To be completed.	None	Des. Eng. / SE	Image 01
	0++145 to 0+240 LHS	Very old boundary wall at LHS. Offset is average 4.5m.	Monitoring is required when apply vibration rollers. If damage while construction, it is required to re-construct the wall.	To be completed.	None	SM / Safety officer / SE	Image 02

	0+242 LHS	Culvert inside damaged at near headwall.	Head wall to be re-construct and deck slab may need to extend while road edge widening.	To be completed.	None	Des. Eng. / SE	Image 03
2. Clearing of vegetation and removing trees		None			None		
3. Shifting utilities		None			None		
4. Impacts to common properties		None			None		
5. Hydrology and drainage	0+500 to 0+550 LHS & RHS	Rain water running on the road.	Either side drains system to be improved.	To be completed.	None	Des. Eng. / SE	Image 04
	0+900 to 0+950 LHS	Rain water running on the road.	Drains system has to be improved.	To be completed.	None	Des. Eng. / SE	Image 05
	1+470 to 1+520 LHS	Drains are not functioning.	Drains system has to be improved.	To be completed.	None	SE	Image 06
	1+580 to 1+640 LHS	Drains are silted with soil.	Drains to be clean and re-build.	To be completed.	None	Des. Eng. / SE	Image 07

4

	1+610 to 1+640 RHS	Drains are silted with soil.	Drains to be clean and re-build.	To be completed.	None	Des. Eng. / SE	Image 08
	1+655 LHS	Surface water coming through an access road and coming to the road. No cover slabs. Concrete drain fully silted.	Concrete cover slabs to be place for access road. Drain system should be improved.	To be completed.	None	Des. Eng. / SE	Image 09
	2+162 to 2+300 RHS	Concrete Darin fully silted.	Drain should be clean and if need; to be repair after cleaning.	To be completed.	None	Des. Eng. / SE	Image 10/11
6. Grievance redress		None			None		

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Appendix 06. Project approval letter, CEA.

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மத்திய சுற்றாடல் அதிகாரசபை
Central Environmental Authority

Director General,
Road Development Authority,
"Sethsiripaya"
Battaramulla

24 AUG 2015

REHABILITATION OF RURAL ROADS IN SOUTHERN PROVINCE UNDER INTEGRATED ROAD PROGRAM OF ROAD DEVELOPMENT AUTHORITY

This has reference to your letter No. RDA/ADB/iROAD/SP/ENV dated 11.08.2015 and to the information attached therein regarding road projects under the above Programme.

a) As per the information provided by you, the road projects to be rehabilitated (as described in **Annex** 2 attached to the above letter) do not require to undergo Environmental Impact Assessment or Initial Environmental Examination approval process under the National Environmental Act.

However, in order to mitigate any environmental impacts from the above projects, we advise you to adhere to the guidelines given in the attachment No.01 to this letter. Please incorporate these guidelines in the contract documents, so that the contractor or sub contractor is held responsible for carrying them out during construction and on completion of the work.

b) You are also advised to obtain recommendations from the Department of Wildlife Conservation and/or Forest Department in order to abide by the regulations under Flora & Fauna Protection Ordinance and/or Forest Ordinance if any section of above roads falls within or in the proximity of such Protected Area/ Forest Reserve administered by the above Departments.

Gamini Jayasinghe
Deputy Director General (EMA)
CENTRAL ENVIRONMENTAL AUTHORITY

Cc :
1. Conservator General of Forest/ Forest Department
2. Director General/ Department of Wild Life Conservation
3. Director, Environment & Social Division/ RDA
4. Project Director / Road Project/ RDA
5. Deputy Director/ Southern Provincial Office/ CEA

GUIDELINES

1. LAND FILLING/ SPOIL DISPOSAL

1.1 If the project activities involve reclamation of paddy lands prior approval should be obtained from the Agrarian Development Department.

