



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

June 4, 2014

Dear LDCF/SCCF Council Member:

ADB as the Implementing Agency for the project entitled: *Timor Leste: Upscaling Climate-Proofing in the Transport Sector in Timor-Leste: Sector Wide Approaches under the Regional: Climate Proofing Development in the Pacific*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with ADB procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by LDCF/SCCF Council in July 2013 and the proposed project remains consistent with the Instrument and LDCF/SCCF policies and procedures. The attached explanation prepared by ADB satisfactorily details how Council's comments have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

for Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee



REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

For more information about GEF, visit TheGEF.org

PART I: PROJECT INFORMATION

Project Title: Upscaling Climate-Proofing in the Transport Sector in Timor-Leste: Sector Wide Approaches			
Country(ies):	Timor-Leste	GEF Project ID: ¹	5773
GEF Agency(ies):	AsDB (select) (select)	GEF Agency Project ID:	
Other Executing Partner(s):	Counsel for Administration of Infrastructure Projects; Ministry of Public Works	Submission Date:	2014-05-07
GEF Focal Area (s):	Climate Change	Project Duration(Months)	48
Name of Parent Program (if applicable):	Climate Proofing Development in the Pacific	Project Agency Fee (\$):	364,800
	<ul style="list-style-type: none"> ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/> 		

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Cofinancing (\$)
CCA-1 (select)	1.2 Reduced vulnerability to climate change in development sectors.	1.2.1 Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability	LDCF	3,259,000	88,080,000
CCA-2 (select)	2.1 Increased knowledge and understanding of climate variability and change induced threats at country level and in vulnerable areas.	2.1.1 Risk and vulnerability assessments conducted and updated	LDCF	521,000	7,660,000
CCA-2 (select)	2.2 Strengthened adaptive capacity to reduce risks to climate-induced economic losses	2.2.1 Adaptive capacity of national and regional centres and networks strengthened to rapidly respond to extreme weather events	LDCF	780,000	23,010,000
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
(select) (select)			(select)		
Total project costs				4,560,000	118,750,000

B. PROJECT FRAMEWORK

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

Project Objective: The Objective of the Project is to reduce the vulnerability of road infrastructure in Timor Leste through the implementation of the NAPA.

Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Cofinancing (\$)
Component 1: Strengthening the climate resilience of infrastructure	Inv	Outcome 1: The Manatuto to Natabora road link climate proofed	<p>Baseline: Reconstruction and rehabilitation of the Manatuto-Natarbora link road (90 km).</p> <p>LDCF Alternative: Output 1.1 Drainage infrastructure upgraded to account for climate change.</p> <p>Output 1.2 Road base and road surface adapted to account for increased rainfall intensity, localized flooding and increased prevalence of drought and flooding conditions.</p> <p>Output 1.3 Slope stability enhanced to account for climate change.</p>	LDCF	3,000,000	83,800,000
Component 1: Strengthening the climate resilience of infrastructure	Inv	Outcome 2: Road maintenance programmes contribute to climate resilience	<p>Baseline: Performance based maintenance of the Manatuto-Natarbora link road (90 km) demonstrated and associated capacity built to ensure sustainability.</p> <p>LDCF Alternative: 2.1 Performance based maintenance of the Manatuto-Natarbora link road (90 km) – that ensures resilience to climate change - is demonstrated and associated capacity is built to ensure sustainability</p>	LDCF	146,000	4,280,000
Component 2:	TA	Outcome 3: Capacity	Output 3.1 A trained	LDCF	468,000	7,160,000

<p>Enabling adaptation through improved decision-making and knowledge development</p>		<p>to identify, plan, appraise, design and implement climate change adaptation measures for road infrastructure projects</p>	<p>cadre of policy-makers, planners and design engineers in the Ministry Public Works with capacity to mainstream climate change into their Operations.</p> <p>Output 3.2 A practical tool (i.e. ministerial Guidelines) for use by planners and design engineers, to mainstream climate change into their operations.</p> <p>Output 3.3 Knowledge and understanding of climate change, of the impacts of climate change on road infrastructure, and of how to adapt to climate change.</p> <p>Output 3.4 Effective working linkages between road transport sector professionals and climate change sector professionals.</p> <p>Output 3.5 Capacity to support bioengineering schemes and watershed-wide, community implemented programmes that increase climate resilience and ecosystem Strength.</p>			
<p>Component 3: Reducing infrastructure vulnerability through ecosystem-based adaptation</p>	<p>TA</p>	<p>Outcome 4: Improved Watershed Management at Hotspots Contributing to Infrastructure Climate Resilience and Generating Co-benefits in terms of</p>	<p>Output 4.1 Improved watershed management and protected road infrastructure at Manelima Suco.</p> <p>Output 4.2 Improved watershed management and protected road</p>	<p>LDCF</p>	<p>725,000</p>	<p>22,510,000</p>

		Livelihoods and Ecosystem Strength	infrastructure at Turlalan Aldea, Orlalan Suco. Output 4.3: Improved watershed management and protected road infrastructure at Cetula Aldea, Fatumakerek suco.			
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
	(select)			(select)		
Subtotal					4,339,000	117,750,000
Project management Cost (PMC) ³				(select)	221,000	1,000,000
Total project costs					4,560,000	118,750,000

C. SOURCES OF CONFIRMED COFINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)

Please include letters confirming cofinancing for the project with this form

Sources of Co-financing	Name of Co-financier (source)	Type of Cofinancing	Cofinancing Amount (\$)
National Government	Government of Timor-Leste	Investment	68,750,000
GEF Agency	Asian Development Bank (Asian Development Fund)	Soft Loan	10,000,000
GEF Agency	Asian Development Bank (Ordinary Capital Resources)	Hard Loan	40,000,000
(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
(select)		(select)	
Total Co-financing			118,750,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) ²	Total c=a+b
AsDB	LDCF	Climate Change	Timor-Leste	4,560,000	364,800	4,924,800
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0

³ PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				4,560,000	364,800	4,924,800

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

² Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Cofinancing (\$)	Project Total (\$)
International Consultants	280,000	2,880,000	3,160,000
National/Local Consultants	360,000	652,500	1,012,500

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF⁴

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

The Project was approved through a GEF Program Framework Document (PFD), not a PIF. The PFD covered three countries, hence, it provided limited details on each individual project. More details are provided in the following sections.

The Project contributes to the implementation of national development plans, national transport infrastructure and national plans to adapt to climate change.

In Timor-Leste, the principal development policy and plan is the Timor-Leste Strategic Development Plan, 2011-2017 (SDP), issued in 2011. The SDP establishes the importance of rapidly improving road infrastructure in the country “the poor state of our roads is increasing transport costs and impeding economic growth and the reduction of productivity at national, regional and local levels”. The SDP underlines the current inadequate construction, rehabilitation, maintenance standards for roads. Further, it specifies that upgrading the Manatuto-Natarbora road link to international standards is a priority. The SDP also identifies the importance of adapting to climate change, stating that “climate change presents environmental and political challenges for Timor-Leste”. It identifies the potential impacts of climate change on infrastructure.

These priorities are confirmed in the current Government’s program, The Program of The Fifth Constitutional Assembly 2012-2017. This Program re-emphasizes the importance of good infrastructure for development in general, and the Manatuto-Natarbora road link in particular. This Program identifies the nation’s vulnerability to climate change.

⁴ For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question

associated increased risk of flooding and landslides.

Since the late 2000s, the Government has undertaken several planning studies covering road infrastructure, with international partners led by ADB. A comprehensive series of financial, social and economic studies identified and developed the strategic approach to upgrading the nation's road network – covering both national and regional roads. ADB-financed “Preparing the Road Network Development Project” led to the preparation of a (draft) National Road Master Plan (2009). This Project also undertook pre-feasibility assessments of several road sections, and underpinned the Change Assessment of road transport infrastructure (see below). These studies determined that the lack of reliable (north-south) road links is a major obstacle to social and economic development. Accordingly, upgrading the Natarbora road link to climate resilient, international standards was identified as a priority infrastructure requirement.

In the climate change sector, Timor-Leste completed its National Adaptation Programme of Action (NAPA) on Climate Change (NAPA) in 2009. The NAPA analysis concludes that Timor-Leste's road infrastructure is highly vulnerable to disasters, and that this vulnerability will increase with climate change. It notes that storms in 2008 destroyed roads underlying the vulnerability of road infrastructure to climate related disasters and climate change. Further, the NAPA identified eight priorities, including: Priority #7 - Physical Infrastructure: Improved Regulations and Standards for Resilient Infrastructure. This Project is fully in line with that priority.

The Government of Timor Leste (GoTL) has finalized its Initial National Communication (INC) to the UNFCCC. The final report is planned to be submitted to the UNFCCC Secretariat in Mid 2014 following final approval by the Ministers (CoM). The Third Progress Report (2 June 2013) on the INC states “change in the rainfall pattern along with more intense storm activity may bring damages and losses to infrastructures usually used to support activities in many sectors.” The INC has also mapped the most vulnerable sucos (administrative level above the village but below the district) in Timor-Leste – a mapping that is used in the selection of demonstration sites in this Project.

As mentioned above, the “Preparing the Road Network Development Project” developed a comprehensive climate change assessment (See Volume III) of the road network. The main findings were that inland roads in Timor-Leste were increasingly affected by land slides and flooding, as a result of the increased frequency and intensity of rainfall associated with climate change. It was found that almost all roads in Timor-Leste would be affected. The Project assesses and recommends a series of adaptation options. This Project follows those recommendations.

Finally, in recent years, the GoTL has been strengthening its capacity for disaster risk reduction and management. Significant natural hazards include floods and landslides. Recent studies (See Appendix 1-End note 1) identify Manatuto District to be highly vulnerable to these and other hazards, and hence is a priority district for intervention. Manatuto is exposed to the following hazards: floods, coastal erosion, tsunamis, strong wind, drought, earthquake, landslide and fires. This Project focuses on infrastructure in Manatuto District and is therefore aligned to national policy on disaster risk reduction and management.

A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities.

This Project is consistent with the GEF's Adaptation Strategy to support developing countries to increase resilience to climate change through both immediate and longer-term adaptation measures in development policies, plans, programs, projects and actions. This Project will specifically address the LDCF priority of infrastructure.

This Project is consistent with guidance from the Conference of Parties (CoP) and is in alignment with Timor-Leste's NAPA and its INC. It conforms with CoP guidance for the LDCF, as it implements high priority interventions to assist urgent adaptation needs in an identified priority area, i.e. infrastructure development. Also, it supports capacity building for preventive measures in areas prone to extreme weather events.

In line with CoP and LDCF guidance, this Project catalyses and leverages co-financing resources from domestic and international multilateral sources. The GEF/LDCF financing helps to cover the additional costs of achieving sustainable development that are imposed on Timor-Leste by the impacts of climate change. Moreover, as set out in the following sections, the LDCF activities are country-driven, cost-effective, and will integrate climate change risk considerations into infrastructure projects in areas with high poverty. These are priority interventions and eligible under the LDCF guidelines.

The Project focus of safeguarding Timor-Leste's road transport infrastructure against future climate risk by pursuing a range of adaptation measures in the field of infrastructure resilience and capacity development is aligned with the scope of expected interventions as articulated in the LDCF programming paper.

As climate impacts fall disproportionately on the poor, the project recognizes the link between adaptation and poverty reduction (GEF/C.28/18, 1(b), 29), and the main ultimate beneficiaries are the poor people in Timor Leste. Specifically, this Project contributes to the LDCF Focal Areas/Outcomes. See Table 1, Appendix 1.

A.3 The GEF Agency's comparative advantage:

ADB in Timor-Leste

Since the referendum on independence in 1999, the ADB has been the lead agency in the road transport infrastructure sector in Timor Leste. It has provided six technical assistance projects, three project grants, one sector grant and one loan financed project. It is currently undertaking feasibility studies and detailed design studies for several important road rehabilitation projects critical to the nation's development. Through this support, ADB has established itself as the leading policy and capacity advisor to the government, a position from which it can advocate on climate change issues and provide capacity development related to climate change. Notably, the ADB played a key role in establishing the Project Management Unit (described later) – the principal national agency responsible for designing road infrastructure and overseeing its construction and rehabilitation.

Through the ongoing ADB's Country Partnership Strategy, 2011–2015, ADB continues its strategic directions in Timor-Leste by concentrating on infrastructure development and management. In addition, through this period, ADB plans to provide complementary assistance to finance, regional cooperation and integration, and education, and will support the private sector as a key driver of change to help Timor-Leste make the transition from a public-sector-led economy. To help drive change, the Strategy will selectively support the following drivers of change: good governance and capacity development, gender equity, knowledge solutions, and partnerships.

ADB's Timor-Leste's Resident Mission (TL) has a full-time Principal Infrastructure Specialist to lead monitoring of Project implementation. Moreover, the national Senior Portfolio Management Officer has extensive in-country experience in relation to climate change programs (including past involvement in NAPA preparation). This role is to ensure the optimal approach to adaptation is taken and to ensure coordination and collaboration with related initiatives.

ADB and Climate Change Adaptation in the Transport Infrastructure Sector

ADB's Long-Term Strategic Framework (Strategy 2020), includes environmentally sustainable growth as one of its three strategic agendas (the others are inclusive growth and regional integration). With respect to climate change, ADB has adopted an integrated approach—addressing both climate change mitigation and adaptation, facilitated by financing, knowledge generation, and partnerships. This focuses on five priorities: clean energy, encouraging sustainable transport and urban development, managing land use and forests for carbon sequestration, promoting climate-resilient development, and strengthening related policies and institutions. Accordingly, ADB has a broad range of experience and expertise related to climate change and transport infrastructure.

In promoting climate-resilient development, ADB seeks to ensure that its development objectives will be achieved across a wide range of potential climatic conditions. Hence, the ADB promotes adaptation activities that work to eliminate poverty and build a climate-resilient Asia-Pacific. Across the region, the solutions include investing in water supply, sanitation, irrigation, flood control, transport and energy infrastructure that builds resilience to current and future climate variability. The broad approach also includes investment in sectors such as health and education in order to improve countries' capacity to adapt. By assisting vulnerable communities and economic sectors in coping with climate variability and extremes, ADB is strengthening countries' resilience to the long-term and uncertain impacts of climate change. Examples of ADB projects in this area can be found at: <http://www.adb.org/themes/climate-change/climate-resilience>.

In recent years, ADB has developed several knowledge management tools in order to advance understanding of the approaches and choices for adapting to climate change, many with relevance to the situation in Timor-Leste and to transport. The results of these studies are integrated into this Project strategy, approach and design. These include:

- Climate Proofing: A Risk-based Approach to Adaptation (2005);
- The Economics of Climate Change in Southeast Asia: A Regional Review (2009);
- Climate-Proofing Timor-Leste's Roads (2010); and,
- Guidelines for Climate Proofing Investments in the Transport Sector – Road Infrastructure Projects (2011).
- The Economics of Climate Change in the Pacific (2013)

Finally, ADB has recently undertaken, or collaborated with, several more general climate change adaptation knowledge management tools, notably:

- AWARE Tool: Aware for Projects is a web-based, rapid climate risk screening tool;
- The Regional Climate Projections Consortium and Data Facility: ADB is facilitating the development of this regional climate projections consortium and data facility. The Facility aims to provide improved access to scientifically robust and well documented climate data and scenarios, accompanied with capacity building and user services;
- Technical Resources on Adaptation: ADB is developing technical resources to assist both its operational staff and its developing member countries (DMC) partners in managing climate risks confronting their investment projects. These resources encompass guidance materials, technical notes, and case studies on integrating climate change adaptation actions and climate proofing vulnerable investments in critical development sectors.

ADB in the Pacific Region – the Pacific Climate Change Program (PCCP)

ADB's PCCP supports a three-pronged strategy:

- (i) Immediate attention to fast-tracking and scaling up climate change adaptation and mitigation investment, involving: climate proofing of ongoing and planned infrastructure projects of ADB and contributing development partners, promotion of renewable energy through new technology and research and development, and working with partners to manage land, water, forests and coastal and marine resources, including REDD+;
- (ii) Building capacity to strengthen the knowledge, skills, and practices of sectoral agencies and communities in various climate change-related fields to enable integration of climate change into development plans and programs; and,
- (iii) Promoting more effective development partner responses by coordinating and harmonizing their responses, sharing best practices, and helping developing member countries (DMC) to access funding from other global financing facilities. The PCCP provides the platform for a multi-donor technical and financial assistance facility to support DMCs in project development and implementation, as well as to extend start-up and catalytic financing through deploying staff and engaging long-term consultants to work with DMCs.

A.4. The baseline project and the problem that it seeks to address:

As mentioned in the SDP, development of road infrastructure is a priority for development, stability, food security and poverty reduction in Timor-Leste. As stated above, the “Preparing the Road Network Development Project” led to the preparation of a (draft) National Road Network Master Plan. As stated in this draft document, “Roads play a vital role in the economy and country integration of Timor-Leste. Roads are the primary mode of transport, carrying about 90% of passengers and 70% of freight. The Ministry of Infrastructure (MOI) data indicates that the Core Network comprises of 1,426 km of National Roads, and 869 km of District Roads. The National Road Network, linking the thirteen national districts, comprises of the two, northern and southern, coastal roads; and five roads traversing north-south, connecting the two coastal roads. The District Roads link secondary population centres to the National Roads. The Core Network is supplemented by 716 km of Urban Roads, largely in Dili, and in several other smaller towns. The Rural Roads, about 3,000 km in length, provide access to villages and the more remote areas.”

Moreover, the Project determined the roads to be in very bad condition, “According to a road condition survey of the Core Network conducted by this study in 2008/09, almost the entire Core Road Network has deteriorated into a condition that is no longer maintainable.... only about 8% of the Core Roads are in fair condition, about 22% in poor condition, and about 70% in very poor condition.” Another key challenge facing road transport development is the terrain – land in Timor-Leste includes a large proportion of steep lands and many narrow valleys.

Preparing the Road Network Development Project assessed the feasibility of rebuilding/upgrading 62 road transport links in Timor-Leste, representing the major part of the national network. It established a 10-year plan, consisting almost entirely of rehabilitating and upgrading existing road links (i.e. no major plans to construct new roads). Many of the priority links, and current status, are described in Table 2 of Appendix 1. One key priority is to ensure good transport links connecting the north and south coasts – currently there are no good roads providing this link. The map in Figure 1 (See Appendix 1) illustrates the priorities being supported by ADB.

This 10-year plan forms the foundation for the baseline Project on which the LDCF funds are to build.

The Manatuto to Natarbora Link Road

The Manatuto to Natarbora via Laclubar Junction is one of the priority coast-to-coast roads identified in the draft Plan. It is a National road approximately 80 km in length. The Laclubar Junction to Laclubar road is a District road approximately 10 km in length.

The Manatuto – Natarbora road (National Road A-09) is a central north-south link, crossing Manatuto district. Its poor condition is a major barrier to the development of Manatuto District, and it hinders the development of the south coast. Starting from the north, National Road A-09 begins at a roundabout intersection on the outskirts of Manatuto at an elevation of approximately 50m a.s.l. From there it veers inland in a southern direction, traversing a flat to rolling terrain during the first 22 km, and gradually ascending to Cribas Sub-District with an elevation of approximately 400m a.s.l. It continues to ascend in the same southern direction until reaching the Laclubar Junction at an elevation of approximately 1200m a.s.l., almost 35km from the Manatuto roundabout. From this point, A-09 descends, and the road-way becomes narrower, down from 4.5m to 3m. It traverses winding mountainous terrain down to Manehat District, at an elevation of approximately 850m a.s.l., about 65km from Manatuto. Then, the road continues to descend the rolling terrain until it crosses the Lamera River, approximately 75 km from Manatuto, at an elevation of approximately 150m a.s.l. From that point onwards, the road traverses a flat terrain, with fair asphalt surfacing and a wider pavement of approximately 4.5m, up to the junction with National Roads A-14 and A-07 on the edge of Natarbora.

The District Road C-15 from Laclubar Junction to Laclubar is approximately 10.3km long. It traverses a mountainous terrain with an elevation of approximately 1200m a.s.l., in a westerly direction. This road link is in very poor condition: the existing asphalt surface is heavily deteriorated, and in many places it has become a gravel road. In many places the road is narrow, approximately 3m to 3.5m.

An ongoing assessment has indicated that almost the entire length of these roads is threatened with climate related challenges: i.e. landslides, floods, scouring, debris and cracking due to floods followed by drought. Landslides occur throughout the region, and occur both close to the road (above and below) and in slopes going high above the road. In addition to climate, the key factors affecting landslides are: topography, soil type, and land-use. There is also evidence that flashfloods have caused small scale damage at many points along the road. This damage affects the drainage infrastructure, the protecting gabions and the pavement. Topography and land-use also influence this flooding. At several points the road runs parallel and slightly above small or medium-sized rivers. At some points, there is evidence of recent shifts in the course of these rivers. This has led to a scouring that is getting close to the road, and threatening to undermine it, even destroy it. Previous attempts to control this scouring with gabions have only been partially successful. In addition, heavy rainfalls, flashfloods and landslides have led to the deposit of large amounts of debris along and near the road. This can cause danger to traffic and can block drains. The situation of blocked drains is exacerbated by the apparent weakness of existing road maintenance mechanisms. Finally, in flat and low-lying sections, flooding followed by rapid drying (during drought) can lead to road cracking (if it does not have the appropriate quality of sub-base and subgrade).

The baseline project has both investment and capacity building components.

The Baseline Project: Investment Component

The Government wishes to upgrade the Manatuto to Natarbora via Laclubar Junction Road (and the Laclubar Junction to Laclubar Road) to an all-weather, surfaced two-lane road with shoulders, adhering to international standards. This will enable it, among others, to carry, at a minimum, 20-foot container trucks. Accordingly, with support from ADB, a team of design engineers has designed the investment required to rehabilitate/upgrade the road. This investment design covers:

- The civil works to strengthen and widen the existing pavement to international standards, notably to approximately six meters width, with asphalt-cement surfacing, and with one meter shoulders on each side. The section from Laclubar Junction to Laclubar will be widened to 4.5m, also with 1 m shoulders on both sides;
- The necessary civil works to address existing threats to the road from climate variability and climate events. This notably includes significant slope stabilization measures at many points along the road;
- The total cost of these civil works is estimated at \$88 – 104 million;
- The necessary inputs to provide performance-based maintenance of these roads for two years. Total costs of maintenance are approximately \$450-720,000/year (Appendix 1: Endnote 2) . This two-year input will demonstrate (i) how to maintain and (ii) the importance of maintenance, and it will build capacity to maintain. Subsequently, government funds will be used to cover maintenance (Appendix 1: Endnote 3) ;
- The necessary inputs to provide supervision and oversight to the implementation of the civil works, including training for contractors and government staff as appropriate.

Manatuto District

The entire road addressed through this Project lies within Manatuto District (see Map in Appendix 1: Figure 2). Manatuto is the largest (1,706 km²) in area and the least populated (population of 43,234 in 2010) (See Appendix 1: End Note 4) district in Timor-Leste. Manatuto is divided into six sub-districts, 29 villages (or *suco*) and 97 sub-villages (or *aldeas*). Manatuto is the only district that touches both the north and south coast (other than Lautem District that lies at the extreme eastern end of the island). This north-south range means that Manatuto has high geographical diversity. Excluding the two towns (Manatuto and Laclubar), a population of only 19,537 people (44.2% of the District total) live in this vast area. Hence, Manatuto District is very sparsely populated, inhabited mainly by subsistence farmers, and is expected to remain that way in the foreseeable future.

The following socio-economic indicators indicate the high poverty levels in Manatuto:

- Population in poverty: 73.7%;
- Adult illiteracy: 47%;
- Population with access to improved water sources: 85%;
- Malnutrition (underweight children): 32% of children under five years old; and
- Population with access to grid electricity: 30%.

Climate and Climate Variability in Timor-Leste and at the Project site

Timor-Leste has a tropical, monsoon climate with a differentiated effect between the North and South of the country. The Northern part of the country has a 4-6 month wet season starting in December. The Southern part has a bimodal wet season, lasting for 7-9 months, with peaks in December and in May. However, overall and seasonal rainfall is also greatly influenced by topography, with the general rule being the 'higher altitude, higher rainfall' (source, NAPA).

Timor-Leste's rainfall exhibits great variability, both spatial and temporal. In spatial terms, this can mean neighboring hillsides experiencing rainfall very differently. In temporal terms, there is great annual variability, but there is also great monthly and daily variability, with intense rainfall being experienced at all places Timor (source, NAPA).

Due to these rainfall patterns and temperature patterns (Appendix : Table 3), Timor-Leste is often categorized as having three climatic zones: (1) the northern coast (mean temperature > 24oC, annual rainfall < 1500mm, dry season of five months); (2) the mountain zone (temperatures < 24oC, rainfall > 1500mm, dry season of four months); and (3) the southern coast (temperatures > 24oC, heavier rainfall, dry season of three months) (see Appendix 1: End Note 6) . Rainfall figures for three sites during 1954-1974 are provided in Table 3. As can be seen, although the mean annual figures vary greatly across the three sites, the peak monthly rainfalls differ much less.

Finally, annual variations are also greatly influenced by the El Nino Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD).

Climate Change in Timor-Leste and at the Project Site (See Appendix 1: EndNote 5)

Numerous studies on projected climate change in Timor-Leste have been undertaken, of which the most comprehensive is provided in the Road Network Development Project (Volume III). This latter document combined the findings from 22 global and regional climate models and three GHG emissions scenario to provide 136 climate projections for Timor-Leste. The findings of the models were validated using basic ground-truthing. The results were analysed, outliers identified, and the most likely climate changes identified. The findings are summarized in Box 1.

These findings are fully in line with the findings presented in the NAPA. For the purpose of this Project, the most notable findings are: (i) potential small increase in annual precipitation; (ii) the high likelihood of fewer but more extreme and intense rainfall events ; (iii) expected increased flood intensity and frequency; (iv) raised possibility of short term, localized droughts.

Finally, annual variations are also greatly influenced by the El Nino Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD).

Climate Change in Timor-Leste and at the Project Site

Numerous studies on projected climate change in Timor-Leste have been undertaken, of which the most comprehensive is provided in the Road Network Development Project (Volume III). This latter document combined the findings from 22 global and regional climate models and three GHG emissions scenario to provide 136 climate projections for Timor-Leste. The findings of the models were validated using basic ground-truthing. The results were analysed, outliers identified, and the most likely climate changes identified. The findings are summarized in Box 1; Appendix 1.

These findings are fully in line with the findings presented in the NAPA. For the purpose of this Project, the most notable findings are: (i) potential small increase in annual precipitation; (ii) the high likelihood of fewer but more extreme and intense rainfall events (Appendix 1: EndNote 7) ; (iii) expected increased flood intensity and frequency; (iv) raised possibility of short term, localized droughts.

The most recent assessment has been taken under the Program for Climate Change of the South Pacific (PCCSP)(Appendix 1: EndNote 8) . PCCSP work included dynamical downscaling for the region covering Timor-Leste – using the Conformal Cubic Atmosphere Model to look at 60x60km and then 8x8 km cells. The PCCSP findings confirmed, generally, the findings in Box 1.

However, it is noted that all projections on climate change for Timor-Leste suffer the following weaknesses:

- There is a lack of historical meteorological data for Timor-Leste. Data is either missing or incomplete, and in many other cases it may not be fully reliable. In general, when selecting models to project into the future, the selection of best-fit future models is based on fit with past data – if the past data is not available, the future models can be considered less accurate. Hence, most existing models used data from nearby Indonesia or Australia as a second best fit;
- The coarse nature of the projections. In most cases the projections are not able to provide models for Timor-Leste, but cover a much larger area. They do not provide sufficient details of Timor-Leste; and,

- The inability of the models to account for local factors, notably topography, but also climatic factors such as convection. Given the importance of topography to weather and climate in Timor-Leste, this may be a major weakness.

Vulnerability of the Baseline Project Investment Component to Climate Change

Geological, geomorphical and other technical studies clearly demonstrate that the incidence of landslides and floods in hilly and mountainous areas is highly influenced by rainfall, notably by the peak intensities of rainfall over periods of several hours or days. In turn, this highly affects efforts to construct roads (Appendix 1: EndNote 9) and it affects the stability of roads. This has been confirmed in Timor-Leste by Road Network Development Project. This latter looked in detail at the likely effects of climate change on Timor-Leste roads, with an in-depth look at (i) coastal roads and (ii) inland roads through hilly/mountainous terrain. For inland roads through hilly/mountainous terrain, it was identified that the major climate change related factors are potentially: (i) increased instability in slopes near the road, both below and above road; (ii) increased rainfall discharges leading to increased chance of flooding; (iii) increased levels of debris from slope above road; and (iv) drought after flood leading to road cracking. It is further noted that (i) and (ii) can contribute to increased scouring potential of rivers lying near roads.

For several reasons it is not possible to determine the exact impact of climate change on the Manatuto to Natarbora road. These reasons include: (i) the climate models are insufficiently precise and contain high levels of uncertainty; (ii) the principal underlying climatic factors, slope instability and increased discharges, are also greatly affected by land-use in areas above the road. This is known to have changed in recent decades, and may change further in the future. This is impossible to predict and is beyond the control of the infrastructure decision-makers. For these reasons, the Road Network Development Project recommends a ‘low’ and ‘no’ regrets approach to adaptation measures – i.e. implementing adaptation measures that are effective in all climate scenarios, and will lead to other socio-economic benefits.

Legal, Institutional and Regulatory Framework

Information on the institutional framework for road transport infrastructure and climate change is provided in Section B.1 below. Key policies, strategies and plans are described in Section A.1 above and include the SDP, the Road Network Development Project, and the NAPA.

A rapid legal and regulatory analysis was undertaken in the preparation of this Project (see summary of results in Annex F). From this Annex, it is clear that in general the legal and regulatory framework is not a good entry point for mainstreaming climate change into transport infrastructure at this point in time in Timor-Leste. There are no specific laws pertaining to climate change. There are various laws related to transport infrastructure (e.g. the Pre-Qualification Law, the Procurement Law), however the interaction between climate change and road infrastructure is not pertinent to these laws. There are no plans to prepare new or to amend pertinent laws during the lifetime of the Project.

With regards to Standards, in 2005 Timor-Leste issued detailed standards with regards to road infrastructure (Appendix 1: EndNote 10). Currently, most contracts use a combination of these 2005 standards and international standards (e.g. American Association of State Highway and Transportation Officials, 2011). That is, for each road infrastructure project, the project design team develops detailed design specifications for all points on the road, referring to both the 2005 Timor-Leste and AASHTO standards. The project design team then proposes an appropriate combination of these standards to the authorities for approval. To some extent, each Project adopts a unique approach in line with road parameters. This approach is being applied to the Manatuto-Natarbora link road.

In 2008, ADB supported the preparation of revised geometrical standards. These are currently used for guidance but have not yet been formally adopted (by the Minister of Public Works).

Capacity Development in the Baseline

All previous studies indicate that whereas technical capacity (to design projects) is relatively strong, capacity to plan, monitor and maintain road development is weak. In the baseline, the government aims to develop capacity to plan and manage road infrastructure development. One key element of this is the ongoing first phase of the project Democratic Republic of Timor-Leste – Infrastructure Management (Appendix 1: EndNote 11). The first phase of this Technical Assistance Project (Appendix 1: EndNote 12), supported by ADB, has two principal components: (i)

development of a five year strategic plan for the Ministry of Public Works and (ii) development of a capacity development framework and plan. The second phase will support implementation of these plans. The Ministry of Public Works (MPW) notably aims to develop capacity related to environmental and social assessment.

With support from ADB, MPW has also established the PMU (described below). This dedicated Unit has growing capacity to cover most aspects of road design and to oversee road construction.

Gaps in Baseline and Related Barriers

As mentioned in the above sections, in the baseline, the design to rehabilitate and upgrade the Manatuto to Natarbora Link Road has been prepared to account for current climate variability. In the baseline, it does not include additional design measures to allow for future climate change. The additional costs associated with adapting this road construction to climate change have been conservatively estimated to be \$3.57 million, or approximately 3-4% of the total investment costs (see Annex E for details of the calculation). In the baseline, given the vast range of development issues to be addressed in Timor-Leste, the government would not be able to make covering these additional costs a top priority. Barrier no. 1: This lack of finance can be considered the first barrier to climate proofing the Manatuto to Natarbora Link Road. Moreover, in line with international agreements, the international community is committed to supporting Timor-Leste in covering the additional costs of adapting to climate change.

In terms of capacity, there are the following barriers to the identification, planning, designing and financing of measures to adapt to climate change in the transport infrastructure sub-sector:

Barrier no. 2: Limited knowledge and understanding of climate change amongst policy-makers, planners and engineers in the transport sector. A rapid capacity assessment was undertaken during the preparation of this project (see Annex G). In summary, professionals and decision-makers in the transport sector have very little understanding of climate change in Timor-Leste, nor of the potential implications for development of the road network. They have even less understanding of potential adaptation options and how to apply them. These weaknesses range from lack of basic awareness, to the need to be able to undertake technical and economic analysis, to the absence of tools to support vulnerability assessments and design/select adaptation options.

In the baseline, the consideration of climate change is very much instigated by international partners (on roads with an international investor). Moreover, there is no set methodology or approach. Project design teams develop their own methodology for estimating climate change, its impacts and the needed adaptation measures. This approach is greatly subject to errors, inconsistencies and inefficiencies.

Barrier no. 3: Capacity to identify, design and implement ecosystem wide solutions. In Timor-Leste, the identification, planning, design and construction of highways is mostly undertaken as a civil engineering exercise limited to the 'right of way' (RoW) (Appendix 1: EndNote 13). In the current situation, the two-way interactions between the highway and the broader ecosystems are largely neglected, and are felt to be 'beyond the influence' of the road planners/constructors. Road transport professionals, when planning/designing roads that cross mountainous terrains, do not consider the road as part of the ecosystem, and make little consideration of road-ecosystem interactions. Road transport professionals are unable to integrate the road construction into the ecosystem and yield pertinent benefits. They have little concept of watershed management, and how bio-engineering can increase the feasibility of roads and yield other benefits.

However, experience from other countries and regions suggest that an approach integrating road construction with ecosystem management can lead to benefits for all sub-sectors, particularly in hilly/mountainous areas. Notably, roads and transport can benefit from improved management of land and slopes through watershed management. The benefits can be in the form of less flooding, less debris, lower groundwater tables, etc. In return, ecosystems can also benefit from the improved design and construction of roads. And the local communities can benefit from improved ecosystems, watersheds and from the increased reliability of roads.

Barrier no. 4: Commitment to road maintenance and capacity to undertake maintenance. Given the great uncertainty associated with impacts of climate change, it is impossible to predict when climate change impacts will occur, and what their scope will be. Hence, it is not possible to construct highways that are resilient to every possible climate change impact. Accordingly, a key adaptation strategy is to be able to monitor the road continuously, to predict and deflect climate change impacts just before they happen, and to respond to climate

change impacts immediately after they occur. This can be done by continuous observation of the ecosystem surrounding the road and the road itself, and establishing a readiness to intervene when landslides and floods occur. In the transport sector, this is normally addressed through the approach to ‘maintenance’ of road infrastructure (Appendix 1: EndNote 14) .

Maintenance is a key issue in the sector, even without climate change, and is one issue that is currently experiencing many challenges. In response to this, in the baseline, the Government has requested ADB support to strengthen maintenance. The Government is allocating important funds to maintenance, but recognises that it does not have sufficiently advanced maintenance systems. Although strengthening this capacity for maintenance will contribute to climate change resilience, in the baseline the maintenance system being established is not sufficient to cover anticipated climate change impacts.

57.51. Barrier no. 5: Inadequate integration between climate change sector and transport sector. At a professional level, there are very few working linkages between professionals in the road sector and professionals in the climate change sector. This ‘gap’ means that road transport professionals do not get optimal support from climate change professionals, and that climate change professionals are not working on the most important socio-economic transport-related issues. For example, the climate change sector is undertaking research into climate change and likely impacts, but as of yet, it is not producing information in a format or to a quality that can be used by the transport planners/designers. Whereas the climate change modellers are using data from Indonesia in order to develop projections for climate change in Timor-Leste (including Manatuto), the transport planners utilise rainfall data from Darwin (Australia) when determining drainage specifications for highways. A second example of this gap was evidenced during the preparation of the NAPA. The importance of climate change to road infrastructure was agreed to by all, and road infrastructure was identified as a priority sector for adaptation in the NAPA . However, the road infrastructure measures recommended in the NAPA (Appendix 1. EndNote 15) were clearly not the optimal entry point for climate change adaptation when seen from the perspective of the transport sector.

- A. 5. Incremental / Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project: The Objective of the Project is to reduce the vulnerability of road infrastructure in Timor-Leste through the implementation of the NAPA. The impact of the Project will be to reduce absolute investment losses from the negative impacts of climate change.

The main focus is minimizing the impacts of climate change and climate variability on the Manatuto to Natarbora road. This will lead to socio-economic benefits for Timor-Leste, in particular for communities using the road, and for communities living near the road, and for economic actors that will benefit from improved north-south travel links. A second focus is the overall framework in Timor-Leste for identifying/planning/designing/(re-)constructing roads. The Project will take steps to mainstream climate change adaptation into this framework. There will also be significant direct and in-direct co-benefits for ecosystems along the Manatuto to Natarbora road.

The main climate change impacts on roads addressed through this project are: (i) greater slope instability above and below roads; (ii) localized flooding; (iii) river scouring that threatens slope instability below roads; (iv) increased moisture content of the sub base and sub grade (if base course is not of sufficient quality, this will lead to pavement cracking); and (v) increased debris from climate events that threatens road reliability and maintenance.

The Project Objective will be achieved through four Outcomes and related Outputs as described below.

Outcome 1: The Manatuto to Natarbora Road Link is Climate Proofed

Under this Outcome, a series of adaptation measures to the road civil works are to be implemented with LDCF support, in order to climate proof the road. In some cases, these adaptation measures provide other benefits. The details are provided in Annex E.

Output 1.1 – Drainage infrastructure upgraded to account for climate change

Baseline

The drainage infrastructure ensures that all rainfall reaching the road is quickly drained away without causing damage to the road surface or structure. This infrastructure consists of:

- Horizontal drains that take water along the side of the road to crossing points;
- Crossing points, usually culverts or bridges, that take water under the road to the lower parts of the hill-side;
- Inlet infrastructure to the crossing points, to minimize scouring, erosion and blockages at the inlet;
- Outlet infrastructure, to ensure that after crossing, the water's energy is reduced and the flowing water does not cause scouring, erosion. The outlets often consist of concrete constructions, gabions, or cascaded structures

The drainage infrastructure has to be sufficiently large to carry the entire rain potentially falling on the surrounding watershed. At times of intense rainfall, all the rain over the watershed may quickly reach the road, creating a major risk of flood or rain damage. This threat is exacerbated when heavy rainfall follows periods of regular and intense rain, and the watershed's natural capacity to hold or absorb the rain is reduced.

The approach to calculating the maximum potential discharge at any point along the road is based on standard engineering formula related to (i) surface area of concerned watershed (ii) the rainfall intensity duration frequency (RIDF). RIDF is a function of maximum possible hourly rainfall, and is determined using daily rainfall figures over a ten-year or longer period. This meteorological data is not available for Timor. Hence, in the baseline, the RIDF for Darwin is used as a proxy. This approach has been approved by both government and ADB, and is a standard approach in the region.

Once the potential discharge has been calculated, the drainage infrastructure is designed using the smallest available drainage dimensions that are greater than the maximum potential discharge. Drains and culverts come in standard sizes, the smallest drain and culvert which are larger than the anticipated discharge are used.

Additional investment in the LDCF Alternative scenario

The impact of climate change on RIDF is not known with much accuracy. Moreover, RIDF figures for outside Timor-Leste are used. Hence, in order to allow for the expected increases in heavy rainfall associated with climate change, in the LDCF alternative scenario, the calculated maximum discharge for each watershed along the road is increased by 20% over the baseline. This, in turn, leads to new requirements in terms of drains and culverts. Moreover, the increase discharges place additional stress on the inlets and outlets to culverts. These must be adjusted in order to prevent erosion and scouring. The details of the additional infrastructure, and associated costs, is provided in Annex E, parts 1 and 4.

Output 1.2 - Road base and road surface adapted to account for increased rainfall intensity, localized flooding and increased prevalence of drought and flooding conditions

This applies in particular to stretches of the road that are vulnerable to flooding. Standing water negatively affects road pavement, base and sub-base and subgrade (Appendix1: EndNote16) . Drying out of flooded areas, especially when rapid, can also affect sub-base and subgrade, leading to cracking of road surface, if they contract too quickly. This is particularly true when the road lies on expansive materials. The design and materials chosen influence the resilience to climatic factors.

Firstly, when designing this road, design engineers considered several road surfaces: (i) triple surface treatment or TST; (ii) gravel; (iii) asphalt. Gravel is not appropriate for such roads. Hence, in the baseline situation, TST could be selected for the road pavement surface, as it is less costly. However, for several reasons, asphalt has been selected. One reason is that it is more resistant to climatic events. TST leads to a slightly uneven surface, which is more vulnerable to flooding and to water damage. Asphalt, being smoother, has less such problems. Asphalt is also less vulnerable to UV damage and temperature fluctuations.

Secondly, the selected sub-base and embankment materials must be (i) resistant to weakening when saturated for extended periods, (ii) and be composed of carefully selected non-expansive materials. Materials of higher quality are needed to ensure resistance to deterioration due to flooding or prolonged droughts.

Finally, at some points along the road, to avoid flooding, it is necessary to re-design the road and raise it by up to one meter above expected flood levels.

Each adaptation measure is specific to the road and ecological characteristics at each point along the road. The measures to be taken to adapt the road base and road surface to climate change are summarized in Appendix1:Table 4 (see details

of the measures, and how much they are to be implemented, and the costs, in Annex E, part 4)Output 1.3 - Slope stability enhanced to account for climate change.

Baseline

Slope instability is affected by many factors, notably: slope inclination, materials present, water content and level of groundwater table. The measures required to counter slope instability along road also depend greatly on the location of the instability with reference to the centre of the road.

In many countries, slope instability at each point can be calculated and optimal stabilisation measures designed. In Timor-Leste, there is insufficient data to calculate slope instability. There is no possibility of undertaking the scientific analysis. Moreover, for the Manatuto-Natarbora road, the potential construction budget and the difficult construction terrain mean that only a small number of counter measures can be considered.

There are 'standard' counter-measures for narrow, hilly roads in Timor-Leste. These standard counter-measures involve a combination of: soil/rock removal; retaining walls; and gabion walls. The precise recommended combination depends on the location of the unstable slope with reference to the centre of the RoW – and so vary for each point along the road. In the baseline, these counter-measures are designed to be more than adequate. I.e., even with climate change, it is considered the counter measures will be sufficient. Hence, the baseline design is considered to already be climate change proof.

LDCF Alternative

However, climate change will lead to more floods and more erosion. This will lead to increased debris in the areas surrounding the counter-measures. This is likely to undermine the effectiveness of the counter-measures over time. Accordingly, as a precaution, and in order to limit erosion and debris near the counter-measures, bio-engineering measures are to be implemented at many points in connection with the geo-technical counter-measures. These adaptation measures are presented in the following table (details are provided in Annex E, Part 3).

Outcome 2: Road Maintenance Programmes Contribute to Climate Resilience

The additional works to adapt to climate change (under Outcome 1) will actually increase the resilience of the road and will lower the maintenance requirements (compared to the baseline situation in which the additional works are not undertaken).

However, climate change (more floods, erosion, slides and debris) will actually increase maintenance requirements. Hence, more maintenance is required in the climate changing world.

In the baseline, for the first two years after the civil works, performance based maintenance will be implemented. In this format, the contractor is required to fully maintain the road, and will receive payments at the end of each period. Although costly, this is highly likely to maintain the road. This maintenance covers, inter alia:

- cleaning of carriageway and shoulder surface;
- up-keep of roadside slopes;
- cutting of branches of trees and bushes;
- cutting of grass/vegetation within clearway;
- reducing of higher shoulders;
- removal of slides less than 20.0m³;
- cleaning of ditches and all drains with lining;
- cleaning of ditches and all drains without lining;
- cleaning of culverts (pipe and box);
- up-keep of bridge super structure; and

- up-keep of bridge decks.

Hence, in the baseline, effective maintenance will be demonstrated over a two year period. Moreover, necessary capacity building in government to establish effective maintenance systems will be developed in the baseline. The demonstration, the capacity, and the increased Government budgetary allocations to maintenance should create the conditions for improved maintenance after the two year demonstration period.

However, performance contracts do not cover ‘extreme events’. It is therefore possible that during the period climate change may lead to extreme events that are not covered by the performance contract.

As mentioned above, the maintenance requirements increase due to climate change. Climate change is likely to lead to more debris, more damaged roads, more damaged and blocked drains etc. Hence, performance-based maintenance is in some aspects a climate change adaptation measure. For this reason, the Project will contribute to the maintenance system. It will contribute 10% of the costs of the performance based monitoring over the first two years. It will not contribute to maintenance costs in the years following.