1.2 Excavated material, excess top soil or material generated due to demolishing of structures should not be disposed as road sides or into water ways or at a site where it is likely to enter a water body. These materials shall be stockpiled at suitable locations and removed from the site to suitable disposal grounds/landfill sites in nuisance free manner.

1.3 Suitable disposal ground/land fill sites should be identified and approval should be obtained from the relevant Local Authority and other relevant authorities before commencing any kind of clearing activity.

1.4 Loading and unloading of materials such as soil, boulders etc. should be restricted to the time between 6.00hrs to 22.00 hrs only.

2. EXCAVATION, HANDLING, PROCESSING OF MATERIALS

2.1 For operation of quarry sites and borrow areas approvals should be obtained from relevant authorities such as Geological Survey & Mines Bureau (GS & MB), Local Authority, Divisional Secretariat and CEA.

2.2 All blasting/ quarrying activities shall be carried under approval and supervision of GS & MB.

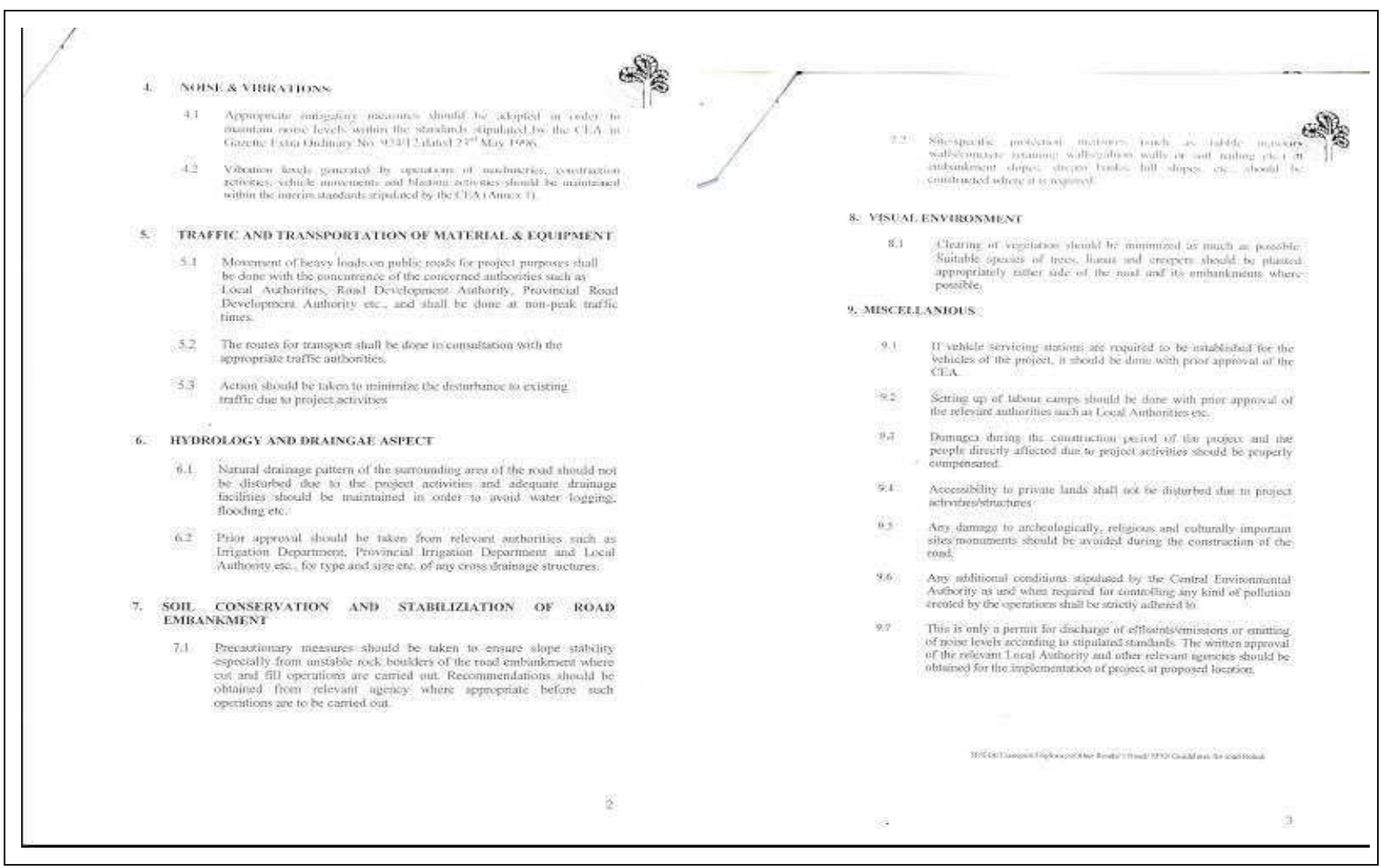
2.3 Required approval/ Licence for operation of asphalt plants, crusher plants and concrete bat ching plants should be obtained from the CEA.

3. Air Quality

3.1 All the materials (sand, soil, rubble, metal, cement etc) required for the construction shall be stored with proper covers to minimize dust emissions.

3.2 The loaded trucks should be covered while on transport in order to reduce the possibility of dust emission.

3.3 During dry periods it is necessary to dampen the exposed areas of roads at regular intervals to prevent emission of dust.



4. NOISE & VIBRATIONS

4.1 Appropriate mitigatory measures should be adopted in order to maintain noise levels within the standards stipulated by the CEA in Gazette Extra Ordinary No. 924/12 dated 23rd May 1996.

4.2 Vibration levels generated by operations of machineries, construction activities, vehicle movements and blasting activities should be maintained within the interim standards stipulated by the CEA (Annex 1).

5. TRAFFIC AND TRANSPORTATION OF MATERIAL & EQUIPMENT

5.1 Movement of heavy loads on public roads for project purposes shall be done with the concurrence of the concerned authorities such as Local Authorities, Road Development Authority, Provincial Road Development Authority etc., and shall be done at non-peak traffic times.

5.2 The routes for transport shall be done in consultation with the appropriate traffic authorities.

5.3 Action should be taken to minimize the disturbance to existing traffic due to project activities

6. HYDROLOGY AND DRAINGAE ASPECT

6.1 Natural drainage pattern of the surrounding area of the road should not be disturbed due to the project activities and adequate drainage facilities should be maintained in order to avoid water logging, flooding etc.

6.2 Prior approval should be taken from relevant authorities such as Irrigation Department, Provincial Irrigation Department and Local Authority etc., for type and size etc. of any cross drainage structures.

7. SOIL CONSERVATION AND STABILIZIATION OF ROAD EMBANKMENT

7.1 Precautionary measures should be taken to ensure slope stability especially from unstable rock boulders of the road embankment where cut and fill operations are carried out. Recommendations should be obtained from relevant agency where appropriate before such operations are to be carried out.

2

7.2 Site-specific protective measures, such as rubble masonry walls/concrete retaining walls/gabion walls or soil nailing etc.) on embankment slopes, deeper trenches, hill slopes, etc., should be constructed where it is required.

8. VISUAL ENVIRONMENT

8.1 Clearing of vegetation should be minimized as much as possible. Suitable species of trees, shrubs and creepers should be planted appropriately either side of the road and its embankments where possible.

9. MISCELLANIOUS

9.1 If vehicle servicing stations are required to be established for the vehicles of the project, it should be done with prior approval of the CEA.

9.2 Setting up of labour camps should be done with prior approval of the relevant authorities such as Local Authorities etc.

9.3 Damages during the construction period of the project and the people directly affected due to project activities should be properly compensated.