Further, it is considered that increasing capacity to undertake maintenance, and increased investment in maintenance, are excellent “adaptive measures” – that is they decrease vulnerability to climate change, increase resilience and increase adaptive capacity.

Outcome 3: Capacity to Identify, Plan, Appraise, Design and Implement Climate Change Adaptation Measures for Road Infrastructure Projects

Baseline

Timor-Leste is a new country and lacks capacity to plan, appraise, design and implement transport infrastructure projects. This capacity will be strengthened in the baseline. In the baseline, MPW continues a programme of developing its staff. The Department for Roads is considering increasing the number of professional staff and establishing an environmental unit. In the baseline, the transfer of some responsibilities from the current Regional Units to the District Public Works units will increase outreach and capacity to consult, to monitor and to respond to challenges. In the baseline, the PMU’s capacity to manage projects will be further developed. The ADB Infrastructure Management TA will first develop, and then implement, a capacity development framework in baseline.

However, and as mentioned in previous sections, in the baseline there is very little capacity to mainstream climate change adaptation measures into road infrastructure projects. In the baseline, transport professionals have little information on the likely impacts of climate change, and how it may affect their sector and their work. They have little data and information on climate change, on adaptation measures, or on the related economic analyses.

In the baseline, there is no standard approach to adapting transport infrastructure projects to climate change, rather each project team may, or may not, consider climate change, using tools at its disposal. However, as most project teams have little knowledge of climate change, and little incentive to adapt, for the most part in the baseline infrastructure projects will not be adapted to climate change (Appendix 1: EndNote 17). Even if project teams wish to adapt to climate change, they have no tools or standard methods for integrating climate change.

Based on the capacity assessment in Annex G, LDCF funds will deliver five additional capacity Outputs in the alternative – with the effect of mainstreaming climate change adaptation into the road infrastructure sub-sector.

Output 3.1 - A trained cadre of policy makers, planners and design engineers in the Ministry Public Works with capacity to mainstream climate change into their operations

Activities will commence with the provision of awareness raising on climate change and potential impacts of climate change on road infrastructure and the resulting impacts on economy. The target will be policy makers and decision-makers and planners in the sector. As a result, key people will understand the importance of climate change, how it relates to their work, and the main approaches for adapting. Key people will then support the mainstreaming of climate change into the road transport infrastructure sector.

Other activities will focus on providing in-depth training to a small number of MPW professionals (three engineers). These professionals will be given training from a leading institution in the region. Subsequently, they will have an in-depth understanding of the implications of climate change on the planning, appraisal, design and implementation of transport infrastructure project, and of adaptation measures. After having received the training, they will be able to oversee a process for mainstreaming climate change into future projects in the sector, and train their colleagues.

Output 3.2 - A practical tool (i.e. ministerial Guidelines) for use by planners and design engineers, to mainstream climate change into their operations

Currently there is no tool for road planners and designers to adapt to climate change, each project team develops its own approach. Under this Output, activities will:

- Review how other countries mainstream CC into planning/designing roads;
- Identify entry points in the road design/planning process in Timor-Leste for mainstreaming climate change;
- Identify methods to address climate change in the design/planning of roads. This will cover: re-estimating climate parameters (rainfall); redesigning drainage systems; selection of materials; identification of bio-engineering measures, etc;
- Prepare a draft Guideline to be used by Timorese planners and designers, with a step by step guide and checklist for mainstreaming climate change. This will be presented in a practical, hands-on manner that does not lead to delays or to significantly increased workloads; and
- Test the Guideline, and finalise it.

As a result, in the future, project teams will have a handy, practical tool with which to address climate change.

Output 3.3 - Knowledge and understanding of climate change, of the impacts of climate change on road infrastructure, and of how to adapt to climate change

This Output will monitor the Manatuto – Natarbora road to assess how climate change affects it, and to determine the success of the adaptation measures. This monitoring will be integrated into the standard project monitoring and supervision procedures of MPW and PMU. Activities will include:

- Collect information on weather and extreme weather events;
- Collect and store information on climate related damage to the road – i.e. all landslides, road failures, etc;
- By observing the differentiated impacts of extreme weather events, assess how the measures taken by the project have assisted, or otherwise, adaptation to climate change. Analyse all available data to determine (i) costs of climate related damage to the road; (ii) relationship between extreme weather and damage; (iii) the points along the road that are not climate proofed; and (iv) the technical and cost effectiveness of adaptation measures taken along the road;
- Publish a lessons learnt document.

Output 3.4 - Effective working linkages between road transport sector professionals and climate change sector professionals

In the baseline, the climate change professionals in Timor-Leste do not understand the road transport infrastructure sector. Hence, they are not doing research, collecting data or forecasting in a way that is useful for road transport infrastructure professionals. Likewise, the road transport infrastructure professionals are unaware of climate change and of the work done by the climate change professionals. This Output aims to overcome this gap and develop practical ways for climate change and road transport infrastructure road transport professionals to collaborate, leading to mutual benefits.

Activities will include:

- Establish an informal, inter-sectoral working group on information needs of infrastructure;

- Identify climate data needs in transport sector that can be met;
- Develop a programme of studies linking climate change and transport and undertake basic studies; and
- Obtain and provide information useful to infrastructure experts on climate change.

Output 3.5 - Capacity to support watershed-wide, community implemented bioengineering schemes that increase climate resilience and ecosystem strength

In the baseline, road transport infrastructure professionals are unaware of the potential of bioengineering to meet infrastructure needs. Moreover, they are unaware of the role of road infrastructure in ecosystems. They are unaware how roads can improve or undermine ecosystem resilience. In the baseline, the road transport infrastructure professionals in Timor-Leste are unable to consider the ecosystem in general, and bio-engineering in particular, in the planning and design of roads. As a result, ecosystems are frequently damaged, and the climate resilience of the road is decreased, and it faces higher threats of flooding, land-slides, erosion, debris and scouring. Moreover, in this vicious circle, the ecosystem is weakened by the road construction process.

The Project will provide the road transport infrastructure professionals (planners and designers) with the basic information and capacity needed to ensure roads are constructed in a manner that integrates road transport into the broader ecosystem. The road transport infrastructure professionals will understand how to utilise ecosystem techniques to increase the climate resilience of the road. The focus will be on developing understanding of integrated watershed management, so that the road transport infrastructure professionals are able to plan and design roads that mutually support watershed ecosystems.

- Training and awareness raising for transport planners on: (i) basic bioengineering techniques; (ii) when to use bioengineering in infrastructure projects; (iii) how to economically assess bio-engineering;
- In-depth training for operational staff from MPW, PMU and the District Public Works unit on planning, designing and overseeing the implementation of bio-engineering and watershed protection measures;
- Implementation of small pilot plots to demonstrate basic bio-engineering techniques and build capacity; and
- Ongoing monitoring of the effectiveness of bio-engineering and watershed protection measures (i.e. those implemented under Outcome 4).

Outcome 4: Improved Watershed Management at Hotspots Contributing to Infrastructure Climate Resilience and generating Co-benefits in terms of Livelihoods and Ecosystem Strength

Baseline

In the baseline the watersheds along the Manatuto – Natarbora road are under threat, most notably from (i) the predominant slash and burn approach to agriculture which, combined with inadequate fallow periods, leads to increased erosion and decreased productivity and (ii) highly unsustainable goat and cattle grazing practices that disturb soil and prevent re-vegetation of hill sides. There is a complex package of socio-economic and cultural reasons behind these unsustainable practices. For example, this relates to the lack of a Land Law and to unclear Land Tenure.

Moreover, following the construction of the Manatuto – Natarbora road, it is widely expected that these threats will grow as there will be increased access to the area, and increased access to markets from farmers in the area.

Hence, the baseline consists of increasingly degraded hillsides along the road, leading to: (i) increased erosion and debris; (ii) increased maintenance costs; (iii) increased socio-economic challenges to local communities; and (iv) decreasing value of ecosystems. All of these are exacerbated by climate change.

The baseline project road assessment has identified three key spots where the combination of land degradation and climate change will lead to threats to the road and to socio-economic challenges:

- Manelima suco. This suco lies along Laclubar – Laclubar Junction District road to the south. The area consists of very hilly and steep terrain. This suco is one of the farthest from markets and from most government facilities (schools, clinics, etc). This suco has been identified in the INC as one of the sucos with the highest vulnerability to

climate change in the entire country. The local population (of approximately 2,500) is very poor and is highly exposed to climate change. In the future, ecosystem degradation is both highly likely and will be highly detrimental to the local communities and to the road;

- Turlalan Aldea (Appendix 1: Endnote 18), Orlalan suco. In 2009, following heavy rain, a massive landslide caused a massive failure to the Manatuto – Natarbora road, on the approach to Laclubar Junction (Appendix 1: Endnote 19) in Turlalan. The landslide destroyed approximately 300m of the road, and led to the need to construct a temporary detour of approximately 600m. The landslide occurred downstream from a small pond on the hill top that presumably provided a constant flow of ground water which weakened the hill side - contributing to the instability. There is some evidence that improved watershed management may have reduced or prevented that landslide. Currently, the landslide is still active, making it impossible to re-construct the road along its original path. However, the detoured road follows a complex path, with a large number of steep slopes and sharp bends. The detoured road will therefore be expensive to rehabilitate and highly vulnerable to small landslides. The slopes and bends cause slow traffic and bottlenecks. The landslide happened in a region that is subject to very unsustainable agriculture and forestry practices;
- Certula Aldea, Fatumakerek suco. Approximately 10km to the North of Laclubar Junction. A recent housing project, financed by the previous president, led to the construction of 37 new households and an associated increase in the population in the Aldea. However, the incoming population have few employment opportunities. Moreover, they do not have the appropriate natural resource management skills to practice sustainable agriculture or forestry in the region. Hence, the most likely result is that they will adopt unsustainable agriculture and forestry practices, leading to ecosystem destruction in this very fragile area. This will lead to threats to the road from debris, erosion and possibly associated flooding.

LDCF Alternative

The Project will work with professionals from the Ministry of Public Works and the State Secretary for Forestry to demonstrate watershed management practices at the above three hot spots. The Project will demonstrate how strategically designed watershed management, designed with a consideration for the road design, can lead to: (i) improved livelihoods and poverty alleviation; (ii) improved ecosystems; and (iii) reduced threats to the road infrastructure from climate related events.

At each of the three sites, the steps to be taken may include:

- Work with communities to assess challenges and to plan watershed investments;
- Develop micro-irrigation schemes;
- Develop sustainable agricultural activities;
- Develop sustainable livestock regimes;
- Plant trees (e.g. Casuarina or bamboo);
- Undertake training and sustainability activities; and
- Carefully monitor the watershed and the associated ecosystem condition.

The main aim of this Outcome is to demonstrate to road transport professionals how to achieve infrastructure objectives through watershed management. This Outcome is highly innovative as it will break down existing barriers between road transport professionals and watershed management professionals. In the past, all watershed management in Timor-Leste has been implemented uniquely by foresters or natural resource managers. Moreover, it will contribute to creating a new paradigm in the road transport sector, where professionals see the road within a larger ecosystem, and consider both socio-economic and ecological benefits. It is anticipated that (i) at Manelima, livelihoods will improve and fewer road failures due to ecosystem damage will be observed; (ii) at Turlalan, the active land-slide will be stabilised, and possibly the original route for road construction can be re-considered over the medium term; (iii) at Certula, the increased population will not lead to watershed degradation and subsequent road failures.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks: See Appendix 1: Table 6 for Risks, Impacts and Counter Measures

A.7. Coordination with other relevant GEF financed initiatives

This Project takes place within the framework of the Climate Proofing Development in the Pacific Program. The overall goal of the Program is to reduce the vulnerability of vital infrastructure in the Pacific LDCs through the implementation of NAPA priorities. The Program includes a multi-country component on cross-cutting learning, improved information, training and innovation. At this regional/program level, ADB will set up a program support unit (PSU) which will: coordinate regional activities, provide oversight to the implementation of the individual sub-projects, organize program steering committee meetings, track lessons learned, manage the mid-term and final evaluation processes, coordinate with country OFPs and project executing agencies, identify capacity constraints and develop targeted capacity support including regional trainings for country project leaders.

A suite of regional activities will be undertaken through the Climate Proofing Development in the Pacific Program. These will be funded through internal ADB resources and through integration with ADB-led regional climate change adaptation projects expected to be up to US\$600,000. These activities will focus on these issues to ensure that sufficient attention is given to coordination and harmonization between NAPA projects underway and being planned. This will be undertaken through the facilitation of information exchange, particularly on common challenges, lessons and demonstration activities and the production and dissemination of targeted knowledge products between the 3 countries and across the region through linkage with other ongoing and planned programs. In addition, the ADB Guidelines for Climate Proofing Investment in the Transport Sector: Road Infrastructure Projects, on its planned revision will incorporate lessons learned from the current project.

The design of regional knowledge sharing aspects of the program is currently being finalised. It is anticipated that this will include working through existing regional climate change adaptation knowledge networks (such as the Pacific Climate Change Portal and Adaptation Knowledge Platform of the Asia-Pacific Adaptation Network), through the development of joint knowledge products and through building synergies with the emerging regional knowledge sharing networks, specifically through the Pilot Program on Climate Resilience (PPCR), ADB is developing a regional program, including a knowledge platform for sharing lessons on adaptation.

In Timor-Leste, coordination will be developed with the following LDCF initiatives:

- UNDP/LDCF - Strengthening Community Resilience to Climate Induced Natural Disasters in the Dili to Ainaro Road Development Corridor, Timor-Leste (project currently in detailed design/PPG phase). The UNDP/LDCF project will work with communities along the Dili-Ainaro road corridor, to increase their resilience and decrease vulnerability to climate change. This may include watershed management measures that increase slope stability – leading to co-benefits for the road construction. The UNDP/LDCF project will also undertake studies to better understand climate change, climate change impacts and adaptation responses in the Timor-Leste context – knowledge that will be equally useful to the current proposed Project. The UNDP/LDCF project is also to undertake capacity development for planners and policy makers in general, at both national and sub-national levels.

The institutions targeted for support by this ADB/LDCF project are not targeted by the UNDP/LDCF Project. There is no geographical overlap with this project. MPW and ADB officials have made initial contact with project stakeholders and UNDP. The principle of coordination has been established. Once both projects are operational, concrete coordination mechanisms will be established, perhaps through the UNDP/LDCF Steering Committee and MPW;

- Road Climate Resilience Project (World Bank). This infrastructure development project is currently in the detailed design phase. It covers rehabilitation and upgrading of the Dili – Ainaro road link. Detailed design is to be overseen by PMU, as will be supervision of construction. The PMU will ensure coordination with the current proposed Project.
- UNDP/LDCF - Strengthening the Resilience of Small Scale Rural Infrastructure and Local Government Systems to Climatic Variability and Risk (project is starting up). The geographical focus of this UNDP/LDCF project is the western districts of Timor-Leste, and so there is no geographical confluence with the current proposed project.

However, the UNDP/LDCF project has a focus on the climate resilience of infrastructure, possibly including rural roads. Hence, there is a potential for thematic confluence – shared lessons and resources. However, the institutions targeted for support by the UNDP/LDCF Project are not targeted by this ADB/LDCF project (the ADB/LDCF project targets the transport sector).

Moreover, the UNDP/LDCF project will also undertake studies to better understand climate change, climate change impacts and adaptation responses in the Timor-Leste context – knowledge that will be equally useful to the current proposed Project. The UNDP/LDCF project is also to undertake capacity development for planners and policy makers in general, at both national and sub-national levels. Initial contact has been made with project stakeholders and UNDP. The principle of coordination has been established. Once both projects are operational, concrete coordination mechanisms will be established, perhaps through the UNDP/LDCF Steering Committee and MPW;

- Infrastructure Management. Technical Assistance – Capacity Development Technical Assistance (ADB project no. TA 8278-TIM). This ongoing project includes components to (i) develop a five year strategic plan for the Ministry of Public Works. The current proposed Project will ensure that climate change is integrated into that plan, and where relevant it will help elaboration/implementation of that plan; (ii) develop a capacity development framework for MPW. The current proposed Project will ensure that climate change is integrated into that framework, it will also help the implementation of that framework on issues related to climate change.

In particular, this proposed Project is starting at approximately the same time as the two above-mentioned UNDP/LDCF projects, and coordination will be established regarding outputs, inputs and activities. Notably, the two UNDP/LDCF projects are to provide a significant amount of awareness raising and training for government planners and decision-makers at national and district level. This Project will not attempt to duplicate that, however it may use it where appropriate. For example, it is likely that this Project will cover some of the costs of sending transport sector professionals and Manatuto district officials to short training programmes provided by the UNDP/LDCF projects.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

A full stakeholder analysis has been undertaken and is included in Annex G. Summary information on the key stakeholders provided in the following paragraphs.

Transport Infrastructure Sector

The Ministry of Public Works (MPW) is responsible for all aspects of transport infrastructure: planning; policy preparation; regulation; overseeing project financing, design and construction; and maintenance. Within MPW, the key agency is the Directorate for Roads, Bridges and Flood Control (NDRBFC). Within NDRBFC, the Department for Roads is responsible for transport. For rural (minor) roads, the Secretary of State for Professional Training (Appendix 1:EndNote20) is responsible for planning, regulation and overseeing project financing, design and construction.

Implementing Large-Scale Public Investments

Following the generation of sizeable revenues from the petroleum sector, the GoTL established the Timor-Leste Petroleum Fund (TLPF). This is a sovereign wealth fund into which the surplus wealth produced by East Timor petroleum and gas is deposited. Strict rules and procedures are established for its use. One important priority of the TLPF is to develop infrastructure. In order to plan TLPF infrastructure-related investments, the Government established the Council for Administration and Finance. Under this Council, the Major Projects Secretariat (MPS) takes responsibility for the management of infrastructure investments.

Climate Change Sector

The institutional framework for the climate change sector is under development. The focal point for the UNFCCC is the Secretary for Environment (SSE) in the Ministry of Commerce, Industry and Environment. SSE recently established the Directorate for International Environmental Affairs and Climate Change (within the Directorate General for Environment).

Services). In 2013, a separate National Directorate for Climate Change will be established, increasing the professional sector.

The SSE oversaw development of the NAPA and is currently overseeing development of the INC. For these processes, established multi-sectoral technical working groups to oversee research, data collection and to establish priorities. The responsibility for overall monitoring of the implementation of the NAPA, and reporting to stakeholders and UNFCCC. It is likely that the INC will propose the creation of a permanent, cross-sectoral, multi-agency national climate change committee. This would be responsible for overseeing and coordinating climate related developments in the country. Establishing a committee would be in line with developments in most other countries. At a technical level, the Government is establishing a centre for climate change and biodiversity within the University of Timor-Leste.

Local Government Agencies

Currently, 'regional' units under MPW are responsible for local affairs related to transport infrastructure. Each region has several Districts. Manatuto District is divided between the Dili Region and the Manufahi region. These regional units are responsible for MPW actions on the ground – including involvement in construction, and a lead role in maintenance. They are also responsible for consultation with local authorities (including suco) and local conflict resolution. There are plans to restructure this, as part of the overall government restructuring in Timor-Leste. In the future, District level MPW units will be established in each region. Hence, in Manatuto District, there will be a unit responsible for all roads in Manatuto. As these agencies grow in capacity, their capacity will need to be developed accordingly.

The SSE local units are already established at the District level. Accordingly, each District has an Environmental Fund (EF) responsible for local issues related to climate change.

In general, government agencies are also represented at lower levels of government, at the Sub-District, Village and Suco level.

Project Implementation Arrangements

Project Implementation Arrangements are as with the baseline investment project. In ADB terminology, the project agency is EA is the Counsel for Administration of the Infrastructure Fund and MPW is the Implementing Agency.

Given Timor-Leste's ambitious road building programme, a dedicated structure to oversee project design and implementation is necessary. Hence, GoTL in 2000 established the 'Project Management Unit' (PMU). The PMU is currently responsible for ADB, World Bank and Japanese funded projects. The PMU reports technically to the Minister of MPW, and reports administratively to the Major Projects Secretariat.

The PMU is responsible for: (i) overall project implementation; (ii) stakeholder consultation and coordination; (iii) procurement of goods, works and consulting services for road rehabilitation and maintenance; (iv) contract administration; (v) sector development support to MPW; and (vi) on the job counterpart training for MPW staff. The PMU is responsible for overseeing/supervising the identification, design, construction and maintenance of roads constructed and rehabilitated under the NRRMP.

The PMU was established with support from the ADB. It is headed by a Project Manager and is staffed with key personnel including, inter alia, a Chief Technical Advisor, Road Maintenance Advisor, Road Maintenance Engineer, Project Coordinator and a Financial Administrator. Its practices and procedures are fully in line with ADB guidance. The PMU is currently being strengthened, and it is in the process of establishing an Environment and Social Unit. The PMU is an important mechanism for the transfer of knowledge, technology and best practices to the transport sector in Timor-Leste. The PMU manages implementation of the baseline investment project. The PMU will be responsible for managing the GEF/LDCF activities. The PMU will be responsible for planning GEF/LDCF activities, procuring inputs and for all aspects of monitoring. It will be responsible for project financial management, including contracting and authorizing payments. It will be responsible for mobilizing technical inputs, and it will provide direct technical inputs as possible.

Communities

The population of Manatuto District is largely poor. The vast majority of the population are involved in agricultural activities. The Manatuto – Natarbora road is essential for all social, economic and cultural activities. The community will benefit from the road rehabilitation and reconstruction. In line with GoTL and ADB procedures, the project will take every

involve communities in awareness raising and training activities.

The project will also involve, to the extent possible, members of local communities in the civil works, bio-engineer maintenance activities. This is likely to contribute significantly to the local community in the short-term. Using this Project will generate an important number of local jobs, which is expected to have a significant multiplier effect through the economy and job market.

Stakeholder Involvement

MPW, PMU and ADB will ensure the appropriate involvement of all stakeholders. MPW will be responsible for the involvement of other government agencies, as appropriate, including SSE. PMU will be responsible for the involvement of all other stakeholders in the road infrastructure sector in Timor-Leste, in line with their overall mandate. ADB will support, in coordination with other international development partners.

B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):

As described in previous sections, Timor-Leste is a developing country and Manatuto is one of the poorest districts in the country. This project will yield social, economic and cultural benefits to all the people in Manatuto, in particular to the poor people living in the rural mountainous areas – the most marginalized, vulnerable and poor.

The Project significantly upgrades transport infrastructure in Timor-Leste, providing immediate benefits. This will contribute considerably to inter-island trade, particularly north-south. It will facilitate the development of economic activities in both the north and south of the island. It will increase the access to markets for all the population in Manatuto district. Based on these basic economic benefits, the internal rate of return of the project of 8.8%. This alone is sufficient to justify investment.

Under Outcome 4 the Project focuses interventions into three Sucos. One of these is Manelima Suco. This Suco, with a population of approximately 2,468 in 2010, has been identified as having the highest level of vulnerability to climate change (Appendix 1: Endnote 21). By focusing Project interventions in that Suco, this will reduce this vulnerability.

The Project will also implement a series of ‘win-win’ activities – that will lead to both climate change adaptation and improved livelihoods. These include livelihood development at the three sucos lying in the road corridor.

The project will also yield important social benefits, as follows:

- Greatly increased access to education facilities for, at a minimum, the 20,000 rural residents of Manatuto;
- Greatly increased access to health facilities for, at a minimum, the 20,000 rural residents of Manatuto;
- Facilitation of social and cultural and religious ties across communities, with particular benefits for all 40,000 residents of Manatuto district; and,
- Increased possibility of leisure activities for a sizeable percentage of the Timor-Leste population.

The LDCF funds are used to ensure the Project is climate proof, and so to ensure the above gains will be maintained through climate change. Moreover, the LDCF funds are used to build sustainable capacity in Timor-Leste to plan, identify, design and construct roads – this will contribute to the upgrading and maintenance of all roads in Timor-Leste, and to the subsequent social, economic and cultural benefits.

Gender Assessment

The Timor-Leste Constitution establishes that men and women must be treated equally in all aspects of life. The Constitution also guarantees protection against discrimination based on sex and equality of rights and obligations in familial, political, economic, social and cultural life.

The SDP vision is, by 2030, “for Timor-Leste to be a gender-fair society where human dignity and women’s rights are valued, protected and promoted by our laws and culture”. One of the key strategies to achieve this vision is gender mainstreaming promoted across government in policies, programs, processes and budgets.

Timor-Leste's commitment to and progress in gender equality is reflected in the strong ratio of girls to boys in primary school and the proportion of women in the National Parliament, armed forces and the police. Notwithstanding, traditional gender biases affect all aspects of life. Adult female illiteracy stands at 32%, compared to 21% for men. In higher education, there are only 83 women for every 100 men. Although female representation on Suco Councils is relatively high, only 2% of Suco Council Chiefs are women. The Maternal Mortality Rate remains one of the highest in the world, with 42% of all deaths of women aged 15 to 49 related to pregnancy. Nearly 40% of women in Timor-Leste over the age of 15 have experienced physical violence (Appendix1:Endnote22).

A thorough gender assessment was undertaken during the design the road (Appendix1:Endnote24) . The entire range of potential positive and negative impacts on women was considered. A response strategy was drawn up, providing recommendations to optimise the impact on women. These include institutional measures, training, and capacity building for gender. They also include practical measures such as ensuring women are hired in the labour force, ensuring all communication programmes adequately reach women, providing facilities for women, and the provision of gender training for district officials. The implementation of the gender response strategy is an integral part of the baseline, in line with ADB rules and procedures. The LDCF project budget foresees the involvement of a national gender expert to ensure mainstreaming of gender issues

B.3. Explain how cost-effectiveness is reflected in the project design:

Road Design

The design of the baseline project is based on detailed cost-benefit analysis and comparison of the financial and economic viability of several alternative approaches. In the design of the baseline project, the internal rate of return and net present value was calculated for several options, including: (i) do nothing; (ii) repair and rehabilitate with 4.5m width; (iii) reconstruct with 4.5m width; and (iv) reconstruct with 6m width. The final option was chosen to be most in line with international practices, and to have the highest long-term benefits. In addition, during the detailed design, all forms of civil and bio-engineering approaches were considered in order to achieve objectives. Cost-benefit analysis was used to determine the optimum combination.

In line with GoTL and ADB strategic approaches in Timor-Leste, the baseline project and LDCF funding place strong emphasis on road maintenance. Improving maintenance has been identified as a most cost-effective strategy for improving road transport. Likewise, developing maintenance systems and capacity has been identified as a most cost-effective adaptation measure.

Approach to Select Climate Proofing Activities

The ADB has significant experience in the selection of adaptation activities for infrastructure - and has developed several tools to facilitate this selection (Appendix1:EndNote24) . A key tool is the 'Adaptation Assessment Matrix for Road Works' (Appendix1:Endnote25) . Building on this, the following three step approach to selecting activities to be supported by LDCF was undertaken:

- (1) At pre-feasibility stage, the Project design consultants analyzed the Adaption Assessment Matrix for Road Works. From this matrix, a short list (appendix1:EndNote26) of priority hazard impacts and proposed adaptation strategies was identified.
- (2) At feasibility stage, ADB climate change experts and local staff analyzed the short list from step (1). A list of options for LDCF support was prepared.
- (3) At final design stage, ADB staff consulted with government, project design experts and climate change experts. They considered the advantages and disadvantages of each option from step (2). The final activity list in this proposal was prepared (Appendix1:EndNote27) .

Integration into ADB Programme

The LDCF activities build onto a strong baseline and will therefore yield an influence and impact beyond the LDCF budget. The total baseline value is \$122,750,000. The LDCF will be managed jointly with the baseline projects. This is a cost-effective manner for LDCF to influence road transport infrastructure in Timor-Leste and to mainstream climate change into the transport infrastructure sector.

Integration into the ADB Regional Program

Given the relatively small scale of the ADB's country programs in Timor-Leste and South Pacific countries, the regional Program approach is a cost-effective way to provide support and to achieve adaptation objectives.

The programmatic approach allows for sharing knowledge across sectors and between countries which face similar challenges in terms of infrastructure development and maintenance. The regional program support unit (PSU) will ensure coordination, knowledge management, and lesson learning. Channels for sector knowledge groups, such as transport forums and Pacific Infrastructure Advisory groups will be explored. The Pacific Region Infrastructure Facility (PRIF), for example, is a multi-partner infrastructure coordination and financing mechanism that will be involved in this program. This will provide a channel for greater access to sector experts in each country and for learning across sectors and countries.

Because this is a Pacific regional program, it will also enable the direct building into other regional programs. Notably, three ADB regional Technical Assistance projects are expected to directly support a regional approach to NAPA implementation: (i) Strengthening Governance and Accountability in Pacific Island Countries, Phase II, which will provide sub-regional audit support to public auditing in Kiribati, Nauru, and Tuvalu; (ii) Pacific Economic Management to support countries in addressing the impacts of the global financial and economic crisis; and (iii) Strengthening Capacity of Pacific Developing Countries in Climate Change. Finally, the regional programmatic approach also allows for better coordination with other regional programs and centers. This will include linkages with programs such as the EU funded "Increasing Climate Resilience of Pacific Islands Small Island States through the Global Climate Change Alliance", the GEF funded Pacific Alliance of Sustainability Program, and the Secretariat of the Pacific Regional Environment Program (SPREP).

C. DESCRIBE THE BUDGETED M & E PLAN:

As part of the overall regional programme, at the regional level, the PSU will track program indicators and will prepare the progress reports to the GEF. PSU will also support the project evaluations.

In-country, the PMU will be responsible for monitoring on a day-day basis. This will be fully integrated into the monitoring of the baseline project. PMU has significant experience monitoring such projects, and significant resources to do that.

Within the framework of the overall regional programme, a separate mid-term and final evaluation will be undertaken for this project. The mid-term evaluation will take place during the first two years and will be designed to identify gaps and constraints which can be addressed during the remainder of the program time-frame.

The M&E plan is consistent with GEF policies. The M&E plan will be reviewed and revised as necessary at project inception and a project supervision plan will be developed at this stage. The main weight will be on outcome monitoring, but financial and implementation monitoring will also be equally considered.

A summary of the envisaged M&E activities is provided in the following Table 7 of Appendix I: M&E Activities and costs

LDCF Indicators and Targets

The LDCF/SCCF Adaptation Monitoring and Assessment Tool (AMAT) will be used to monitor project contribution to the global LDCF objectives and strategies. This will be used at project start-up, at mid-term and at project-end, in line with GEF procedures. The Indicators selected for monitoring are provided in Appendix1:Table8.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this form. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mario Ximenes	Operational Focal Point/Director	REPUBLICA DEMOCRATICA DE TIMOR LESTE, MINISTERIO DA ECONOMIA E DESENVOLVIMENTO SECRETARIA DE ESTADO DO MEIO AMBIENTE, DIRECCAO NASIONAL PARA ASSUNTOS AMBIENTAIS INTERNASIONAIS	02/08/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Nessim Ahmad Director, Environment and Safeguards concurrently Practice Leader (Environment) Asian Development Bank		07/05/2014	Richard Phelps Principal Infrastructure Specialist	+670 332-4801	rphelps@adb.org

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Outcome/Output	Activities
<p>Outcome 1: The Manatuto to Natabora road link climate proofed</p> <p>Indicator : Travel time from Manatuto to Natarbora</p> <p>Target: 30% reduction in travel time on the main road (2013 baseline 3.5 hours); 15% reduction in travel time on the District Road from Laclubar to Laclubar Junction (2013 baseline: XX hours to be updated by PMU).</p>	
Output 1.1 Drainage infrastructure upgraded to account for climate change	1.1.1 Construction of larger drains, large culverts and improved culvert inlets/outlets
Output 1.2 Road base and road surface adapted to account for increased rainfall intensity, localized flooding and increased prevalence of drought and flooding conditions	1.2.1 Road raised, road base improved, road surface material improved, embankments strengthened.
Output 1.3 Slope stability enhanced to account for climate change	1.3.1 Implementation of bio engineering measures such as grass planting, coco-net, bamboo fences, etc.
<p>Outcome 2: Road maintenance programmes contribute to climate resilience</p> <p>Indicator: Performance-based road maintenance contracts are expanded by the MPW. By December 2017, at least 650 km of national roads (45%) receive routine maintenance under a performance-based contract in accordance with DRBFC's annual plan (2013 baseline: 0%).</p>	
Output 2.1 Performance based maintenance of the Manatuto-Natarbora link road (90 km) – <i>that ensures resilience to climate change</i> - is demonstrated and associated capacity is built to ensure sustainability	2.1.1 The Activities are spelled out in the performance based contract. They cover 91km for two years, at an estimated cost of \$8,000 per km per year.
<p>Outcome 3: Capacity to identify, plan, appraise, design and implement climate change adaptation measures for road infrastructure projects</p>	

Outcome/Output	Activities
<p>Indicator no. 1: The coverage (quality and quantity) of road transport infrastructure in the national reports to UNFCCC (<u>baseline</u>: NAPA has poor coverage and INC has no coverage; <u>target</u>: second national communication covers road transport infrastructure in a manner that is generally considered to be accurate and relevant).</p> <p>Indicator no. 2: Guideline being utilized (<u>baseline</u>: no guidelines exist; <u>target</u> by 2015, at least 3 Districts are using the guidelines)</p>	
<p>Output 3.1 A trained cadre of Policy Makers, Planners and Design Engineers in the Ministry Public Works with Capacity to Mainstream Climate Change into their Operations</p>	<p>3.1.1 3 workshops to raise awareness in MPW, PMU, districts etc.. (separate policy makers, planners, designers, local staff)</p> <p>3.1.2 In-depth training for (4: 2 from MPW, 1 from PMU, 1 from district – e.g. each for 2 weeks) transport infrastructure professionals on how to address climate change.</p>
<p>Output 3.2 A practical tool (i.e. Ministerial Guidelines) for use by planners and design engineers, to mainstream climate change into their operations</p>	<p>3.2.1 Review how other countries mainstream CC into planning/designing roads</p> <p>3.2.2 Identify entry points in road design/planning in Timor-Leste for mainstreaming climate change</p> <p>3.2.3 Identify methods to address climate change in the design/planning of roads</p> <p>3.2.4 Develop practical guidelines to be used by planners and design engineers.</p>
<p>Output 3.3 Knowledge and understanding of climate change, of the impacts of climate change on road infrastructure, and of how to adapt to climate change</p>	<p>3.3.1 Collect information on weather and extreme weather events</p> <p>3.3.2 Collect and store information on climate related damage to the road – all land slides, closures, etc.</p> <p>3.3.3 Analyze above data to determine (i) costs of climate related damage (ii) relationship between extreme weather and damage (iii) the points along the road that are not climate proof (iv) the effectiveness of adaptation measures taken along the road.</p> <p>3.3.4 Publish a lessons learnt document</p>
<p>Output 3.4 Effective working linkages between road transport sector professionals and climate change sector professionals</p>	<p>3.4.1 Establish small working group on information needs of infrastructure</p> <p>3.4.2 Identify climate data needs in transport sector that can be met</p> <p>3.4.3 Climate change experts provide useful information to infrastructure expert on climate change</p>

Outcome/Output	Activities	
Output 3.5: Capacity to Support Bioengineering Schemes and Watershed-Wide, Community Implemented Programmes that Increase Climate Resilience and Ecosystem Strength	3.5.1 Training for transport planners on (i) basic bioengineering techniques; (ii) when to use bioengineering in infrastructure projects; (iii) how to economically assess the use of bio-engineering.	
	3.5.2 2 x 2-week basic training for MPW, PMU and District staff	
	3.5.3 Prepare some pilot sites	
	3.5.4 Monitor and report on effectiveness of bio-engineering and watershed protection measures	
<p>Outcome 4: Improved Watershed Management at Hotspots Contributing to Infrastructure Climate Resilience and Co-benefits in terms of Livelihoods and Ecosystem Strength</p> <p>Indicator no. 1: Activity in the Orlalan landslide (baseline and target to be determined)</p> <p>Indicator no. 2: level of erosion at the three sites (baseline and target to be determined)</p>		
Output 4.1 - 4.3 Improved watershed management and protected road infrastructure at Manelima Suco, Turlalan Aldea (Orlalan Suco) and Cetula Aldea (Fatumakerek Suco)	4.1.1 At all the three sites the initial steps will be assessment and planning and activity selection	
	4.1.2 At all three sites, based on 3.1.1., there will be the appropriate mixture of tree planting, small-scale irrigation, new crop development, sustainable agriculture, sustainable livestock, check dam construction, nursery development ,etc.	
	4.1.3 At all 3 sites, there will be monitoring of land cover, erosion, debris, and livelihood development	

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Note: The following comments pertain to the overall program, and not uniquely to the Timor-Leste Project. Most comments are not pertinent to Timor-Leste

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
Agency's Comparative Advantage	5. Does the project fit into the Agency's program and staff capacity in the country?	Please provide information on staff capacity of the offices especially Timor-Leste or others that will be directly linked to the program.	<p>TIM: ADB's Special Office in Timor-Leste (SOTL) has an officer dedicated to the water sector who will be supporting the government in implementing the project. The main implementing agency will be the National Directorate for Water Supply. It has been implementing the Dili Urban Water Supply Sector Project and is just about to start implementing the District Capitals Water Supply Project. The Second District Capitals Water Supply Project will be its third ADB-financed urban water sector project. The capacity of the directorate in water management and service delivery is being built through a technical assistance, which will commence in August 2012. The directorate's previous experience in implementing water supply projects, and ongoing capacity building efforts, means it has sufficient staff capacity to implement the GEF financing.</p> <p>For road upgrading projects, a Principal Infrastructure Specialist has been out posted from PARD HQ to Dili, Timor-Leste to lead project design and monitoring of implementation. A national Senior Portfolio Management Officer, has also been recruited and has extensive in-country experience in relation to climate change programs (including past involvement in NAPA preparation with UNDP). ADB field office staff will be supported as required by ADB HQ specialists. Detailed assessment of potential climate change impacts and adaptation costs for specific project roads will be undertaken by the firm of consultants appointed for detailed engineering design.</p> <p>VAN: The Department of Environmental Protection and Conservation (DEPC) has a dedicated division for environmental protection, with a solid waste officer, a chemical officer, a climate change adaptation officer and other relevant support staff for environmental</p>

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
			engineering, environmental impact assessment, and environmental compliance.
Project Consistency	10. Does the proposal clearly articulate how the capacities developed, if any, will contribute to the sustainability of project outcomes?	Please describe mechanisms and project activities in each country and at the regional level that are targeted towards ensuring sustainability of project outcomes.	<p>TIM: The Second District Capitals Water Supply project follows the model set out by the District Capitals Water Supply Project in terms of sustainability. First, it will support 2 years of operation & maintenance of the rehabilitated systems to (a) ensure the systems function as designed, (b) water is provided 24 hours per day, and (c) local authorities have time to build their capacity to operate and maintain the system and to manage private sector participants in urban water supply. Second, it will support local residents to take training/certifications in construction, operation and maintenance for the water sector thereby expanding the number of qualified technicians available locally to support the sector. Third, it will include hygiene awareness campaigns and support to local health officers to ensure communities understand how to maintain the quality of the new water supply.</p> <p>All proposals for major projects are vetted for viability and sustainability by the Major Projects Secretariat and the National Development Agency under current country systems. The Major Project Secretariat has an international environmental specialist with responsibility to review safeguard issues. The Government's Directorate of the Environment is responsible for reviewing environmental due diligence and issuing Environmental Licenses for individual projects. ADB-supported projects will undergo these processes in addition to due diligence mandated by ADB.</p> <p>TUV: The ADB Pacific Approach recognizes that in a micro-economy such as Tuvalu, poor expenditure allocation decisions have significant opportunity costs that impede development and growth. For this reason, the focus of support to Tuvalu is on improving public sector management and the environment for private sector development. Support will be provided for strengthening budget management and implementing</p>

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
			<p>public enterprise reforms. Strengthening of public sector management will also provide fiscal space to enable policy makers respond to future exogenous shocks when these occur. This country operations business plan (COBP) is consistent with the Pacific Approach and its drivers of change, and CPS 2008-2012.</p> <p>ADB does not currently have planned “hard” infrastructure projects in Tuvalu. However, the government has expressed interest in participating in this program for support to address their urgent and immediate adaptation needs. The sub-project for Tuvalu will therefore be fairly innovative in that it will seek to incorporate adaptation into broader infrastructure planning, prioritization and budgeting process. It is at these earliest stages that very profound changes can be made to how infrastructure is planned, by, for example, ensuring that building codes and land zoning is appropriate to projected sea-level rise, in the case of small islands such as Tuvalu. Tuvalu’s first NAPA priority relates to coastal zone protection. In identifying their vulnerabilities for this priority, they identified the high level of vulnerability of coastal infrastructure as important to communities which are largely concentrated along the coastal zone.</p> <p>The baseline project for Tuvalu will therefore be through the Pacific Region Infrastructure Facility (PRIF), which is a multi-partner infrastructure coordination and financing mechanism. It was initiated in 2008 by the Asian Development Bank (ADB), the Australian Agency for International Development (AusAID), the New Zealand Government via the New Zealand Aid Programme (NZMFAT), and the World Bank Group (WBG). The European Commission (EC) and the European Investment Bank (EIB) became members of the joint initiative in 2010.</p> <p>The PRIF is supporting Tuvalu to prepare an Infrastructure Strategy and Investment Plan, which assists the central government to identify, prioritize and budget for key infrastructure projects, and is prepared iteratively. The objective of the work is to</p>

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
			<p>identify the Government's needs, strategies, policies, and immediate priorities in the infrastructure sector as well as identify the financial resources to support their realization. The immediate output is the plan itself and increased capacity to implement it. PRIF management has confirmed support for this project and together with the government of Tuvalu believe it to be fundamental to directing future investments towards reducing vulnerability to climate change.</p> <p>VAN: Firstly, there is the enactment of two legislations dealing with pollution control and waste management, which will go to the Parliament in August 2012. These will allow for a clearer delineation of roles and responsibilities for waste and pollution control at the national, provincial, and community levels. Second, the DEPC structure will be revised to allow for more recruitment of capacity to implement the above laws and undertake any other roles relating to climate change adaptation and pollution control in general. Third, the National Advisory Committee for Climate Change is being restructured to integrate disaster risk reduction (DRR) into its portfolio and will be called the National Advisory Board (NAB), which will deal with both climate change adaptation and DRR. A project management unit is being established to oversee these changes and improve coordination of all climate change projects/ activities in Vanuatu.</p>
Project Design	11. Is (are) the baseline project(s), including problem (s) that the baseline project(s) seek/s to address, sufficiently described and based on sound data and assumptions?	Please describe the underlying problem expected to be exacerbated by climate change that the baseline projects intend to address. In cases where there is a lack of sufficient data to carry out the baseline or the proposed LDCF projects, please	TIM: Although Timor has sufficient water supply overall, there are localized and seasonal supply issues. These are expected to worsen with climate change. For example, in towns that rely on rivers for their water supply, longer and more severe dry seasons mean they may need alternative ground sources to supplement the river supply. The exact climate change issues of the three towns (Los Palos, Viqueque, and Baucau) covered by the project will be explored during the PPTA, and adaptation mechanisms will be built into the design of the project. During the PPTA, baseline data will be gathered to provide reliable measures for judging the project's

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
		<p>provide suitable mechanism through which suitable data are generated, accessed or substituted with other reliable measures. For Tuvalu, please clarify the geographical coverage of the baseline project.</p>	<p>impact on climate change adaptation.</p> <p>For road projects, the main problem is to ensure resilience of the constructed road to increased rainfall intensity through appropriately designed and constructed drainage and erosion protection measures. The PFD explains the lack of data and the proposed approach. Climate change downscaling has been conducted but with high variability in the mountainous landscape. The project may seek to strengthen the data but will also examine and agree sets of assumptions to guide decision making.</p> <p>TUV: The proposed sub-project will contribute to implementing NAPA Priority #1. Increasing resilience of Coastal Areas and Community Settlement to climate change. The proposed program will support Tuvalu to protect its coastal communities and infrastructure by directing investments towards projects which reduce vulnerability to climate change, particularly to sea-level rise and associated storms and impacts. In preparing its NAPA, the government identified a number of barriers to protecting coastal communities such as lack of building codes and norms for infrastructure. This is in addition to overall environmental degradation which makes the coast even more vulnerable. The project will work at the highest levels of government to effect significant changes to decision making and budgeting process in light of climate change priorities.</p> <p>The proposed sub-project will seek to incorporate climate change adaptation needs into the infrastructure prioritization and budgeting process. The activities are targeted therefore at the policy level but require important capacity building efforts as well as monitoring and evaluation of the effects of the project activities. There are very few examples globally where adaptation is being integrated at such high level of the decision-making process and there will be much to learn from this exercise. The project will also include a review and amendments to the building codes, and strengthened implementation capacity to enforce measures which will reduce the</p>

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
			<p>vulnerability of the coastline and associated assets.</p> <p>VAN: Climate change in Vanuatu may lead to: (a) increased fecal pollution from surface water runoff and related problems such as poor water quality; (b) increased sedimentation of coastal areas, to the detriment of coral reef areas; and (c) damage to physical infrastructures (e.g., roads, drainage systems, etc.).</p>
	<p>20. Is the project implementation/ execution arrangement adequate?</p>	<p>Please provide details on implementation arrangement at project level including identification of executing agencies in each country.</p>	<p>TIM: The National Directorate for Water Supply will be the implementing agency, and the Ministry of Infrastructure will be the Executing Agency. They will be supported by a urban water sector project implementation unit that is currently support the ongoing ADB-financed urban water sector projects. The existing steering committee for the District Capitals Water Supply Project (which includes national, district, and town stakeholders) will be expanded to include the three towns of the Second District Capitals Water Supply Project.</p> <p>The Executing Agency for the road projects will be the Council for Administration of the Infrastructure Fund (which is supported technically and administratively by the Major Projects Secretariat). The Implementing Agency will be the Ministry of Infrastructure, supported by a Project Management Unit. A firm of consultants will be responsible for detailed engineering design and construction supervision.</p> <p>TUV: The national agency to execute the project will be the Department of Planning and Budget, Ministry of Finance and Economic Development (MFED). This department is the lead agency responsible for the development of The Tuvalu Infrastructure Strategy and Investment Plan 2012 (TISIP), which will guide investment planning for economic infrastructure for the next 5-10 years. In order to integrate climate change considerations into this plan, it is planned that the Department of Environment, within the Ministry of Natural Resources, Environment, Agriculture and</p>

Review Criteria	Questions	GEF Secretariat Comment at PIF (PFD) / Work Program Inclusion	PARD Response
			<p>Lands (who leads on climate change issues) will also be heavily involved in the project.</p> <p>VAN: National agency to execute the project – Public Works Department (PWD) National coordinating agency – Climate Change Unit, Meteorology Department Other supporting agencies – Department of Environmental Protection and Conservation (DEPC) Department of Water Resources Other concerned agencies</p>

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁵

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG Grant Approved at PIF: N/A			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Total	0	0	0

⁵ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/NPIF Trust Fund or to your Agency (and/or revolving fund that will be set up)

N/A

Annex E - Determining the incremental cost of ‘right of way’ measures designed to accommodate forecasted changes in climate characteristics.

Five sets of measures have been identified:

- 1) Adapted drainage structures to increase drainage capacity:
 - a) Drains, culverts, embankments and bridges
 - b) Cascades, inlets, outlets, etc....
- 2) Adapted geotechnical measures to counter slope instability;
- 3) Adapted bio-engineering measures to reduce erosion in unstable areas;
- 4) Adapted road base and road surface to account for increased rainfall intensity, localized flooding and increased prevalence of drought conditions;
- 5) Adapted maintenance to account for increased discharges/debris.

The estimated associated additional costs are summarized in the following table (and calculated in the following sections). It is noted that these are based on *conservative* estimates.

ITEM	COST
1a) Adapted drainage structures - drains, culverts, embankments and bridges	1,466,000
1b) Adapted drainage structures - inlets, outlets (cascades), etc	176,726
2 Adapted geotechnical measures to counter slope instability	0
3 Adapted bio-engineering measures to reduce erosion in unstable areas	80,266
4 Adapted road surface and road base	1,704,501
5 Adapted maintenance to account for increased discharges/debris.	145,600
Total climate change additional cost	3,573,093

It is noted that, in addition, watershed management/bioengineering measures outside of the ‘right of way’ (RoW) are recommended for highly vulnerable segments *off* the road (high above the road). These measures can be designed to contribute to improved livelihoods in the community – so called ‘win-win’ or ‘no-regrets’ measures. ***This annex does not discuss these outside RoW measures.***

1. Drainage

a) Drains, culverts, embankments and bridges

Method:

The following Design Flood Frequency (return periods) are used in the road design.

Structure	Return Period (years)
Bridges	1 in 50
Box culverts	1 in 25
Pipe Culverts	1 in 15
Embankment	1 in 10
Road Surface	1 in 5
Lined Ditch	1 in 2

Without climate change, at each watershed, drains are designed to account for rainfall intensity duration frequency (RIDF) over the entire watershed. As data is not available for the project site, RIDF from Darwin (northern Australia) is used (this is in line with standard practices for Timor-Leste). This is used to calculate the total design discharge. The drains are designed to be sufficiently large to be able to transport this total design discharge.

With climate change, the calculated total Design Discharge for each watershed is increased by 20%, to take account of potential increased intensity of heavy rainfall and medium term cumulative rainfall. Hence, each element in the drainage structure needs to be increased in size in order to allow for this increased discharge. The calculation and the design are complete only for package 1 (Manatuto to Laclubar junction). The incremental costs for all elements in the structure in Package 1 is presented in the following table:

Measure	Without climate change		With climate change		Incremental cost (US\$)
	quantity	Cost (US\$)	quantity	cost (US\$)	
Horizontal drains	25.22 km (0.5m x 0.5 m) Volume = 9,584m ³	1,042,740	25.22 km (0.5m x 0.6 m) Volume = 10,593m ³	1,152,519	109,779
RCPC (reinforced concrete pipe cube)					

<ul style="list-style-type: none"> • Diameter 910 mm • Diameter 1070 mm • Diameter 1220 mm • Diameter 1520 mm 	818 m	230,390	723 m	203,633	(26,757)
	383 m	128,696	225 m	75,605	(53,091)
	210 m	91,466	262 m	119,224	27,758
	106 m	55,137	229 m	119,117	63,980
RCBC (reinforced concrete pipe box)					
<ul style="list-style-type: none"> • Structural conc. Class A • Reinforcing steel bars 	834cu.m	238,441	1,284 cu. m	367,096	120,655
	184,000 kg	493,120	303,584 kg	1,180,606	320,486
Bridges					
<ul style="list-style-type: none"> • Bridge 1 • Bridge 2 	RC deck grade	658,461	RC deck grade	658,461	0
	RC Flat Slab	601,061	RC Flat Slab	601,061	
Total		3,539,512		4,110,322	570,810

The data in the above table only covers Package 1 (i.e.: Manatuto – Laclubar Junction, 35km). Hence, the total cost for Package 1 is estimated at \$571,000.

The costs for Packages 2 and 3 are calculated on pro-rata basis (until detailed design data is available for those packages). Packages 2 and 3 = 44.5 + 10.3 = 54.8 km. Hence calculated total cost for packages 2 and 3 = \$571,000 x 54.8/35 = \$895,000

(1a) total adaptation costs are 895,000 + 571,000 = \$1,466,000

b) Inlets, Outlets to culverts

In the baseline situation, the outlets from cross road drains (culverts) fall directly on to loose stones and gravel. However, this is insufficient to absorb energy at times of high discharge. As a result, rainwater from outlets will scour hillsides, undermine slope stability, and contribute to road failure.

Climate change, with more intense rainfalls, has more potential to cause erosion and scouring. Accordingly, design measures have been developed to resist the increased flows under climate change. This consists of the following design changes:

- At 25 locations, increased slope protection, gabion boxes and stepped masonry ditches in the *outfall section* of drainage crossing structures;
- At 10 locations, bio-engineering measures such as vegetating of brush layers of Palisades and fascines in the *upstream gullies* of the drainage crossing structures.

The incremental costs of these design changes, for Package 1, are presented in the following table:

Hazard Impact	Significance	Adaptation Measure	Without Climate Change		With Climate Change		Cost Difference (\$)
			Quantity	Cost (\$)	Quantity	Cost (\$)	
<i>(Intense Rainfall)</i>							
Flow of rain water along gullies in the upstream influence erosion	Removal of soil in the upstream by the action of running water	Brush layering, palisades and fascines installation	nil	0	1200 linear meter	4,860	4,860
Rapid flow in the outlet of drainage crossing caused erosion and scouring	Scouring of soils and rock falls cascading in the outfall downstream	Grouted riprap slope protection, gabion box and stepped lined canal/ditch	350 cu.m Hand-laid stones/rocks	14,000	180 cu.m gabion, 250 cu.m grouted riprap, 300 cu.m stone masonry	78,020	64,020
Total Cost for Climate Change Adaptation (US \$)							68,880

The data in the above table only covers Package 1 (i.e.: Manatuto – Laclubar Junction, 35km). Hence, the total cost for Package 1 is estimated at \$68,880.

The costs for Packages 2 and 3 are calculated on pro-rata basis (until detailed design data is available for those packages). Packages 2 and 3 = 44.5 + 10.3 = 54.8 km. Hence calculated total cost for packages 2 and 3 = \$68,880 x 54.8/35 = \$107,846

(1a) total adaptation costs are 107,846+ 68,880 = \$176,726

2. Geotechnical measures to counter slope instability

Method:

Slope instability is affected by many factors, notably: slope inclination, materials, water content and level of groundwater table. The measures required to counter slope instability along the road also depend greatly on the location of the instability with reference to the centre of the road.

Without climate change. There is very limited data required to calculate slope instability. There is no possibility of undertaking the necessary scientific analysis. Moreover, for this road, given the available construction budget, and the difficult construction terrain, only a *small number of counter measures can be considered*. There are in effect 'standard' counter-measures for narrow, hilly roads in Timor-Leste. These are to be implemented at each location considered unstable. These standard counter-measures involve a combination of: soil/rock removal; retaining walls; and gabion walls. The details of the combination depend on the location of the unstable slope with reference to the centre of the RoW.

In the baseline, the counter-measures are designed to be more than adequate. Even with climate change, it is considered that the counter measures will be sufficient. Hence, the baseline design (without climate change) *is considered to already be climate change proof*.

In this conservative estimate, there is no additional cost associated with geotechnical counter-measures.

(2) total adaptation costs are 0.

However, as a precaution, and in order to limit erosion and debris near the counter-measures, bio-engineering measures are recommended at many points, often in connection with the geo-technical counter-measures (see (3)) below.

3. Bio-engineering measures to reduce erosion in unstable areas

Without climate change, in the civil works, in the baseline, bio-engineering measures are not necessary.

With climate change Bio-engineering is an additional measure to increase resilience to climate change, and is necessary. This reduces erosion and debris. It may also increase slope stability. The nature and costs of these additional bio-engineering measures are provided in the following table.

Measure	Without climate change	Cost (A)	With climate change	Cost (B)	Incremental cost (B-A)
Grass (m ²)	None	0	5,664	17,389	17,389
Bamboo (m)	None	0	168	387	387
Blankets (m ²)	none	0	5,784	7,809	7,809
Tree planting	None	0	115	342	342
Tree guards	none	0	115	199	199
Slope Trimming	none	0	6,480	5,314	5,314
					31,440

The data in the above table only covers Package 1 (i.e.: Manatuto – Laclubar Junction, 35km). Hence, the total cost for Package 1 is estimated at \$31,440.

The costs for Packages 2 and 3 are calculated on pro-rata basis (until detailed design data is available for those packages). Packages 2 and 3 = 44.5 + 10.3 = 54.8 km. Hence calculated total cost for packages 2 and 3 = \$31,440 x 54.8/35 = \$49,226

(3) total adaptation costs are 31,440 + 49,226 = \$80,266

4. Adapted road base and road surface to account for increased rainfall intensity, localized flooding and increased prevalence of drought conditions

This applies to stretches of the road that are vulnerable to flooding. Standing water affects road pavement, base and sub-base and subgrade. Drying out of flooded areas, especially when rapid, can also affect sub-base and subgrade, if they are not of sufficient quality. This can cause rapid expansion/contraction, and lead to cracking of the road surface.

When designing the road, design engineers considered several road surfaces (i) triple surface treatment or TST; (ii) gravel; (iii) asphalt. Gravel is not appropriate for such roads. Hence, in the baseline situation, TST could be selected for the road pavement surface, as it is less costly. However, for several reasons, asphalt has been selected. One reason for selecting asphalt is that it is more resistant to climate change. TST leads to a slightly uneven surface, which is more vulnerable to flooding and to water damage. Asphalt, being smoother, has less such problems. Asphalt is also less

vulnerable to UV damage and temperature fluctuations. This is one measure, partly justified by the need to adapt to climate change. This applies to the entire road.

At some points, to avoid flooding, the re-design leads to a raising of the road by approximately 1 m. Moreover, at these points, in order to strengthen road and stability, high quality flexible sub-base⁶ is required. This sub-base must be (i) resistant to flooding (ii) flexible, in order to resist drought conditions, when inflexibility would lead to shrinking after flood, followed by road cracking. That is, the sub-base and subgrade must consist of expansive materials that, even after highly humid conditions, will not be affected by shrinking once the humidity dries out.

To adapt to climate change, specific measures are required *at each point* along the road, depending on possibility of flooding, scale of potential flooding, possibility of rapid drying out. Notably, flexible pavement using asphalt concrete surfacing, with strengthened subgrade support by applying extra sub-base thickness and raising of road level at potential flooded section are used in the design to address climate change.

For package 1, the following design measures are taken to adapt to climate change:

Climate hazard/impact	Significance	Adaptation Measure	Without Climate Change		With Climate Change		Cost Difference (\$)
			Quantity	Cost (\$)	Quantity	Cost (\$)	
<i>(Drought)</i>							
Shrinkage of Embankment Materials (due to presence of expansive soils)	Cracking of soil filling materials and differential settlement of embankment fill	Excavation and replacement of expansive subgrade soils with selected fill material	Replacement of 7,575 cu.m. with common materials from roadway excavation	38,784	Replacement of 7,575 cu.m. with selected materials (in addition, meeting standard Californian Bearing Ratio, CBR of at least 5 %)	60,827	22,043
<i>(Intense Rainfall)</i>							
Presence of prolonged water surface run-off	Water penetration on road pavement structure	Flexible surface using asphalt concrete of less stability	210,000 sq. m. (2.5 cm thick triple surface treatment (tst))	4,120,200	230,000 sq. m (5 cm asphalt concrete surfacing and shoulder paving)	6,016,570	284,455 (only 15 % of the difference)

⁶ Sub-base is the layer of aggregate material laid on the subgrade, on which the base course layer is located. Sub-base is the main load-bearing layer of the pavement. Its role is to spread the load evenly over the subgrade. The materials used may be either unbound granular, or cement-bound. The quality of sub-base is very important for the useful life of the road.

		loss)		@ steeper gradient)		in cost is allocated to climate change – as there are other reasons for using asphalt)
Saturated Ground in Low lands	Presence of unsuitable clayey materials	30 cm removal of unsuitable materials and replacement with stable non-plastic materials	No removal	0	6000 cu.m Selected granular materials	156,000	156,000
Flooding	Unpassable submerged roadway	All-weathered road by raising road level	Follow existing road level	0	6,000 cu.m embankment Raised roadway, pavement structures above flood level	30,720	30,720
	Scouring of embankment slope	Grouted riprap slope protection	Without slope protection	0	1,200 cu.m grouted riprap slope protection	116,400	116,400
	Wet subgrade level	Increase subbase thickness to compensate loss of subgrade support	3,700 cu.m (20 cm Aggregate subbase)	213,120	4,650 cu.m (25 cm aggregate subbase)	267,840	54,720
Total Cost for Climate Change Adaptation in Package 1 (US \$)							664,338

The data in the above table only covers Package 1 (i.e.: Manatuto – Laclubar Junction, 35km). Hence, the total cost for Package 1 is estimated at \$664,338.

The costs for Packages 2 and 3 are calculated on pro-rata basis (until detailed design data is available for those packages). Packages 2 and 3 = 44.5 + 10.3 = 54.8 km. Hence, calculated total cost for packages 2 and 3 = \$664,338 x 54.8/35 = \$1,040,163.

(4) total adaptation costs are 664,338 + 1,040,163 = \$1,704,501

5. Maintenance

The increased works to adapt to climate change (points 1, 3 and 4 above) will actually increase the resilience of the road and lower the maintenance requirements (compared to situation in which the works are not done). However, climate change (more floods, erosion, slides and debris) will actually increase maintenance requirements. Hence, more maintenance is required in the climate changing world.

Moreover, increased capacity to undertake maintenance, and increased investment in maintenance, are in themselves adaptive measures – they decrease vulnerability to climate change, increase resilience and increase adaptive capacity. Hence, ‘maintenance’ is eligible for support from LDCF.

However, it is not possible to calculate the additional costs of maintenance due to climate change. Hence, it is estimated that 10% of maintenance costs are due to climate change. These are to be paid, as a demonstration and capacity building technique, for the first two years.

Maintenance costs are up to \$8,000/km/year;

Total maintenance costs are therefore \$8,000 x 91 (km) x 2 (years) = \$1,456,000.

Maintenance costs due to climate change are therefore \$1,456,000/10 (i.e. only 10%) = **\$145,600**.

It is noted that this does not include the maintenance costs due to climate change for years 3 and onwards. Hence this is a very conservative estimate.

(5) total adaptation costs are \$145,600

6. Grand Total

ITEM	COST
1a) Adapted drainage structures - drains, culverts, embankments and bridges	1,466,000
1b) Adapted drainage structures - inlets, outlets (cascades), etc	176,726
2 Adapted geotechnical measures to counter slope instability	0
3 Adapted bio-engineering measures to reduce erosion in unstable areas	80,266
4 Adapted road surface and road base	1,704,501
5 Adapted maintenance to account for increased discharges/debris.	145,600
Total climate change additional cost	3,573,093

Annex F – Overview of Policy, Strategy, Legal and Regulatory Issues

	Transport Infrastructure	Climate Change
Policy/strategy	<p>The Strategic Development Plan 2011 – 2030 (SDP) establishes the importance of rapidly improving road infrastructure in the country. It states <i>“the poor state of our roads is increasing transport costs and impeding economic growth and the reduction of poverty at national, regional and local levels”</i>. It refers to inadequate construction, rehabilitation, maintenance and standards. It provides some details of priorities and timelines. It states that <i>“the Manatuto-Natarbora road link will be fully upgraded to international standards, including widening where technically feasible”</i>.</p> <p><i>The Program of The Fifth Constitutional Government, 2012-2017</i> re-emphasizes the importance of infrastructure in general, and the the Manatuto-Natarbora road link in particular – in order to provide a key north-south link and support development of the South coast.</p> <p>Recently the government has placed more emphasis on maintenance, in an effort to redress past errors. The Ministry of Public Works allocated 30% of its total budget to maintenance in 2013, and aims to increase this in coming years.</p>	<p>The SDP states that <i>“climate change presents serious environmental and political challenges for Timor-Leste”</i>. It establishes the general importance of adapting to climate change, but does not set out specific measures or approaches to be taken.</p> <p>Policy on climate change is broadly established in the ‘National Adaptation Plan of Action’ (NAPA). It is currently being further elaborated in the Initial National Communication to UNFCCC (INC, currently in draft form). The NAPA recognizes the impacts of climate change on infrastructure. It recommends priority adaptation measures in several sectors, but not transport infrastructure <i>per se</i>. Infrastructure in general, including transport infrastructure, is listed as vulnerable for example in relation to climate related disasters and hazards. There is no government budget dedicated to implementing the NAPA, however the government is committed to mobilizing resources to the NAPA.</p> <p>The Government has ratified the UNFCCC. However, there is no Law or other policy/strategy document addressing climate change adaptation or mitigation.</p>
Plan	<p>The Government has set priorities with regards to road infrastructure development, with support from international partners led by ADB. Priorities have been set, and many plans, pre-feasibility studies, feasibility studies and detailed designs undertaken. Notably, ‘the National Road Network Master Plan’ (NRNMP) assessed feasibility of rebuilding/upgrading 62 road transport links in Timor-Leste, representing a major part of the entire network. It established a 10-year plan, consisting almost entirely of rehabilitating and upgrading existing road links. Rehabilitation and construction has already started for some important links. The implementation of the NRNMP <i>is a potential entry point for climate change</i></p>	<p>The NAPA (2010) sets out a plan for immediate action. Although a well prepared document, it is not comprehensive and does not adopt a long term approach. It is not supported by a budget, so implementation is through projects, subject to time delays and mostly funded by international partners.</p> <p>The NAPA focus is mostly community-based adaptation and agriculture/forestry – in response to urgent needs identified by communities. It does include one priority related to ‘physical Infrastructure’ – with a focus on improving regulations and standards for climate-resilient infrastructure. This generally includes</p>

	<p>mainstreaming over the medium term.</p> <p>The Ministry of Public Works is currently preparing a five year plan, with support of ADB (the Infrastructure Management TA). This will include a 'capacity development framework'. <i>This is a potential entry point for climate change mainstreaming over the long term.</i></p>	<p>transport infrastructure. It also has sections related to natural disasters and infrastructure, and the need for early warning systems and improved legislation/standards. It also has a priority related to natural disasters, but the focus on transport infrastructure is not explicit and not clear.</p> <p>The (draft) INC sets out measures for mitigation and adaptation. It is not supported by a budget, so implementation is through projects, subject to time delays and mostly funded by international partners.</p> <p>The NAPA and INC do not provide specific guidance to addressing adaptation in the infrastructure sector. However, the proposed project is aligned to both the NAPA and the INC.</p> <p><i>In fact, climate change related policy and plans do not give sufficient or clear priority to transport infrastructure – given its vulnerability to climate change/variability and its socio-economic importance.</i> This is symptomatic of the incomplete communications between climate change and road infrastructure sectors.</p>
Regulation	<p>Neither current nor draft legislation or regulations provide an entry point for mainstreaming climate change.</p> <p>For example, the Government recently issued a Procurement Law and a Pre-qualification Law. These are very pertinent to development of transport infrastructure. However, there are no clear entry points for climate change mainstreaming.</p>	<p>There are no specific legislation/regulations relating to climate change.</p>
Standards	<p>There is no single set of transport infrastructure standards currently being used in Timor-Leste. For example, international contractors use a combination of TL standards (from 2005) and international standards. These standards are comprehensive and cover all aspects of road design (in hundreds, maybe thousands, of pages).</p>	<p>There are no specific standards relating to climate change.</p>

Clearly, some items in these standards may be affected by climate change. For example, the standards recommend which species to be used when planting trees as part of bio-engineering measures – and this could be affected by climate change.

With support from ADB, a revised set of geometric standards (covering only a small element of overall standards) has been prepared and is being reviewed by government.

Should it be decided to revise standards, or to prepare a single, uniform set of standards, it would be good to ensure they account for climate change. That is a **possible future entry point** – to be monitored.

It is noted that it is the plans and specifications, as prepared by the design engineer, that specify the detailed design of roads. These are based on site-specific calculations (including, as necessary, many based on rainfall data). **This is the entry point - the design stage and the supervision engineer.**

Annex G – Stakeholder Analysis and Rapid Capacity Assessment

Stakeholder	Description (units, numbers)	Responsibility	Role in LDCF Project	Capacity Needs
Ministry of Public Work (MPW) – National Directorate for Roads, Bridges and Flood Control (DRBFC) - Department of Roads (DR).	In total NDRBFC have 15 engineers, including 3 regional engineers.	Design road infrastructure; Procurement of road construction and maintenance services; Supervising road construction and maintenance; Monitor road network.	Guide project; Benefit from capacity building; Provide experts; data/information, facilities.	Awareness raising on climate change – all staff; Detailed knowledge of climate change – 1-2 persons; Practical tool to deal with climate change in their work; More knowledge of bio-engineering measures
MPW – Manatuto District ‘satellite office’	Three persons (one engineer assisted by 2 staff). Note: now Manatuto-Laclubar Jn. is part of Dili Region/Lacubar Jn – Natabora is part of Manufahi Region. This will change, and all will be under one Manatuto office.	Collect information and make recommendations; Supervising road construction and maintenance in the region; Monitor road network; Consultation with local authorities (including <i>suco</i>) and local conflict resolution.	Benefit from capacity building; Provide experts, data/information.	Awareness raising on climate change – all staff; Practical tool to deal with climate change in their work; More knowledge of bio-engineering measures.
MPW – NDRBFC – Department of Bridges and Flood Control	There are 3 engineers at the national office, and assisted administration staffs.	Planning development of bridges as well as monitoring. Prepare standards for bridge construction and flood stabilization.	Benefit from capacity building; Provide experts, data/information.	Awareness raising on climate change – all staff; Practical tool to deal with climate change in their work; More knowledge of bio-engineering measures.

Stakeholder	Description (units, numbers)	Responsibility	Role in LDCF Project	Capacity Needs
MPW – NDRBFC – Department of Planning	There is only 1 engineer, assisted by administration staffs.	Responsible for overall planning and development of the directorate, this includes project preparation and budgeting.	Benefit from capacity building; Provide experts, data/information.	Awareness raising on climate change – all staff; Practical tool to deal with climate change in their work; More knowledge of bio-engineering measures.
Project Management Unit (PMU)	Project Manager; CTA; Project Coordinators (2); Contract Quality Engineer; Quality Assurance Surveyor; Short-term consultant.s	PMU is responsible for (certain ADB/WB/JIC projects): (i) overall project implementation; (ii) stakeholder consultation and coordination; (iii) the procurement of goods, works and consulting services for road rehabilitation and maintenance; (iv) contract administration; (v) sector development support to MPW; and (vi) on the job counterpart training for MPW staff.	Overall management, coordination and monitoring; Procure goods (civil works) and services (experts, trainers, etc); Ensure LDCF activities/funds are fully integrated with ADB loan/grant activities and funds; Ensure expertise on key issues (climate change, bio-engineering) is brought to develop capacity and support project activities;; Benefit from capacity development.	Awareness raising on climate change – all staff; Detailed knowledge of climate change – 1 persons; Practical tool to deal with climate change in their work; More knowledge of bio-engineering measures.
State Secretary for Environment (SSE)/Directorate General for Environmental Services - National Directorate for International Environmental Affairs and Climate Change	Approximately 40 persons overall – target is more than 70 persons. Department for climate change (currently has 3 staffs and will	Coordinate climate change issues, relations with Convention, collect data, representing country in international fora. Research and data collection on CC. Education and awareness	Provide data and information on climate change. Benefit from capacity building.	Tools/skills to support transport sector on climate change adaptation issues.

Stakeholder	Description (units, numbers)	Responsibility	Role in LDCF Project	Capacity Needs
	increase to 20).	raising on CC. Liaise with other sectors and mainstream climate change into other sectors		
SSE - National Directorate for Environmental Services/Biodiversity	Currently has 10 staffs and will increase to 20 staffs.	Monitoring; Control; Protection; Law development and enforcement; Impact Assessment.	Not really relevant;	Awareness raising on climate change – all staff;
SSE - District 'focal points'	One person in each district and will increase to 3 persons in each districts.	See above	Linking with MPW regional/district staff.	Tools/skills to support transport sector on climate change adaptation issues; Awareness raising on climate change – some staff.
State Secretary for Forests and Natural Conservation – National Directorate of Forestry	Currently have 20 staffs – one District forester in each district.	Forest protection Forest management Reforestation Forest Conservation	Provide guidance and expertise on forest management and reforestation. Benefit from capacity development.	Awareness raising on climate change – some staff.
Community	People living in Manatuto District.	Participate in certain activities. Provide labour.	Provide labour for civil works, maintenance and bio-engineering; Main beneficiaries of overall project.	Awareness rising on climate change. Related to bio-engineer and watershed management.
Timorese transport consulting sector	Small number exists.	Compete for projects.	To be assessed. Unlikely to be an entry point.	Awareness raising on climate change –

Stakeholder	Description (units, numbers)	Responsibility	Role in LDCF Project	Capacity Needs
	Weaker than international counterparts.			some staff; Need tools and methods and data to address climate change in their work.
Timorese road construction company	There are many. Weaker than international counterparts.	Compete for projects.	To be assessed. Unlikely to be an entry point.	Awareness raising on climate change – some staff;
NGOs	Several involved in climate change adaptation – both international (Oxfam, Mercicorps, etc) and national (Haburas, etc).	Support development in country. Support local CBOs.	To be assessed. Unlikely to be an entry point.	
CBO	Are very many.	Mobilize communities, undertake local works, and address local issues – usually financed by external funds.	May well be involved in civil works/maintenance/bio-engineering – but through the main contractor.	Awareness raising on climate change

Initial Environmental Examination

August 2013

TIM: Road Network Upgrading Sector Project

Initial Environmental Examination

TIM: Road Network Upgrading Sector Project

Road A-09 Manatuto– Natabora Road

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APPENDICES

Abbreviations and Acronyms

ADB	–	Asian Development Bank
DSC	–	Design and supervision consultant
DEIA	–	Department of Environmental Impact Assessment (in NDE)
DRBFC		Directorate of Roads, Bridges and Flood Control
EA	–	Executing agency
EARF	–	Environmental assessment and review framework
EHS	–	Environmental Health and Safety Guidelines (of World Bank Group)
EIS	–	Environmental impact statement
ELL	–	Environmental Licensing Law (Decree No. 5/11)
EMP	–	Environmental management plan
ESO	–	Environment and safety officer (in PMU)
GRC	–	Grievance redress committee
GRM	–	Grievance redress mechanism
GoTL	–	Government of Democratic Republic of Timor-Leste
IA	–	Implementing agency
IEE	–	Initial environmental examination
IES	–	International environmental specialist
MAFF	–	Ministry of Agriculture Fisheries and Forestry
MOF		Ministry of Finance
MPW	–	Ministry of Infrastructure
NDE	-	National Directorate of Environment
NES	–	National environmental specialist
NGO	–	Non – government organization
PMU	–	Project Management Unit in MPW
REA	–	Rapid environmental assessment
ROW	–	Right-of-way
RP	–	Resettlement plan
RRP	–	Report and Recommendation of the President
SEMP	–	Site-specific environmental management plan
SPS	–	Safeguard Policy Statement
TA	–	Technical assistance
TOR	–	Terms of reference

Executive Summary

1. **Overview.** The Government of Timor-Leste (GoTL) has requested the Asian Development Bank (ADB) to provide financing to facilitate the upgrading of roads proposed in the Road Network Upgrading Sector Project (RNUSP). The objective is to provide a comprehensive program to upgrade, rehabilitate and maintain priority road sections of the road network of Timor-Leste that provide links between major cities and towns. The core sub-project is the Manatuto – Natabora Road and five candidate sub-project roads for improvement have been suggested for priority study, design and implementation by Ministry of Public Works (MPW).
2. **Implementation arrangements.** The executing agency for the upgrading and improvements of RNUSP is the Ministry of Finance (MOF) and the implementing agency will be MPW. Within MPW the key agency for implementation will be the Project Management Unit (PMU) established to manage and implement projects financed wholly or partially by GOTL's development partners. The PMU will be responsible for day to day management of the sub-projects, including implementation of requisite safeguards measures and requirements.
3. **The sub-project.** The existing bitumen road will be improved, widened and resurfaced to bring it up to standard. Detailed design for the core sub-project has been prepared while the detailed designs for candidate sub-project roads will be prepared during project implementation. The core subproject will improve and rehabilitate the 81km long Manatuto – Natabora Road (A-09). This will be completed by: (i) improvement, road widening and upgrading along the existing alignment following international best practices and quality standards; (ii) providing one wider traffic lane per direction, with sealed hard shoulders and / or sidewalks in villages and repairs to bridges; (iii) clearing and improvement of culverts; (iv) installing a higher capacity drainage system along the corridor; (v) fine tuning alignment by widening curves (vi) introducing new road marking and signage and other measures to improve road safety.
4. **Legal Framework.** The assessment and implementation of the subproject will be governed by laws, regulations, and standards for environmental assessment and management of GoTL. The Basic Law of Environment (April 2012) covers all relevant aspects of environmental protection and the Decree Law 5/11 on environmental licensing covers environmental assessment requirements. In addition to GoTL's requirements the RNUSP must comply with ADB's Safeguard Policy Statement (SPS) 2009. An environmental assessment and review framework (EARF) has been prepared to guide the implementation of, and compliance with, environmental safeguards during Project implementation. According to both Timorese law and the SPS, the sub-project can be classified as Category B because the potential adverse environmental impacts are site-specific, few if any of them are irreversible, and mitigation measures can be designed readily.
5. **Consultation and information disclosure.** As required by the ADB's SPS and Public Communications Policy 2011, public consultations were undertaken during the preparation of this IEE and social safeguards documents. The stakeholder consultation process disseminated information to all key stakeholders including the general public and the authorities through meetings and door to door surveys along the project corridor. Information was provided on the scale and scope of the subproject works and the expected impacts and the proposed mitigation measures through meetings and surveys. The process also gathered information on relevant concerns of the local community so as to address these in the project implementation stages. Project documentation will be disclosed in a place and language accessible to stakeholders.

6. **Grievance redress mechanism.** Through the Project's grievance redress mechanism (GRM), procedures will be established that can help resolve issues associated with the Project. The GRM will receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the environmental and social performance of the Project. Resolution of these issues and concerns will be undertaken expeditiously and according to the procedures of the GRM. The complaints/issues registry maintained at the site project office and by the contractor will be subject to monitoring. The GRM will aim to provide an accessible, time-bound and transparent mechanism for the affected persons to voice and resolve social and environmental concerns linked to the subproject.

7. **Environmental Management Plan.** Mitigation measures, environmental monitoring, and capacity development are required to minimize the environmental impacts in the design, construction and operational phases. The main issues relate to planning and design of the subproject structures and roadside drainage, and control of construction impacts such as spoil and waste disposal, water quality impacts, health and safety concerns, tree felling, traffic interruption, re-provisioning of utilities and irrigation, noise and dust during construction.

8. To ensure these impacts are mitigated to the greatest extent feasible, the PMU shall update the environmental management plan (EMP) based on detailed design and integrate it into bid and contract documentation. Following induction provided by the PMU the contractor will prepare site-specific EMPs (SEMPs) detailing how they propose to implement the works. The SEMP will cover: (i) waste management and spoil disposal; (ii) tree removal and replanting (iii) utilities, irrigation and telecommunications re-provisioning; (iv) temporary drainage; (v) construction materials management; (vi) runoff control and excavation protection; (vii) noise and dust control; (viii) temporary traffic management; and (ix) worker and public safety.

9. The operation of the subproject road should have beneficial effects on the surrounding environment overall. The improvement of the subproject road will allow faster more efficient travel and improved traffic flow and smoother asphalt pavement and improved road side gutters and drainage can be expected to reduce the accumulation of road side dust and therefore air pollution from disturbed dust should also be controlled.

10. **Conclusion and Recommendations.** The subproject construction is restricted to areas within the road corridor and the land required for minor alignment improvements for curve widening. The impacts from construction and operation will be manageable and no insurmountable impacts are predicted, provided that the EMP is included in the contract documents and implemented thoroughly. MPW (assisted by PMU) shall ensure that the EMP is included in the contract documents, and the EMP provisions are implemented and monitored to their full extent. In the event that any design details change the locations or scope of the proposed subproject works the environmental assessment and EMP shall be reviewed and revised accordingly. The findings of the IEE are that the environmental impacts of the proposed rehabilitation of the Manatuto - Laclubar Road will be minor and manageable if the mitigation measures established in the EMP are implemented thoroughly. The IEE also sets out the requirements for monitoring.

1. Introduction

1.1 The Sector Project

1. The Government of Timor-Leste (GoTL) has requested the Asian Development Bank (ADB) to provide financing to facilitate the upgrading of roads proposed in the Road Network Upgrading Sector Project (RNUSP). The objective is to provide a comprehensive program to upgrade, rehabilitate and maintain priority road sections of the road network of Timor-Leste that provide links between major cities and towns. The Project will use a sector approach to finance improvements on up to 260 kilometers (km) of road identified in the medium-term road network development program.

2. The Timor-Leste Strategic Development Plan (SDP) outlines GoTL's vision for upgrading national roads. The program of the Fifth Constitutional Government includes a major program of road rehabilitation, repair and improvement. ADB, Japan International Cooperation Agency (JICA) and World Bank (WB) are coordinating their support and work that is already under implementation. ADB's draft Country Program and Strategy (CPS) aligns with the goals of the SDP. The CPS envisages continuing support for a medium-term approach to the rehabilitation, upgrading, and maintenance of the core road network with emphasis on investment projects that are of national importance and which provide an inclusive pattern of economic growth, particularly by improving the transport links needed by agriculture and the rural economy. ADB has made adjustments to its country strategy to expedite this support in line with GoTL's priorities.

3. The Road Network Upgrading Project (RNUP) financed by ADB's first loans to Timor-Leste includes feasibility study and detailed engineering design of the Manatuto to Natabora road. Construction of this road is urgently needed to support south coast developments associated with the oil and gas industry as well as to provide access for development generally.

4. Project preparatory technical assistance (PPTA) conducted during February and March 2013 has assessed the technical and economic feasibility of upgrading the roads from Baucau to Viqueque, Baucau to Lospalos and Lautem to Com. These roads are key elements of the national road network. ADB proposes to support detailed design and safeguards due diligence under a first phase of a "sector" project. This will underpin a rolling program of road upgrading by ensuring projects are prepared for construction in a timely manner. Subject to satisfactory implementation of the first phase, ADB may support the subsequent construction phase with additional financing for civil works and construction supervision. A sector approach gives GoTL the flexibility to add, delete, or amend sub-projects, subject to them meeting agreed sub-project selection criteria.

5. A core sub-project - the Manatuto – Natabora Road- and five candidate sub-project roads for improvement have been suggested for priority study, design and implementation by Ministry of Public Works (MPW). The existing bitumen roads will be improved, widened and resurfaced to bring the selected roads up to standard. Detailed design for the core sub-project has been prepared while the detailed designs for candidate sub-project roads will be prepared during project implementation.

6. The executing agency for the upgrading and improvements of RNUSP is the Ministry of Finance (MOF) and the implementing agency will be MPW. Within MPW the key agency for implementation will be the Project Management Unit (PMU) established to manage and implement projects financed wholly or partially by GoTL's development partners.

1.2 Methodology and Scope of IEE

1.2.1 Methodology

7. The conduct of the IEE was guided by the GoTL's environmental assessment requirements and in compliance with ADB's Safeguard Policy Statement (SPS) 2009 and the Project's Environmental Assessment and Review Framework (EARF). It commenced with an environmental screening using ADB's Rapid Environmental Assessment (REA) checklist to determine the project's category and critical environmental issues associated with the proposed project.

8. The IEE is based on collation of environmental data gathered through reconnaissance survey, conduct of interviews and public consultations. The study involved the review of existing reports, project documents, published reports including those published in the worldwide web.

9. The initial appreciation of the general environmental conditions, particularly land use, along the length of the project corridor was carried out through the review of the satellite imagery published by Google Earth in the worldwide web and the use of available topographic maps.

1.2.2 Structure of the Report

10. This IEE report has been presented in the format prescribed in ADB's SPS. The report is organized into following Sections. An Executive Summary is also prepared and presented in the beginning of the report.

- Section 1 : Introduction
- Section 2 : Policy, Legal, and Administrative Framework
- Section 3 : Description of the Project
- Section 4 : Description of the Environment (Baseline Data)
- Section 5 : Anticipated Environmental Impacts and Mitigation Measures
- Section 6 : Information Disclosure, Consultation, and Participation
- Section 7 : Grievance Redress Mechanism
- Section 8 : Environmental Management Plan
- Section 9 : Conclusion and Recommendation

11. A number of appendices contain additional information and details referred to in the main text.

2. Legal and Policy Framework

2.1 Environmental Law in Timor-Leste

12. **The Constitution.** The implementation of the subproject will be governed by laws, regulations, and standards for environmental assessment and management of GoTL. The Constitution of Timor-Leste has clearly established the importance of protecting the environment. The Constitution of Timor-Leste establishes a healthy environment as a constitutional right. The Constitution stipulates that:

- Everyone has the right to a humane, healthy, and ecologically balanced environment and the duty to protect it and improve it for the benefit of the future generations.
- The State shall recognize the need to preserve and rationalize natural resources.
- The State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

13. As of 05 July 2012 the Environmental Basic Decree Law came into force (Decree-Law no. 26/2012). This sets the framework for other environmental legislation such as the Decree 05/2011 Environmental Licensing Law (ELL) and pending laws and regulations including the draft biodiversity law.

14. **Environmental Licensing Law.** The ELL implements a system of environmental impact assessment (EA) and licensing in Timor-Leste. Under the ELL, proponents of projects or activities that may impact the environment are required to undertake a process of environmental assessment (EA), which includes preparing an 'environmental impact statement' (EIS) or 'initial environmental examination' (IEE), depending on the level of likely impact of the project (respectively Category A and Category B), together with an environmental management plan (EMP), according to the procedure established through the ELL, and submitting this information to National Directorate for Environment (NDE). If the Minister determines to approve the project or activity, based on the recommendations of NDE, the proponent is granted an environmental license by NDE to conduct the project or activity.

15. According to the ELL the Project is Category B because it involves construction, reconstruction, and extension of roads and bridges. To comply with the ELL, an environmental assessment and EMP must be prepared in the prescribed format and be submitted to the NDE for approval.

16. Article 18 of the ELL requires that the application for environmental license be made to the Department of Environmental Impact Assessment (DEIA). The proponent (in this case MPW) of a project classified as Category B initiates the procedure for IEE and environmental license application with the submission of a Development Proposal Application Form to the (DEIA). The information to be included with the application is: (i) name of the applicant, and their identifying information and contact details; (ii) location and scale of the project; (iii) plans and technical drawings of the project; (iv) technical study on the feasibility of the project; (v) opinions or other documents on the project issued by other entities; (vi) the EMP; and, (vii) the application for an environmental license.

17. Public consultation is not mandatory for Category B development projects under the ELL. However, the proponent must, in the event that the NDE/DEIA requires it, conduct public consultation, to discuss issues the project with relevant stakeholders. The proponent must also implement the EMP in accordance with the provisions of relevant legislation.

18. The GOTL's environmental classifications for environmental permitting requirements and environmental regulatory compliance required for Category B developments such as this Project are listed in Table 2.1.

Table 2.1 - Environmental Regulatory Compliance

Project Component Description				
Sector		Category B in accordance with ELL	Scale	Environmental Assessment
EMP = Environmental Management Plan, IEE = Initial Environmental Examination.				
Transportation	V 1	Rehabilitation of an existing road, excluding community road (including toll roads, bridge crossing, each with two lanes	All	IEE and EMP
Transportation	V 2	Construction of Bridges	<300m	IEE and EMP
Quarries				
Mining	I 1	Exploitation of minerals (sand and gravel)	<30,000 m ³ /year & >5,000 m ³	IEE and EMP
Mining	I 2	Processing and refinement of minerals / quarrying (non toxic)	<30,000 m ³ /year & >5,000 m ³	IEE and EMP
Hot Mix Plant				
	IV 1	p) Other: Plant releasing environmental pollutant, noise, vibration, dust and/or smells, or plant handling flammable and/or hazardous materials (small scale, determined by the environmental authority).	Site <1ha and installation area >3000m ²	IEE and EMP

19. Under the ELL the DEIA has 30 days to respond to receipt of the application for an environmental license for Category B project. NDE/DEIA may suspend the review process if additional information is required and has 10 days to review the additional information or reject the application. The NDE/DEIA will also establish the conditions and restrictions deemed necessary to protect the environment as part of the environmental license.

20. **Occupational health and safety.** Timor-Leste has not enacted laws or implemented regulations for working conditions, health and safety. UNTAET Regulation 2002/05, the Labor Code for Timor-Leste, is broadly relevant but it does not regulate health and safety. This Labor Code creates a National Labor Board with the mandate to provide independent advice on occupational safety and health matters as well as programs on vocational training and skills development, grant exemptions, set minimum wages and other related functions. However, the National Labor Board has not yet been established. The Occupational Health and Safety Law was drafted in 2004, but has not yet been enacted. Therefore during construction, the Subproject will conform to the Environmental, Health, and Safety General Guidelines published by World Bank unless the local legislation supersedes the international standards.

21. **International Conventions.** GoTL is a party to several international conventions that are relevant to environmental management. GoTL has signed and ratified three international conventions on preserving the natural environment: the United Nations Convention to Combat

Desertification (UNCCD; August 2003), the UN Framework Convention on Climate Change (UNFCCC; Oct. 2006) and the UN Convention on Biodiversity (UNCBD; Oct. 2006). In late 2007, Timor-Leste signed the Kyoto Protocol to the UNFCCC, expressing its commitment to reduce global climate change.

22. None of these conventions have any direct or specific relevance for this IEE as the sub-project does not encounter any areas of environmental sensitivity covered by the conventions.

2.2 Safeguard Policy Statement

23. In addition to complying with country safeguards the Project will also need to comply with ADB's SPS (2009) which sets out the policies and principles for protecting the environment and people by wherever possible avoiding impacts and mitigating and/or compensating for impacts that cannot be avoided.

24. The ADB's SPS is policy document in respect of safeguards and avoiding, minimizing or mitigating adverse impacts on people and the environment. Safeguard frameworks will: (i) reflect fully the policy objectives and relevant policy principles and safeguard requirements governing preparation and implementation of projects and/or components; (ii) explain the general anticipated impacts of the project and/or components; (iii) specify the requirements that will be followed for subproject screening and categorization, assessment, and planning, information disclosure, meaningful consultation, and grievance redress mechanism; (iv) describe implementation procedures, including budgets, institutional arrangements, and capacity development requirements; (v) specify monitoring and reporting requirements; and (vi) specify the responsibilities and authorities of the borrower/client, ADB, and relevant government agencies in relation to the preparation, submission, review, and clearance of safeguard documents, and monitoring and supervision.