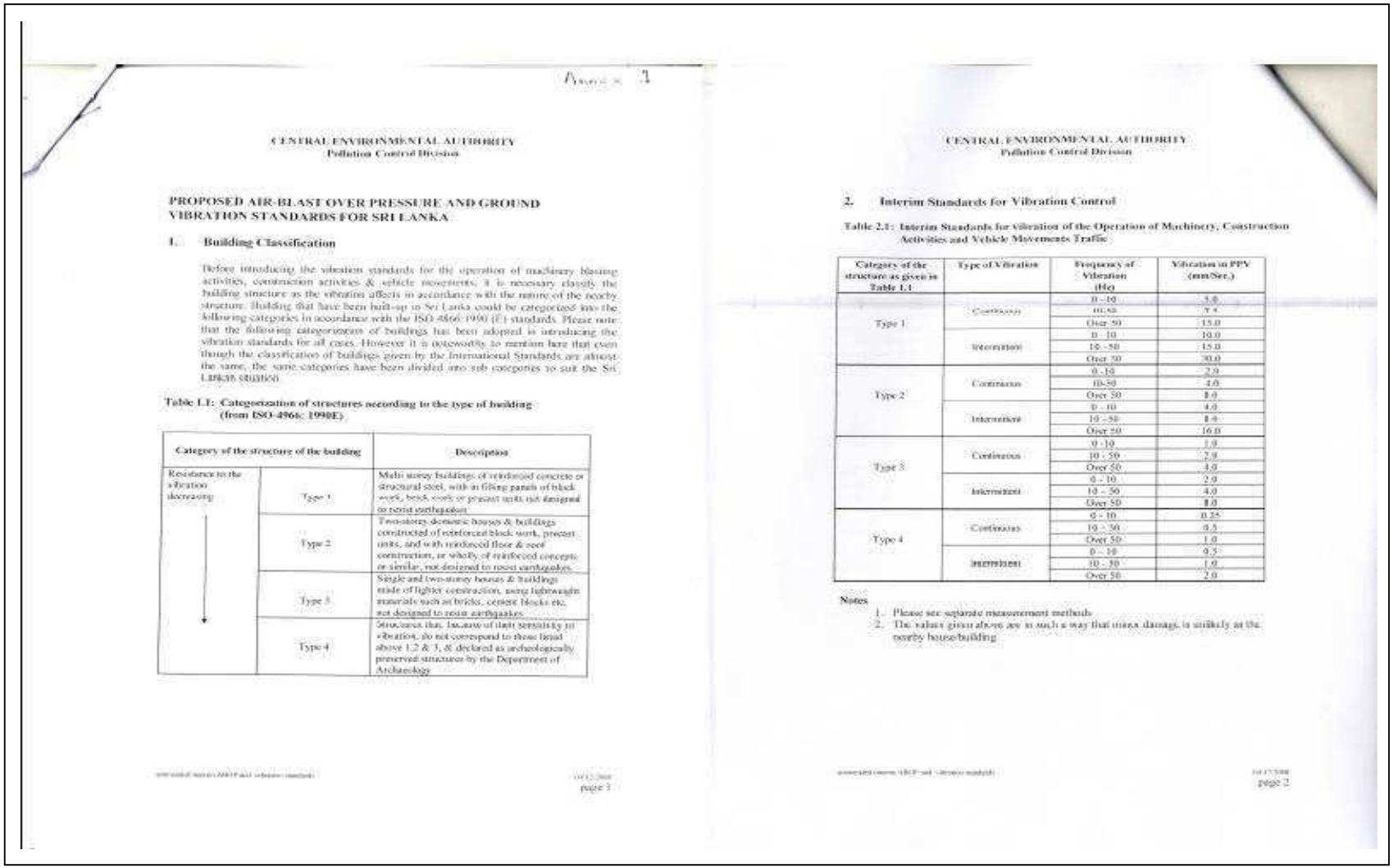
9.4 Accessibility to private lands shall not be disturbed due to project activities/structures.

9.5 Any damage to archeologically, religious and culturally important sites/monuments should be avoided during the construction of the road.

9.6 Any additional conditions stipulated by the Central Environmental Authority as and when required for controlling any kind of pollution created by the operations shall be strictly adhered to.