25. The sub-project can be classified as Category B because the potential adverse environmental impacts are site-specific, few if any of them are irreversible, and mitigation measures can be designed readily. The appropriate level of environmental assessment for environment category B proposals is an IEE. The objectives of this IEE are to:

- Identify and describe the existing environmental conditions in the project area including the identification of environmentally sensitive areas;
- Assess the proposed works and activities to identify their potential impacts, evaluate the impacts, and determine their significance; and
- Propose appropriate mitigation measures that can be incorporated into the proposed activities to minimize any adverse impacts, ensure that residual impacts are acceptable and establish the requirements for monitoring of the subproject.

26. If gaps exist between ADB's requirements and the countries' laws, or where gaps in borrowers' capacity are apparent, the safeguard frameworks should include the details of the specific gap-filling requirements to ensure that policy principles and safeguard requirements are achieved.

3. Description of the Sub-project

3.1 Background and Need for the Sub-project

27. The existing road infrastructure needs to be improved because the standards and conditions of many of the roads in Timor-Leste are inadequate to meet rapidly growing demand for efficient travel. This situation limits national development and economic growth.

28. The sub-project is part of the road network that connects the districts in the western half of the island with the capital, Dili. The project road is part of an important trade link since it provides road connectivity to the Indonesian part of the island, which is the source of international trade and freight movement by land route from Indonesia to Timor-Leste and vice versa.

29. During the Indonesian regime the road received maintenance and some of the major bridges and cross drainage structures were constructed. But the civil unrest and struggle for independence resulted to severely damaged road condition particularly after 1999 elections. In post-independence years (post 2002) the road received basic emergency repair in its severely damaged sections to keep it traffic worthy. A decade or more of lack of strengthening and absence of bituminous overlay has left this vital road in very poor condition.

30. The GoTL has recognized the importance of developing physical infrastructure including road network as part of its program to reduce poverty in the country. With the realization that improvement of the road infrastructures will contribute to economic growth and poverty reduction. The overall objective of this Project is to reduce vehicle operating costs, improve accessibility to market opportunities and economic and social services, as well as generate employment opportunities and income.

31. The existing conditions of the subproject road vary and are good in some places but only fair to poor and unacceptable in many places. The road is sealed in most sections and earthen shoulders are often in poor condition and overgrown with grass and other plants. Most of the bridges are in fair condition, however some bridges will be repaired and subject to detailed design some bridges may be rebuilt. The culverts are in fair to poor condition but many are blocked and damaged and some require major improvement and repair.

3.2 Location

32. Manatuto District is located in the central region, and in effect is the most central district. The district borders Aileiu and Manufahi to the west and Viqueque and Baucau to the west. Along with Lautem, Manatuto is (i) one of only two districts that border the coast along northern (Wetar Strait) and southern boundaries (Timor Sea); and (ii) spatially the second largest of the districts accounting for 12% of the country's land area. Figure 3.1 shows the location of the existing alignment in Manatuto district in the context of the country map.

33. Road A09 starts at Km 65 at Manatuto town proper in suco (village) Sau and ends at the intersection at Natarbora (suco Manehat) at Km 144. The road traverses four towns (Manatuto Vila, Laclubar, Soibada and Natarbora) and all sub-districts of Manatuto.

Figure 3.1 - Location Map



3.3 Proposed Works

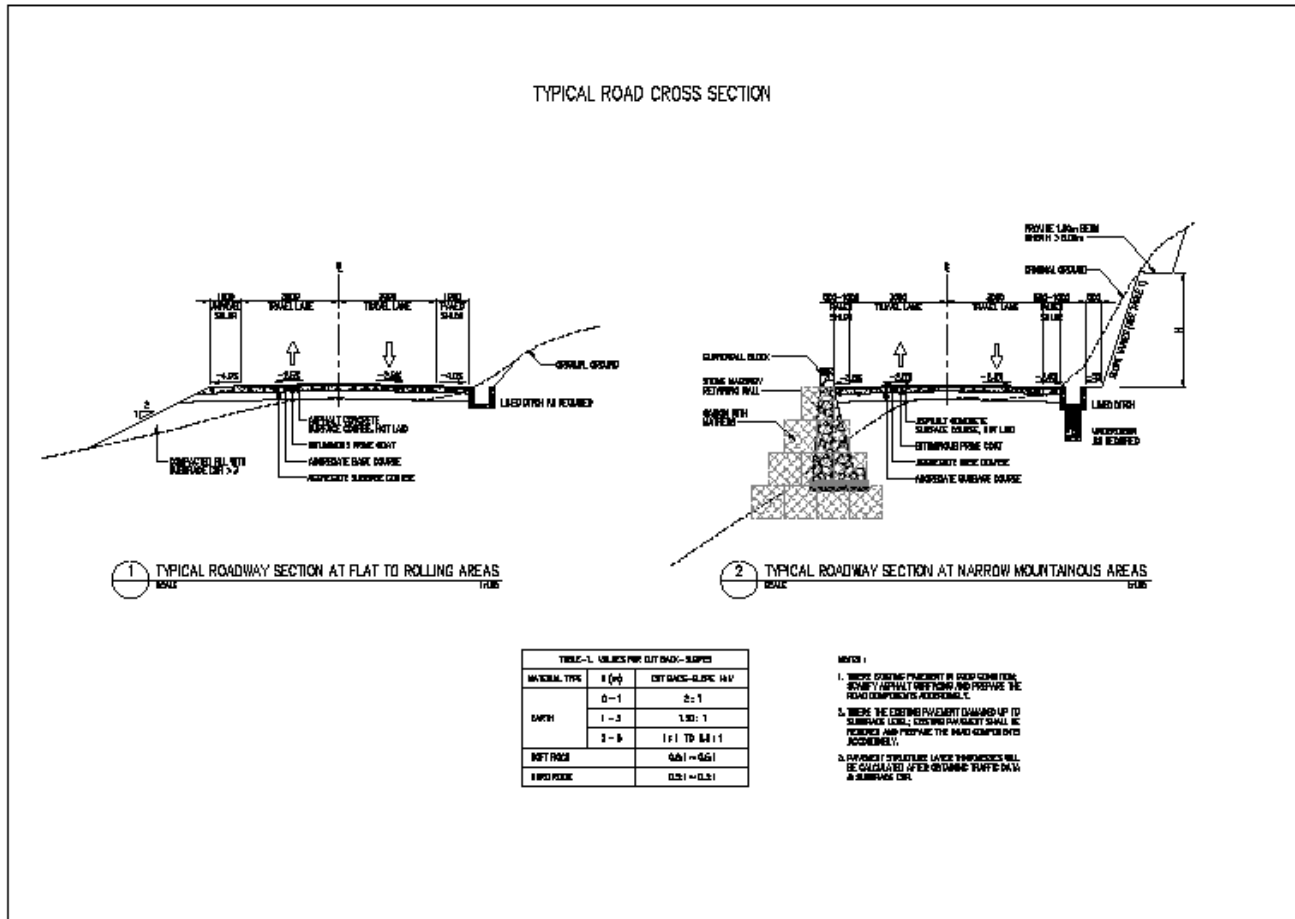
34. Upgrading works include improvement of the existing road, bridges, construction of drainage structures and slope protection works to achieve the national road standard of 6m pavement plus 2 x 1m shoulders and drainage as shown in the typical cross section (Figure 3.2). The proposed works will involve widening of the pavement from 4.5m to 6m and sealing with asphalt. The width of shoulder will vary from 0.5m – 1m. Half meter shoulders will be adopted for constricted sections. The width of the shoulders in school zones, hospital zones and other important areas shall be 1m. Street furniture for urban areas (towns and large villages) includes concrete curb, drains, sidewalks and street lighting. Pavement markings shall be extensively provided completely from beginning to end of the project. Shoulders will be improved to provide support for the pavement structure.

35. **Clearing and grubbing.** The sub-project will involve removal and satisfactory disposal at designated and approved locations of all materials including trees, stumps, roots, logs, vegetation, wastes, debris, and top-soil.

36. **Removal of structures and obstructions.** This project will involve the removal wholly or in part, and satisfactory disposal at designated and approved locations of all buildings, fences, structures, old pavements, abandoned pipe lines, masonry ditches, culverts, bridges, and any other obstructions which are not designated or permitted to remain and backfilling the resulting trenches, holes, and pits.

37. The proposed works will include removal of all existing asphalt pavement, selective replacement of unsuitable sub-grade materials and construction of new road-based and asphalt pavement.

Figure 3.2 – Typical Cross-Section



38. **Drainage.** Improvements to the road include provision of adequate drainage including replacement, modification or repair of culverts and masonry ditches. Drainage works will involve replacement and/or deepening of existing masonry ditches, construction of under-drains, extension or replacement of existing culverts and construction or installation of new culverts.

39. Design considerations for drainage have included:

- Cleaning drainage and waterways of accumulated debris.
- Construction of headwalls and drainage outlet protection structures such as chutes, weirs, aprons and splash pads to prevent stream bed scouring.
- Construction of catch-basins, inlets, manholes and junction boxes to contain flow and prevent spillage.
- Construction of river training dikes and revetment walls to prevent scouring of river banks.

40. **Earthworks and sources of materials.** This works include both excavation of earth or rock materials from high sections and filling of low sections on uphill and downhill sides of the road. Approximately, 37,461 m³ earth or rock materials will be excavated and about 24,215 m³ of fill will be needed.

41. If excavated materials are insufficient or not suitable, additional materials may be excavated from designated sources as preliminarily identified in Table 3.1. Excess materials shall be disposed at designated approved locations.

Table 3.1 - Potential Material Sources

Chainage (km)	Location
82+000	Birac river
84 +500	Sumase River
87+500	Cribas, Sub district of Manatuto
89+250	Carcos River near Mount Tanussa (about 800m from road)
96+000	Mount Henuc
100+000	Junction to Laclubar
106+000	Mount Hunaro
121+000	Sahe river about 5km from Junction Soibada
145+000	Junction Natarbora Sub district about 3km
Laclo River	(Suai Indah Company)
3 km from Natarbora	Commercial Crushers near Sahen River

42. The materials from common and rock excavation work in the sub-project area are expected to be suitable as borrow soil. Since the excavation volume was estimated to be about half the required quantity of borrow soil for bulk fill, it is assumed that borrow soil for will be needed for construction.

43. **Riverbed gravels.** Generally, the local riverbed gravels are suitable as road construction materials. A few large rivers cross the subproject road. No laboratory tests were carried out therefore the suitability of materials is based on observation (subject to confirmation). Riverbed gravels in the several rivers are composed of schist, slate and amphibolite. Based on observation₂ these materials should enough strength as aggregates for asphalt concrete and suitable as mixture to any aggregates and sand. However, laboratory tests will be required to confirm its applicability for asphalt concrete. Sands from several rivers were observed as applicable for structural use₂.

44. **Existing Quarries.** There are a few small scale existing active areas and redundant small quarries within short travelling distances from the subproject where aggregates are available but there is no or hot mix plant near the subproject area. Contractors will need to install the necessary plant. The crushers and hot mix plant must have an environmental permit and be licensed (under the ELL) before the construction works can begin. There are some quarries and borrow pits that have been used in the past for obtaining aggregates. If these quarries and pits can provide further quantities of suitable materials they can be reopened and NDE should be consulted to clarify if these locations also require an environmental permit and license (under the ELL) before the construction works can begin.

45. **Slope stabilization and retaining structures.** A number of sections along the core sub-project road are unstable and in some locations the road has failed and attempts to stabilize the road have been made through installation of gabion basket walls. The detailed design proposes additional measures to address stability in critical sections such as bioengineering, stone masonry retaining walls and, breast walls, and gabion walls. Stone masonry retaining walls are usually used to retain cut slopes on areas with deep excavation to be able to minimize earthwork and slope disturbance and to preserve uphill structures.

46. They are also used as containment structure for embankment formation. Breast walls are also made of stone masonry but shorter in height. Breast walls are used to prevent minor landslides and to contain materials from minor slips.

47. **Bio-engineering measures.** Bioengineering involves preparation of excavated back slopes and embankment slopes and planting of selected vegetation and trees on the slopes that will help reduce soil erosion, improve soil stability, minimize seepage of water to the ground and help prevent landslides. The techniques that could be used in the sub-project are as follows:

- Live stake – for repair of small earth slips and slumps that are frequently wet, through the use of local suitable species which creates a living root mat, that eventually stabilize the soil;
- Vegetation – serves as cut slope protection. Sodding or grass planting will protect the road slopes from erosion when the developed roots hold the slope soils together;
- Live fascines – these are long bundles of branch cuttings bound together and installed with live and dead stout stakes;
- Brush layering – consist of live branch cuttings of rooting plants installed almost perpendicular to the slope, to provide immediate earth support as a result of the overlapping layers;
- Coconut netting – made from coconut fibre twine woven into high strength nets for extreme slope stabilization and protection for stream/river banks and channels.

48. **Bridges and culverts.** There are a number of culverts for stream crossings and retaining walls along the subproject road. Maintenance is the first option, followed by repair and reconstruction. Additional culverts, new embankments and lined drains are proposed. This work can be accomplished comfortably in one dry season (May to November). Upgrading and reconstruction will be further elaborated at the detailed design stage. Increased maintenance is also proposed for the operational phase

49. At the current level of traffic, the existing carriageway width of 4.0-5.0 m would be sufficient for most of the bridges provided that they are maintained well. At this stage it is assumed that only one bridge will be replaced and for the rest improvements will include repairs and reconstruction of bank protection with works to the substructure of one of the bridges. These works will be scheduled for the dry season (May to November). At the bridges options for improvement are mostly limited to repairs, although other options for widening and reconstruction will also be considered at the detailed design stage. Constructing a new bridge beside an existing bridge is difficult because of existing bridge condition and structure.

50. In the case of the footpaths, it is technically possible to fix the footpath deck on the outside of the truss however most of the bridges may be too weak to undergo such modification. Before deciding on the final design a detailed structural examination of the bridge will be made but it is expected repairing and not constructing new bridges beside the old ones is also the preferred option.

51. **Road safety measures.** In order to address the concerns raised during consultations, road safety measures for this project involves provision for adequate and continuous reflective pavement markings that will delineate the boundary between opposing and parallel traffic and pedestrians; traffic humps on entering and exiting villages; covered drains adjacent to the road asphalt paved shoulders where pedestrians especially school children can walk; adequate road signs that will serve as warnings (36), information signs (10). The overall Project will also include a road safety program.

4. Description of Existing Environment

4.1 Physical Environment Baseline Conditions

4.1.1 Air Quality

52. Air quality monitoring was not undertaken on the subproject road. In general, air quality is acceptable and the World Bank's Country Environmental Assessment (2009) concluded that outdoor air pollution in the country is currently a minor problem. Ambient air quality concerns are mainly limited to larger urban areas/towns and heavily trafficked routes. Gaseous pollutants of carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂) from traffic are well dispersed in the open terrain and there is potentially adequate dispersion in the wide main thoroughfares of the towns and villages.

53. Air quality appears to be generally acceptable with the exception of dust. Dust arises owing to the poor condition of the roads and dust arising when vehicles pass over unsealed shoulders of roads in many places. Dust concentrations will be higher, if only intermittently, within about 10m of the subproject road when dust rises as vehicles pass along the unpaved road shoulders. However dust levels are not high enough to obscure vision significantly, based on field observations except in a few sections where there is no sealed surface on the roads.

4.1.2 Meteorology and Climate

54. The climate in northern Timor-Leste and is tropical, hot and humid and temperature varies within a narrow range over the whole year. The average temperatures are largely affected by altitude since there is little temperature variation on either a diurnal or a seasonal basis under the tropical climate conditions in Timor-Leste.

55. Variations in rainfall and temperature can occur over short distances due to the steep topography. Topography has a strong influence on rainfall quantity, with marginal to low rainfall observed along the northern coast of Timor-Leste (<1,000mm / year). There are two annual seasons. The main rainy season is from December to March but varies in length according to location.

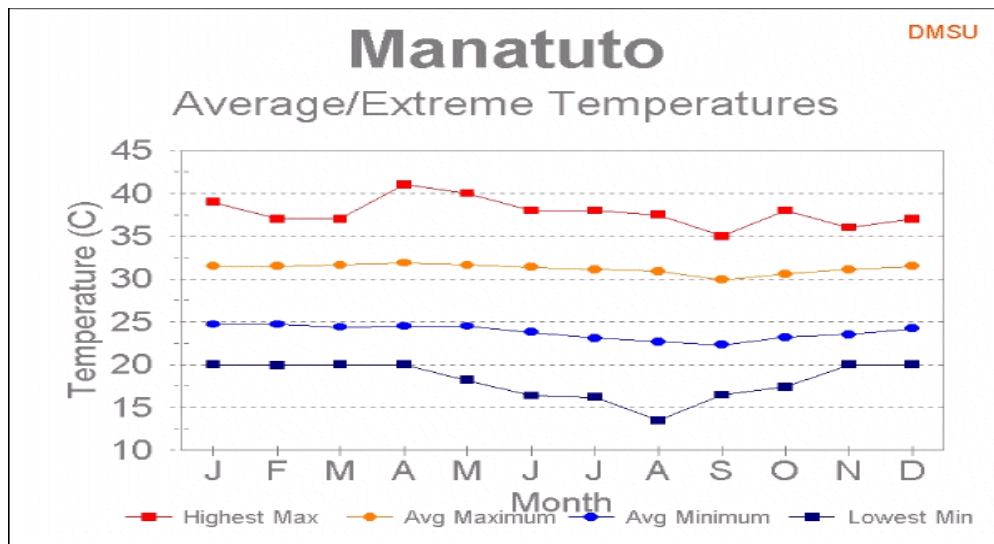
56. Rainfall is characterized by tropical strong showers. Heavy downpours in combination with steep terrain often increase surface runoff and cause extensive soil erosion/landslides. An unusually heavy rain hit the central and western part of the county in June 2010, causing serious damage to roads and pathways in the mountainous area. Strong winds occasionally hit the rural areas destroying houses and farm crops.

57. The monsoon type climate characterized by a clear distinction between wet and dry seasons. Northwest monsoon winds prevail from December to March, bringing the principal wet season to most parts of the country. At other times of year the dry season is caused by southeast trade winds which prevail from May until October, except for the south coast and southern slopes where the wet season persists until July. The average annual rainfall is typically between 900mm and 1200mm. Therefore although severe rainfall events have generally been less in the subject areas in northern Timor-Leste, with lower rainfall along the northern coast (<1,200mm/year) than the south it has been noted that on some occasions as much as a quarter of the total annual rainfall can be received in a single day.

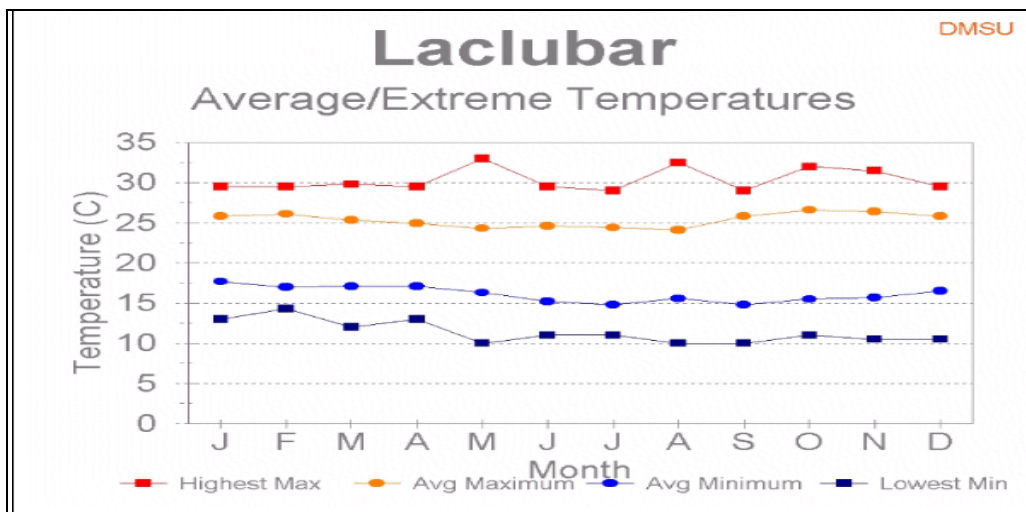
58. This type of rainfall not only causes extremely high rates of erosion and agricultural and infrastructure damage, it also runs off rapidly and may not effectively recharge groundwater sources. Given the rainfall pattern over the region of the subproject, it is important that season be considered in planning the implementation of the improvement programme, Major earthworks should be planned for the dry season (May to November) particularly for areas susceptible to flooding and landslides and for works near rivers.

59. The average minimum temperature in Manatuto ranges from 22°C (September) to 25°C (December, January, February) while the average maximum temperature ranges from 30°C (September) to between 32°C and 34°C. Highest temperatures have been recorded as 35°C to 41°C (April). In Laclubar, temperatures are slightly lower given its height above sea level, average minimum temperatures ranging between it is about 15°C and 18°C and average maximum temperatures ranging between 25°C and 27°C. Daily and monthly variations in temperature can be significant. Refer to graphs 1 and 2.

Graph 1 – Temperatures in Manatuto



Graph 2 – Temperatures in Laclubar



4.1.3 Extreme Weather Events

60. **Cyclones.** The tropical cyclone season in East Timor normally occurs from November to April. The mean occurrence over the Timor-Leste region is around 0.2 per year (Kirono 2010). A severe cyclone has not been recorded since January 1993, when 400 houses were destroyed. Figure 4.1 shows the tropical cyclone path.

Figure 4.1 – Tropical Cyclone Path in Timor-Leste

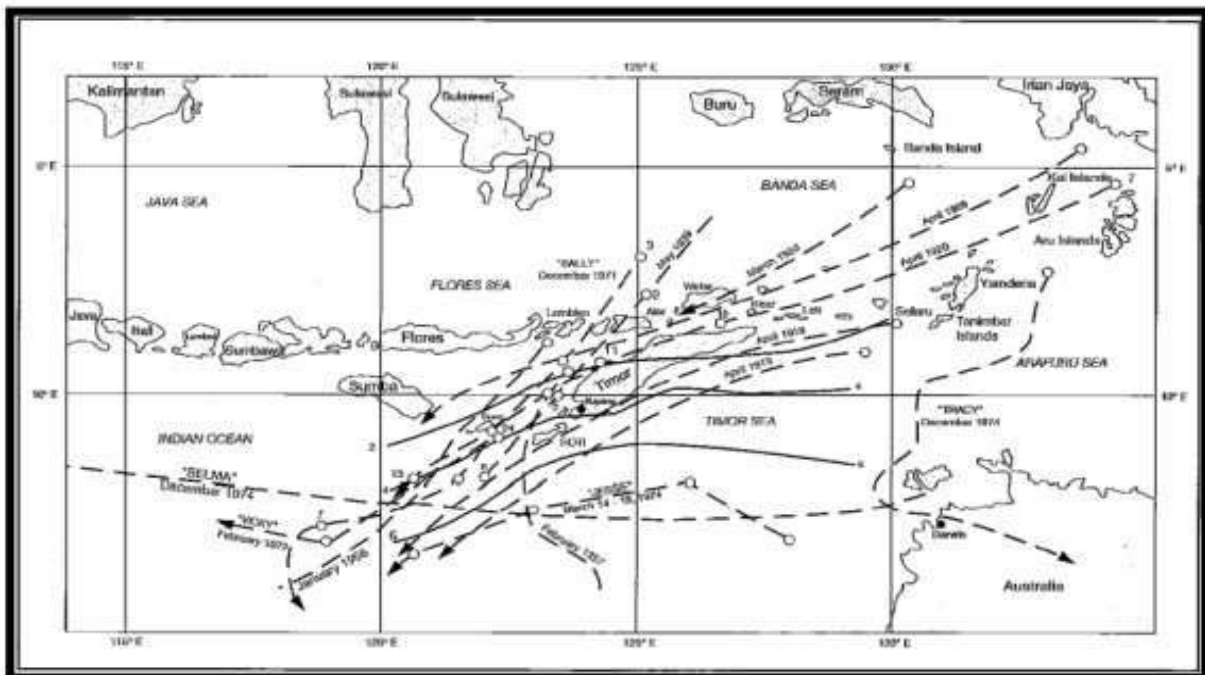


Figure 5: Occurrence of tropical cyclones in the past over Timor-Leste region (Crippen International 2010, quoted in Monk et al. 1997).

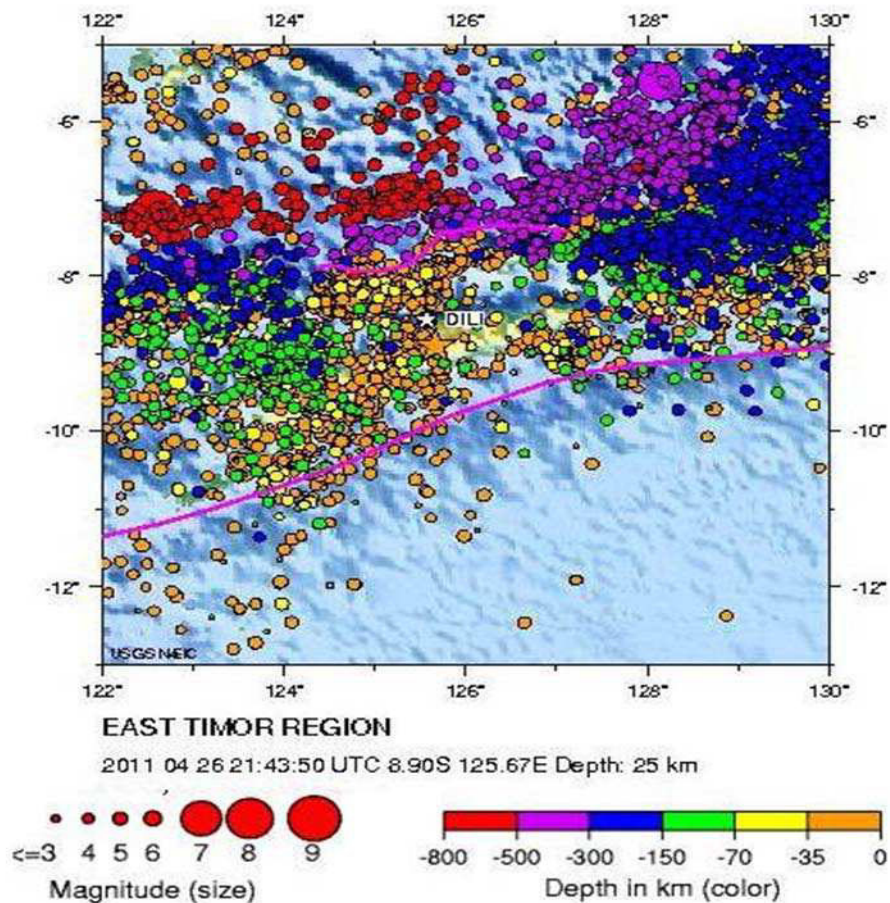
61. **Flooding.** Flooding is a common problem in Timor-Leste, especially in the low-lying coastal plains along the southern shores. On a smaller scale, flooding from overflowing rivers also occur in the project area, especially in low-lying areas like Manatuto Town. Large amounts of sediments and gravel washed out from the upper catchments, during high intensity rainfalls, are deposited in low-lying downstream river sections.

62. Anthropogenic effects, such as deforestation, shifting cultivation, and subsequent soil erosion, are contributing to increased sediment loading of rivers and have a multiplier effect on flooding. This was confirmed in Manatuto town as some residents expressed that they experienced flooding every year or every rainy season with the inundation reaches up to 1m level. The floodwater, however, subsides in 2-3 hours.

4.1.4 Seismicity

63. Timor Island is prone to earthquakes being located in a tectonically active region, along the collision zone of the Australian plate and the Eurasian Plate. Compilation of major shallow earthquakes in Indonesia from 1897 to 1984 by the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE, 1985) showed a number of earthquake (magnitude 6 to 6.9) with epicenters located offshore north of Timor Island. A magnitude 8 or greater has been recorded in 1963 with epicenter located offshore southwest of Timor Island. In 2011 a very shallow (depth of 1.1 km) earthquake occurred with magnitude of 5.6 and epicenter located on-shore south of Dili. Figure 4.2 shows the compilation of historic earthquakes in the region of Timor Island from 1990 to present (after USGS).

Figure 4.2 – Earthquakes in Timor-Leste Region 1990 - Present

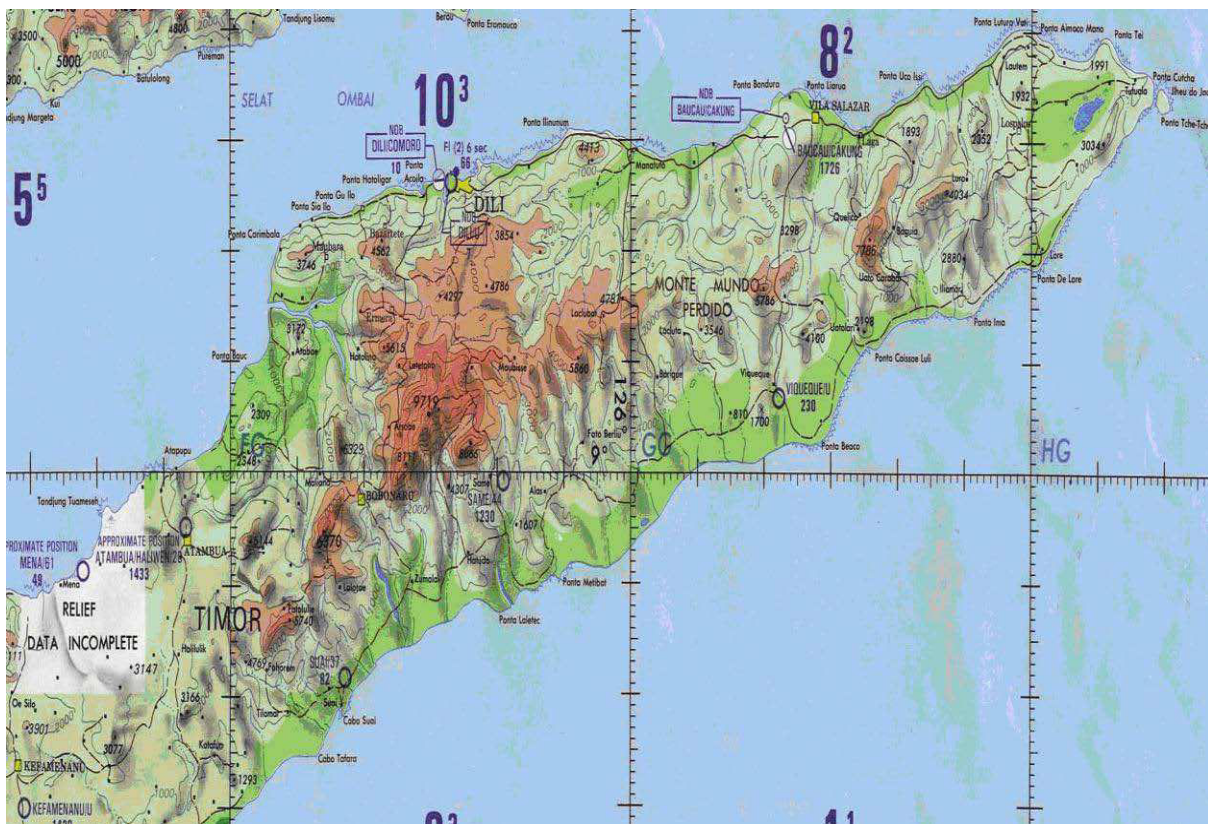


4.1.5 Topography

64. Timor-Leste's landscape is dominated by mountain ranges which are estimated to cover about a third of the land area (UNESCAP, 2003). Among the prominent mountain ranges is the Ramelau Range with the highest peak elevation of 3,037 m above sea level represented by Foho Tatmailau. The rugged topography of the country is exemplified by the fact that more than 40% of the land has more than 40% slope (MOI, 2009).

65. The Manatuto-Laclubar-Natarbora Road is one of the north south connector across the mountainous spine/ridge. The first section includes gentle and rolling hills and the alluvial fan of Manatuto area, the maximum altitude is 320m. Between Km 91 and Km 99.5 the road traverses a flat plane called River Terrace before ascending into a steep mountainous area, reaching heights of around 1,200m. The next section of the alignment winds through mountain slopes (elevation 460m) and to Km 127 runs through a ridge known as Skyline. The road descends, veers west and traverses a small mountain (450m asl) before traversing the alluvial flats associated with River Lamara and town of Natarbora. Figure 4.3 provides the topographic map of the sub-project area.

Figure 4.3 – Topographic Map of Sub-project Area



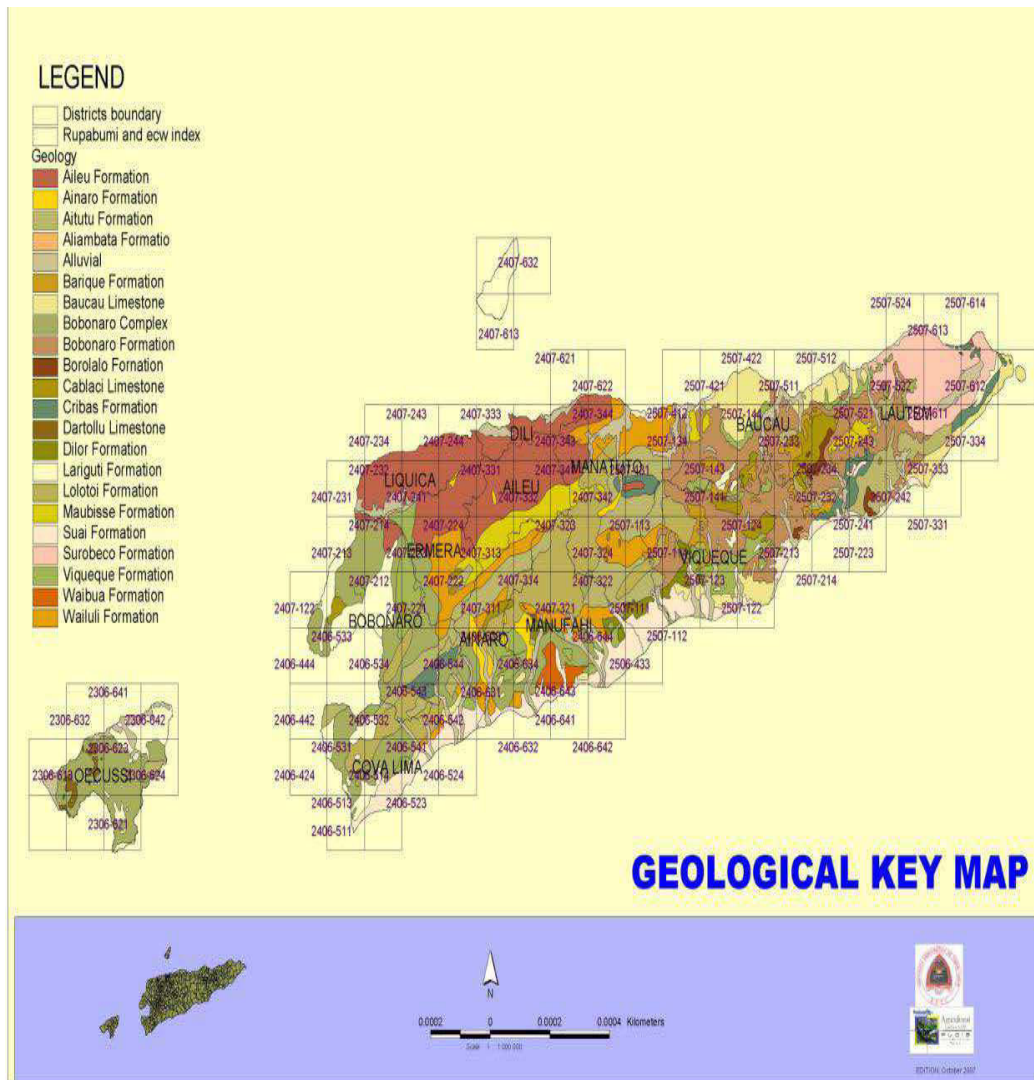
4.1.6 Geology and Soils

66. **Geology.** Timor Island is located in a tectonic region known as the Banda Arc. The Banda Arc is a west facing horse-shoe shaped tectonic boundary to the east of Indonesia which marks the collision zone of the Indo-Australian Plate, the Pacific Plate and the Eurasian Plate. Timor Island originated due to the collision between the northwestern edge of the Australian continent and a former oceanic subduction zone and it is an aggregation of continental fragments (part of Australian plate), deep marine sediments, oceanic crust and Quaternary sediments. Seismic data suggests that Timor Island is an accretionary prism (or wedge) formed from marine sediments and slices of the old Australian cratonic rocks.

67. In this area, geological basement consist of the Pre-Permian Lolotoi Complex which has thrusts over the younger formations, Permian Atahoc and Cribas FM, Triassic Aitutu FM, Jurassic-Cretaceous Wailuli FM and Middle Miocene Bobonaro Scaly Clay. The Lolotoi Complex is composed mostly of basic schist and amphiborite (Laclubar metamorphic massif). Atahoch and Cribas Formation are black pyritic shale, silty shale, limestone and sandstone etc. exposed in only small area around Atahoc village. Aitutu Formation includes a calcilutite, shale and sandstone sequence and contains a basal radiolarian limestone. Wailuli Formation is predominantly clay, marine shale, marl and fine-grained limestone.

68. The origin that preceded the deposition of the Viqueque Formation (upper Miocene) resulted in the placement Scaly Clay of large thrust sheets of Permian rocks and the placement of a huge gravity-slide deposit, the Bobonaro Scaly Clay. Figure 4.4 provides the geologic map of Timor-Leste.

Figure 4.4 - Geologic Map of Timor-Leste



69. **Soils.** The geotechnical assessment shows that the alignment traverses several soil types; scaly clay, river terrace deposits and alluvial sediments, through very condensed gravel and sand sequences. The fluvial fan is mainly composed of coarse (gravel and sand) granular deposits. In the high mountain area the soil is underlain by Aitutu Formation and talus deposits.

70. **Instability and landslides.** Timor-Leste is unique among the major islands of the Sunda archipelago in that it is not of volcanic origin. Timor-Leste is a continental fragment, composed largely of limestone and other sedimentary deposits. The island is geologically young, with steep and unstable slopes, deep valleys and prone to flash floods.

71. The young geological age and the high rate of tectonic uplift, combined with the presence of weak, poorly consolidated strata, produces intractable stability, slope failure, and erosion problems in many areas. Landslides and erosion are one of the most common environmental risks in the project area, resulting from interactions between water flow and soil. Table 4.1 provides information extracted from the geological report. Very wet conditions can trigger slope failures and in many areas road construction is feasible only during the dry season.

Table 4.1 - Areas of Unstable Geology and Landslides

Station	Observations
Km 65.2 -66	Quarry, cut/fracture, hair crack, subsidence, strongly withered
Km 66-67	Cut
Km 69	Failure
Km 70	Cut
Km 70-71	Landslide
Km 71-72	Cut
Km 73	Landslide
Km 74	Landslide
Km 75	Steep slope, cut
Km 76	Creep slope, cut
Km 77	Creep, moving cracks, cut
Km 78-79	Deformed Gabion, Cut
Km 80-81	Talus
Km 90-95	Terrace deposits, talus, landslide
Km 96-97	Rock fall, Landslide, Deformed gabion, Talus
Km 98-99	Talus, Rolling Stone, Rock Slide, Landslide
Km 100 -101	Talus, flood fan
Km 108 -111	Rock slides, rolling stones
Km 122-123	Landslide, cracks and sliding surface
Km 128-129	Landslide, black shale, strongly weathered
Km 132-133	Talus
Km 136-137	Land/rock slide

Source: PPTA data provided from geologist and site observation (2013)

72. Intermittent occurrence of heavy rain, slow erosion-deposition, rapid mass washing processes, including rock falls and landslides, and the weaknesses underlying in the rocks coupled with the steep terrain, make erosion and sedimentation significantly active geological processes in Timor-Leste. Several landslides have been observed along the sub-project alignment. The main cause of landslides is the nature of the sedimentary rocks, low mechanical strength of the underlying strata during spells of persistent torrential rain, topography and intensity of rainfall as well as saturation and poor drainage and undercutting and erosion of the road earthworks.

73. Other significant factors that contribute to soil erosion in the mountainous and hilly parts of the subproject area are grazing and burning. Old pasture is not so palatable or nutritious to cattle and goats and therefore farmers periodically burn old pasture grass to stimulate growth of new green pasture for grazing. In combination the frequent over grazing of the slopes by cattle and goats and the periodic burning of established grass cover will hasten soil erosion in times of heavy precipitation, especially in spaces where cattle and goats have grazed out local areas and burning exposes soils to erosion. By observation the overriding result is that there is very heavy sedimentation in the rivers within the sub-project area. In some places there are uplifted river alluvial terraces and wide alluvial river channels are full of sediments; this can reduce river channel capacity and lead to overtopping and flooding during heavy rains.

4.1.7 Hydrology and Water Resources

74. **Hydrology.** The existing alignment traverses a number of waterways. Manatuto town at the start of the sub-project road lies within Laclo watershed with perennial courses of water. The Laclo River originates from Aileu, southwest of Manatuto District. It has an estimated length of 93 km and drains an area close to 1,400 km². At the southwest periphery of town, the main Laclo watercourse converges with Sumase River. Portions of the alignment run parallel to Laclo River and Sumase River. Laclo River is about 300m away along Km 65+000 to 66+000 while Sumase River is about 2km away along Km 67+000 to 79+000. Sumase River is the main provider of agricultural water supply for an extensive paddy fields located on the south and north western periphery of town. An irrigation canal crosses the road at about Km 67+000.

75. The waterways with the corresponding catchment areas, lengths and difference in elevations are presented in Appendix 1. Coefficient values reflect the watershed cover which comprises bare clay surface, steep or rolling grassed areas or rocky surface areas. Prolonged exposure of the bare clay surface to rainwater turned the material saturated. Sediments are then carried by run-off thus affecting the quality of nearby waterways which occurs only during wet season.

76. **Surface water.** In Timor-Leste surface water is scarce as many rivers flow is intermittently and do not flow dry season. The presence of thick river gravel deposits in most of the rivers and streams suggests that water is diverted to interstitial and subsurface flow for most of the year (June to November). Water quality is generally threatened by the high levels of erosion and by the increasing amount of domestic waste that is discharged untreated into the environment. Widespread clearing of forests and other ground cover throughout the country has reduced the ability of the soil to retain water and will contribute to the scarcity of surface water. There is no reliable data on the quantity or quality of available groundwater resources in the country and baseline surface and ground water quality data are not available for Timor-Leste.

77. **Water quality.** None of the rivers near the subproject road is subject to industrial pollution. There are no other industrial areas alongside the road. Some small quarries are in operation near this subproject stretch, mostly for limestone exploitation. Other than occasional settlements and local carpentry and basket weaving workshops there is no other development near the banks of the rivers that will affect the water quality during implementation.

78. Water quality monitoring was not undertaken during the environmental assessment. Decree Law No. 5/2009, on Licensing Regulations, Sale and Quality of Drinking Water is the appropriate standard for comparison purposes for impacts on water supply for human consumption. No standards for ambient water quality or water quality criteria have yet been declared in Timor-Leste, therefore the World Bank's Environmental, Health, and Safety (EHS) General Guidelines will apply to the implementation of the subproject.

4.2 Biological Environment Baseline Conditions

4.2.1 Vegetation Cover and Flora

79. The land cover data of Timor-Leste gives an indication of its present ecologic condition. While statistics of existing land cover have yet to be reconciled, the land cover mapping done by ALGIS in 2008 using remote sensing data showed that forest (various types of forests) is the dominant land cover of Timor-Leste. It is estimated that various types of forest covers 53.9% of Timor-Leste's land area, various types of cultivated land (agriculture) makes up about 28.7% and other land cover types, (including savannah, grassland, large towns and cities, bare, etc.) make up only 2%. Other researchers doubt the accuracy of this data believing that the forest cover is overestimated. It is believed that savannah formation is the predominant land cover in Timor-Leste.

80. The sub-project road stretch passes through agricultural areas and villages and small towns and is within a few meters of the north coast in some places. The human impact on the vegetation is most pronounced in the areas where grasslands created by cycles of forest clearance for agriculture and their reversion to fallow gradually transformed the forest to short grassland with some occasional trees and shrubs.

81. Woodlands and savannas occur extensively from sea level to low-mid altitudes. These include savanna woodlands with an open, low over-storey dominated by gum trees (*Eucalyptus alba*) palm and / or acacia. Open forest dominated by medium to tall *Eucalyptus urophylla* is also found at higher altitudes. The type of trees and vegetation in the project area vary as topography and type of soil change except for perennial species that grow in all areas such as shrubs and grasses.

82. Savanna areas which were observed between Km 65 and Km 122 with predominant vegetation being medium growth trees that are sparsely distributed. During site inspection, the flora/crops found in the project area are: banana, coconut, papaya, guava, orange, corn, mango, teak, jackfruit, bamboo, avocado, cacao, fire-tree, sugarcane, palm, Albizia tree/Ai-samtuku, Madre de Cacao, rice, pine, Ai-Bobur, eucalyptus, leuceana /Ai-kafe, and various shrubs and grasses.