9.7 This is only a permit for discharge of effluents/emissions or emitting of noise levels according to stipulated standards. The written approval of the relevant Local Authority and other relevant agencies should be obtained for the implementation of project at proposed location.

3



CENTRAL ENVIRONMENTAL AUTHORITY
Pollution Control Division

PROPOSED AIR-BLAST OVER PRESSURE AND GROUND VIBRATION STANDARDS FOR SRI LANKA

1. Building Classification

Before introducing the vibration standards for the operation of machinery blasting activities, construction activities & vehicle movements, it is necessary classify the building structure as the vibration affects in accordance with the nature of the nearby structure. Building that have been built-up in Sri Lanka could be categorized into the following categories in accordance with the ISO-4866-1990 (E) standards. Please note that the following categorization of buildings has been adopted in introducing the vibration standards for all cases. However it is noteworthy to mention here that even though the classification of buildings given by the International Standards are almost the same, the same categories have been divided into sub categories to suit the Sri Lankan situation.

Table 1.1: Categorization of structures according to the type of building (from ISO-4866: 1990E)

Category of the structure of the building		Description
Resistance to the vibration decreasing	Type 1	Multi storey buildings of reinforced concrete or structural steel, with at filling panels of block work, brick work or precast units not designed to resist earthquakes
	Type 2	Two-storey domestic houses & buildings constructed of reinforced block work, precast units, and with reinforced floor & roof construction, or wholly of reinforced concrete or similar, not designed to resist earthquakes.
	Type 3	Single and two-storey houses & buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc. not designed to resist earthquakes
	Type 4	Structures that, because of their sensitivity to vibration, do not correspond to those listed above 1,2 & 3, & declared as archeologically preserved structures by the Department of Archaeology

page 3

CENTRAL ENVIRONMENTAL AUTHORITY
Pollution Control Division

2. Interim Standards for Vibration Control

Table 2.1: Interim Standards for vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic

Category of the structure as given in Table 1.1	Type of Vibration	Frequency of Vibration (Hz)	Vibration in PPV (mm/Sec.)
Type 1	Continuous	0 - 10	5.0
		10-50	7.5
		Over 50	15.0
	Intermittent	0 - 10	10.0
		10 - 50	15.0
		Over 50	30.0
Type 2	Continuous	0 - 10	2.0
		10-50	4.0
		Over 50	8.0
	Intermittent	0 - 10	4.0
		10 - 50	8.0
		Over 50	16.0
Type 3	Continuous	0 - 10	1.0
		10 - 50	2.0
		Over 50	4.0
	Intermittent	0 - 10	2.0
		10 - 50	4.0
		Over 50	8.0
Type 4	Continuous	0 - 10	0.25
		10 - 50	0.5
		Over 50	1.0
	Intermittent	0 - 10	0.5
		10 - 50	1.0
		Over 50	2.0

Notes

1. Please see separate measurement methods
2. The values given above are in such a way that minor damage is unlikely in the nearby house/building

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3. **Standards for the inconvenience of the occupants in buildings**

The frequency response of vibration of the human body is complex as explained in chapter 6. However, approximate response curves (basic curve) for Z axis are given in SIS 6172: 1992. These are given in terms of base curves, which may be close to the threshold of perception for majority of people.

Table 6.1: Base curve in relation to preparing of interim vibration for the inconvenience of the occupants in building when from SIS 6172: 1992

Frequency Hz	PPV (mm/sec)
1	2.25
1.25	1.61
1.6	1.11
2.0	0.796
2.5	0.569
3.15	0.402
4.00	0.281
5.00	0.225
6.30	0.179
8.00	
10.00	
12.50	
16.00	
20.00	
25.00	
31.00	
40.00	
50.00	
63.00	

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Table 2.2: Interim Standards on Air Blast Over Pressure and Ground Vibration for Blasting Activities