4.2.2 Protected Areas and Important Bird Areas

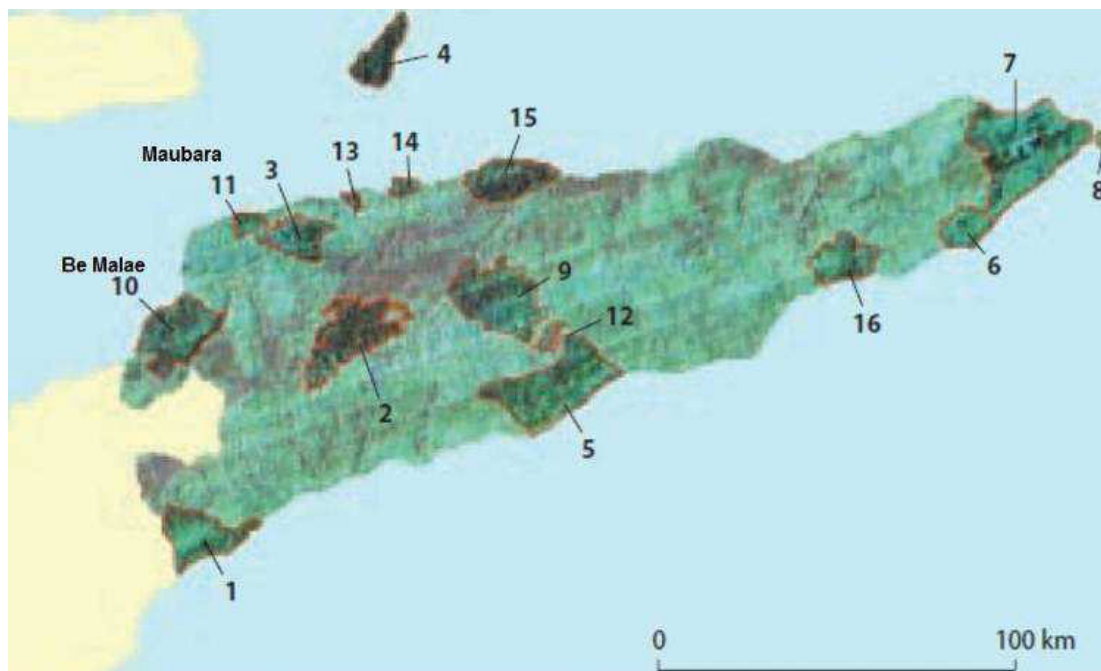
83. **Protected Areas.** Timor-Leste is still in the process of developing its biodiversity protection and conservation legislation and it has acceded to international conventions. The country acceded to the Convention on Biological Diversity (CBD) on 10 October 2006, and became a Party to the Convention on 8 January 2007.

84. With the effort of the government to preserve the remaining diverse land cover, a number of locations have been declared protected. The nominated sites are also presented in the list as presented in Appendix 2. KuriMountain, New Diatuto and Aitana Mountain areas are located in Manatuto District but between 8 and 12 km distant from the sub-project area.

85. **Important bird areas.** There are designated and candidate important bird areas (IBA) in Timor-Leste as provided in Appendix 3 and shown on Figure 4.5. Some Important Bird Areas within the administrative region of Manatuto are Mount Diatuto, Mount Makfahik, Mount Sarim and Mount Curi. Mount Diatuto is a protected area with geographic coordinates of 8°49'S 125°51'E. Its land area is 15,000 hectares with an altitude of 600m to 1,770 m. The location is about 8 km beyond Laclubar junction (i.e. the end of the sub-project road). Habitats in this IBA are forest lands with Turaco Enamodesta, Treron Psittacea, Ducula Cineracea, Cacatua Sulphurea as the threatened species.

86. Mount Mak Fahik and Mount Sarim are unprotected with a total land area of 10,000 hectares. It has a geographic coordinates of 8°53'S 126°01'E. The altitude ranges from 400 m to 1,000 m hectares. This is situated on the left side of the alignment with the nearest point at about 4 km away.

Figure 4.5 – Important Bird Areas



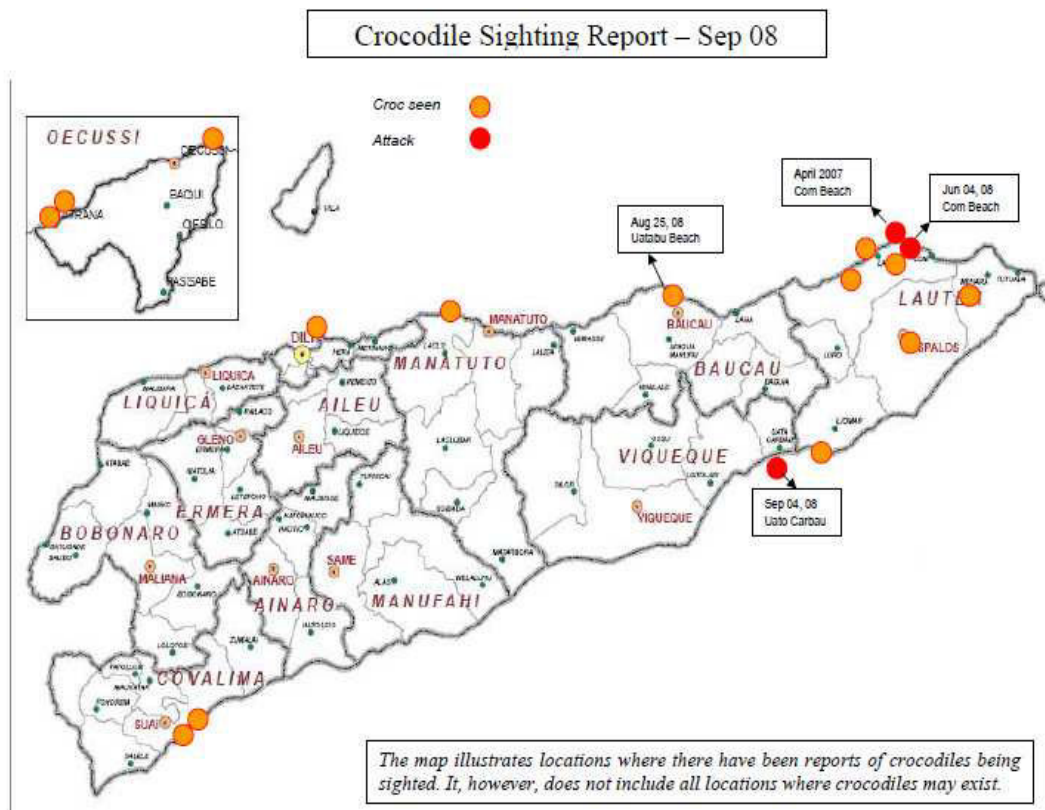
4.2.3 Fauna

87. Timor Island lies in a bio-geographic region known as Wallacea and within the Timor and Wetar Island Endemic Bird Area (EBA). This area has been colonised by birds, animals and plants from both Asia and Australasia, but through long isolation have developed exceptionally high levels of endemism. There are 35 restricted-range species as occurring in the Timor and Wetar Island region; 31 of which are found on Timor Island, 23 are endemic to the EBA and 8 are endemic to Timor. Appendix 4 provides the threatened and restricted-range species recorded in Timor-Leste.

88. In existing waterways in the sub-project area, the residents mentioned that there are freshwater species that still thrive in rivers traversed by the alignment. These are *Clarius Melanoderma*, Tiapia Mas, Kabosu, Batabis, swamp eel (*Monopterus albus*), crab and lobster.

89. The saltwater crocodile (*Crocodylus porosus*) is known to inhabit the coastal swampy area close to several rivers in the sub-project area. This crocodile is in the red list of endangered species compiled by the International Union for Conservation of Nature (IUCN), which gives it the conservation status of “least concern”. Locally the UNTAET 19/2000 regulation currently protects the crocodile because it is listed under CITES. It inhabits the rivers and swamps close to the sea and mangrove area where brackish waters are available. Figure 4.6 shows location of crocodile sightings.

Figure 4.6 – Locations of Crocodile Sightings



90. **Protected species.** Section 3 of Regulation No. 2000/19 on Protected Places provides the species of animals that constitute endangered species within Timor-Leste are: (i) sea tortoises; (ii) sea turtles; (iii) marine mammals, including bottlenose dolphins, whales and dugongs; (iv) crocodiles; (v) all animal and plant species listed in the Convention on the International Trade in Endangered Species (CITES); and (vi) any other plant or animal species designated as endangered by the Transitional Administrator. Threatened bird species in IBAs in Manatuto District include *Turacoenamodesta*, *Treronpsittacea*, *Cacatuasulphurea*.

4.3 Socio-Economic Environment Baseline Conditions

4.3.1 Population and Demography

91. **Population.** Manatuto is comprised of six sub-districts and a total of 29 sucos. The sub-project road traverses 23 aldeias which are located in ten sucos: Ailili, Aiteas, Ma'abat, Sau, Cribas, Fatumaquerek, Orlalan, Leo hat, Manlala and Manehat. The population of Manatuto District in 2010 is 43,246 with an average density across the district of 24.3 people per km² while the sub-district of Manatuto Vila has a higher population density of 45.5 people per km². The average household size in Manatuto is 6.0.

Table 4.2 - Population Data of Manatuto

Administrative Unit (sub-district)	Area Sq. km	Population (2010)
Barique/ Natarbora	397	5,077
Lacio	368	7,939
Laclubar	391	11,376
Laleia	226	3,470
Manatuto (Town)	271	12,339
Soibada	130	3,051
Total Manatuto District	1,783	43,246

Source: Census Report (2010)

92. **Morbidity.** The morbidity rate in Manatuto is 31% which is the highest in the country. Among those with ailments, 97% reported the ailment was serious enough to disrupt daily activities while some 81% sought treatment. Of those not seeking treatment, a third reported the reason was the health facility was too far. For those visiting a health care facility the main means of transportation is by walking (for 86%) and the average one-way travel time is 42 minutes which is lower than the average national travel time to the nearest healthcare facility of 47 minutes.

4.3.2 Livelihoods and Poverty

93. **Livelihoods.** Most of the population relies on agriculture. However, low output, high post-harvest losses, and limited alternative sources of income have resulted in rising numbers of poor people in rural areas. High population growth (about 3% annually) rapid urbanization and a small formal sector have resulted in slow rates of job creation in urban areas and have contributed to poverty rates rising.

94. About two-thirds of households in Manatuto are engaged in some form of subsistence production: 61% growing cassava, 57% growing coconut, and 62% growing maize. About 30% of the households are involved in production of higher-value crops such as rice, some 56% grow various fruits and 51% grow vegetables, with only a third of households growing coffee. Large livestock, which typically includes cattle, buffalo, ponies, pigs and goats with a population of 20,100 heads giving an average of 2.4 heads per household. About 6,063 households in Manatuto raise large livestock. The agricultural sector accounts for 81% of the labor force aged between 15 and 64 years.

95. **Poverty.** Damage to infrastructure and the dislocation of the population during the independence struggle made East Timor's poverty problem worse. Local studies indicate that about a higher proportion of the rural population are poor, compared to the urban areas. About 75% of the poor live in rural areas and 25% live in urban areas.

96. The poverty incidence in Manatuto is 73%, which is the third highest poverty rate in Timor-Leste. The district accounts for 4% of the total population but 6% of the total poor. The depth of poverty, i.e. how far below the poverty line the poor fall is 25%. About a quarter of the population does not consume enough food, which, in terms of population suffer food shortage, gives the district the highest food security in the country.

4.3.3 Noise

97. Noise from vehicles is not a concern in the areas around the subproject road at present as traffic is confined to occasional vehicles. Noise levels are generally within acceptable limits for the public and there were no complaints about current noise levels from the public during consultation. There is no criterion for road traffic noise in Timor-Leste.

98. The UNTAET guideline on ambient noise was introduced in 2002. The Timor-Leste the ambient noise standard is Leq55dB(A) for residential sensitive receivers and is the same as for World Bank. The World Bank standard applies an ambient criterion of Leq55dB(A) for residential areas, hospitals and schools. Where the background exceeds the ambient standards the criterion is background +3dB(A).

99. Based on observation in the settlements and towns where traffic runs throughout the day the criterion of Leq55dB(A) for residential, school and hospital sensitive receivers is potentially exceeded at some times. As the criteria are potentially exceeded at some times of the day it is recommended that in order to make a consistent assessment for all locations the existing criterion of background +3dB(A) will be applied in the assessment for both daytime and night time.

4.3.4 Access to Social Infrastructure and Facilities

100. **Education.** There are 39 primary schools, eight junior high schools and five secondary schools in Manatuto. About 47% of the population (18 years and older) of Timor-Leste have not received an education. Considering Manatuto District, about 14% have completed secondary school. The proportion of females without education in the district without education is 58% which is higher than that of males compared with (42%) of males.

101. Schools are located at some distance from the road in many locations but not in proximity to the subproject road. The boundaries of the school playgrounds and gates are generally near to the road (within 10 m) but the noise sensitive facades of the school buildings are generally set well back from the subproject road by more than 30m; outside the corridor of direct impact. However schools are particularly vulnerable to construction impacts and the scheduling of works near schools should be scheduled after discussions with the school principals to avoid impacts.

102. **Health and Sanitation.** There are 13 health posts and six community health centers in Manatuto District. The nearest hospital is located in Dili. Two-thirds of the population of the subproject area has access to basic sanitation (pit latrine, septic tank, flush toilet).

103. **Water Supply.** Manatuto has access to drinking water from an improved source making use of river and spring water in the area. In Manatuto Town, in particular, water is drawn from Lacro River through perforated pipes encased in wire screens holding infill filter media consists of gravel and cobbles.

104. This is transmitted with the aid of gravitation force to an underground reservoir at the Nunululi pump station which is then distributed to the public through pipe connections. As reported 89% or 6,415 households in Manatuto District still treat the water before drinking through boiling, filtration or adding chemicals.

105. **Power.** About 30% of the population or 2,162 households of Manatuto have power supply from the national grid.

5. Anticipated Environmental Impacts & Mitigation Measures

5.1 Introduction

106. Determining the scale of impact depends on (i) spatial scale of the impact (site, local, regional, or national / international); (ii) time horizon of the impact (short, medium, or long term); (iii) magnitude of the change in the environmental component brought about by the project activities (small, moderate, large); (iv) importance to local human populations; (v) compliance with international, national, provincial, or district environmental protection laws, standards, and regulations; and (vi) compliance with guidelines, policies, and regulations of Timor-Leste and ADB.

107. Where potential major negative impacts are identified, mitigation measures are developed to reduce them to acceptable levels. Where this is not possible, major negative impacts can act as a trigger for further detailed environmental impact assessment. There are several types of impacts to be considered. Direct impacts are caused by a project activity, and occur at the same time and place and can be created during both project construction and operation. Indirect impacts, which may include growth-inducing impacts, are caused by a project activity, or the overall project, and while they are later in time or farther removed in distance, they are still reasonably foreseeable.

108. Short-term impacts, like the noise and fumes associated with heavy equipment occur during road construction and are usually without long-lasting effects. Long-term impacts, on the other hand, could affect regional land use and development patterns and even mobility and migration. The project, however, is limited to relatively small-scale road rehabilitation works with additional maintenance (as required) for an existing road. There is little scope for long-term environmental impacts arising from such works and measures in the subproject area.

109. Impacts created during construction activities are dependent on a number of factors including the temporary use of land and its rehabilitation post-construction, 'best practices' being employed during construction activities, coordination and cooperation with local authorities in terms of impact management, and strict enforcement of environmental clauses and conditions included in project bid documents, the contract and technical specifications and adherence to the EMP contained in the IEE and construction environmental management plan (SEMP) prepared by the contractor and submitted to, and reviewed by, PMU. This process is explained further in Section 8.

5.2 Pre-Construction Impacts

110. Pre-construction impacts are limited to the following activities: climate change adaptation measures (incorporated into design); vegetation removal during surveying and demarcation of corridor and extent of works; site clearance, digging and excavations; and, restrictions on land use associated with foregoing and/or need for resources and materials.

5.2.1 Climate Change Adaptation and Resilience

111. The ADB financed Preparing the Road Network Development Project (TA 7100-TIM), Climate Change Assessment identified some significant risks to infrastructure arising from climate change. In that study the most significant risks to the infrastructure, arising from the anticipated hydro-meteorological changes, were anticipated to be from sea level changes and increased storm surge wave height and increase intensity of short duration rainfall.

112. The reports propose an integrated solution for each of the roads under that study. The proposed integrated adaptation measures include both civil-engineering and bio-engineering solutions for each of the sample roads. Together, these are expected to provide the most efficient and appropriate set of treatment options for the subproject road to cope with anticipated (projected) climate change as well as bringing the roads up to a maintainable condition.

113. Considering sea level changes and storm surge, in low lying coastal areas the combined effects of higher sea levels and larger storm induced waves will increase the risk of damage to the road infrastructure. For the purpose of the TA7100 study the altitude of low lying areas is defined as less than or equal to 2m. The main impact of this hazard is erosion of the embankment by wave action and the frequency and severity of flooding. Flooding being due to inundation by seawater at high tide and storms and surface runoff after intense precipitation and the backwater effect from the high sea level. The impact of flooding is to saturate road pavement, embankment and sub-grade material leading to structural failure. In order to assume a conservative case and make an assessment of a worst case situation a trigger of 4m asl or less was used to identify low lying areas near the coast potentially subject to flooding. These areas will be further investigated at the detailed design stage.

114. Where the intensity of short duration precipitation events is increased runoff significantly increases in small catchments. The main impact of this hazard is an increased flooding incidence due to insufficient hydraulic capacity of the longitudinal and transverse drainage systems. While the extent of the flooding may be small, the impact of the flooding is significant in the area inundated. The main impacts are increased erosion, safety issues associated with water on the carriageway and weakening of the pavement due to saturation. The increased erosion will arise from the higher volume of runoff.

115. Erosion is already a serious problem in Timor-Leste due to the steep topography, the shallow soils and poorly consolidated geological sediments. The shallow soils, especially on the steep topography, result in poor vegetation cover that increases runoff and provides little protection against erosion. The steep topography increases runoff and reduces the time of concentration for individual catchments. The poorly consolidated soils are susceptible to erosion due to the age of the geological formations and ongoing uplift. The increased runoff due the higher precipitation and the shift in precipitation from the drier months to wetter months will exacerbate the problems. The main impacts of the increased erosion will be higher sediment loads and the risk of damage to the drainage system. The higher sediment loads will increase the deposition of sediment in the drainage system. The intensity of short duration precipitation events and increased runoff is a significant concern in this subproject.

116. Engineering adaptation strategies have been developed under TA7100 for each significant infrastructure risk. These strategies focus on protecting the infrastructure from the impact of the environmental hazards resulting from climate change. The strategies involve a combination of capital and maintenance works to ensure a reliable and safe transport link is provided.

117. Sea level changes and increased storm surge wave height are potentially concern for this subproject particularly in the areas identified as vulnerable. Therefore the PMU and design and supervision consultant (DSC) supporting the PMU will need to include the following strategies to combat sea level changes and increased storm surge wave height (identified in TA 7100-TIM reports):

- Realignment: Where the elevation of the road is so low that the sea will intrude on both sides of the road the preferred strategy is to relocate the road away from the coast. Where horizontal realignment is not an option, realign the vertical alignment to raise all areas of the road above 2m asl.
- Erosion protection: Where the road will be subject to risk of erosion from wave action the preferred strategy is to construct an earth levee bank with rip rap protection against erosion by wave action.
- Increased maintenance: The quantity and frequency of maintenance is increased in response to the faster rate of physical deterioration.

118. The PMU and DSC will include the following strategies in the detailed designs that have been identified to combat more intense short duration precipitation in are identified as vulnerable.

- Increase capacity of transverse drainage system: Where the intensity of short duration precipitation events increases, the capacity of transverse drainage system will be increased by providing additional relief culverts.
- Improved longitudinal drainage: The ability of the longitudinal drainage systems to accommodate the higher quantity of runoff due to the higher precipitation rates will be improved by lining drains and providing larger drains.
- Erosion protection: Areas in the vicinity of the road, at risk of erosion, will be protected using bio-engineering techniques. In addition, steeply graded streams in the vicinity of the road will be provided with check dams to reduce sediment loads on the road drainage system.
- Increased maintenance: The quantity of maintenance is increased in response to the faster rate of physical deterioration.

5.2.2 Vegetation Removal during Surveying and Demarcation

119. Minor impacts upon terrestrial habitats and flora of the subproject area are expected as a result of the surveying and demarcation of centre-line. Surveying and demarcation will cause minor degradation of local ecology through the clearance of small areas of this vegetation. Plant species present within the impact area are either introduced species or ubiquitous native species, which are highly tolerant of disturbances. There is no vegetation that has any conservation significance nor is it representative of the original vegetative cover. There are some gardens, plantations and individual trees, on or very close to the road along and along the shoreline that could require removal.

120. Measures to be included in the project to ensure minimization of impacts from vegetation removal include:

- Vegetation clearance during surveying and demarcation activities, especially of trees along the river banks and road-side, will be minimized. Major trees (especially in suco areas) to be removed will be clearly marked, only marked trees will be removed;
- The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project; and

- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible.

5.2.3 Accidental Discovery of Physical Cultural Resources

121. Any site clearance, digging and excavation activities undertaken during pre-construction can unearth physical cultural resources (PCR) including sites. In the event this occurs, work shall cease immediately and the relevant authorities shall be informed. Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue.

122. The Contractor shall be responsible for complying with the requirements of authorities, and the PMU shall monitor the same. The contractor will include a section on “chance finds” in the SEMP. Mitigation measures for potential impacts on PCR include:

- Site agents will be instructed to keep a watching brief for relics in excavations.
- Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area.
- The PMU with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GoTL (i.e. Secretary of State for Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection.

123. Until GoTL has responded to this invitation work will not re-commence in this location until agreement has been reached between GoT and PMU as to any required mitigation measures, which may include structured excavation.

5.2.4 Restrictions on Use of Land

124. A resettlement framework has been prepared for the Project overall. A resettlement plan for this sub-project sets out the resettlement impacts and measures required to mitigate them including compensation for temporarily or permanently affected land and resources. Provided that the approved resettlement plan is implemented, resettlement impacts including restrictions on use of land will be mitigated.

5.2.5 Mobilization of the Contractor and Construction Camp

125. With the mobilisation of the contractor and initial establishment of site office, works yard and work sites will be presence of construction workers and associations with local people. Prior to contractor mobilization to the site, PMU will work with the contractor to establish the communications protocol between the project and communities as per the Project's communications plan. The contractor will identify one member of their staff to be the liaison between the suco chiefs and elders and contractor, as well as between the contractor and PMU.

126. The contractor will adopt good management practices to ensure that fuels and chemicals, raw sewage, wastewater effluent, and construction debris/scarified material is disposed of in controlled conditions to reduce the risk of contamination. Measures to minimise disturbance by construction workers and presence of the works site/area include:

- Suco (village) protocols discussed with workers as part of awareness and mobilization training;

- The contractor is to ensure that workers' actions outside work site are controlled and Suco codes and rules of conduct are observed at all times;
- The contractor will identify one member of their staff to be the liaison between the Suco chiefs and elders and contractor, as well as between the contractor and PMU;
- Worker camp location and facilities located at least 500m from settlements and agreed with local communities and facilities approved by PMU and managed to minimize impacts;
- Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (especially children) entering the area;
- Hire and train as many local workers as possible;
- Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas;
- Construction camp(s) will be established in areas with adequate drainage in order to prevent water logging at the camp and formation of breeding sites for mosquitoes in order to facilitate flow of the treated effluents;
- Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided. Separate toilets shall be provided for male and female workers;
- Portable lavatories (or at least pit latrines in remote areas) shall be installed and open defecation shall be prohibited and use of lavatories encouraged by cleaning lavatories daily and by keeping lavatory facilities clean at all times;
- Wastewater effluent from contractors' workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed before discharging it into natural streams. Oil and grease residues shall be stored in drums awaiting disposal in line with the agreed waste management section of the EMP;
- Predictable wastewater effluent discharges from construction works shall have the necessary permits from NDE and local authorities before the works commence;
- As much as possible, food shall be provided from farms nearby or imported to the area. Bush meat supplies from protected areas will be banned to discourage poaching. Solid and liquid wastes will be managed in line with the provisions of the waste management section of the EMP;
- Use of guns and hunting equipment by workers will be banned and dismiss workers taking or using green timber or hunting or in possession of wildlife (see 5.4.1);
- Entry to the protected, IBAs and/or sensitive areas (mangrove areas) by workers will be banned;
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas;

- Provision of safe access across the works site to people whose suco and access are temporarily affected during construction works;
- At all times workers should respect village and land owner's boundaries and be cognizant of village rules and terms of conduct (especially addressing women and elders), avoiding damage to productive trees and gardens, and access to the resources and springs;
- As per provisions set out in Poverty and Social Assessment, implement HIV/AIDS/STIs awareness and prevention for the contractor's workers and adjacent communities;
- Land used for campsites shall be restored to the original condition as far as practicable and the area shall be planted with appropriate trees / shrubs as soon as practicable after it is vacated and cleaned; and
- Work and camp sites will be cleaned up to the satisfaction of and local community after use.

5.3 Construction Impacts on Physical Environment

5.3.1 Impacts on Air Quality

127. As noted in Section 4.1, the air quality of the subproject area is very high due to lack of industry and a very small vehicle fleet. During the construction phase the rehabilitation works will have a minor and temporary impact on local air quality through emission of exhaust from vehicles and aggregate crushing plant, as well as through dust generation from vehicles transporting materials and from exposed stock-piles of material.

128. Earthworks and rock crushing activities will be the main sources of dust. The works in any given section of the road will generally be of short duration and in many locations there will be sufficient buffer distance such that no significant impact is expected from the construction works on residential sensitive receivers in terms of noise, vibration, and dust. Also works will not take place at night except in special circumstances justifiable to the PMU. Baseline data will be collected for monitoring of total suspended particulates (TSP).

129. Overall, the improvement of the road will result in reduction of dust emissions as a result of proper compaction and treatment of the road surface. There are a number of good engineering practices that can be employed to ensure that any air quality impacts generated during construction are mitigated. These include:

- Construction equipment being maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring;
- Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the subproject site;
- Material stockpiles being located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne;
- Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at

the sides and tail of the vehicle) during transportation. This is especially important as there are a number of suco along the road;

- Damping down of the road, especially in the vicinity of the suco along the road and any roads being used for haulage of materials, during the dry season; and
- Periodic qualitative air quality monitoring.

5.3.2 Works in or Adjacent to Rivers and Streams

130. During the works it will be necessary to carry out excavation of existing road pavement materials, for culverts and drainage works in the vicinity of rivers and streams. Where culverts are required there could be the need to temporarily constrict water flows and dry out sections of rivers or streams depending on their size and water volumes carried, in order to place new structures. These activities can result in a risk of channel shifts and erosion, particularly of river banks that would lose their vegetation cover, most particularly during floods.

131. Stockpiled materials, if located within the floodplain, may be eroded and dispersed and patterns of water movements during 'normal' and flood flows affected. Movements of machinery and other activities can be expected to impact riverine fauna and flora, however because the rivers in the area are high-disturbance ecosystems, regularly subjected to flooding and channel shifts, impacts on these are likely to be minimal.

132. Potential impacts on the structure of river habitats, including their channels, banks and floodplains will be mitigated by:

- Material stock-piles will not be located within riverbeds or the islands in the centre of rivers. Similarly, they will not be located within the current area of floodplain in areas subject to regular flooding (i.e. once per year or more). All land will be rehabilitated to its original or better condition upon completion of the works;
- Scour protection will be used as temporary measures, as needed, to ensure temporary structures do not damage river configuration;
- Movements of vehicles and machinery, and hence disturbance, within the riverine habitats will be minimised at all times;
- In the event that the contractor causes damage to the river bank or other structural parts of a river, the contractor is solely responsible for repairing the damage and/or paying compensation;
- Embankments and in-stream/river activities will be monitored during construction for signs of erosion;
- Re-vegetation with local fast growing species, or other plants in consultation with the land owners and suco chiefs, will be carried out incrementally and as quickly as possible after work within any river habitat has been completed; and
- Spoils, rubbish or any material will not be disposed of within any river system including riverbed, banks or floodplain areas. Suitable tip sites will be designated in consultation with land owners and suco chiefs.

5.3.3 Impacts from Materials Extraction

133. Sources of material (gravel, aggregate etc) and quarry sites for the sub-project will be agreed prior to commencement of works. The contractor will be required to identify sources and prepare a sustainable extraction plan, for all sources of material and spoil that will be used in road works. The aggregate extraction plan will be submitted to PMU, which will approve and monitor implementation of the extraction plan.

134. To mitigate the impacts from extraction sites, in addition to the preparation of the site specific extraction plan by the contractor, that bid and contract documents specify that: (i) Balance cut and fill requirements to minimize impacts from extraction of aggregates; (ii) Prioritize use of existing quarry sites with suitable materials and update the list of quarries and borrow pits monthly and report to MPW/DRBFC and minimize impacts on other local resources; (iii) Procure materials only from quarries and borrow sites acceptable to NDE or licensed and authorized by NDE; (iv) If the contractors shall operate the quarry site, required environmental licenses and permits shall be secured prior to operation of quarry/borrow areas; and (v) borrow/quarry sites shall not be located in productive land or forested areas.

135. Mitigation measures identified in the EMP include:

- Stockpile topsoil for later use and fence and re-contour borrow pits after use
- Properly remove topsoil, overburden, and low-quality materials and stockpile near the site to be covered and preserved for rehabilitation.
- Use quarry with highest ratio between extractive capacity (both in terms of quality) and loss of natural state.
- Use quarry sites lying close to the alignment, with a high level of accessibility and with a low hill gradient;
- Reinstate damaged access roads, agricultural land and other properties due to transport of quarry/borrow materials, other construction materials and any other project-related activities upon completion of construction works at each section;
- Provide adequate drainage to avoid accumulation of stagnant water during quarry/borrow site operation.;
- Preferably avoid or reduce the sections of quarry sites located on river bed. If it is not possible to locate quarries out of river beds, quarry sites lying on small rivers and streams shall be avoided;
- Choose alluvial terraces or alluvial deposits which lie on the river beds but not covered by water in normal hydrological conditions; shall be preferred;
- Cut berms and terraces after extraction in quarries in the mountainous or hilly areas, or wherever slopes are important, and implement a drainage system and vegetation cover for rehabilitation;
- Dewatered and fence quarries and borrow pits as appropriate, upon completion of extraction activities to minimize health and safety risks;
- Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding;

- Prevent accidental access and avoid drowning when pits become water-filled by implementing measures such as fencing, providing flotation devices such as a buoy tied to a rope, etc; and
- Additional extraction sites and/or borrow pits will not be opened without the restoration of those areas no longer in use; and
- The excavation and restoration of sites and borrow areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the PMU. Sign-off to this effect by PMU will be required before final acceptance and payment under the terms of the contract.

5.3.4 Impacts from Spoil Disposal

136. In most locations the use of this immediately available material will reduce the need for additional extraction of rock based materials. The surplus material should be graded and the suitable cut materials directed for reuse as far as possible on the subproject road and subsequently on other roads and other local infrastructure projects. This will reduce the need to extract other rock and gravel resources from vulnerable hillsides and river beds. The surplus can then be stockpiled at locations agreed with local authorities for use on other local district projects or other nationally planned infrastructure. The surplus shall not be stockpiled at the side of the road or dumped over the crash barriers or side of slopes as is the current practice by some contractors. Areas for disposal shall be worked out and agreed with the local authorities.

137. The surplus rock and soil based materials for disposal must be controlled to avoid potential impacts due to improper disposal. The EMP submitted by the contractor will include a section on spoil disposal to ensure waste from subproject road improvement is managed properly. Contractors will initially review the PMU's options for stockpiling and disposal locations for cut surface materials and reconfirm or propose alternative disposal locations for agreement with the PMU and local authorities. The EMP will cover all aspects of construction waste disposal. It is preferred that Government land is used for dumping of material. If private land is to be used for the purpose of dumping it shall commence only after written permission from the land owner is checked and recorded by the PMU and agreeable to NDE.

138. Mitigation measures will seek to control the impacts at source in the first place. The PMU will be responsible to report the update of the cut and fill estimates in conjunction with asphalt and aggregate materials planning between the different areas and advise on overall balancing for cut and fill materials to minimize impacts on local resources. (Mitigation measures for cut slopes are covered under erosion control).

139. The spoil disposal section of the EMP will include; (i) locations and quantities of spoil arising; (ii) agreed locations for disposal / endorsement from NDE and local groups; (iii) methods of transportation to minimize interference with normal traffic; (iv) establishment of acceptable working hours and constraints; (v) agreement on time scale and programme for disposal and chain of custody; (vi) programming issues including the time of year and available resources; (vii) discussion of the PMU inspection/monitoring role; and (viii) links to the grievance redress mechanism and complaints management system for duration of the works.

140. Mitigation measures will seek to prevent slope collapse impacts and control the impacts at source in the first place. The PMU will be responsible to monitor the progress of cutting slopes and the implementation of mitigation measures, to minimize impacts. The mitigation measures in the EMP will include but not necessarily be limited to:

- Spoil will not be disposed of in rivers and streams or other natural drainage path;
- The surplus shall not be stockpiled at the side of the road or dumped over the crash barriers;
- (Spoil will not be disposed of on fragile slopes, flood ways, wetland, farmland, forest, mangrove and associated salt flats, beaches, religious or other culturally sensitive areas or areas where a livelihood is derived;
- Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community;
- Spoils shall only be disposed to areas approved by local authority;
- Spoil disposal will be monitored by PMU and recorded using a written chain of custody (trip-ticket) system to the designated disposal sites;
- Spoil will be to disposed of to disused quarries and abandoned borrow pits where practicable;
- Disposed spoil will be spread in 15 cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent erosion in line with best practice;
- Spoil disposal shall not cause sedimentation and obstruction of flow of watercourses, damage to agricultural land and densely vegetated areas;
- Under no circumstances will spoil be dumped into watercourses (rivers, streams, drainage, irrigation canals, etc.); and
- The spoil disposal site shall be located at least 50m from surface water courses and shall be protected from erosion by avoiding formation of steep slopes and grassing.

5.3.5 Impacts on Water Resources

141. The drainage system, irrigation and water resources on surrounding lands will be affected by construction activities as follows: a) local water supplies will need to be tapped to meet campsite and construction requirements, so bringing project based water use into competition with local use; b) surface and subsurface water resources near the selected subproject road sections could be contaminated by fuel and chemical spills, or by solid waste and effluents generated by the kitchens and toilets at construction campsites; c) irrigation channels run close to or cross the works areas and require re-provisioning, (d) natural streams may become silted by borrow material (earth) in the runoff from the construction area, workshops and equipment washing-yards.

142. The contractors will be required to implement the provisions of the EMP and to provide drainage facilities to avoid ponding/flooding within the subproject site, construction camps, borrow/quarry areas, other areas used for project-related activities and adjacent areas. Potential impacts on water quality are already identified in the subsequent sections (e.g., under hazardous materials and hazardous waste disposal, water quality, etc.).

143. In areas close to the sensitive receivers, the contractors will provide appropriate drains so that the outfalls of the surface run-off from the carriageway are diverted away from the receivers. Measures will also be taken by the contractors during the construction phase to ensure that storm drains and road drainage systems are regularly cleared to maintain storm water flow.

5.3.6 Impacts on Water Quality

144. Through works adjacent to rivers and streams (culvert replacement, bridge repair, major bridge works) subproject has the potential to create some temporary and minor adverse impacts on water quality including (i) increased turbidity and downstream siltation created during the removal of gravels; (ii) an increase in silt loads at culverts to be replaced and/or constructed; (iii) construction materials such as small gravels, sand, and fill, being 'washed out' into streams, rivers during rain; (iv) hydro-carbon leakage and/or spills from vehicles and plant or workshop/storage locations; and, (v) discharge of waste-water and sewage from construction camp, site office and work yard to local streams and rivers.

145. Impacts can be reduced by confining activities to the dry season when there will be little or no water in the rivers and streams crossing the sub-project road. It will be sufficient to monitor other physical mitigation measures in place at the major river crossings where bridge repairs and replacement will be undertaken as well as on river/stream sections close to construction camps (i.e., rivers that will most likely receive run-off/discharge from construction/workers' camps).

146. In addition to a number of the items outlined in 5.3.5 above and employed to mitigate soil impacts and erosion effects (refer to 5.3.7 below) that will also mitigate adverse effects on water quality, the following measures will be included in the engineering design and EMP:

- Lubricants will be stored in containers / dedicated enclosures with a sealed floor >50m from water bodies;
- Work in rivers will be scheduled during dry season and work duration shall be as short as possible. Bare slopes shall be stabilized immediately after works are completed;
- Stockpile areas and storage areas for hazardous substances shall be located away from water bodies;
- Washing of machinery and vehicles in surface waters shall be prohibited;
- Sediment controls such as silt fences or other sediment reducing devices (rock dams or silt barriers), to prevent both siltation and silt migration during works being undertaken in the vicinity of streams and rivers;
- Sediment control devices will be cleaned and dewatered, discharges will not be to the rivers or streams. Consultation with land owners and suco chiefs will identify suitable land-based areas for settling ponds or discharge areas;
- Diversion ditches will be placed around material stockpiles;
- Minimizing interference with natural water flow in rivers, water courses or streams within or adjacent to work sites. Abstraction from and pollution of water resources will not be permitted;

- Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from work sites will not be dumped in or near streams, rivers or waterways
- Discharge of sediment laden construction water or material (including dredged spoil) directly into the rivers, sea, inter-tidal area or surface waters will not be permitted. All such construction water will be discharged to settling ponds or tanks prior to final discharge;
- Discharge zones from culverts and drainage structures will be carefully identified, and structures will be lined with rip-rap. Down-drains and chutes will be lined with rip-rap, masonry or concrete. Spillage ways will be lined with rip-rap to prevent under-cutting;
- Spoil and material stock piles will not be located near the coast, on the coastal side of the subproject road, or within 15 m of waterways, streams or rivers, or on the edge of slopes or hills above rivers or stream;
- Hydro-carbons, fuel, and other chemicals as required for the works, will be stored in secure containers or tanks located away from the coast, surface waters, or streams. Any spills will be contained and immediately cleaned up as per the requirements of the emergency response plan prepared by the contractor (and approved by PMU);
- Contractor's site office and works yard to be equipped with portable sanitary latrines that do not discharge directly to or pollute surface waters and waterways; and
- All water, waste-water and other liquids used or generated by project works and activities will be collected and disposed of in an approved manner and in an approved location. Such disposal will not be permitted to cause either pollution or nuisance.

147. The monitoring report will however specify the month the monitoring of physical mitigation measures was undertaken. Time and date of monitoring, potential sources of contaminants/pollutants during the monitoring period shall also be included in the report. Actual location of the monitoring stations shall be described in the report and plotted on a map together with GPS readings.

148. The condition of rivers near the bridges will be reported by PMU at the end of the detailed design period, either in the detailed design report or in a dedicated baseline monitoring report before the bidding documents are completed.

5.3.7 Soil Impacts and Erosion

149. The potential impacts on soil, or from erosion, during construction are from (i) sediment contamination of streams and rivers, turbidity impacts by construction activities; (ii) loss of agricultural soil or soils of productive value; (iii) extraction of materials from streams or rivers and/or borrow pits; (iv) conversion of the existing land uses such as agriculture and grassland for stockpiles of materials; (v) soil erosion and loss of protective vegetation in areas of slopes or uncompacted embankments; and (vi) soil contamination from fuel, chemicals and/or construction material spillage.

150. Earth embankments and material stockpiles will be susceptible to erosion, creating sediment laden run-off, particularly during rains and re-suspension of dust during the dry season. As noted above (5.3.5) stockpiles will not be permitted within 15m of streams and rivers. Works in rivers and streams will be required to limit losses of sediment into the rivers through the use of silt fences, progressive re-planting and siting works area areas well back from river bank areas.

151. There will be no loss of soil of agricultural or productive value as the project does not cross any lands currently being used for gardens or plantations. The works will be largely confined to the existing road and immediate right-of-way. Excavation for materials or location of material stockpiles is not permitted on agricultural or potentially productive land (including land identified as garden land). Therefore there will be no conversion of land from productive or livelihood uses as a result of the sub-project works.

152. Potential impacts will be mitigated by:

- All required materials will be sourced in strict accordance with GoTL guidelines and the EMP;
- Material stock-piles, borrow pits and construction camps will only be located on unused land or non-agricultural land following consultation with PMU, land owners and suco chiefs. All land will be rehabilitated to its original or better condition upon completion of the project works;
- Re-use of excavated material wherever possible;
- In the event that the contractor causes damage to agricultural land, productive land or gardens, the contractor is solely responsible for repairing the damage and/or paying compensation based on the rates in the approved resettlement plan;
- Embankments and in-stream/river activities will be monitored during construction for signs of erosion. Stones and rocks should be kept on hand for work in location of stream and river which can be used in the event that there is bank or channel erosion;
- Gabion baskets, rip-rap or bio-engineering methods will be used to both strengthen the road and to prevent erosion at bridge abutments;
- Re-vegetation of riverbanks with fast growing species, or other plants in consultation with the land owners and suco chiefs, as quickly as possible after work has been completed;
- Random and uncontrolled tipping of spoil, or any material, will not be permitted. Suitable tip sites will be designated in consultation with land owners and suco chiefs. Tip sites will not be permitted adjacent to rivers or streams or on garden land or in areas used for livelihood production by suco residents; and
- Obtaining all necessary permits or approvals for location of construction camps, material extraction sites and sources of construction materials from NED and other government agencies prior to works commencing.

153. It should be noted that a number of the mitigation measures (compacting, terracing, drainage and re-vegetation) will provide long-term environmental benefits by reducing soil erosion and sedimentation of surface waters while replacing damaged culverts and providing well constructed drainage will reduce localized flooding.

5.3.8 Waste Management

154. Uncontrolled waste disposal operations can cause significant impacts. Mitigation measures will seek to reduce, recycle and reuse waste as far as practicable. The PMU will be responsible to monitor the contractor's progress of implementing the provision of the waste management section of the EMP and all mitigation measures. The waste management section of the EMP will include consideration of all matters related to solid and liquid waste disposal including the following: (i) expected types of waste and quantities of waste arising; (ii) waste reduction, reuse and recycling methods to be employed; (iii) agreed reuse and recycling options and locations for disposal / endorsement from NDE and local groups; (iv) methods for treatment and disposal of all solid and liquid wastes; (v) methods of transportation to minimize interference with normal traffic; and (vi) establishment of regular disposal schedule.

155. The mitigation measures in the EMP will include but not necessarily be limited to the measures listed below. The contractors shall ensure implementation of these measures.

- Areas for disposal to be agreed with local authorities and checked and recorded and monitored by the PMU;
- Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses may be given to local farmers for fodder and fuel. Organic (biodegradables) shall be collected and disposed of on-site by composting (no burning on site);
- Recyclables shall be recovered and sold to recyclers;
- Residual general wastes shall be disposed of in disposal sites approved by local authorities;
- Construction/workers' camps shall be provided with garbage bins;
- Burning of construction and domestic wastes shall be prohibited;
- Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest, mangrove and associated salt flats, beaches, places of worship or other culturally sensitive areas or areas where a livelihood is derived canals, agricultural fields and public areas shall be prohibited;
- There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local waste disposal sites; and
- Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked.

5.3.9 Hazardous Materials and Waste Disposal

156. Use of hazardous substances such as oils and lubricants can cause significant impacts if uncontrolled or if waste is not disposed correctly. Oils and lubricants discharged to mangroves can kill the roots and destroy the mangrove. Mitigation measures will seek to control access to and the use of hazardous substances such as oils and lubricants and control waste disposal. The PMU will be responsible to monitor the contractor's progress of implementing the hazardous materials and waste section of the EMP to avoid or minimize impacts from use of hazardous substances such as oils and lubricants.

157. The hazardous materials and waste management section of the EMP will include consideration of all matters related to hazardous waste disposal including the following: (i) expected types and volumes of hazardous materials and waste; (ii) methods for treatment and disposal of all hazardous wastes; (iii) approvals and environmental licenses required; (iv) methods of transportation to minimize interference with normal traffic; and (v) establishment of regular disposal schedule as agreed or as condition of granting of environmental license.

158. The mitigation measures identified in the EMP include:

- Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by PMU and have necessary approval/permit from NDE and local authorities.
- Hydrocarbon, toxic material and explosives (if required) will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination.
- Equipment/vehicle maintenance and re-fuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency;
- Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant;
- Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations;
- Ensure all storage containers are in good condition with proper labelling;
- Regularly check containers for leakage and undertake necessary repair or replacement;
- Store hazardous materials above flood level;
- Discharge of oil contaminated water shall be prohibited;
- Used oil and other residual toxic and hazardous materials shall not be poured on the ground;
- Used oil and other residual toxic and hazardous materials shall be disposed of in an authorized facility off-site;
- Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of river channel beds;
- Ensure availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored;
- Spillage, if any, will be immediately cleared with utmost caution to leave no traces;
- Spillage waste will be disposed at disposal sites approved by local authorities and approved by PMU;

- All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation;
- The contractors shall identify named personnel in their EMP in-charge of storage sites for hazardous materials and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization.