Category of the structure as given in Table 6.1	Type of Vibration	Type of Blasting	Ground Vibration in PPV (mm/sec)	Air blast over Pressure (dB (L)
Type 1	Impulsive	Single bore hole	8.0	105
		Multi bore hole with delay detonators	10.0	115
Type 2	Impulsive	Single bore hole	6.0	103
		Multi bore hole with delay detonators	7.0	113
Type 3	Impulsive	Single bore hole	4.0	115
		Multi bore hole with delay detonators	5.0	120
Type 4	Impulsive	Single bore hole	0.5	95
		Multi bore hole with delay detonators	0.75	100

Note

1. Please see separate measuring methods
2. The values given above at such a way that minor damage to unlikely to occur in the nearby house/building

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Table 3.2 Multiplying factors use to specify magnitudes of building vibration with respect to human response using the base curve in Table 3.1

Place	Time	Multiplying factors		
		Continuous vibration (day time and night time)	Impulsive vibration (number of occurrences per day)	Intermittent vibration
Critical working areas (e.g. hospital operating theatres, precision laboratories)	Day	1	1	1
	Night	1	1	1
Residential	Day	30	30	30
	Night	1	1	1
Office	Day	60	60	60
	Night	60	60	60
Workshop	Day	90	90	90
	Night	90	90	90

Note * "day time" from 0600 to 1800h
"night time" from 1800h to 0600h

Table 3.3: Interim standards on vibration for the inconvenience of the occupants in buildings

Place	Time	Multiplying factors		
		Continuous vibration (day time and night time)*	Impulsive vibration (max. of three occurrences per day)	Intermittent vibration
Critical working areas	Day & Night	0.141	0.141	0.141
Residential	Day	0.705	5.660	2.820
	Night	0.282	1.410	0.705
Office	Day & Night	0.846	11.280	4.230
Workshop	Day & Night	1.41	1.41	7.05

Note * " day time" from 0600 to 1800h
" night time" from 1800h to 0600h

All values are frequency weighted to vertical axis

Appendix 07. Establishing of GRCs

District	Package	Total No. of DSDs	GRCs at DSD level		Total No. of GNDs	GRCs at GND level	
			GRCs established	GRCs to be established		GRCs established	GRCs to be established
Matara	M1	2	2	0	48	48	0
	M2	6	5	1	20	16	4
	M3	7	6	1	25	24	1
Sub total		15	13	2	93	88	5
Galle	G1	4	4	0	24	21	3
	G2	6	5	1	18	14	4
	G3	8	8	0	42	36	6
Sub total		18	17	1	84	71	13
Hambantota	H1	5	4	1	19	11	8
	H2	4	2	2	18	18	0
	H3	3	3	0	14	10	4
Sub total		12	9	3	51	39	12
Total		**45**	**39**	**6**	**228**	**198**	**30**

Appendix 08. Summary of progress of public grievances including; number of complaints received, solved, pending and number which was sent to GRCs

District	Package	No. of roads	No. of Grievances	No. of Requests	No. of Suggestions	No. of Complaints	Total	No. of Completely settled	Solutions in progress
Galle	G1	10	0	26	9	13	48	14	34
	G2	5	39	39	15	21	114	37	77
	G3	8	0	47	0	27	74	13	61
Sub Total		**23**	**39**	**112**	**24**	**61**	**236**	**64**	**172**
Matara	M1	16	0	26	18	53	97	35	62
	M2	4	0	1	2	14	17	16	1
	M3	8	0	0	0	17	17	11	6
Sub Total		**28**	**0**	**27**	**20**	**84**	**131**	**62**	**69**
Hamba-ntota	H1	5	0	8	0	19	27	21	6
	H2	7	0	14	1	7	22	12	10
	H3	3	1	14	9	3	27	26	1
Sub Total		**15**	**1**	**36**	**10**	**29**	**76**	**59**	**17**
Total		**66**	**40**	**175**	**54**	**174**	**443**	**184**	**259**