5.3.10 Emergency Response

159. The contractor will be responsible for preparation of an emergency response plan within the EMP which will cover containment of hazardous materials, oil spills, and work-site accidents. The plan will detail the process for handling, and subsequently reporting, emergencies, and specify the organizational structure (including responsibilities of nominated personnel).

160. The plan will be submitted to PMU for approval. Implementation of the plan will be monitored by PMU. Any emergencies, and how they were handled, will be reported in the contractor's monthly progress reports.

5.3.11 Effects on Existing Services and Infrastructure

161. The PMU and Contractor will consult with all relevant authorities to ensure that they minimise any disruptions to existing infrastructure and services. This includes suco water supplies, telecommunications infrastructure and electricity supply wherever applicable.

162. Plans will be obtained from utility/service providers showing all underground facilities and/or services in order to avoid damage or disruption during works. Mitigation measures included in the EMP require the contractor to:

- Reconfirm power, water supply, telecommunications and irrigation systems likely to be interrupted by the works and any additional trees to be cut near utilities;
- Contact all relevant local authorities for utilities and local village groups to plan reprovisioning of power, water supply, telecommunications and irrigation systems;
- Relocate and reconnect utilities well ahead of commencement of construction works and coordinate with the relevant utility company at the district and district levels for relocation and reconnection well before works commence and include for compensatory planting for trees;
- Inform affected communities well in advance;
- Arrange reconnection of utilities and irrigation channels in the shortest practicable time before construction commences; and
- If utilities are accidentally damaged during construction it shall be reported to the PMU, DRBFC and utility authority and repairs arranged immediately at the contractor's expense.

5.4 Construction Impacts on the Biological Environment

5.4.1 Impacts on Flora and Fauna

163. **Impacts on habitat and flora.** Minor impacts upon terrestrial habitats and flora of the subproject area are expected as a result of the road reconstruction and rehabilitation. Habitat fragmentation occurs when a road cuts through an ecosystem; the core sub-project road has existed for some time and though its original construction would have caused habitat fragmentation, ecosystems have re-established albeit as altered and /or smaller units around the road.

164. There will be limited and minor, if any, impacts on habitat, flora or fauna. Rehabilitation work will directly cause minor degradation of local ecology through the clearance of small areas of vegetation at work sites and ancillary sites such as materials extraction sites, and material stockpiling areas. Construction activities will impact only a narrow band of vegetation within the existing road corridor.

165. Plant species present within the impact area are either introduced species or ubiquitous native species, which are highly tolerant of disturbances. There is no vegetation adjacent to the subproject road that has any conservation significance nor is it representative of the original vegetative cover. There are some gardens, plantations and individual trees, including mango, jackfruit and teak close to the road that will require removal. They are non-endemic, common and have no special characteristics to merit protection.

166. Therefore, in light of the nature of the project and the types of works envisaged, there will be little, if any, loss of valuable flora or habitat. Rehabilitation activities will take place entirely within the existing road or within areas already subject to clearing in the past.

167. **Impacts on fauna.** In terms of impacts on fauna, there is the potential for construction workers to poach edible animals and birds of the locality in spite of prohibitions and poaching. The contractor will be responsible for providing adequate information to workers regarding the protection of fauna and imposing sanctions on workers trapping, killing or wounding birds or other wildlife.

168. Field observations, research, and consultations indicate that the streams and rivers, have some, but limited aquatic macro-fauna. Replacement of culverts will create minor, if any, impacts. Where possible, gravel extraction should be confined to the floodplain areas of rivers, rather than the river bed (especially through curves or bends in the river).

169. The PMU will supervise and monitor to check that the contractors to carry forward the mitigation measures and environmental enhancements identified in the EMPs as well as routine matters such as avoiding unnecessary removing of trees and compensatory and enhancement planting.

170. Invasive species shall not be introduced. During replanting/revegetation works, new alien plant species (i.e., species not currently established in the region of the project) shall not be used unless carried out with the existing regulatory framework for such introduction. All replanting and compensatory planting will be planned in full agreement with the local forest authority.

171. Measures to be included in the project to ensure protection of flora and fauna within the subproject area include:

- Contractor's site office, works yard, rock crushers, material storage, borrow pits, and quarries will all be approved by PMU and will not be permitted in any ecologically important sites or areas valuable for conservation;

- Vegetation clearance during construction activities, especially of trees along the river banks and road-side, will be minimized;
- Under no circumstances is the contractor permitted to fell or remove mangroves;
- Vegetative cover cleared from the roadside during rehabilitation activities will be kept for coastal protection and re-vegetation. Contractors will be responsible for re-vegetation in cleared areas;
- The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project;
- The contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. Contract documents and technical specifications will include clauses expressly prohibiting the poaching of fauna by construction workers and making the contractor responsible for imposing sanctions on any workers who are caught trapping, killing, poaching, or having poached fauna;
- The PMU will supervise and monitor a ban on use of forest and mangrove timber and workers shall be prohibited from cutting trees for firewood; and
- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible.

5.4.2 Impacts on Protected or Sensitive Areas

172. There are no protected areas (designated or proposed) or IBAs within the construction corridor or likely to be affected by construction activities or works.

5.5 Construction Impacts on Social Environment

5.5.1 Impacts on Noise Levels

173. Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation, location and function of equipment. During construction, there will be a temporary adverse impact due to the noise of the construction equipment, especially heavy machinery, when construction activities are carried on in the vicinity of the sucos. The most sensitive receptors along the subproject road include the suco residential areas, churches, health clinics and schools. Cooperation between the contractor and the residents is essential and it is the responsibility of the contractor to arrange meetings between these parties and arrange such matters as work schedules (hours of equipment operation etc.), locations of work camps and material storage areas, and the locations of rock crushers.

174. Clearing vegetation, bulldozing, compaction equipment, excavation of existing pavement materials, and grading will produce noise. Aggregate processing is one of the noisiest activities required in construction processes, however, this will be undertaken at a designated site located away from sensitive receivers.

175. Noise impacts may be short lived, although can be very intrusive if not controlled properly. Noise measurement shall be undertaken using hand held noise meter at the same sites sampled for TSP and shall follow the methodology specified by the manufacturer. Noise shall be measured in dB(A) over a 24 hours covering the different periods (i.e., 6h to 18h, 18h to 22h and 2h to 6h). Measurement will also be taken to establish if the World Bank criterion of Leq55dB(A)1-hour is exceeded at the measurement points. If it is exceeded by the existing noise a criterion of background +3dB(A) will be applied in the impact monitoring. Works are not expected to be carried out at night but if this is unavoidable for unexpected reasons separate measurements will also be taken before construction commences to establish if the World Bank criterion of Leq45dB(A)1-hour is exceeded and the monitoring assessment criteria will be established accordingly.

176. Measures to be included in the project to mitigate the effects of noise include:

- Baseline data on noise levels shall be collected before commencement of civil works.
- Requirements in the EMP and contract documents that all vehicle exhaust systems and noise generating equipment be maintained in good working order and that regular equipment maintenance will be undertaken;
- The contractor will prepare a schedule of operations that will be approved by suco chiefs and PMU. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction activity and identify the types of equipment to be used;
- Workers will be provided with noise abatement equipment as may be required; and
- Any complaints regarding noise will be dealt with by the contractor in the first instance through the communications plan.

5.5.2 Impacts on Access and Traffic Safety

177. The subproject will cause temporary negative impacts through presence of vehicles and equipment, including inconvenience, minor disruptions to traffic using the road, and on local access to and from the villages along the subproject road during the construction period. Mitigation of impacts on access and traffic will include:

- The contractor will prepare, and submit to PMU, a traffic management plan detailing diversions and management measures;
- Signs and other appropriate safety features will be used to indicate construction works are being undertaken;
- Contract clause specifying that care must be taken during the construction period to ensure that disruptions to access and traffic are minimized and that access to villages along the subproject road is maintained at all times; Provincial Works and village officials will be consulted in the event that access to a village has to be disrupted for any time and temporary access arrangements made;
- Construction vehicles will use local access roads, or negotiate access with land owners, rather than drive across vegetation or agricultural land, to obtain access to material extraction sites. Where local roads are used, they will be reinstated to their original condition after the completion of work;

- The road will kept free of debris, spoil, and any other material at all times;
- Disposal sites and haul routes will be identified and coordinated with local officials; and
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; and
- Provision of safe access across the works site to people whose villages and access are temporarily affected during road re-sheeting activities.

5.5.3 Impacts on Worker Health and Safety

178. The sub-project's construction phase can cause a range of health and safety impacts. The SPS requires that health and safety impacts on workers and the community are identified and mitigation measures proposed. Air pollution and noise, which also have a health and safety aspect, have already been discussed. Traffic safety issues have been discussed above. The risk of spread of communicable disease is dealt with in the next section.

179. Worker occupational health and safety is generally governed by the new Labour Code of Timor-Leste and the UNTAET National Labour Code (1 May 2002). As of 2009 the then current National Labour Code has been in a reform process. The International Labour Organisation (ILO) has supported the drafting the new Labour Code to include the fundamental and principles of rights at work. It is expected that the Labour Code will have been approved by the Council of Ministers and Parliament before implementation of the subproject. The contractor's EMP will address worker health and safety and will establish routine safety measures as required by World Bank Group's EHS Guidelines, Labor Code of Timor-Leste and by good engineering practice.

180. Observing general health and safety requirements, including provision of safety and protective gear and equipment to workers, will reduce the risk of accidents at the work sites. The construction camp will be equipped with a health post which will include first-aid and basic medical supplies. To reduce the risk of incidents at the camp, access to construction camps by other than those authorized will be prohibited.

181. Mitigation measures for reducing and avoiding impacts on worker health and safety include:

- At least one month before construction commences the contractors will demonstrate to the PMU they are properly resourced and a qualified/experienced environment and safety officer (ESO) will be identified by the contractors in the bid;
- Establishment of safety measures as required by law and by good engineering practice and provision of first aid facilities at work sites, in vehicles and establishment of an first aid/health post at the camp;
- The contractor will conduct of training (assisted by PMU) for all workers on safety and environmental hygiene at no cost to the employees. The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities;
- Instruction and induction of all workers in health and safety matters, including road safety as necessary;

- The contractor will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene;
- Workers shall be provided with appropriate personnel protection equipment (PPE) such as safety boots, helmets, reflector vest, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers;
- Fencing on all areas of excavation greater than 1m deep and sides of temporary works shall be observed;
- Reversing signals (visual and audible) shall be installed on all construction vehicles and plant.
- Provision of potable water supply in all work locations;
- Fencing on all excavation, borrow pits and sides of temporary bridges;
- Scheduling of regular (e.g. weekly tool box talks) to orientate the workers on health and safety issues related to their activities as well as on proper use of PPE;
- Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from traffic vehicles. Another measure is to install channelling devices (e.g., traffic cones and barrels) to delineate the work zone; and
- Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained and cleaned regularly to encourage use and allow effective operation.

5.5.4 Impacts on Community Health and Safety

182. The works could create various impacts on the health and safety of communities. The presence of construction workers and work camps can induce or increase risk of spread of communicable diseases such as sexually transmitted infections (STIs) and Human Immuno-Deficiency Virus (HIV) is a potential impact of the construction phase posed by construction workers engaging in either commercial sex or sexual relationships with local people.

183. Potential sanitation and impacts from disease will need to be controlled by maintaining hygienic conditions in the worker camps and implementing the social and health programs for the subproject.

184. Public safety, particularly of pedestrians and children can be threatened by the excavation of the trenches for side drain construction. Within 500m of settlements and towns fencing will be installed prior to excavation work commencing on all sides of temporary excavations. The plans will include provisions for site security and guards, trench barriers and covers to other holes and any other safety measures as necessary. The contractor will provide warning signs at the periphery of the site warning the public not to enter. The contractor will restrict the speed of subproject vehicles and also control traffic by contra-flow and provide flag men and warning signs at either end of the works where the traveling lanes must be temporarily reduced.

185. The contractors will provide information boards near the work sites to inform and instruct the public on how to conduct themselves and to be aware of their surroundings if they must approach the works. Information boards will be refreshed as necessary and also show the name and telephone contacts in PMU and contractors offices for complaints about the works. Information boards will also state that the PMU and contractor have an open door policy as regards complaints. The contractors will implement the following safety measures for the public:

- The contractor will appoint an ESO to address health and safety concerns and liaise with the PMU and sucos within the sub-project area;
- Barriers (e.g., temporary fence), and signs shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points;
- Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (including children) entering work areas and camp. Warning signs will be provided at the periphery of the site warning the public not to enter;
- The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and these sites will have a watchman at the entrance to keep public out;
- Speed restrictions shall be imposed on subproject vehicles and equipment traveling within 50m of sucos and sensitive receptors (e.g. residential, schools, places of worship, etc.);
- Upon completion of construction works, borrow areas will be backfilled or temporarily fenced, awaiting backfilling;
- Provisions will be made for site security, trench barriers and covers to other holes and any other safety measures as necessary;
- Drivers will be educated on safe driving practices to minimize accidents and to prevent spill of hazardous substances (fuel and oil) and other construction materials during transport;
- Contractors will ensure that no wastewater is discharged to local water bodies;
- Measures to prevent proliferation of mosquitoes shall be implemented (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside);
- Provision for the contractor to ensure the construction workforce attends STI and HIV/AIDS prevention workshops provided through an approved service provider. The workshops will be delivered to the contractor's workforce prior to commencement of any civil works; and
- Suco-based community awareness raising about transmission of STIs and HIV, reproductive health and safe sex. The program will be implemented prior to contractor mobilization.

5.5.5 Impacts on Physical Cultural Resources

186. Consultations and research indicated that there are no PCR sites or cultural property in the vicinity of the sub-project road. Depending on the specific locations of gravel and material extraction site, consultation with suco chiefs as well as resource owners is required to ensure that there are no PCR or sites in the locations to be proposed.

187. Any accidental discovery of PCR will be handled as per the provisions set out in 5.2.3. In the event this occurs, work shall cease immediately and the relevant authorities shall be informed. Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue.

188. The Contractor shall be responsible for complying with the requirements of authorities, and the PMU shall monitor the same. The contractor will include a section on “chance finds” in the SEMP. Mitigation measures for potential impacts on PCR include:

- Site agents will be instructed to keep a watching brief for relics in excavations.
- Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area.
- The PMU with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GoTL (i.e. Secretary of State for Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection.

189. Until GoTL has responded to this invitation work will not re-commence in this location until agreement has been reached between GoTL, PMU and MPW as to any required mitigation measures, which may include structured excavation.

5.6 Operation Impacts on Physical Environment

5.6.1 Air Quality

190. **Gaseous emissions.** Vehicle emissions as indicated concentration of oxides of nitrogen will be the main air pollution sources during operation. Following the rehabilitation of the road its use will create air pollution such as hydrocarbons, carbon monoxide, nitrous compounds, sulphur dioxide and particulate matter. The current volume of traffic and forecasted traffic growth are such that emissions will be low enough to not have a noticeable effect on ambient air quality. The anticipated levels of traffic, excessive capacity of the road network, and subsequent lack of congestion and concentration of traffic, are unlikely to result in adverse impacts on air quality. There will be few other sources of emissions near the subproject road other than from domestic fuel burning. Sensitive receivers are set far enough back from the subproject roads road to allow adequate dispersion that there will be no significant impacts at the sensitive receivers.

191. **Particulate emissions.** Particulate contamination such as dust and fumes will also be air pollution sources during operation however toxic residues from vehicle emissions near the subproject roads road are unlikely to accumulate or create significant impacts. Dust from the existing road will be reduced due to the better asphalt surface for the new road.

192. The conclusion in respect of air quality is that the subproject road is likely to continue to operate at well under its design capacity and no significant air quality impacts warranting mitigating actions are anticipated.

5.6.2 Run-off and Soil Erosion

193. Soil erosion will be prevented by developing a comprehensive suite of engineering controls in the detailed designs to prevent and maintain erosion. A system will be devised and engineered to control erosion and flooding on either side of the embankments in case of heavy rains. Apart from affecting the community lands and resources, this would otherwise cause natural streams and irrigation channels to become silted.

194. Measures will also be taken during the operational phase to ensure that the frequency of maintenance is increased and that storm drains and highway drainage systems are periodically cleared to maintain clear drainage to allow rapid dispersal of storm water flow. An adequate system of monitoring, reporting and maintenance will be developed.

5.6.3 Water Quality

195. Potential impacts on water quality or availability of water for domestic or agricultural use are not expected to occur. During operation negative impacts on water quality could be caused by accidental spills.

196. There is a risk of minor impacts on sedimentation and water quality through improving drainage from the road and areas landward of it. The subproject will lead to longer term environmental benefits for water quality created by the subproject through proper compacting of the road and surface and reducing mobilisation of sediments during rain. Those sediments that are mobilized will be captured where required in sediment traps to limit the amounts finding their way to the sea. The maintenance contractor will be responsible for regular clearing of drainage structures to keep them effective. Additional plantings around drains where appropriate will help to trap sediments on land.

197. Water quality may show slight improvements after rehabilitation and maintenance due to reduced erosion from improved embankments on the slopes, stabilization by rip-rap or gabion baskets, and re-vegetation to prevent erosion. Replacing missing or damaged culverts will facilitate passage of high flows and reduce scouring and remove overland flows, ensuring the integrity of the surface of the road and removing a potential hazard.

198. The area of impervious surface is not being significantly increased by sub-project and therefore increased runoff due to rehabilitation activities (if any) will be negligible in the subproject area.

5.6.4 Routine and Ongoing Maintenance

199. There are unlikely to be any significant impacts on soil or coastal erosion during the operation phase of the subproject as long as the structures are properly maintained. Naturally occurring coastal erosion could in fact be reduced as a result of the subproject if selective road sealing, gabion baskets and rip-rap are used to stabilize the coastline and protect the road where it passes close to the shore. Rip-rap, gabion baskets or bio-engineering alternatives will also be used to reduce scour and erosion in identified sections. These impacts and values can be maintained through good design as follows:

- DRFBC will ensure that all culverts and drainage structures are adequately maintained so that debris does not build up causing waters to deviate around the structures stranding them and resulting in severe erosion and loss of land; and
- Scour protection is on-going and adaptive to changing river requirements.

200. Increasing awareness about the need to maintain vegetative cover of areas adjacent to the road in terms of both assisting in reducing silt laden run-off to waterways and the inter-tidal area and contributing to the stability of river banks and the foreshore area, can be included as a component of the project's communication plan and identified as part of the maintenance activities.

5.7 Operation Impacts on the Biological Environment

5.7.1 Effects on Flora and Fauna

201. The operation of the subproject is not likely to induce people to the area to poach or hunt timber, flora or fauna as it does not comprise provision of additional access to previously inaccessible areas. The road already exists and does not provide access to the interior and still forested areas.

202. Deforestation is not an impact attributable to the subproject because (i) single selective logging for traditional and/or cultural purposes is permitted; and (ii) logging companies purchase licenses to fell trees within prescribed areas and construct their own roads to provide access to these areas, and in any case logging has not been a major activity in the sub-project areas. Therefore there will be no impacts on flora and fauna as a consequence of road rehabilitation during the operational phase.

203. There are no rare or endangered fauna that could be impacted by the operation of a rehabilitated road.

5.7.2 Protected Areas

204. There will be no impacts on existing or proposed conservation area as a result of the road rehabilitation.

5.8 Operation Impacts on the Social Environment

5.8.1 Noise Effects

205. Even under the most optimistic scenario of increased traffic, the ambient noise level after the completion of rehabilitation activities along the road (operational period) will not be of sufficient magnitude to require mitigation.

206. As noise is a function of traffic volume, ambient noise levels will not be appreciably increased due to the low forecast traffic.

207. Maintenance of vehicles to maintain an acceptable level of, or to reduce, noise emissions is beyond the scope of the project.

5.8.2 Risk of Spread of Communicable Disease

208. In terms of risk of transmission of communicable diseases during operation, roads have the potential to pose a risk as a pathway for disease transmission only if they carry a large volume of traffic, including high proportions of heavy traffic such as trucks, are routes that connect cities, towns or large numbers of villages, especially roads or highways with international borders where improved access to major markets can facilitate international trade, and there is a hospitality service industry established that is geared towards large numbers of truck drivers and mobile populations.

209. The road does not provide linkage to Indonesia. Therefore the conclusion, in terms of risk of transmission of communicable diseases during operation, is that the subproject road has the potential to pose, an all be it low, risk as a pathway for disease transmission. In any case, even this small risk is considered to be mitigated by implementation of project's the STIs/HIV/AIDS awareness and prevention campaign.

5.8.3 Access, Traffic and Community Safety

210. Following rehabilitation of the road, local access as well as the performance of a key route in the transport network will be improved. This will facilitate the flow of traffic, goods, and passengers between the sub-districts and two towns within the sub-project area and facilitate transportation to and from the capital of Dili. Access to social services and key community facilities will be improved as a result of the subproject. The implementation of the maintenance plan to be implemented by DRBFC will ensure the sustainability of the road rehabilitation.

211. In general traffic safety will be improved following rehabilitation and routine maintenance of the road, inclusion of the shoulder and minor widening of the road will allow for safe passing of vehicles. An increased traffic volume and possibility of higher vehicle speeds can create the potential for accidents involving pedestrians and children (who are used to playing on the road). The Project overall includes a road safety program which will help mitigate this.

212. It should be noted that overgrown vegetation poses a traffic hazard, especially when it reduces sight-lines around corners. Vehicles are known to cross to the other side of the road to avoid heavily vegetated areas, posing accident risks to oncoming vehicles. Clearance of road-side vegetation should be included as part of the road maintenance program.

213. The rehabilitation and widening of the subproject road is likely to increase the vehicle speed on the road. Increases in traffic flow indicate additional future traffic should be moderate and unlikely to create many community safety issues. Overall the condition of the road facilities will be enhanced and driving conditions should improve. Routine safety measures, signage and road markings should be introduced to reduce driving risk further in accident prone areas and provide enhancements to driving conditions.

6. Consultation and Information Disclosure

6.1.1 Introduction and Stakeholder Identification

214. The objectives of the stakeholder consultation process was to disseminate information on the subproject and its expected impact, long-term as well as short-term, among primary and secondary stakeholders and to gather information on relevant issues so that the feedback received could be used to address these issues at early stages of subproject design. Another important objective was to determine the extent of the concerns amongst the community, to address these in the subproject implementation and to suggest appropriate mitigation measures. The feedback received has been used to address these issues at early stages of subproject design.

215. The stakeholders consulted for the subproject included local affected persons, local village head persons, local authorities, suco leaders, national authorities, educational institutions, and other groups with an interest in the subproject corridor where the improvements will be implemented. GoTL departments were also consulted. Individuals representing several hundred persons from numerous family groups in the sucos along the alignment were informed about the subproject and invited to comment on their environmental concerns. These stakeholders were considered to be representative of the community living in the area, the road users, the business associated with the road and the locally elected representatives. Consultations took place between February and April 2013. Consultations included public meetings (see Table 6.1.1), meetings with government stakeholders and survey interviews for the poverty and social assessment.

Table 6.1.1 – Record of Meetings

Date	Location	Total no. of participants	No. of male participants	No. of female participants
25/02/2013	Manatuto Vila	38	28	10
26/02/2013	Manatuto Vila, Suco Cribas	59	51	8
26/02/2013	Laclubar Suco Orlalan	61	49	12
27/02/2013	NatarboraSuco: Manehat	55	30	25
28/02/2013	Soibada	50	31	19
	Total	263	189	74

Source: PPTA Consultations (February 2013)

6.1.2 Concerns Raised and Responses

216. The communities along the sub-project road indicated they would fully support the rehabilitation and improvement project. The main environmental concerns included vegetation loss, flooding, erosion control, traffic accidents, protecting water supplies, preventing damage to local electricity cables and other infrastructure and utilities surroundings construction areas. Prompt completion of the works and minimization of land acquisition were also requested by some local stakeholders. No significant operational phase impacts were identified.

217. Concerns with respect to road alignment and drainage design and the disturbance or destruction of crops and gardens, private property and community disturbance have been brought to the attention of the subproject proponent and the relevant parties are well aware of the potential for local disturbance that can result from poorly controlled contractors. The main issues raised are addressed in the environmental management plan, as far as is reasonably practicable at this stage; a resettlement plan has been prepared to compensate for affected persons that can reasonably be predicted at this stage. Unforeseen impacts will also be captured by the requirements to update the environmental management plan and inform ADB in response to any unpredicted impacts that arise periodically as necessary. The main concerns raised and the responses are in Tale 6.1.2.

Table 6.1.2 – Concerns Raised and Responses

Concern raised	Response
Generally, locals are very happy with this improvement project. They feel this will contribute to the local development. It is beneficial and can drive up local economic growth	Participation and consultation will be continued into the implementation stages to preserve the goodwill and support of the public.
Water supply is essential for the locals. Many are still lack of water even they have pipes or water well. Water is also collected from different sources and places (hillside and underground pump). Although supply is not generally sufficient for local requirements but this must be protected. Local people need clean water. Most of the pipes are rightly on the roadsides	Facilities will be identified before construction commences and re-provisioning planned to be completed before construction commences and agreed with local authority in Utilities & Infrastructure Management Plan.
There are sacred places, religious sites, and cemeteries close to the roads. These places must be considered when road improvement project is implemented	Known religious sites and cultural heritage locations have been recognized and protected in the EMP As a fall back option a watching brief will be kept and included in EMP
Besides water, electricity is very essential. The distribution lines run on poles next to the road and need to be protected.	Power and other facilities will be identified before construction commences and re-provisioned before construction commences and agreed with local authority in the EMP
Local traffic is not expected to be affected significantly. Many agreed to help manage this situation.	Precautions will be taken to keep traffic flowing by implementation of measures included in the EMP
Traffic accidents would be unavoidable, but it should be controlled. There are some concerns and comments asking to build pavement for pedestrian as well. It would also be good to improve culverts and drainage at the same time	Road will be widened with sealed hard shoulders and road markings and signs to improve safety. Footpaths have been recommended in villages particularly near the schools.
Local affected people do not expect too many major impacts but this is the first project of this scale for some time in the area. [Contractor should control the impacts]. Most people are also recommending a close coordination between government, companies and local communities and leaders to see the impacts	Participation and consultation will be continued into the implementation stages to preserve the goodwill and support of the public. The GRM will also respond to any complaints. The contractor(s) will commit to implementing the mitigation measures identified in the Project EMP and EMPs and will be monitored by PMU
Starting soon [and complete a soon as possible} is highly expected.	PMU will monitor progress of the works. This matter has been drawn to the attention of the proponents and is recognized as a public concern through this report
Negative impacts, such as on environment should be minimized through the cooperation with local leaders and community	The EMP requires presents mitigation measures for all impacts foreseeable at this stage.

Concern raised	Response
Flooding is common as many places are situated lower than the roads. As suggestions, most of them recommend to have drainages on both sides of the roads and culverts. Good maintenance would be important	The EMP requires detailed designers to take account of heavy rainfall and potential flooding in the detailed designs. In construction phase erosion control plan will be implemented as per EMP to control runoff. Maintenance is proposed to increase.
Few are concerned about road widening project. If this will happen, a close coordination and cooperation with local leaders and affected community is necessary. Mostly recommend for a fair and reasonable compensation	If land acquisition or resettlement are needed the appropriate compensation will be included in the resettlement plan.
There are some buildings to be protected close to the main roads (mostly are local administration building and Police), which need to be considered as well.	The EMP requires presents mitigation measures for all impacts foreseeable at this stage.

Source: PPTA Consultation (February 2013)

218. Consultations will be continued throughout preconstruction and construction phase as per the Project's communications plan. Records including reports on environmental and social complaints and grievances will be kept in a simple database in the PMU Project Office.

6.2 Information Disclosure

219. Information disclosure will be undertaken as per the requirements of SPS and Public Communications Policy 2011. In disclosing the environmental documents to the public, the MPW through the PMU is responsible for (i) providing the IEE to ADB for review and to NDE for clearance; (ii) ensuring that all environmental assessment documentation, including the environmental due diligence and monitoring reports, are properly and systematically kept as part of the sub-project specific records; (iii) disclosing all environmental documents, and making documents available to public, on request; and (iv) providing information to the public and stakeholders as per the Project's communications plan.

220. Disclosure of relevant environment safeguards documents will be in an appropriate form, manner, and language and at an accessible location to be understandable to the affected people and local stakeholders.

221. Where indigenous people or a linguistic group requires translation assistance, the Project will ensure that translators and translation of information materials will be available. This will be done in a manner to ensure full consultation with and disclosure to affected people, stakeholders and communities regarding the requirements for environment mitigation and monitoring as well as for land acquisition.

222. The following safeguard documents to be prepared and submitted by the PMU shall be publically disclosed including posting on ADB's website:

- Draft and final IEEs or other environmental assessments;
- New or updated environmental assessment reports if prepared to reflect significant changes in the project during design or implementation;
- Corrective action plan prepared during project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and
- Semi-annual safeguards monitoring reports and other reports submitted by the PMU during project implementation.

7. Grievance Redress Mechanism

7.1 Need for Grievance Redress Mechanism

223. MPW assisted by PMU will establish a grievance redress mechanism (GRM) for the sector project to facilitate resolution of complaints by affected people and grievances about the project's environmental performance, in line with the requirement of SPS. The GRM will be facilitated by the PMU and be applicable to all contractors who will be required to maintain a grievance registry or record. The PMU or designated officer in liaison with the Suco leaders and committees at the district level.

224. The public will be made aware of the relevant contact numbers and contact person in PMU and each contractor through media publicity, notice boards at the construction sites, and local authority offices. The public will be made aware that the contractors and the PMU have an open door policy and that the complainant can remain anonymous if requested. The GRM will address affected people's concerns and complaints promptly, using an understandable and transparent process based on traditional methods for resolving conflicts and complaints. The GRM shall provide a framework for resolving complaints at the project level as well as beyond the project (that is, involving relevant government offices such as District and Suco committees, NDE, etc.), using the existing judicial or administrative remedies. The GRM will be detailed in the IEEs and other safeguard reports as required (such as resettlement plans).

225. The GRM to be established to receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the social and environmental performance at the level of the Project. The PMU will maintain an open door policy to accept complaints at all levels concerning the environmental performance of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

226. A project information brochure will include information on the GRM and shall be widely disseminated throughout the corridor by the safeguards officers in the PMU. Grievances can be filed in writing or by phone with any member of the PMU, construction sites and other key public offices all of which will accept complaints.

227. Existing arrangements for redress of grievances for affected persons are through complaints to the village and suco committees up to the district level and then through the PMU and back to the agency which implements a project. This indirect route will remain in place to preserve the usual administrative remedies. There will be a need to deal with complaints and grievances during construction for this sub-project.

7.2 Steps and Procedures for the GRM

228. **First tier of GRM.** The contractor and/or PMU are the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The one of the two safeguards officers or designated officer in the PMU shall be the key officers for grievance redress. Resolution of complaints will be done within fifteen working (15) days. The will provide the support and guidance in grievance redress matters. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included unless anonymity is requested.

229. A tracking number shall be assigned for each grievance, and it will be recorded including the following elements: (i) initial grievance record (including the description of the grievance), with an acknowledgement of receipt handed back to the complainant when the complaint is registered; (ii) grievance monitoring sheet, describing actions taken (investigation, corrective measures); and (iii) closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off. The updated register of grievances and complaints will be available to the public at the PMU office, construction sites and other key public offices along the project corridor (offices of the suco and districts). Should the grievance remain unresolved it will be escalated to the second tier.

230. **Second Tier of GRM.** The PMU will activate the second tier of GRM by referring the unresolved issue (with written documentation) to the PMU who will pass unresolved complaints upward to the Grievance Redress Committee (GRC). The GRC shall be established by MPW before commencement of site works. The GRC will consist of the following persons: (i) Project Director; (ii) representative of District and Suco; (iii) representative of the affected person(s); (iv) representative of the local land office; and (v) representative of the National Directorate Environment (NDE) (for environmental related grievances). A hearing will be called with the GRC, if necessary, where the affected person can present his/her concern. The process will facilitate resolution through mediation.

231. The GRC will meet as necessary when there are grievances that cannot be solved at the first tier and within thirty (30) working days will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision and a timeframe that must be adhered to. The functions of the GRC are as follows: (i) resolve problems and provide support to affected persons arising from various environmental issues and including dust, noise, utilities, power and water supply, waste disposal, traffic interference and public safety as well as social issues land acquisition (temporary or permanent); asset acquisition; and eligibility for entitlements, compensation and assistance; (ii) reconfirm grievances of displaced persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

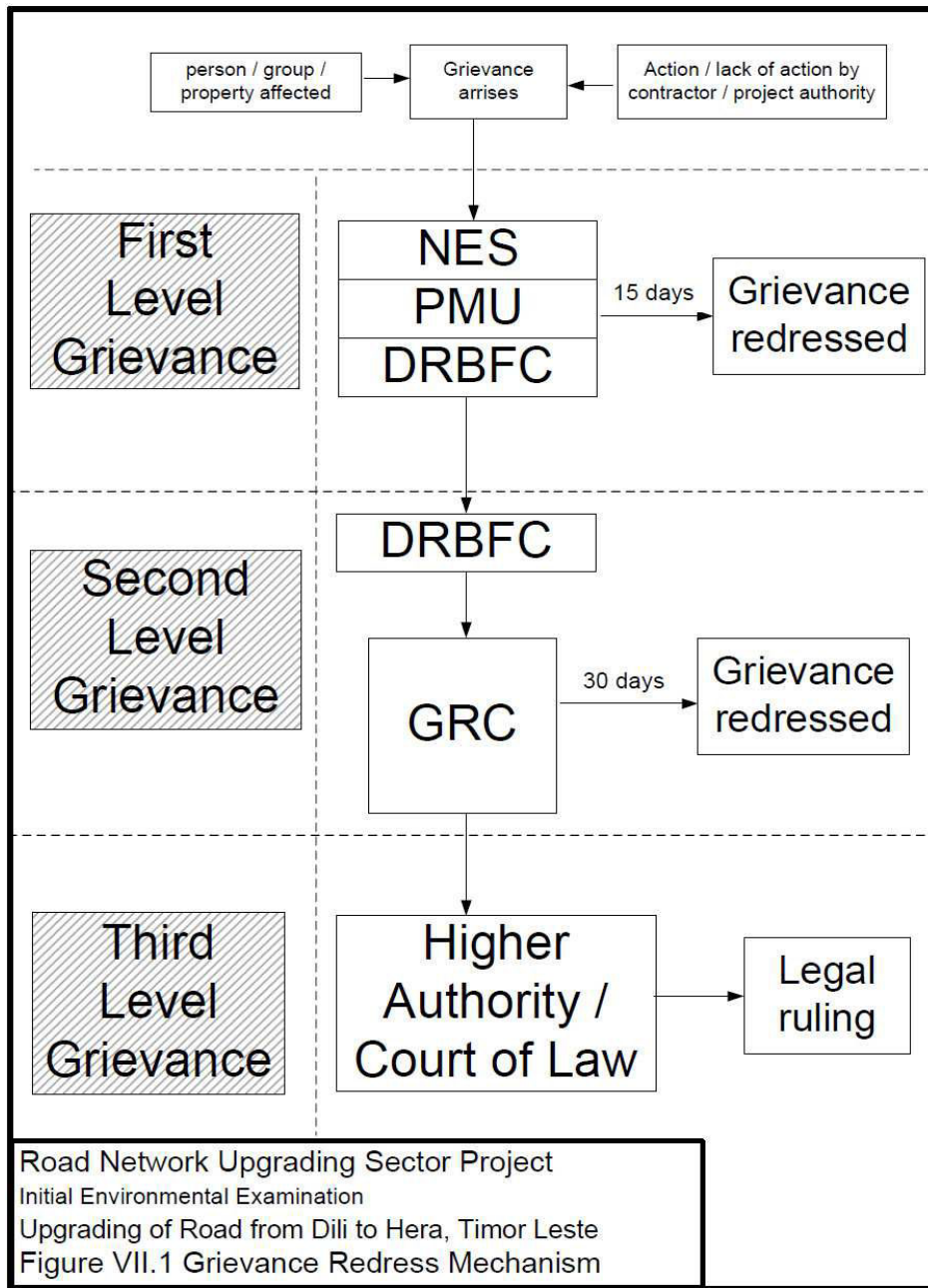
232. The PMU will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out. The contractor will have observer status on the committee. If unsatisfied with the decision, the existence of the GRC shall not impede the complainant's access to the GOTL's judicial or administrative remedies.

233. **Third tier of GRM.** In the event that a grievance cannot be resolved directly by the contractor or PMU officers (first tier) or GRC (second tier), the affected person can seek alternative redress through the Suco or District committees under the existing arrangements for redress of grievances for affected persons. The PMU or GRC will be kept informed by the district, municipal or national authority.

234. Monitoring reports shall include information about the GRM including: (i) the cases registered, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) an appendix which lists cases in process and already decided upon may be prepared with details such as name, ID with unique serial number, date of notice/registration of grievance, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).

235. The grievance redress mechanism and procedure is depicted in Figure 7.1.

Figure 7.1 - Grievance Redress Mechanism



8. Environmental Management Plan

8.1 Overview of Environmental Management Plan

236. The environmental management plan (EMP) contains a number of components crucial to effective environmental management within the project, these include: (i) organizational responsibilities (for various aspects of EMP implementation); (ii) consultation and information disclosure; (iii) plan for mitigation of impacts (during pre-construction, construction and operation); and, (iv) monitoring. These are explained in detail in the sub-sections below. Figure 8.1 (overleaf) provides the environmental management document map, showing the process for preparation, submission, and approval of various documents as well as the monitoring and reporting required for environmental management of the project.

8.2 Institutional Arrangements and Responsibilities

237. This sub-section of the EMP presents a discussion of the environmental management activities that will be undertaken as part of overall RNUSP implementation. The roles and responsibilities of various agencies in undertaking these activities are then defined and the institutional strengthening activities that will be required to allow those organizations to fulfil their nominated roles and responsibilities are identified. An environmental monitoring program has been prepared and the cost associated with its implementation has been identified (refer to Section 8.6).

8.2.1 Organization Roles and Responsibilities

238. The overall organizational structure for environmental management for the project is shown in Figure 8.2.

Figure 8.2 - Organizational Structure for Environmental Management

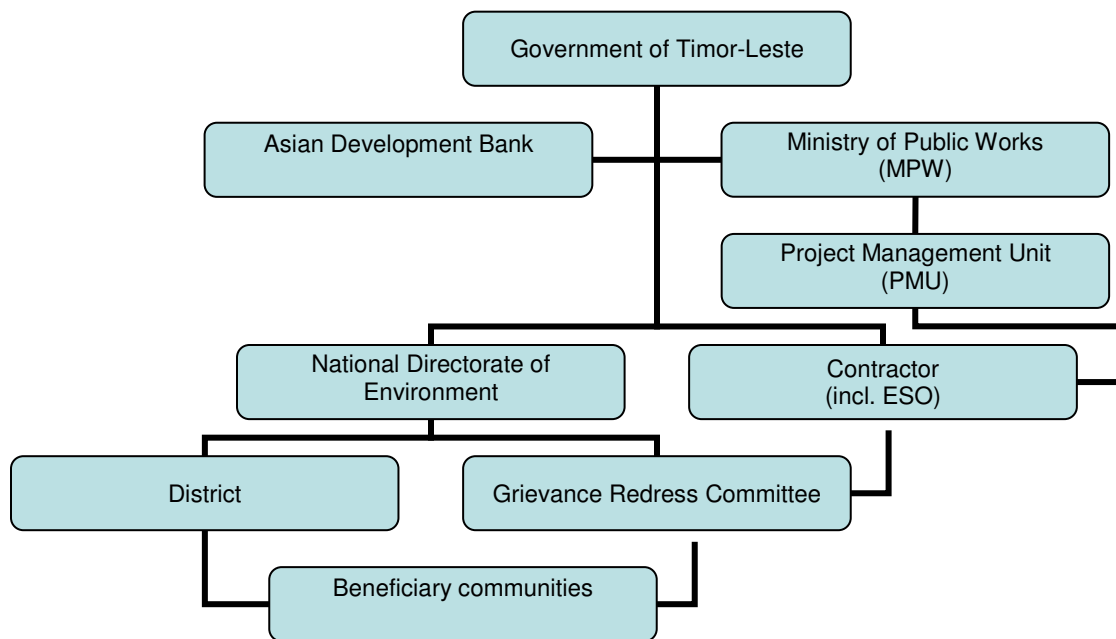
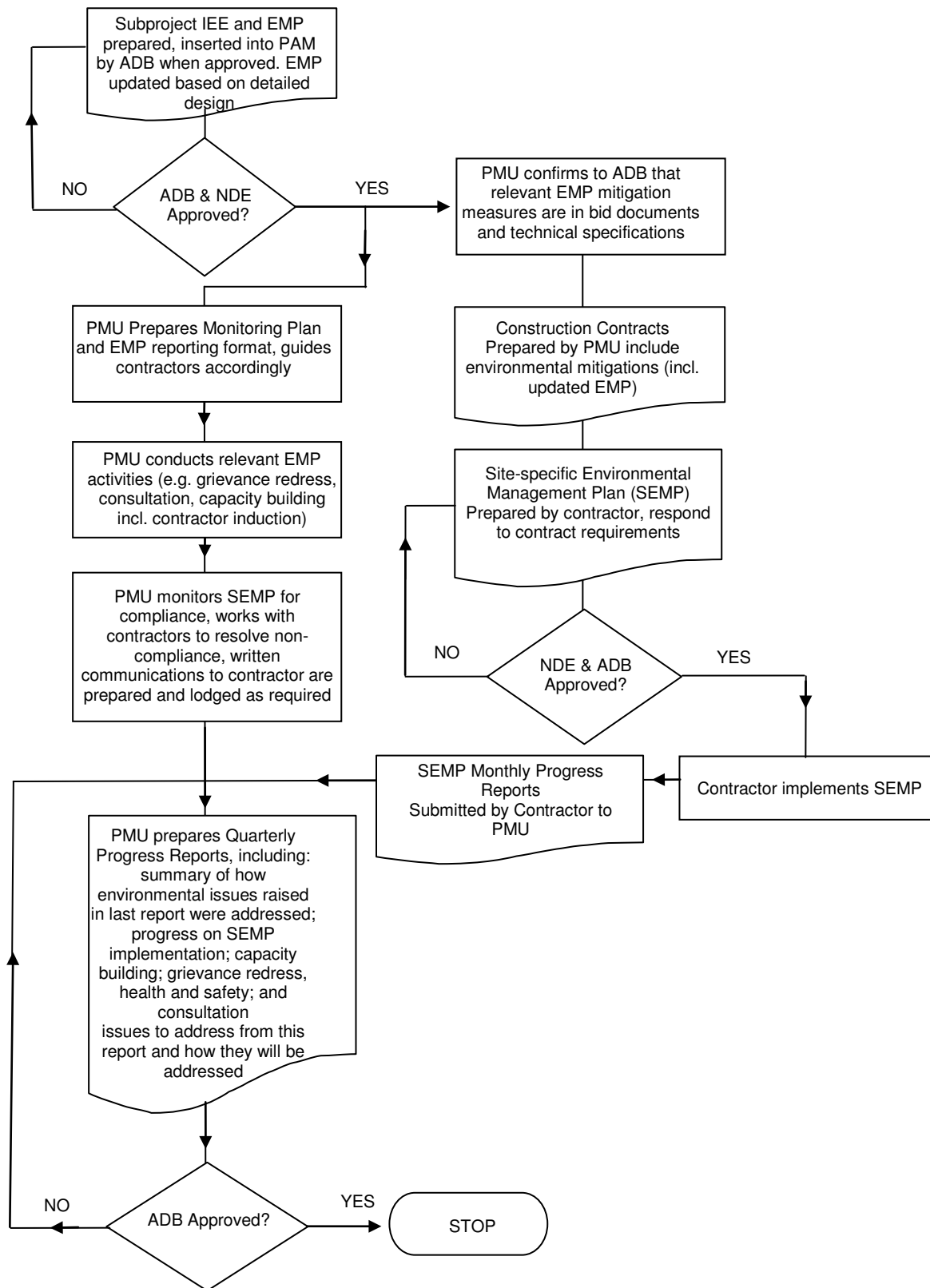


Figure 8.1 – Environmental Management Document Map



8.2.2 Role of Ministry of Public Works

239. As implementing agency for RNUSP MPW has overall responsibility for preparation, implementation and financing of environmental management and monitoring tasks as they pertain to the Project overall and each sub-project, and inter-agency coordination. MPW will exercise its functions through the PMU which will be responsible for general project execution, and which will be tasked with day-to-day project management activities, as well as monitoring.

240. A consulting firm (DSC) will be hired to provide services for detailed engineering design, construction supervision, and other assignments, as needed.

241. **Project Management Unit.** The PMU already established in MPW will be augmented sufficiently to implement the Project and manage detailed design and supervision of construction. The PMU is headed by a full-time Project Director and supported by a team consisting of staff and consultants engaged under different project arrangements. The PMU will be responsible for the following: (i) assisting the IA in implementing the Project; (ii) carrying out procurement and engaging design and supervision consultants (DSC) and contractors; (iii) as required liaising and coordinating with the DRBFC; and (iv) managing the contractors, and liaising with other stakeholders, on the day to day implementation of Project activities. The PMU, through the DSC, will retain experienced consultants to monitor and report on contractor compliance with the approved SEMP.

242. Road project implementation has evolved to the point that PMU needs to recruit safeguards staff who can receive training and capacity building under various projects financed by development partners. The proposal is that PMU (assuming approvals from MPW) will now establish an Environmental and Social Unit (ESU). ADB will finance two staff positions under the Project, and WB and JICA may also finance staff positions in time. ESU staff - environment officer (EO) and social safeguards officer (SSO) - will receive capacity building and training from international specialists financed under the Project (one environment and one resettlement and social).

243. Wherever possible future projects - irrespective of financing - will provide support to PMU staff rather than national consultants brought on for specific projects. This will provide long term institutional support and develop the PMU.

244. In the implementation of environmental management and monitoring tasks specific technical assistance will be provided by environmental specialists that are part of the PMU. The specialists will assist in all aspects of implementation of environmental assessment and management, internal monitoring and evaluation (M&E), and training of MPW and MECM and other relevant government agencies.

245. PMU will prepare and submit to MPW and ADB Quarterly Progress Reports, these will incorporate the main items raised in contractor's monthly reports and the environmental monitoring reports prepared by PMU environmental specialists and NED, as well as all other items required by MPW and ADB.

246. **Design and Supervision Consultant.** The PMU will be supported by a DSC. The DSC will comprise international specialists as required to supplement existing PMU resources and deliver a capacity building program. In respect of safeguards the DSC will include an international environment specialist (IES) and international resettlement and social development specialist for 36 months each. The first inputs of each specialist will be 12-18 months to maximize capacity building efforts across a number of activities required in first phases of implementation as well as for more general awareness raising and training needs.

247. A capacity building program in environmental assessment and management will be delivered by the IES and EO. Staff in the MPW, PMU, EO and contractors will receive training and capacity support from the IES to ensure learning and development, as well as smooth and effective implementation of the SEMP.

8.2.3 Role of National Directorate of Environment

248. The NDE, the agency responsible for environmental management, was consulted at the outset of the IEE process, will be consulted on the confirmation of the categorization of the project, and under the provisions of the ELL will review the IEE and issue environmental clearance and grant of license.

249. Ongoing consultation with NDE will be required during the construction of the project and NDE will be asked to assist in the monitoring of implementation of the SEMP and ensure that environmental management and mitigation of the project is undertaken to an acceptable standard.

8.2.4 Role of the Contractor

250. The civil works contractor will be responsible for responding fully to all contract conditions including those covering environmental mitigation, social mobilisation and awareness and monitoring. The contractor will then be responsible for implementing all environmental, health and safety actions included in the EMP and relevant clauses in the bidding documents and contract during the pre-construction and construction period.

251. The contractor will prepare the site-specific EMP (SEMP) based on the specific construction methodologies they propose to use. The SEMP will further develop the EMP contained in this IEE and will detail measures for traffic management, waste management, hazardous material and waste management and health and safety. The PMU will review and approve the SEMP before implementation.

252. The contractor will appoint an Environmental and Safety Officer (ESO) who will be responsible for site inspections on a daily and weekly basis to check compliance with the approved SEMP and ensuring implementation of all health and safety requirements, these will be documented and subject to monitoring by PMU and NDE. The responsibilities of the Contractor include:

- Participate in induction on EMP and mitigation measures to be delivered by PMU prior to preparation of the SEMP;
- Appointing an ESO and Deputy ESO, sending letter to PMU confirming that these positions have been filled and by whom (the bidding documents and contract specify the roles and tasks of the ESO);
- Seeking training and support from PMU on any aspects of environmental management, as required;
- Coordinating with PMU for preparing and submitting the SEMP following detailed design, the ESO will be responsible for ensuring that the Contractor complies with the clauses in the contract and bidding documents in respect of environment, health and safety;
- As required, preparing, and submitting for approval, appropriate plans (aggregate extraction, traffic management etc);

- Engaging an approved service provider to undertake STIs and HIV/AIDS briefings and awareness raising amongst the contractor’s employees and communities, and reporting on the same;
- Coordinating with PMU in respect of community consultation i.e. establishing GRM etc; and
- Undertaking daily and weekly site inspections (by the ESO) recording the same in a site diary, and participating in monitoring and coordinating with PMU to ensure that environmental management activities are reported in Monthly Progress Reports as required.

8.2.5 Assessment of Institutional Capacity

253. A capacity assessment of the MPW for application of environmental safeguards in donor assisted projects was carried out. Environmental management for earlier donor assisted projects has been with support of consultants. MPW has no direct experience in preparation of environmental assessment documents and the experience of the conformance to the NDE requirements has been very limited; largely as NDE is still developing as the regulatory agency under the ELL. MPW and DRBFC’s current approach to tackling environmental issues is on a project level basis and varies with the requirements of the funding agency.

254. In Timor-Leste, the environmental assessment process is established but environmental awareness and capability for implementation of EMP in infrastructure projects of both the executing agency (MOF) and the implementation agency (MPW) are still developing. MPW’s PMU does have some experience with the ongoing Road Network Development (Sector) Project and WB and JICA investments in upgrading and improving the road network.

255. The Rural Roads Policy (2009), still awaiting endorsement, has a main objective to “develop rural road infrastructure in an environmentally sustainable way”. The need to institutionalize environmental assessments in the design and implementation of rural roads has been identified and close cooperation with the NDE is anticipated. This policy is focused on rural roads but makes several significant commitments as follows:

- MPW is committed to mitigate negative environmental impacts at all stages of provision and production of the rural road infrastructure;
- MPW will develop comprehensive guidelines that will be followed by all involved in the planning and development of rural road infrastructure; and
- MPW will mainstream environmental safeguards into the planning and development of rural road infrastructure, followed up during the implementation.

256. If this policy is supported and applied to other road infrastructure there is a basis for environmental management infrastructure projects in the medium term. However, consultations with the various agencies indicate that there will not be a permanent structure or division to handle environmental concerns or issues in project planning and implementation during the term of this Project.

257. Therefore the most significant challenge for environmental management on this Project is the lack of human and financial resources and necessary infrastructure in MPW as the line agency for implementation. The institutional capacity in terms of environment, currently existing is largely that of the existing PMU created for implementation of ongoing development partner funded projects in the transport sector.

258. Training and orientation programs on environmental aspects have been largely through the capacity building initiatives taken up as part projects, and these have been mostly one at a time and have been limited to a awareness or sensitization workshops.

259. National minimum environmental standards have not yet been declared but guidelines already exist and need to be applied. However the current capacities of MPW to address the environmental issues at headquarters and regional offices are insufficient and need to be augmented; at present there are no staff with direct responsibility for addressing environmental issues. The current practice in MPW is that engineering officers may occasionally be delegated to check environmental matters on an ad hoc basis but for day to day environmental management of projects is undertaken by the PMU.

260. Currently there is no in-house capacity in MPW to check the adequacy of the subproject EMPs or that they are being implemented effectively by a contractor. In the long term it is recommended that a new unit responsible for environmental management be set up to improve capacity in the MPW.

261. The proposed capacity building includes (a) awareness training of the MPW and PMU (including management) and contractors on environmental management as per GOTL and ADB requirements; (b) capacity building programs to improve the capability of environment staff at all levels in carrying out monitoring and implementing environmental management measures; and (c) capacity building programs on environmental issues including pollution control and guidance on obtaining environmental licenses. The training programs will be conducted in Dili and district capitals as agreed with MPW and PMU.

262. Contractor training workshops should be conducted periodically as every new contractor is engaged during the first year and every six months for the second and third years, to share experience in the implementation of the works and the monitoring report on the implementation of the EMP, to share lessons learned in the implementation and to decide on remedial actions, if unexpected environmental impacts occur. In the medium to long term as the environmental responsibilities of MPW develop, dedicated staff posts will be trained and developed with the aim of taking over the role currently undertaken by consultants and specialists.

8.3 Mitigation of Impacts

263. The IEE has been prepared to identify and assess environmental and social impacts and has also set out a range of measures to avoid and/or mitigate those impacts (Section 5). The mitigation of impacts during the pre-construction phase will be the responsibility of MPW and the contractor, the mitigation of impacts during the construction phase will be the responsibility of the contractor, and the mitigation of impacts during the operations phase will be the responsibility of MPW and DRBFC.

264. A SEMP will be prepared by the contractor and submitted to PMU and ADB for review for approval prior to commencement of works. Table 8.3.1 includes the overall EMP for the subproject, of which parts - such as the pre-construction and construction elements - will be used as the basis for the contractor's SEMP following completion of detailed design, the overall process (as shown previously in Figure 8.1). Costs have been included where these are known. A number of mitigation measures will be the responsibility of the contractor who will be required to identify the best means for mitigating an impact and include these in the CEMP, therefore these costs will be borne by the contractor as part of the construction cost (IIC).

8.4 Environmental Monitoring and Reporting

265. Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the environment. In response to the impacts identified during the feasibility study, an environmental monitoring plan has been developed and is presented in Table 8.4.1. The contract documents will contain a list of all required mitigation measures (Section 5) and a time-frame for the compliance monitoring of these activities. The monitoring will comprise surveillance to check that the contractor is meeting the provisions of the approved SEMP and all other contractual obligations during construction.

266. The environmental specialists of PMU will supervise the monitoring of implementation of mitigation measures during the construction stage and compliance with the SEMP. The PMU during project implementation will be required to:

- Develop an environmental monitoring protocol for the construction period, and formulate a detailed plan;
- With assistance from the Engineer, conduct regular environmental monitoring, including review of daily and weekly site inspections undertaken by the contractor and items recorded in the ESO's site diary (the main parameters to be monitored are outlined in Table 8.3.1); and
- Prepare environmental monitoring reports covering the above and prepare and submit inputs for the Quarterly Progress Reports.

267. Responsibilities for the implementation of the monitoring requirements of this IEE are shown in Tables 8.4.1 and the EMP table (8.3.1). Implementation of mitigation measures during the construction stage will be the responsibility of the contractor in compliance with the bid documents, contract clauses and technical specifications.

268. The monitoring plan is incorporated into the EMP (and is presented in Table 8.3.1).

Table 8.4.1 - Responsibilities for Environmental Management & Monitoring

Agency	Responsibilities
Ministry of Public Works (MPW)	<ul style="list-style-type: none"> • Overall responsibility for project construction and operation • Ensure that sufficient funds are available to properly implement all agreed environmental safeguards measures • Ensure that the Project, regardless of financing source, complies with the provisions of ADB's Safeguard Policy Statement (SPS) 2009 • Ensure that Project complies with GOTL environmental laws and regulations • Ensure that tender and contract documents for civil works include all relevant parts of the environmental assessment and project agreements • Submit semi-annual safeguards monitoring reports to ADB
Project Management Unit (PMU)	<ul style="list-style-type: none"> • Ensure that EMP provisions are implemented to mitigate environmental impacts to acceptable levels • Ensure that Project complies with ADB's SPS and government laws and regulations • Engage and retain two full time staff within PMU as environment officer (EO) and social safeguards officer (SSO) • Ensure that environmental protection and mitigation measures in the IEE and EMP are incorporated into the detailed design • Ensure that requisite measures from the IEE and EMP are incorporated into the bid and contract documents • Undertake environmental management capacity building activities for MPW and orientation and awareness training for contractors • Ensure that MPW has obtained necessary environmental license(s) from NDE/DEIA prior to award of civil works contracts. • Ensure that contractors obtain necessary environmental license(s) from NDE/DEIA prior to commencement of civil works contracts.

Agency	Responsibilities
	<ul style="list-style-type: none"> • During detailed design phase carry out baseline data collection on air quality and noise (as specified in the EMP) • Assist MPW to establish an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance • Undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) • Prepare quarterly or semi-annual environmental monitoring reports for submission to ADB and other cofinanciers as necessary • Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB and other cofinanciers as necessary • Implement all mitigation and monitoring measures for various project phases specified as PMU's tasks in the EMP • Work with DRBFC to undertake any additional environmental assessment for sub-projects prior and submit to ADB and NDE for review and clearance
Design & Supervision Consultant (included in PMU)	<ul style="list-style-type: none"> • Provide training and capacity building to MPW and PMU staff (including management) and provide training to contractors prior to the submission of contractor's SEMP • Incorporate into the project design the environmental protection and mitigation measures identified in the EMP for the design stage • During detailed design phase provide all necessary information to the MPW to facilitate obtaining environmental licenses from NDE prior to award of civil works contracts • During detailed design notify PMU of any change in alignment or project design/components and provide all necessary information to the PMU to facilitate preparation of any additional environmental assessment prior to project construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the IEE prepared during loan processing, etc.) • Update, based on detailed design, the EMPs and other environmental protection and management measures to be incorporated in bid and contract documents • Assist PMU in the review and approval of the contractor's SEMP for each road section • Assist PMU to undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) including incorporation of reports from the contractors • Assist PMU to prepare quarterly progress reports and semi-annual safeguards monitoring reports for submission to ADB and oMPW as necessary including incorporation of reports from the contractors • Based on the results of SEMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB and other cofinanciers as necessary
Contractors	<ul style="list-style-type: none"> • Participate in induction training on EMP provisions and requirements delivered by the PMU • Prepare the SEMP and submit to PMU for approval • Obtain necessary environmental license(s) from NDE/DEIA for associated facilities for subproject works, quarries, hot-mix plant etc. prior to commencement of civil works contracts • Ensure that all workers, site agents, including site supervisors and management participate in training sessions delivered by PMU and DSC. Maintain a record of training and conduct of awareness sessions for staff to ensure compliance with environmental and safety statutory and contractual obligations including the approved SEMP • Ensure compliance with environmental statutory and contractual obligations and proper implementation of ADB requirements including approved SEMP • Based on the results of SEMP monitoring, cooperate with the PMU to implement environmental corrective actions and corrective action plans, as necessary. • Based on the results of EMP monitoring, cooperate with the PMU to implement environmental corrective actions and corrective action plans, as necessary. • Respond promptly and efficiently to requests and instructions from PMU for environmental corrective actions and corrective actions and implement additional environmental mitigation measures, as necessary. • Provide sufficient funding and human resources for proper and timely implementation of required mitigation measures in the EMP.
National Directorate of Environment (NDE)	<ul style="list-style-type: none"> • Review and approve environmental assessment reports required by the GOTL • Issue, and renew environmental licenses as required by the GOTL during the life of the project • Undertake monitoring of the project's environmental performance based on their mandate

8.5 Environmental Management Costs

269. The estimated costs for environmental management include costs for staffing, mitigation, monitoring during construction and permitting costs. Most mitigation measures to be implemented during the construction phase will be included in the construction contract and be covered by the contractor. Implementation of mitigation measures will be part of the construction costs, and will be included in the Bill of Quantities (BOQ) as a monthly line item for implementation of SEMP. The costs for training proposed include the costs incurred towards the site visits, travel to the training program by the participants, printing of training materials and other logistic arrangements. The costs involved towards preparation of training material and imparting of training are covered in the PMU costs.

270. In respect of staffing the IES will be financed through the DSC fee paid for by the loan, the first three years salary of the EO will be also financed out of the loan, after which time the MPW-PMU will cover the cost of the salary as with other full-time staff.

271. The budget for the environmental management costs for the subproject is presented in Table 6.2 below. The government counterpart funding required, covering the costs for environmental licensing, will be borne by Government. Tree planting (re-vegetation) is included as a separate line item and will require clarification at the detailed design stage.

Table 8.5.1 - Summary of Estimated Costs for EMP Implementation

Item	Estimated cost (US\$)	Costs covered by
Environmental specialists in PMU		
IES – 36 months (remuneration and per diem)	534,000	ADB loan
EO – 36 months full-time under loan	21,600	ADB loan
Environmental management capacity building program/ (training materials, daily subsistence allowance as required)	20,000	PMU
Environmental impact monitoring ¹	50,000	ADB loan
SEMP implementation (construction mitigation measures) ²	90,000	BOQ/Contract
Environmental Permitting ³	TBC	MPW/PMU
Tree planting subject to confirmation at detailed design	TBC	Contract

Notes:

- 1 Allows \$25,000 for portable monitoring equipment and \$5,000/year per subproject for chemicals and calibration;
- 2 Assumes \$5000 per month for 18 months;
- 3 Expenditure on environmental licensing procedure are the responsibility of the state according to Article 43 of DL5/2011 therefore cost of permits for environmental license as clearance certificate under DL5/2011 required from DEIA should be nil.

Table 8.3.1 – Environmental Management and Monitoring Plan

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
PRE-CONSTRUCTION PHASE							
Climate change adaptation	Risk of increased erosion and damage to road infrastructure	<ul style="list-style-type: none"> Ensure all measures incorporated in design are implemented 	PMU/DSC - design Contractor	Project IIC	Designs and works implemented	Visual inspection	PMU
Surveying and demarcation of centre-line	Minor loss of vegetation during demarcation	<ul style="list-style-type: none"> Vegetation clearance during surveying and demarcation activities, especially of trees along the river banks and road-side, will be minimized. Major trees (especially in suco areas) to be removed will be clearly marked, only marked trees will be removed; The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project; and Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible. 	PMU Contractor	Project IIC	Area of vegetation; area of felled trees/vegetation removal	During survey and activities - visual inspection before, during and after	Contractor; PMU
Site clearance, digging, excavations	Accidental discovery of PCR or cultural property sites	<ul style="list-style-type: none"> Contractor's SEMP to include section on "chance finds" Site agents will be instructed to keep a watching brief for relics in excavations. Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area. The PMU with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GoTL (i.e. Secretary of State for Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection. 	Contractor;	IIC	Sites and/or resources discovered and their protection	During activities - stop work order issued; Site/resources dealt with appropriately	Contractor; Sec. of State for Culture/, PMU
	Removal of trees	<ul style="list-style-type: none"> Consultation with owner and compensation as per Resettlement Plan (RP) 	PMU	In RP	No residual effect of loss; owner satisfaction with compensation	Following provision of compensation	PMU

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
Mobilisation of contractor, presence of construction workers, establishment of camp, associations with local people	Social disruption	<ul style="list-style-type: none"> Suco (village) protocols discussed with workers as part of awareness and mobilization training; At all times workers should respect village and land owner’s boundaries and be cognizant of village rules and terms of conduct (especially addressing women and elders), avoiding damage to productive trees and gardens, and access to the resources and springs; The contractor is to ensure that workers’ actions outside work site are controlled and Suco codes and rules of conduct are observed at all times; The contractor will identify one member of their staff to be the liaison between the Suco chiefs and elders and contractor, as well as between the contractor and PMU; Worker camp location and facilities located at least 500m from settlements and agreed with local communities and facilities approved by PMU and managed to minimize impacts; Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (especially children) entering the area; Hire and train as many local workers as possible 	Contractor		Complaints of incidents between workers and villagers; No. of children entering camp; Number and effectiveness of signs	During activities - checking records for complaints, consultation with workers about protocols;	PMU
	Health & safety	<ul style="list-style-type: none"> Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas; Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided. Separate toilets shall be provided for male and female workers; Portable lavatories (or at least pit latrines in remote areas) shall be installed and open defecation shall be prohibited and use of lavatories encouraged by cleaning lavatories daily and by keeping lavatory facilities clean at all times; Wastewater effluent from contractors’ workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed before discharging it into natural streams. Oil and grease residues shall be stored in drums awaiting disposal in line with the agreed waste management section of the EMP; Predictable wastewater effluent discharges from 	Contractor	IIC	Camp, yard, streams/rivers	Monthly - observation, consultation	Contractor PMU

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		construction works shall have the necessary permits from NDE and local authorities before the works commence; <ul style="list-style-type: none"> As much as possible, food shall be provided from farms nearby or imported to the area. Bush meat supplies from protected areas will be banned to discourage poaching. Solid and liquid wastes will be managed in line with the provisions of the waste management section of the EMP; Use of guns and hunting equipment by workers will be banned and dismiss workers taking or using green timber or hunting or in possession of wildlife (see 5.4.1); Entry to the protected, IBAs and/or sensitive areas (mangrove areas) by workers will be banned; Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; Provision of safe access across the works site to people whose suco and access are temporarily affected during construction works; 					
	Spread of communicable diseases	<ul style="list-style-type: none"> Construction camp(s) will be established in areas with adequate drainage in order to prevent water logging at the camp and formation of breeding sites for mosquitoes in order to facilitate flow of the treated effluents; Implementation of awareness and prevention program – contractor Implementation of HIV/AIDS awareness and prevention program – community (villages) 	Contractor & Approved service provider	TBA	STI/HIV/AIDS prevalence Increased awareness about transmission and prevention	Prior to construction - check contractor records, consultation with employees, discussions with NGO	PMU
CONSTRUCTION PHASE							
Operation of construction plant and vehicles generating emissions	Emission of exhaust from vehicles and machinery; Dust from aggregate crushing plant; generated by heavy vehicles transporting materials on roads; Uncovered loads on trucks;	<ul style="list-style-type: none"> Construction equipment being maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring; Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the subproject site; Material stockpiles being located in sheltered areas and be covered with tarpaulins or other such 	Contractor	IIC	Air quality, emissions, dust, particulate matter; Use of tarpaulins and loading of vehicles; Stockpiles	Monthly or after complaint - periodic visual inspection; Any particulate matter and smoke managed as per EMMP	Contractor; PMU

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
	Dust from exposed stockpiles	suitable covering to prevent material becoming airborne; <ul style="list-style-type: none"> Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the sides and tail of the vehicle) during transportation. This is especially important as there are a number of suco along the road; Damping down of the road, especially in the vicinity of the suco along the road and any roads being used for haulage of materials, during the dry season; and Periodic qualitative air quality monitoring. 					
Works in, or adjacent to, rivers and streams and in the vicinity of the coast	Erosion of riverbanks.; Effects on river structure including (i) changes to river water flows, including levels and velocity; (ii) changes to channel depth, structure & location resulting from excavations; and (iii) changes to riverbanks; Increased turbidity of river waters due to gravel extraction; Increased siltation at culverts; Construction materials are washed out into rivers and other areas	<ul style="list-style-type: none"> Material stock-piles will not be located within riverbeds or the islands in the centre of rivers. Similarly, they will not be located within the current area of floodplain in areas subject to regular flooding (i.e. once per year or more). All land will be rehabilitated to its original or better condition upon completion of the works; Scour protection will be used as temporary measures, as needed, to ensure temporary structures do not damage river configuration; Movements of vehicles and machinery, and hence disturbance, within the riverine habitats will be minimised at all times; In the event that the contractor causes damage to the river bank or other structural parts of a river, the contractor is solely responsible for repairing the damage and/or paying compensation; Embankments and in-stream/river activities will be monitored during construction for signs of erosion; Re-vegetation with local fast growing species, or other plants in consultation with the land owners and suco chiefs, will be carried out incrementally and as quickly as possible after work within any river habitat has been completed; and Spoils, rubbish or any material will not be disposed of within any river system including riverbed, banks or floodplain areas. Suitable tip sites will be designated in consultation with land owners and suco chiefs 	Contractor	IIC	Temporary structures removed; River training/scour protection; No stockpiling in riverbeds, river islands or floodplains; Flooding frequency; Localised erosion	Monthly or as required after event; Check designs; Visual observation of culverts, bridges and in-stream/river work areas; Consultation with users	Contractor; PMU
Sourcing of	Extraction of river	<ul style="list-style-type: none"> Contractor to prepare materials extraction plan; 	MPW,	IIC	Materials only	Monthly - visual	Contractor; PMU

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
materials (river gravels, aggregates etc)	gravels from the beds or active channels of rivers changes hydrology altering channel & erosion; Extraction from quarries or borrow pits leaves unusable land, exposed water table, attracts rubbish dumping, reduces visual values	<ul style="list-style-type: none"> • Stockpile topsoil for later use and fence and re-contour borrow pits after use. Properly remove topsoil, overburden, and low-quality materials and stockpile near the site to be covered and preserved for rehabilitation; • Use quarry with highest ratio between extractive capacity (both in terms of quality) and loss of natural state; • Use quarry sites lying close to the alignment, with a high level of accessibility and with a low hill gradient; • Reinstate damaged access roads, agricultural land and other properties due to transport of quarry/borrow materials, other construction materials and any other project-related activities upon completion of construction works at each section; • Provide adequate drainage to avoid accumulation of stagnant water during quarry/borrow site operation.; • Preferably avoid or reduce the sections of quarry sites located on river bed. If it is not possible to locate quarries out of river beds, quarry sites lying on small rivers and streams shall be avoided; • Choose alluvial terraces or alluvial deposits which lie on the river beds but not covered by water in normal hydrological conditions; shall be preferred; • Cut berms and terraces after extraction in quarries in the mountainous or hilly areas, or wherever slopes are important, and implement a drainage system and vegetation cover for rehabilitation; • Dewatered and fence quarries and borrow pits as appropriate, upon completion of extraction activities to minimize health and safety risks; • Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding; • Prevent accidental access and avoid drowning when pits become water-filled by implementing measures such as fencing, providing flotation devices such as a buoy tied to a rope, etc; and • Additional extraction sites and/or borrow pits will not be opened without the restoration of those areas no longer in use; and 	Contractor, PMU		obtained from designated sites (locations and method) as per extraction plan; Rehabilitation is conducted as per extraction plan	inspection; Review of extraction plan; Re-vegetation and rehabilitation	

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> The excavation and restoration of sites and borrow areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the PMU. Sign-off to this effect by PMU will be required before final acceptance and payment under the terms of the contract. 					
Spoil disposal	Improper disposal impacts habitats and water courses	<ul style="list-style-type: none"> Contractor's SEMP to include section on spoil disposal Spoil will not be disposed of in rivers and streams or other natural drainage path; The surplus shall not be stockpiled at the side of the road or dumped over the crash barriers; (Spoil will not be disposed of on fragile slopes, flood ways, wetland, farmland, forest, mangrove and associated salt flats, beaches, religious or other culturally sensitive areas or areas where a livelihood is derived; Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community; Spoils shall only be disposed to areas approved by local authority; Spoil will be to disposed of to disused quarries and abandoned borrow pits where practicable; Disposed spoil will be spread in 15 cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent erosion in line with best practice; Spoil disposal shall not cause sedimentation and obstruction of flow of watercourses, damage to agricultural land and densely vegetated areas; Under no circumstances will spoil be dumped into watercourses (rivers, streams, drainage, irrigation canals, etc.); and The spoil disposal site shall be located at least 50m from surface water courses and shall be protected from erosion by avoiding formation of steep slopes and grassing. 					
Clearing, grubbing, cut and fill activities, construction of	Soil erosion & silt generation; Increased runoff /	<ul style="list-style-type: none"> All required materials will be sourced in strict accordance with GoTL guidelines and the EMP; Material stock-piles, borrow pits and construction 	Contractor	IIC	Reduced erosion; Damaged culverts replaced;	Monthly - visual inspection	Contractor; PMU

Notes: IIC=Included in Contract (and specific means for mitigation to be identified and costed by Contractor); TBA=To be advised

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
embankments ; Gravel extraction from rivers leads to erosion; Stockpile and staging areas lead to loss of land use	erosion; Sediment contamination of rivers; Turbidity	<p>camps will only be located on unused land or non-agricultural land following consultation with PMU, land owners and suco chiefs. All land will be rehabilitated to its original or better condition upon completion of the project works;</p> <ul style="list-style-type: none"> • Re-use of excavated material wherever possible; • In the event that the contractor causes damage to agricultural land, productive land or gardens, the contractor is solely responsible for repairing the damage and/or paying compensation based on the rates in the approved resettlement plan; • Embankments and in-stream/river activities will be monitored during construction for signs of erosion. Stones and rocks should be kept on hand for work in location of stream and river which can be used in the event that there is bank or channel erosion; • Gabion baskets, rip-rap or bio-engineering methods will be used to both strengthen the road and to prevent erosion at bridge abutments; • Re-vegetation of riverbanks with fast growing species, or other plants in consultation with the land owners and suco chiefs, as quickly as possible after work has been completed; • Random and uncontrolled tipping of spoil, or any material, will not be permitted. Suitable tip sites will be designated in consultation with land owners and suco chiefs. Tip sites will not be permitted adjacent to rivers or streams or on garden land or in areas used for livelihood production by suco residents; and • Obtaining all necessary permits or approvals for location of construction camps, material extraction sites and sources of construction materials from NED and other government agencies prior to works commencing. 			Reduce flooding and overtopping Vegetation clearance minimized; No garden or agricultural land used; No dump sites near waterways or coast		
Run-off, discharges, generation of liquid wastes	Impacts on water quality; Increased siltation at culverts and bridges; Construction materials washed out into rivers	<ul style="list-style-type: none"> • Lubricants will be stored in containers / dedicated enclosures with a sealed floor >50m from water bodies; • Work in rivers will be scheduled during dry season and work duration shall be as short as possible. Bare slopes shall be stabilized immediately after works are completed; • Stockpile areas and storage areas for hazardous substances shall be located away from water bodies; 	Contractor	IIC	Discharge of waste as per waste management plan; Occurrence of erosion	Monthly - visual inspection of culverts, and in-stream/river work areas	Contractor; PMU

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IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> • Washing of machinery and vehicles in surface waters shall be prohibited; • Sediment controls such as silt fences or other sediment reducing devices (rock dams or silt barriers), to prevent both siltation and silt migration during works being undertaken in the vicinity of streams and rivers; • Sediment control devices will be cleaned and dewatered, discharges will not be to the rivers or streams. Consultation with land owners and suco chiefs will identify suitable land-based areas for settling ponds or discharge areas; • Diversion ditches will be placed around material stockpiles; • Minimizing interference with natural water flow in rivers, water courses or streams within or adjacent to work sites. Abstraction from and pollution of water resources will not be permitted; • Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from work sites will not be dumped in or near streams, rivers or waterways • Discharge of sediment laden construction water or material (including dredged spoil) directly into the rivers, sea, inter-tidal area or surface waters will not be permitted. All such construction water will be discharged to settling ponds or tanks prior to final discharge; • Discharge zones from culverts and drainage structures will be carefully identified, and structures will be lined with rip-rap. Down-drains and chutes will be lined with rip-rap, masonry or concrete; • Spoil and material stock piles will not be located near the coast, on the coastal side of the subproject road, or within 15 m of waterways, streams or rivers, or on the edge of slopes or hills above rivers or stream; • Hydro-carbons, fuel, and other chemicals as required for the works, will be stored in secure containers or tanks located away from surface waters, or streams. Any spills will be contained and immediately cleaned up as per the requirements of the emergency response plan prepared by the contractor (and approved by PMU); and 					

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IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> All water, waste-water and other liquids - see below 					
General activities - solid and liquid waste generation	Uncontrolled and un-managed waste disposal	<ul style="list-style-type: none"> Contractor's SEMP to include section on waste disposal, recycling and re-use; Areas for disposal to be agreed with local authorities and checked and recorded and monitored by the PMU; Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses may be given to local farmers for fodder and fuel. Organic (biodegradables) shall be collected and disposed of on-site by composting (no burning on site); Recyclables shall be recovered and sold to recyclers; Residual general wastes shall be disposed of in disposal sites approved by local authorities; Construction/workers' camps shall be provided with garbage bins; Burning of construction and domestic wastes shall be prohibited; Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest, mangrove and associated salt flats, beaches, places of worship or other culturally sensitive areas or areas where a livelihood is derived canals, agricultural fields and public areas shall be prohibited; There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local waste disposal sites; and Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked. 					
Use of hazardous materials	Oil and other hazardous chemicals are spilled into the environment resulting in pollution; Hydrocarbon leakage or spills from construction camps and workshops; Accidents placing people at risk	<ul style="list-style-type: none"> Emergency Response Plan (as part of EMP) prepared by Contractor to cover hazardous materials/oil storage, spills and accidents; Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by PMU and have necessary approval/permit from NDE and local authorities. Hydrocarbon, toxic material and explosives (if required) will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination. 	Contractor, PMU (to approve plan)	IIC	EMP and emergency response plan; Ensure storage sites are using existing concrete base; Spills cleaned and area rehabilitated	Monthly or after event or as required - review and approval of emergency response plan; Visual Inspection of storage facilities;	Contractor; PMU

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		<ul style="list-style-type: none"> • Equipment/vehicle maintenance and re-fuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency; • Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant; • Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations; • Ensure all storage containers are in good condition with proper labelling; • Regularly check containers for leakage and undertake necessary repair or replacement; • Store hazardous materials above flood level; • Discharge of oil contaminated water shall be prohibited; • Used oil and other residual toxic and hazardous materials shall not be poured on the ground; • Used oil and other residual toxic and hazardous materials shall be disposed of in an authorized facility off-site; • Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of river channel beds; • Ensure availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored; • Spillage, if any, will be immediately cleared with utmost caution to leave no traces; • Spillage waste to disposal sites approved by local authorities and approved by PMU; • All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation; • The contractors shall identify named personnel in 					

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		their EMP in-charge of storage sites for hazardous materials and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization.					
Construction activities causing accidental damage to existing services	Interference with existing infrastructure; Water supplies contaminated or disrupted through breaking of pipelines or exposing water table during works	<ul style="list-style-type: none"> Consult with service providers to minimize physical impacts on public infrastructure and disruption to services; Reconfirm power, water supply, telecommunications and irrigation systems likely to be interrupted by the works and any additional trees to be cut near utilities; Contact all relevant local authorities for utilities and local village groups to plan re-provisioning of power, water supply, telecommunications and irrigation systems; Relocate and reconnect utilities well ahead of commencement of construction works and coordinate with the relevant utility company at the district and district levels for relocation and reconnection well before works commence and include for compensatory planting for trees; Inform affected communities well in advance; Arrange reconnection of utilities and irrigation channels in the shortest practicable time before construction commences; and If utilities are accidentally damaged during construction it shall be reported to the PMU, DRBFC and utility authority and repairs arranged immediately at the contractor's expense. 	Contractor	IIC	Services damaged and rehabilitated/reinstated; Services re-routed; Service disruptions	As required - visual inspection, consultation with service providers	Contractor; PCMBU
Encroachment into precious ecology, disturbance of marine and terrestrial habitats, effects on flora and fauna	Impacts on terrestrial habitats; Workers poach animals for food or feathers etc; Protected or sensitive areas affected	<ul style="list-style-type: none"> Invasive species shall not be introduced. Contractor's site office, works yard, rock crushers, material storage, borrow pits, and quarries will all be approved by PMU and will not be permitted in any ecologically important sites or areas valuable for conservation; Vegetation clearance during construction activities, especially of trees along the river banks and roadside, will be minimized; Under no circumstances is the contractor permitted to fell or remove mangroves; Vegetative cover cleared from the roadside during rehabilitation activities will be kept for coastal protection and re-vegetation. Contractors will be responsible for re-vegetation in cleared areas; The contractor will be responsible for providing 	Contractor	IIC	Check for poaching and unnecessary vegetation clearance; Progress of re-vegetation of work areas; Adequate fuel supplies in camp; Training of workers in information	Spot inspections; monthly - visual inspection of camp and work sites; Re-vegetation activities as per EMP; Consultations with villagers and workers	Contractor; PMU

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<p>adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project;</p> <ul style="list-style-type: none"> The contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. Contract documents and technical specifications will include clauses expressly prohibiting the poaching of fauna by construction workers and making the contractor responsible for imposing sanctions on any workers who are caught trapping, killing, poaching, or having poached fauna; The PMU will supervise and monitor a ban on use of forest and mangrove timber and workers shall be prohibited from cutting trees for firewood; and Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible. 					
Accidental encroachment into historical / cultural sites	Impacts on PCR or cultural property sites	<ul style="list-style-type: none"> Contractor’s SEMP to include section on “chance finds” Site agents will be instructed to keep a watching brief for relics in excavations. Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area. The PMU with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GoTL (i.e. Secretary of State for Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection. 	Contractor;	IIC	Sites and/or resources discovered and their protection	During activities - stop work order issued; Site/resources dealt with appropriately	Contractor; Sec. of State for Culture/, PMU

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
Operation of construction plant and equipment creating noise	Noise in community; Impacts on construction workers	<ul style="list-style-type: none"> Baseline data on noise levels shall be collected before commencement of civil works. Requirements in the EMP and contract documents that all vehicle exhaust systems and noise generating equipment be maintained in good working order and that regular equipment maintenance will be undertaken; The contractor will prepare a schedule of operations that will be approved by suco chiefs and PMU. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction activity and identify the types of equipment to be used; Workers will be provided with noise abatement equipment as may be required; and Any complaints regarding noise will be dealt with by the contractor in the first instance through the GRM. 	Contractor	IIC	Adherence to agreed schedule; Complaints (no. logged with resolution); Workers safety equipment	Monthly or after complaint - review schedule Consultation (ensure schedule being adhered to) GRM register	Contractor; PMU
Presence of vehicles and equipment in villages, use of people's land for access to construction site, traffic and safety issues	Traffic and access disrupted during construction; Traffic safety affected	<ul style="list-style-type: none"> The contractor will prepare, and submit to PMU, a traffic management plan detailing diversions and management measures; Signs and other appropriate safety features will be used to indicate construction works are being undertaken; Contract clause specifying that care must be taken during the construction period to ensure that disruptions to access and traffic are minimized and that access to villages along the subproject road is maintained at all times; Provincial Works and village officials will be consulted in the event that access to a village has to be disrupted for any time and temporary access arrangements made; Construction vehicles will use local access roads, or negotiate access with land owners, rather than drive across vegetation or agricultural land, to obtain access to material extraction sites. Where local roads are used, they will be reinstated to their original condition after the completion of work; The road will kept free of debris, spoil, and any other material at all times; Disposal sites and haul routes will be identified and coordinated with local officials; and Provision of adequate protection to the general public in the vicinity of the work site, including 	Contractor, Sucos	IIC	No. of accidents or events; Maintenance of access; Signage; Road free of materials and debris; Haulage routes rehabilitated	During activities - Visual inspection; Consultations; Review of traffic management plan	Contractor; PMU

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; and <ul style="list-style-type: none"> Provision of safe access across the works site to people whose villages and access are temporarily affected during road re-sheeting activities. 					
General activities, handling equipment and plant; construction vehicles	Worker health and safety risks	<ul style="list-style-type: none"> At least one month before construction commences the contractors will demonstrate to the PMU they are properly resourced and a qualified/experienced environment and safety officer (ESO) will be identified by the contractors in the bid; Establishment of safety measures as required by law and by good engineering practice and provision of first aid facilities at work sites, in vehicles and establishment of an first aid/health post at the camp; The contractor will conduct of training (assisted by PMU) for all workers on safety and environmental hygiene at no cost to the employees. The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities; Instruction and induction of all workers in health and safety matters, including road safety as necessary; The contractor will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene; Workers shall be provided with appropriate personnel protection equipment (PPE) such as safety boots, helmets, reflector vest, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers; Fencing on all areas of excavation greater than 1m deep and sides of temporary works shall be observed; Reversing signals (visual and audible) shall be installed on all construction vehicles and plant. Provision of potable water supply in all work locations; Fencing on all excavation, borrow pits and sides of temporary bridges; 					

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> Scheduling of regular (e.g. weekly tool box talks) to orientate the workers on health and safety issues related to their activities as well as on proper use of PPE; Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from traffic vehicles. Another measure is to install channelling devices (e.g., traffic cones and barrels) to delineate the work zone; and Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained and cleaned regularly to encourage use and allow effective operation. 					
Presence of construction workers	Various social impacts including: (i) social disruption; (ii) possibility of conflicts or antagonism between residents and workers; (iii) spread of communicable diseases including STIs and HIV/AIDS; (iv) children are potentially exposed to exploitation; (v) impacts on community health and safety	<ul style="list-style-type: none"> The contractor will appoint an ESO to address health and safety concerns and liaise with the PMU and sucos within the sub-project area; Barriers (e.g., temporary fence), and signs shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points; Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (including children) entering work areas and camp. Warning signs will be provided at the periphery of the site warning the public not to enter; The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and these sites will have a watchman at the entrance to keep public out; Speed restrictions shall be imposed on subproject vehicles and equipment traveling within 50m of sucos and sensitive receptors (e.g. residential, schools, places of worship, etc.); Upon completion of construction works, borrow areas will be backfilled or temporarily fenced, awaiting backfilling; Provisions will be made for site security, trench barriers and covers to other holes and any other safety measures as necessary; 	Contractor, Suco Chiefs, PMU; approved service provider	IIC + costs for program (already identified)	HIV/STIs awareness campaign implemented; ESO recruited; Training implemented; Provision of safety equipment; Signage and security to prevent unauthorized people entering camp; Signage installed as required;	As required; Monthly or after complaint - ESO recruited; Training records; Staff records; Visual inspection; Consultations with villagers; Checking of complaints; Consultations with workers re training	Contractor; PMU;

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> Drivers will be educated on safe driving practices to minimize accidents and to prevent spill of hazardous substances (fuel and oil) and other construction materials during transport; Contractors will ensure that no wastewater is discharged to local water bodies; Measures to prevent proliferation of mosquitoes shall be implemented (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside); Provision for the contractor to ensure the construction workforce attends STI and HIV/AIDS prevention workshops provided through an approved service provider. The workshops will be delivered to the contractor's workforce prior to commencement of any civil works; and Suco-based community awareness raising about transmission of STIs and HIV, reproductive health and safe sex. The program will be implemented prior to contractor mobilization. No child labour to be used 					
Site office and works yard and use of water and electricity supplies	Stress on resources and existing infrastructure	<ul style="list-style-type: none"> Site office and works yard located, if possible, in areas better supplied with infrastructure and services i.e. Malu'u; Contractor to supply temporary facilities i.e. health post, accommodation, water and electricity, telecommunications, and sanitation 	Contractor	IIC	No. concerns raised and resolution; Service supply to camp and office	Ongoing - consult with villages along subproject road to monitor environmental concerns	
OPERATION PHASE							
Operation of vehicles creating emissions	Hydrocarbons, Carbon Monoxide, Nitrous compounds, Sulphur Dioxide and particulate matter increase through increased traffic	<ul style="list-style-type: none"> Forecasts of traffic growth indicate that emissions will be low and not have a noticeable effect on air quality; Landscaping along roadside to reduce dust impacts 	DRBFC; routine maintenance contractor	IIC	Air quality; Particulates and smoke; No. complaints; incidents logged with resolution	Monthly or as required - consultation and visual observations; Complaints;	Main. Contractor; PMU
Routine and ongoing maintenance	Constriction of water flows through structures blocking water flow; The need for gravel for on-going road maintenance leads to	<ul style="list-style-type: none"> Maintenance of structures to ensure river debris does not collect and result in damage to culverts and drainage structures, riverbanks, or land through altered flow patterns (see below); MPW will negotiate with resource owners and prepare an MOU acceptable to all parties; 	DRBFC; routine maintenance contractor	IIC	Satisfaction with MOUs; Condition of road	As required or as per PSA - MOUs; Routine maintenance records;	MPW/DRBFC; ADB

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Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
	acquisition of new source areas affecting properties; Standing water degrades road and surrounding environment	<ul style="list-style-type: none"> Drain and fill areas where water can pool as part of ongoing maintenance activities 				Visual inspection; As per monitoring framework included in PSA	
Placement of culverts	Alterations to river flow; Restriction of natural meandering of streams; Restriction of natural flood cycles by temporary storage of floodwaters and restricted flood plain movements	<ul style="list-style-type: none"> Proper maintenance of structures to ensure river debris does not collect and result in damage to banks and land; Scour protection; Good design to ensure normal flood behaviour maintained as closely as possible through use of transparent structures and relief culverts 	MPW/DRBFC; routine maintenance contractor	IIC	Erosion; Flooding patterns; Culverts and drainage structures cleared of debris	2 x year for 3 year, mid-term and post-eval. monitoring - check designs; Visual assessment; Review of flooding patterns/records	MPW/DRBFC; ADB
Run-off from road	Use of the road results in problems with runoff, loss of soils and other forms of erosion; Water quality in rivers and near-shore areas is affected by use of the new roads (debris laden run-off and silts etc)	<ul style="list-style-type: none"> Maintenance of erosion control structures, preventing debris build-up and ensuring good vegetation cover; Roads will be better compacted, covered and provided with culverts and drains; Awareness of the value of maintaining vegetation cover will be undertaken 	DRBFC; routine maintenance contractor	IIC	Water quality in streams and rivers; Suspended solids from road or areas of erosion, if identified	2 x year for 3 year, mid-term and post-eval. monitoring - visual assessment; Consultations or complaints	MPW/DRBFC; ADB
Climate change issues	Unexpected and costly failure of road; Impacts on rainfall, groundwater depletion, or carbon emissions not expected	Note: The subproject will not induce climate change; Coastal protection works implemented to accommodate climate change (extreme weather events and predicted sea level rise)	DRBFC; routine maintenance contractor	IIC	Tidal, stream/river heights and velocities; Flooding frequency; Localised erosion	Visual; Review rainfall and flooding records	Contractor; PMU
Improved access to previously inaccessible, or difficult to reach, areas	Hunting and poaching increases	<ul style="list-style-type: none"> Lack of through-route access and low traffic volumes means it is unlikely there will be any impacts on flora and fauna; There are no rare or endangered species that could be affected by operation; There are no protected areas in or near the subproject area 	DRBFC; routine maintenance contractor	IIC	Increases in hunting activity; Reduced sightings of fauna	2 x year for 3 year, mid-term and post-eval. monitoring - visual assessment; Consultations	MPW/DRBFC; ADB
Increased traffic	Increases in noise nuisance for residents; Increased traffic volumes and higher speeds leads to	<ul style="list-style-type: none"> Low traffic forecasts and the low population density means that ambient noise levels will not significantly increase General safety will be improved through providing a shoulder and widening within ROW 	MPW/DRBFC; Local police	IIC	Accidents and collisions; Safety issues discussed in schools;	2 x year for 3 year, mid-term and post-eval. monitoring - consultation and	MPW/DRBFC; ADB

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	accidents	<ul style="list-style-type: none"> • Installation of road safety signage • Work with police to carry out enforcement of traffic regulations once road is upgraded • Awareness raising through village meetings will be needed to create road safety programs • Ongoing community awareness ascertain village concerns regarding traffic calming & management 			Effectiveness of traffic calming measures	visual observations; Complaints; Collect road accident data	
Spread of communicable diseases	Roads act as pathway for spread of communicable diseases such as HIV and STIs	<ul style="list-style-type: none"> • At expected traffic volumes risk of spread of such diseases are not expected 	DRBFC; routine maintenance contractor	IIC	Health status of people; No. of cases of STIs etc	2 x year for 3 year, mid-term and post-eval. Consultations with villagers; Review health records (STI data)	MPW/DRBFC; ADB
Any other	Unintended or unanticipated impacts	<ul style="list-style-type: none"> • As required to avoid or reduce effects or impacts 	DRBFC	TBA	TBA	As above, as required	MPW/DRBFC; ADB

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9. Conclusion and Recommendations

9.1 Findings and Conclusions

272. The improvement of Road A09 – Manatuto – Natabora offers a robust option for the enhancement of the existing road network. The works are largely restricted to the existing road corridor and as far as can be ascertained there will be some small areas of land required where there road geometry is improved but these areas will generally be small and there is not likely to be any significant additional land required to complete the construction. A resettlement plan has been prepared to establish policies and procedures for payment of compensation to affected people for lost or damage assets.

273. The road is an existing piece of infrastructure and does not traverse any protected areas or areas of conservation value, including primary forests, terrestrial reserves or community managed marine protected areas. The subproject will not create any impacts on cultural or heritage sites and neither does it pass through densely populated areas or an area subject to heavy development. The proposed subproject will not create conflicts with natural resource allocation.

274. The construction impacts should be very predictable and manageable and with appropriate mitigation few residual impacts are likely. Additional human and financial resources will be required to improve environmental capability and to progress and achieve necessary statutory compliance and environmental clearance and the associated activities that also require environmental permits under the environmental laws of Timor-Leste. The EMP is based on the type, extent and duration of the identified environmental impacts.

275. Implementation of appropriate measures during the design, construction, and operation phases will minimize negative impacts to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures will be included in the contract specification. Contractors' conformity with contract procedures and specifications and implementation of the approved SEMP during construction will be carefully monitored. The contractor will be required to follow standard construction practices and comply with a series of contractual requirements which will be monitored and supervised by PMU. Environmental monitoring of the project will be undertaken regularly through the first three years of its operation to ensure that the measures are being implemented properly.

276. The subproject will have an overall beneficial impact, improving access, reducing coastal erosion, reducing dust, reducing travel time and travel costs, while improving socio-economic conditions. It will have insignificant negative impacts that will nevertheless be carefully monitored and adequately mitigated. A major benefit of the subproject is the accessibility to the social services being provided.

277. The overall conclusion is that the subproject complies with environmental categorization B, and therefore, the completion of this IEE fully meets GoTL and ADB's requirements and no further environmental study is required for the core sub-project road.

9.2 Recommendations

278. The recommendations of this IEE are: (i) the IEE be accepted by ADB and NDE as the statement of subproject's environmental effects and how they will be mitigated; (ii) Contractor to prepare a SEMP based on the pre-construction and construction parts of the EMP included in this IEE detailing their specific construction methodologies and submit to PMU for review and approval; and, (iii) the sub-project impacts and mitigation thereof, be monitored as per the monitoring plan.

Appendix 1 – Protected Areas

Protected Areas	District	Sub District	Village	Status		
National Park of Koni Santana	Lautem	Tutuala	Tutuala	Definitive		
			Mehara			
			Lospalos			
		Lautem/Moro	Muapitino			
			Lore I			
			Bauro			
Matebian Montain	Baucau	Quelecai	Laissorulai	Definitive		
			Vaitame			
			Afaca			
		Laga	Nama Oli			
			Sosa			
			Curuca			
		Baguia	Sagadati			
			Atelari			
			Alawa Leten			
		Viqueque	Uatolari		Uatolari	Lavateri
						Alawa Kraik
						Defa Uassi
					Uatocarbau	Babulo
						Vessoro
						Afalocai
Mundo Perdido Montain	Viqueque	Osso	Afalocai			
			Osso de Cima			
			Definitive			
	Baucau	Venilale	Loihuno			
			Liaruca			
			Bualale			
Reserve Florest of Tilomar	Covalima	Tilomar	Maudemo	Definitive		
			Lalawa			
Ribeira de Clere	Manufahi	Fatuberliu	Uma Berloik	Definitive		
			Dotik			
			Caicasa			
Fatumasin Montain	Liquiça	Bazartete	Megatou	Definitive		
			Loerema			
			Fatumasin			
Cabraque Montain	Manufahi	Same	Holarua	Definitive		
			Letefoho			
			Rotutu			
			Mauciga			
Tatamailau Mointain	Ainaro	Ainaro	Mauciga	Definitive		
		Hatobuilico	Nunumogue			
	Ermera	Ainaro	Manutasi			
		Lete Foho	Boeboeleten			
			Katrai Kraik			

Saboria Montain	Ainaro	Hatobuilico	Mulo	Definitive
		Maubisse	Harai Kik	
			Liurai	
	Ermera	Lete Foho	Katrai Kraik	
Manu Coco Montain	Dili	Atauro	Makili	Definitive
			Makadiki	
			Beloi	
Cristo Rei	Dili	Cristo Rei	Hera	Definitive
			Camea	
			Metiaut	
Talabu/Laumeta	Ainaro	Ainaro	-	Definitive
Diatuto Montain	Manatuto	Soibada	Fatu Makerek	Definitive
		Laclubar	Funar	
		Turiscari	Materek	
Cutete Montain	Oecusse	Pante Makasar	Costa	Definitive Candidate
			Nipane	
			Bobometo	
Monoleu Montain	Oecussi	Nitibe	Usitaco	Definitive Candidate
			Bene Ufe	
Mangal Area of Citrana	Oecussi	Nitibe	Bene Ufe	Still in process of detailed identification
Tapo Montain	Bobonaro	Lolotoe	Lebos	Still in process of detailed identification
			Lontas	
			Gildapil	
			Saburai	
Taroman Montain	Covalima	Fatululik	Taroman	Definitive Candidate
			Fatululik/Bedasi	
		Fohorem	Dato Rua	
			Dato Tolu	
			Laktos	
Kuri Montain	Manatuto	Laclo	Uma Kaduak	Definitive Candidate
Legumau Montain	Lauten	Luro	Vairok	Still in process of detailed identification
			Afabobo	
			Barikafa	
	Baucau	Laga	Atelari	
		Baguia	Uacala	
Laretame Montain	Viqueque	Osso	Osso de Cima	Still in process of detailed identification
	Baucau	Venilale	Bualale	
Builo Montain	Viqueque	Osso	Loihuno	Still in process of detailed identification

Protected Areas	District	Sub District	Village	Status
Guguleur Montain	Liquiça	Maubara	Lisadila	Still in process of preliminary survey
			Guiso	
			Baubarlisa	
Loelako Montain	Bobonaro	Cailaco	?	Still in process of preliminary survey
Burabo Montain	Viqueque	Uatocarbau	Afalocai	Still in process of preliminary survey
			Bahatata	
			Loiulo	
Maurei Lagon	Lautem	Ilomar	Irabere	Still in process of preliminary survey
	Viqueque	Uatocarbau	Irabi Letarea	
Aitana Montain	Viqueque			In Planning
	Manatuto			
Bibileo Montain	Viqueque			
Modomahut Lagon	Manufahi	Fatuberliu		In Planning
Welenas Lagon	Manufahi	Fatuberliu		In Planning

Appendix 2 – Existing and Proposed Important Bird Areas (IBA)

IBA code	IBA Name
TL 01	Tilomar
TL 02	Tata Mailau
TL 03	Fatumasin
TL 04	Atauro Island-Manucoco
TL 05	Clere river
TL 06	Lore
TL 07	Mount Paitchau and Lake Iralalaro
TL 08	Jaco Island
TL 09	Mount Diatuto
TL 10	Be Malae-Atabae
TL 11	Maubara
TL 12	Mount Mak Fahik and Mount Sarim
TL 13	Tasitolu
TL 14	Areia Branca ("Cristo Rei") Beach and hinterland
TL 15	Mount Curi
TL 16	Irabere Estuary and Ilomar Forest
Candidate IBA	Saboria Mountain (above 2,000 m)
Candidate IBA	Talobu/Laumeta Mountain (above 2,000 m)
Candidate IBA	Mount Mudo Peridido
Candidate IBA	Mount Matebian (above 2,000 m)
Candidate IBA	Mount Cablaque

Appendix 3 – Threatened and Endangered Bird Species

English Name	Scientific Name	IUCN ¹	EBA ²	Altitude (m) ³	Habitat
Christmas Island Frigatebird	<i>Fregata andrewsi</i>	CR			Marine
Beach Thick-knee	<i>Esacus giganteus</i>	NT		Lowlands	Beaches
Malaysian Plover	<i>Charadrius peronii</i>	NT		Lowlands	Beaches
Asian Dowitcher	<i>Limnodromus semipalmatus</i>	NT		Lowlands	Wetlands
Black-tailed Godwit	<i>Limosa limosa</i>	NT		Lowlands	Wetlands
Dusky Cuckoo Dove	<i>Macropygia magna</i>		RR	0–800	Evergreen forest, Tropical dry forest
Slaty Cuckoo Dove	<i>Turacoenamodesta</i>	NT	RR	0–1,300	Evergreen forest, Tropical dry forest
Wetar Ground Dove	<i>Gallicolumba hoedtii</i>	EN	RR	0–800	Evergreen forest, Tropical dry forest
Timor Green Pigeon	<i>Treron psittaceus</i>	EN	RR	0–600	Evergreen forest, Tropical dry forest
Pink-headed Imperial Pigeon	<i>Ducula rosacea</i>	NT	RR	0–1,000	Forest coastal scrub
Timor Imperial Pigeon	<i>Ducula cineracea</i>	EN	RR	400–2,200	Tropical montane forest plantation
Yellow-crested Cockatoo	<i>Cacatuasulphurea</i>	CR		0–1,000	Tropical dry forest woodland plantations
Olive-headed Lorikeet	<i>Trichoglossus euteles</i>		RR	0–2,300	Forest, woodland, agricultural land
Iris Lorikeet	<i>Psittoteles iris</i>	NT	RR	0–1,500	Closed forest, woodland, plantations
Olive-shouldered Parrot	<i>Aprosmictus jonquillaceus</i>	NT	RR	0–2,600	Tropical dry forest, savanna
Timor Coucal	<i>Centropus mui</i>	ne	RR	0–500	Tropical forests (edges), woodland
Cinnamon-banded Kingfisher	<i>Todiramphus australasia</i>	NT	RR	0–1,500	Evergreen forest, tropical dry forest
Streaky-breasted Honeyeater	<i>Meliphaga reticulata</i>		RR	0–1,200	Tropical dry forest, villages
Plain Friarbird	<i>Philemon inornatus</i>		RR	0–2,200	Tropical dry forest, Eucalyptus woodland
Red-rumped Myzomela	<i>Myzomela vulnerata</i>		RR	0–1,200	Tropical dry forest; village
Plain Gerygone	<i>Gerygone inornata</i>		RR	0–1,500	Tropical dry forest, scrub; village
Fawn-breasted Whistler	<i>Pachycephala orpheus</i>		RR	0–1,500	Tropical dry forest
Timor Figbird	<i>Sphecotheres viridis</i>		RR	0–1,000	Tropical dry forest, scrub
Olive-brown Oriole	<i>Oriolus melanotis</i>		RR	0–1,600	Tropical dry forest
Buff-banded Grassbird	<i>Buettikoferella bivittata</i>		RR	0–700 forest	Tropical dry forest
Timor Stubtail	<i>Urosphenas bulata</i>		RR	0–1,900	Tropical dry forest, scrub
Timor Bush Warbler	<i>Bradypterus timorensis</i>	NT	RR	c.1800	Montane forest; montane scrub
Timor Leaf Warbler	<i>Phylloscopus presbyte</i>		RR	0–2,300	All forest types
Spot-breasted White-eye	<i>Heleiamuelleri</i>	NT	RR	0–1,460	Evergreen forest; Tropical dry forest
Chestnut-backed Thrush	<i>Zosterodohertyi</i>	NT	RR	600–2,300	Hill and montane forest
Orange-banded Thrush	<i>Zosteraperonii</i>	NT	RR	0–1,600	Closed canopy forest, plantations

White-bellied Bushchat	<i>Saxicolagutturalis</i>	NT	RR	0–1,200	Tropical dry forest, woodland
Black-banded Flycatcher	<i>Ficedulatinorensis</i>	NT	RR	0–1,200	Evergreen forest, tropical dry forest

English Name	Scientific Name	IUCN ¹	EBA ²	Altitude (m) ³	Habitat
Timor Blue Flycatcher	<i>Cyornishyacinthinus</i>		RR	0–2,000	Tropical dry forest, plantations
Red-chested Flowerpecker	<i>Dicaeummaugei</i>		RR	0–1,200	Open forest; villages
Flame-breasted Sunbird	<i>Nectariniasolaris</i>		RR	0–1,000	Tropical dry forest, scrub; villages
Tricoloured Parrotfinch	<i>Erythruratricolor</i>		RR	0–1,200	Tropical dry forest, thickets
Timor Sparrow	<i>Paddafuscata</i>	NT	RR	0–1,250	Woodland, grassland, agricultural land
Source: BirdingASIA 9 (2008)					

Resettlement Framework

August 2013

TIM: Road Network Upgrading Sector Project

Prepared by the Ministry of Public Works of the Government of Timor-Leste for the Asian Development Bank.

GLOSSARY OF TERMS

Affected Persons

In the context of involuntary resettlement, affected persons (APs) are those who are physically displaced (relocation, loss of residential land, or loss of shelter) and/or economically displaced (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to services, markets, social or economic facilities or land use in urban or rural areas, legally designated parks and protected areas. It is increasingly being replaced by the term “Displaced Persons (DPs)” following ADB Safeguard Policy Statement 2009 – but is still in common use in the field. The terms of APs and DPs are used interchangeably in this document.

Cut-off-date

This is the date at which the identification of APs has been completed and no subsequent claim to inclusion in and entitlement of compensation or asset replacement or income restoration will be allowed. In this RF the cut-off-date is the date of start of a Census of APs and cadastral or Detailed Measurement Survey of affected land or other property during preparation of the RP. APs and local communities will be informed of the cut-off date for each subproject, and that anyone moving into the Project Area, starting a business or constructing any structure after that date will not be entitled to compensation and assistance under the Project.

Eligibility

People who at the cut-off-date were located within the area affected by the project are eligible as APs. Eligibility is irrespective of (a) formal legal rights to land, or (b) customary claim to land or asset, or (c) no recognizable legal right or claim to or use of the land APs are occupying.

Encroachers

People who illegally extend their legal holding, and encroach upon government land. They are encroachers for their illegal holding. Affected people with title to land who have encroached from their legitimate landholding onto land that they do not own, will be compensated for land and assets on the legitimately occupied piece of land and only for eligible non-land assets on non-titled land.

Entitlement

Entitlement relates to the range of measures, compensation and allowances, comprising cash or kind compensation, relocation cost, rehabilitation assistance, transfer assistance, income substitution, and relocation which are due to APs, depending on the type and degree of their losses, to restore their social and economic base. Entitlements are set out in the RP in an Entitlement Matrix. Entitled Persons and Eligible Persons are used interchangeably in this RF and related RPs.

Gender

Gender relates to the separate attributes and rights of people defined by their sex. In the context of involuntary resettlement, project will ensure that women are equally entitled and empowered with men and are consulted and participate equally in the management of resettlement actions and in related safeguard measures. Gender mainstreaming measures to ensuring the equality of participation, protection and benefit of women in the overall project are set out in a separate Gender Action Plan.

Land Expropriation

Land expropriation is the taking of private property and structures by the State for public purposes. This is also called involuntary land acquisition. It is different from a land purchase where the sale is made by a willing seller. Land can only be expropriated following the expropriation law (once promulgated) for purposes of public sector projects which are designated as such by the Ministry of Justice and only after fair compensation.

Negotiated Land Purchase/Settlement

Negotiated Purchase means obtaining land and structures by the State for public purposes through a negotiated process that ensures payment of fair compensation for such assets on a willing seller – willing buyer basis. Negotiated purchase is a proactive way of acquiring land. The government agency through its officials negotiates a price with the owners with the assistance of a valuer or appraiser to determine the market value of the land (replacement cost), which is the minimum amount it can pay for it.

Non-titled persons

Non-titled people are those with no recognizable, formal or legal rights or claims to the land they are occupying and/or using. In Timor-Leste, they may include the majority of farmers and small traders or village dwellers as well as specific indigenous or community groups, ethnic minorities, pastoralists, people who claim such land without formal legal rights, and others, who may have usufruct or customary rights to affected land or other resources, and who have no formal legal title to their lands. The absence of a formal legal title to land (e.g. in rural areas where land is owned legitimately under traditional, indigenous or customary tenure) is not a bar to entitlements, including full compensation for the value of the acquired land and other fixed assets arrived at through the measures provided for in this RF for negotiated transfer, involuntary resettlement and replacement cost survey.

Rehabilitation

Measures required to (i) restore access to public facilities, infrastructure, and services; (ii) cultural property and common property resources; (iii) mitigate loss of access to cultural sites, public services, water resources, grazing, or forest resources including establishment of access to equivalent and culturally acceptable resources and income-earning opportunities; and, (iv) restore the economic and social base of APs seriously affected by the loss of assets, incomes, and employment. All such people or bodies will be entitled to rehabilitation assistance, including any necessary restoration of structures and measures for restoring land, structures, infrastructure, facilities, incomes and living standards. Such measures must be determined in consultation with APs and affected communities, including any APs whose rights might not be formally recognized.

Replacement cost survey

Replacement cost survey is the method of valuing assets to replace the loss at market value, or its nearest equivalent. Replacement cost also includes any transaction costs such as administrative charges, taxes, registration, and titling costs. Where national law does not meet this standard the replacement cost will be supplemented as necessary. Replacement cost is based on market value if it can be ascertained and/or by other factors which are accepted by the parties to the land transfer, such as long-term production value, to arrive at a fair price agreed before the project or dispossession, whichever is higher. Where there are substantial areas of land impacted and substantial numbers of APs needing to be compensated, a replacement price for identical areas of land affected in a sub-project may be arrived at based on replacement cost survey and consultation with the concerned APs and approved by the EA/IA after consultation with the DLPCS. Replacement cost survey is conducted by an

experienced valuer and/or by other qualified specialists selected by criteria and to terms of reference agreed between the EA/IA and DLPCS.

Income or Livelihoods Restoration

In the absence of functioning markets, a compensation and restoration strategy is required that enables APs to restore their livelihoods to levels at least equivalent to those maintained at the time of dispossession, displacement, or restricted access or of the loss of infrastructure or facilities. For losses that cannot easily be valued or compensated for in monetary terms (e.g., access to public services, customers, and supplies; or to fishing, grazing, or forest areas), income or livelihoods restoration may be undertaken, especially for vulnerable and severely affected people, to establish access to equivalent and culturally acceptable resources and earning opportunities.

Relocation

Relocation is the physical shifting of APs from their pre-project place or residence, place of work or business premises and their planned relocation at a site providing equivalent or better residential and economic land use, utilities and facilities, and access to markets, services and employment opportunity.

Resettlement

Resettlement refers to all measures taken to overcome the impact of public or private sector project or development leading to full or partial, permanent or temporary physical displacement (relocation, loss of residential land/ or shelter) and economic loss or displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to parks and protected areas. The definition applies to all measures taken to mitigate or overcome the impacts experienced by APs, regardless of whether they involve actual relocation.

Resettlement Plan

A public sector agency undertaking a project which brings about impact on land/assets and people must prepare a time-bound action plan to compensate and/or mitigate the impacts of resettlement. A resettlement plan (RP) is required for all projects or subprojects with resettlement impacts to a degree of detail commensurate with the level of impact and any impact on vulnerable people. The RP must include a full estimated budget and indicate the source of financing of the resettlement, including the incremental cost of resettlement administration and surveys and the funding of compensation, allowances, and measures for vulnerable groups.

Screening

Screening is the process to determine what types and level of impacts might be anticipated, based on project type, scale, location, and sensitivity. The screening will categorize the project or sub-project, and therefore determine what level of assessment and further planned resettlement is required, including the level of RP and any need for income restoration program and measures for vulnerable groups.

Significant impact

Impact is significant when more than 200 people are affected by resettlement through (i) loss of 10% or more of land or other productive assets (income generating) or (ii) physical displacement/dislocation (loss of housing, business or livelihoods).

Squatter

A person using or occupying vacant state land and who does not have title to it or formal agreement from the owner to use the land. Identification as a squatter does not preclude recognition as an AP or as entitled to compensation or other resettlement measures in respect of any loss of property or of livelihoods. Such a position is especially relevant to APs having small businesses or business properties, including markets, kiosks and stalls, located on the public right of way, which may be of value to them and to the local economy in serving a market (road users, local settlements, etc.).

Vulnerable People

Vulnerable people are those APs who might suffer disproportionately or face the risk of being marginalized or impoverished from the effects of resettlement i.e.; (i) female-headed households with dependents; (ii) disabled household heads or households severely affected with one or more disabled household members; (iii) poor households as defined by the official poverty line or recognised as such by their communities; (iv) landless people; (v) elderly households with no means of support; (vi) households without security of tenure; and (vii) ethnic minorities.

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EXECUTIVE SUMMARY

A. Introduction

1. The Government of Timor-Leste (GOTL) has requested the Asian Development Bank (ADB) to finance the proposed Road Network Upgrading Sector Project (RNUSP). The project includes following road subprojects: (i) Manatuto-Natarbora; (ii) Baucau- Lautem; (iii) Lautem-Com; (iv) Lautem-Los Palos; (v) Lautem-Venilale; (vi) Baucau-Venilale; and (vii) Venilale–Viqueque. This Resettlement Framework (RF) provides guidelines on due diligence and preparation of Resettlement Plans (RPs) for road subprojects. A draft RP has been prepared for the Manatuto-Natarbora road, which is the core or sample subproject. RPs for other subprojects will be prepared during implementation following this RF.

B. Scope, Objectives, Principles and Entitlements

2. The widening and improvement of roads is expected to be almost entirely within the existing road corridor, but will require impact on small areas of land, a small number of houses and shops, larger numbers of roadside stalls and kiosks, and some impact on community irrigation facilities. There will be some need to acquire additional land. The project executing agency (EA) – Conselho de Administracao do Fundo Infraestrutura (CAFI), and the implementing agency (IA) --the Ministry of Public Works (MPW) will follow the principles and procedures set out in this RF, and complying with Timor-Leste's applicable laws and regulations and relevant policies and policy and guidelines of the ADB.

3. The resettlement principles adopted for the project, consistent with the draft Expropriation Law (EL) and ADB Safeguard Policy Statement (SPS) are as follows:

- (i) Resettlement impacts will be minimized through careful engineering design;
- (ii) Affected persons (APs) and concerned communities and local leaders will be consulted meaningfully in the project cycle ensuring their concerns and ideas are incorporated into project design whenever feasible;
- (iii) Effective mechanisms will be established for hearing and resolving grievances;
- (iv) RPs will be prepared and updated after the detailed design and the conduct of census, detailed measurement survey (DMS) and replacement cost survey (RCS);
- (v) All APs will receive compensation at replacement cost for their loss of assets to ensure that they will be as well off as without the Project;
- (vi) Compensation will be paid to APs prior to commencement of civil works;
- (vii) Absence of formal title will not be a bar to compensation and assistance;
- (viii) Particular attention will be paid to safeguarding and restoration of the livelihoods of women and other vulnerable people;
- (ix) Land acquisition and resettlement will be conceived as part of the project and related costs will be included in and financed either out of the project cost or out of a budget established and controlled by the EA/IA; and
- (x) Resettlement activities and impacts, including any unforeseen losses, will be monitored by the EA/IA.

4. Table E1 provides the entitlements matrix.

Table E1: Entitlements Matrix

Type of Loss	Entitled Persons	Entitlements	Responsibility
1. Temporary use of land	Owners/claimants of affected land	Affected landowners/APs will be paid rent on terms negotiated with them based on replacement value. The land will be returned to respective landowners/APs after its restoration.	PMU with assistance of local authorities and community leaders.
2. Permanent loss of land	<ol style="list-style-type: none"> 1. Land owners or customary owners, leaseholders 2. Others with traditional land rights 	<ol style="list-style-type: none"> 1. Land for land compensation is the preferred option. If land is not available then: <ul style="list-style-type: none"> • The AP keeps the remaining land and compensation at replacement cost and assistance is paid to the AP for the land to be acquired • The entire plot including the residual plot is acquired, if the owner wishes that the MPW/PMU will also acquire the residual plot. • If the AP is from a vulnerable category, assistance to purchase land if preferred by the AP. 2. Transitional and livelihood support. If more than 10% of an APs land is acquired and sufficient land is not available as compensation, cash payments will not be enough and transitional support and other livelihood supports e.g. training will be needed to ensure APs can improve or at least restore their standards of living to pre-project levels 3. All fees, taxes and other charges, as applicable under relevant laws incurred are to be borne by the project. 	<p>PMU assisted by District, Sub-District, Suco officials, and the DLPCS, will help identify alternative replacement land and determine replacement cost through valuation in consultation with community leaders and APs.</p> <p>Training and skills will be arranged through contractors or existing government programs.</p>
3. Loss of residential/commercial structures	Owners/claimants of affected structures	<ol style="list-style-type: none"> 1. AP will be provided with replacement house/structure(s) with necessary amenities or compensation at replacement value. 2. Transitional assistance (amounts to be determined in the RP according to severity of impacts). If the household is vulnerable additional transitional allowance may be needed. 3. A lump sum shifting allowance for temporary, semi-permanent and permanent structures. Amounts to be determined in the RP. 4. Right to salvage materials from the demolished structure 5. Training will be provided to upgrade skills. 6. Vulnerable APs will be provided additional rehabilitation support. The RP to determine in-kind support or cash amounts. 	<p>PMU as above. Affected structures may be replaced by the civil works contractor under each sub-project civil works contract under the direction of the PMU.</p>
4. Loss of rented land or structure	Affected Tenants	<ol style="list-style-type: none"> 1. The amount of deposit/advance paid to the landlord or the remaining amount at the time of purchase (to be deducted from the payment to the landlord) 2. Transitional and shifting allowance (amount to be determined in the RP). 3. Payment at replacement cost for any structure the tenant has erected on the property (to be deducted from the payment to the landlord) 	<p>PMU in consultation with local officials, NGOs, APs, community leaders, relevant government agencies.</p>

Type of Loss	Entitled Persons	Entitlements	Responsibility
		4. Vulnerable APs will be provided additional rehabilitation support. The RP to determine in-kind or cash amounts.	
5. Loss of income from business or land through wages and other employment	Affected persons	<ol style="list-style-type: none"> 1. A lump sum grant as a transitional allowance (amount to be determined in the RP). 2. Training to upgrade skills for vulnerable groups and linked to jobs. Livelihood support activities to ensure APs can restore income base. 3. Vulnerable APs will be eligible for additional support. 	PMU as above
6. Loss of annual / seasonal crops	Affected owners/claimants/persons	Grant for lost crop due to forced relocation, equal to market value of crop for three years plus cost of replacement of seeds for the next season.	PMU with assistance from relevant government ministries and valuation expert.
7. Loss of perennial crops / trees	Affected owners/claimants/persons	<ol style="list-style-type: none"> 1. Compensation for trees based on timber value at market price to be determined by valuation specialist. 2. For perennial trees, compensation will be depend on species, current average yields and expected life of the trees. 	PMU as above. Shade trees will be replaced as roadside tree planting.
8. Structures of squatters and informal settlers	Affected persons	<ol style="list-style-type: none"> 1. Compensation for loss of structure at replacement cost paid by project. Asset for asset compensation is preferable. 2. A lump sum amount depending on the type of structure: temporary, semi-permanent or permanent house for shifting household assets 3. Transitional allowance to be determined in the RP. 4. Training and livelihood support activities to ensure APs can restore income base. 4. Vulnerable APs will be provided additional rehabilitation support. RP to specify in-kind or cash support. 5. Right to salvage material from the demolished structure. 	PMU.
9. Shifting business (Kiosks)	Affected households	Ambulatory vendors will be considered as kiosks and will receive a lump sum shifting allowance or replacement structure with improved standards built by project.	PMU. Roadside kiosks and stalls may be rebuilt by civil works contractors under PMU direction.
10. Primary source of income	Affected individual	<ol style="list-style-type: none"> 1. Income generating and livelihood support activities to ensure APs can restore income base. May include starting production or business activity and rehabilitation support. The RP to specify needed support. 2. Preferential employment in the project, especially for women and the poor 	PMU
11. Severely affected households	Severely affected households identified by social assessment.	Severely affected households will receive (i) additional transition allowance (ii) priority employment in project construction and maintenance works, and (iii) income restoration measures under a gender and livelihoods restoration program Amount to be confirmed in the RP for each sub-project.	PMU with the help of safeguard specialists and relevant stakeholders.

Type of Loss	Entitled Persons	Entitlements	Responsibility
12. Impacts on vulnerable APs	Vulnerable AP households identified by social assessment.	Vulnerable households will receive (i) additional transitional allowance (ii) priority employment in project construction and maintenance works, and iv) income restoration measures under a gender and livelihoods restoration program Amount to be confirmed in the RP for each sub-project.	PMU with the help of safeguard specialists and relevant stakeholders.
13. Community infrastructure and amenities	Affected community and public service agencies	Replacement of public buildings and utilities (schools, transmission lines, markets, clinics, offices). Cultural properties will be conserved by special measures such as relocation in consultation with the community. Safety measures will be provided for pedestrians, including children. Landscaping of common areas, improved drainage, rest areas will be provided in the design of the roads. Trees will be replaced by compensatory replanting as required.	These replacement works will be carried out by civil works contractors under instruction from PMU. PMU will liaise with relevant agencies on replacement of buildings and utilities.
14. Other impacts not identified	Affected persons	Unforeseen impacts will be documented and mitigated based on the principles agreed upon in the RF.	PMU identifies and mitigates impacts as required.

C. Consultation, Assessment of Impacts and Preparation of RP

5. APs will be informed and consulted on compensation and/or resettlement options at the stages of project design and implementation. They will be informed of their rights and options and be invited to participate actively in the identification of compensation and rehabilitation measures. District level resettlement committees and Suco level consultative groups, including representatives of relevant government agencies, village chiefs, community leaders, APs and NGOs will be invited in consultations. Local customs and traditions will be respected and protected.

6. Consultations will take in the form of (a) meetings at District, Suco and where necessary at village level with APs and stakeholders, including women and special interest groups (where appropriate), and (b) interviews with APs and local leaders. Meetings with the community will be recorded, including lists of participants.

7. MPW/PMU will undertake the census of APs, cadastral/DMS of affected land and assets, socioeconomic survey, RCS and prepare an RP for each sub-project with the participation of MOJ/DLPCS. The specialists will be engaged for that purpose by the PMU and/or the design and supervision consultant.

8. The RP will summarize relevant Timor-Leste and ADB policy and principles; scope of land acquisition and resettlement impacts; records of consultations; entitlements; implementation arrangements; estimated budget for compensation and other activities; and monitoring . It will also include an implementation schedule ensuring that civil works will not commence until compensation and/or assistance has been paid to APs. The RP will be prepared in consultation with DLPCS and disclosed to relevant stakeholders and submitted to ADB for approval and posting on websites.

D. Land Acquisition, Compensation and Income Restoration

9. Land required for the project will be obtained according to the provisions of Timor-Leste Law and of ADB SPS. Land will be acquired through negotiation with APs based on the cadastral/DMS, valuation/RCS and consultations.

10. Compensation will be negotiated with APs based on fair prices determined in RCS in coordination with the DLPCS. MPW/PMU and project consultants will help in establishing a basis for compensation by means of RCS/valuation for land and other affected assets.

11. MPW/PMU will coordinate with relevant agencies to disburse or pay compensation to APs. Compensation will be paid and affected structures relocated before taking possession of land/properties, and prior to the start of civil works. Besides direct compensation, implementation of other measures for APs such as employment in project, skills training, assistance to vulnerable groups may continue during construction.

E. Grievance Redress Mechanism

12. A grievance redress mechanism will be established to solve disputes and complaints from APs, including: (i) a PMU focal point (e.g. subproject manager) at sub-project level; (ii) committees/groups at District and Suco levels. This mechanism will try to resolve grievances at local level with the assistance of local leaders.

13. The chairperson of Suco level group will be the initial grievance focal point to receive and facilitate project related concerns or disputes. She/he will immediately advise the PMU focal point/subproject manager, who will arrange for any matters concerning the project to be addressed immediately through a site visit and consultations. Any grievance which cannot be settled at the Suco level will be submitted to the District level committee or PMU. At each stage the conduct of grievance resolution will be done in coordination with local authorities, MOJ/DLPCS and MPW/PMU. Other than disputes relating to land ownership rights, most grievances related to resettlement benefits, relocation of structures, and other assistance are expected to be resolved at the project level. When grievances have finally not been resolved at the project level, the AP can submit the case to the civil courts for an early resolution.

F. Institutional Arrangements and Financing

14. The PMU under the MPW will have overall responsibility for implementing land acquisition and resettlement in accordance with the RF and in coordination with the MOF and DLPCS. An Environmental and Social Unit (ESU) will be established under the PMU, staffed by national counterpart staff and assisted by international and national safeguard specialists. The ESU/PMU will be responsible for coordinating with DLPCS and ADB, and managing resettlement aspects including the preparation, review, implementation and monitoring of RPs. The Project Administration Manual (PAM) includes TOR for safeguard specialists.

15. The costs for subprojects will be included in the RPs. The budget will be based on estimates made based on inventory of losses/DMS, RCS, and negotiation with APs. MPW/PMU will be responsible in liaison with the MOF for ensuring that adequate counterpart funds are available for implementation of the RPs. Financing of land acquisition and all associated costs will be borne by the government.

G. Monitoring

16. MPW/PMU will monitor all activities associated with resettlement. The monitoring will include reporting on progress of activities in the implementation schedule with particular focus on public consultations, land acquisition, financial disbursements, and level of satisfaction among APs. MPW/PMU will prepare and submit semi-annual monitoring reports to ADB and MOJ/DLPCS.

17. External monitoring experts (e.g. NGOs or local consultants) are not considered to be a mandatory requirement in RNUSP, since the level and extent of losses will be minor, and specific provision is made for routine internal monitoring and reporting, supported by international and national safeguard specialists. However, individual RP may include a provision of external monitoring if any subproject unexpectedly involved significant resettlement impacts.

A. Introduction

1. The Government of Timor-Leste (GoTL) has requested the Asian Development Bank (ADB) to finance the proposed Road Network Upgrading Sector Project (RNUSP) to improve its priority roads. The project includes following subprojects: (i) Manatuto-Natarbora; (ii) Baucau-Lautem; (iii) Lautem- Com; (iv) Lautem-Los Palos; (v) Lautem-Venilale; (vi) Baucau-Venilale; and (vii) Venilale– Viqueque. The Resettlement Framework (RF) provides guidelines on due diligence and preparation of Resettlement Plans (RPs) for road subprojects. A draft RP has been prepared for the Manatuto-Natarbora road, which is the core or sample subproject. RPs for other subprojects will be prepared during implementation following this RF.

2. The Conselho de Administracao do Fundo Infraestrutura (CAFI) is the Executing Agency (EA) and the Ministry of Public Works (MPW) is the Implementing Agency (IA). The EA/IA will follow the procedures in the RF in compliance with the government's applicable laws and ADB safeguard policies.

B. Scope of Land Acquisition/Resettlement Impacts

3. The government proposes to widen the roads where feasible, to improve their quality and safety and ensure greater economic and social benefits to the people. Sub-projects will be designed with measures to avoiding and/or minimizing resettlement and land acquisition impacts. However, some road improvement works particularly the widening of roads are likely to have impacts on land and other assets, although these are expected to be small. Such impacts may include loss of land, structures, crops, trees and other assets. Table 1 contains a list of subprojects and an indicative resettlement impact category for each road section.

Table 1: Subprojects and Indicative Impacts Category

Subprojects	Length (km)	Indicative Resettlement Impacts Category
Manatuto-Natarbora (Core Subproject)	91	B
Baucau-Lautem	58	B
Baucau-Venilale	27	B
Venilale-Viqueque	35	B
Lautem-Com	21	C
Lautem-Los Palos	28	C

C. Objectives of the Resettlement Framework

4. The objectives of the RF are to: (i) guide the EA/IA in obtaining land, properly identifying impacts, and restoring or preferably improving the livelihoods of APs, (ii) serve as a project level policy framework to ensure adequate compensation and assistance to APs, (iii) provide guidelines in preparing, updating, implementing and monitoring subproject RPs. The RF includes measures to ensure that APs are (i) informed about their options and rights pertaining to resettlement; (ii) consulted on, offered choices, and provided with technically and economically feasible alternatives; and (iii) provided prompt, adequate and effective compensation at full replacement cost for losses of assets attributable directly to the Project.

5. The RF describes (i) the policy and legal framework of the GoTL and ADB policy; (ii) the compensation guidelines to be applied at subprojects; and (iii) other procedures to be followed during preparation and implementation subprojects with regard to resettlement. The RF's process and outline will be used for the RPs for all subprojects requiring land or assets.

D. Legal and Policy Framework

(i) National Policies and Legislation

6. Section 141 of the Constitution states that the ownership, use and development of land are key factors for economic production and they shall be regulated by law. Section 54 of the Constitution covers the right to private property and provides for:

- (i) Every individual has the right to private property and can transfer it during his or her lifetime or on death, in accordance with the law.
- (ii) Private property should not be used to the detriment of its social purpose.
- (iii) Requisitioning and expropriation of property for public purposes shall only take place following fair compensation in accordance with the law.
- (iv) Only national citizens have the right to ownership of land.

7. The first land law of Timor-Leste was promulgated in March 2003 and was designed to serve as an umbrella law for the rest of the land and property regime. The law established the Directorate of Land, Property and Cadastral Survey (DLPCS) as a legal entity and defined its jurisdiction, and articulated general rules concerning land tenure and property rights to be further developed by ensuing legislation. Law No. 1/2003 vests all land that belonged to the Portuguese state, and all state property acquired or built by the Indonesian regime, in the new state of Timor-Leste.

8. A decree issued by the Government in February 2011 provides for granting compensation to relocate unlawful occupants of State property based on humanitarian considerations. The Ministry of Justice (MOJ) through Ministerial Decree, which is yet to be finalized, will establish the basis for calculating compensation.

9. Another decree promulgated in July 2011 allows private property rights registration by landowners/persons in areas where cadastral surveys have been completed (following registration and verification of claims by the government) and confirmed that the claims to land are undisputed. Among the claims registered under the Ita Nia Rai program, which has been limited to urban areas, some 92 per cent of claims are undisputed.

10. The Civil Code promulgated in 2011 which came into force in March 2012 includes a section that governs day-to-day land decisions such as the sale and lease of land. The following three laws were passed by Parliament but returned by President in the past. These laws are being redrafted for resubmission to Parliament:

- The draft **Land Law** decides who owns what land and in the case of conflicting claims, who has the strongest right to the land;
- The draft **Expropriation Law (EL)** determines the conditions and establishes the procedures under which the state can take land for "public good" and under which it will provide fair compensation.
- The draft **Real Estate Finance Fund** provides compensation as determined under the other laws.

11. The draft EL recognizes the right to private property and guarantee of fair compensation for expropriated land, as fundamental rights of citizens. Under the draft EL, the expropriation of property for public purposes will be only possible where it is not possible to acquire it amicably through private negotiations. The Council of Ministers, with advice of the Ministry of Justice, will

be empowered to issue a notice of public purpose for expropriation. However, land acquisition/resettlement activities under RNUSP will follow the procedures outlined in this RF, until such time as the draft EL is promulgated. The procedures in the RF are consistent with the principles and policy of the draft EL as well as with ADB policy.

(ii) ADB Safeguard Policy Statement 2009

12. ADB's Safeguard Policy Statement (SPS) has following policy principles: (1) Screen early and assess resettlement impacts; (2) Carry out consultations with APs and develop a grievance redress mechanism; (3) Improve/restore livelihoods of APs through land-based strategies, replacement of lost assets, compensation at replacement cost, and additional benefits, as appropriate; (4) Provide appropriate assistance to physically displaced APs; (5) Improve living standards of poor APs and other vulnerable groups; (6) develop transparent procedures for negotiations; (7) provide assistance and compensation to non-titled APs for loss of non-land assets; (8) Prepare RPs; (9) disclose RPs to APs and other stakeholders and document the consultation process; (10) conceive and execute resettlement as part of the project; (11) deliver entitlements to APs before their physical or economic displacement; and (12) monitor and assess resettlement outcomes.

E. Project's Policy Framework and Entitlements

13. Timor-Leste has a few laws on land, but the law and regulations on land expropriation and resettlement are yet to be promulgated. The resettlement policy principles adopted for the project, consistent with the draft Expropriation Law (EL) of Timor-Leste and requirements of ADB SPS, are as follow:¹

- (i) Resettlement impacts will be minimized through careful engineering design;
- (ii) APs will be systematically informed and consulted during the entire process of resettlement planning and implementation, including assessment of possible impacts on their livelihoods, acquisition of land/assets, determining compensation/resettlement options, and socio-economic rehabilitation measures. They will be informed of their rights and options and be invited to participate actively in the identification of mitigation and rehabilitation measures;
- (iii) In the consultation process, representatives of local governments, village chiefs, other community leaders and civil society organizations such as non-government organizations (NGOs) from the operational areas will be included. The customs and traditions, as well as the religious practices of all APs, will be respected and protected;
- (iv) The APs will be identified and registered as early as possible in order to establish their eligibility through a population record or census that serves as an eligibility cut-off date, usually around the time of initial consultations, at the subproject identification stage, to prevent a subsequent influx of encroachers or others who wish to take advantage of such benefits;
- (v) Consistent with ADB policies, eligible APs are those with (a) titles to land recognized on a legal basis; (b) no legal rights but have a claim to the land or assets, and are recognized through a process identified in the RP; (c) no legal

¹ As the draft EL is yet to be approved, there is a complete legal gap on land acquisition and resettlement. These will serve as gap-filling measures until the draft EL is promulgated that meet ADB SPS requirements.

- right or claim to the land, but they are occupying it before the cut-off date; (d) whose land is temporarily affected.
- (vi) Eligible APs are entitled to compensation and livelihood rehabilitation measures sufficient to assist them to improve or at least maintain their pre-subproject living standards, income earning capacity and production levels;
 - (vii) The institutions of APs, and, where relevant of their hosts, are to be protected and supported. Physically displaced and relocated APs will be assisted to integrate economically and socially into host communities so that adverse impacts on the host communities are minimized and social harmony is promoted;
 - (viii) Lack of formal legal rights to assets lost will not deprive any AP from receiving compensation and payments for non-land assets and entitlements.
 - (ix) Particular attention will be paid to the needs of vulnerable APs. This group of APs may include those without legal or recognizable title to the land or other assets, households headed by females, the elderly or disabled, and other vulnerable groups, such as people living in extreme hardship, landless and indigenous people that may be present in specific locations. Appropriate assistance will be provided to help them improve their socio-economic status;
 - (x) The concerns of women will be identified based on sex-disaggregated socio-economic data, separate discussions on women's concerns, and ensuring adequate measures and budgetary allocations in the RP to compensate and resettle them in a manner that does not disadvantage them, and to provide for social and economic development in impacted areas. In this effort the assistance of national NGOs currently engaged in women's welfare and in income generation, environmental and human resource development programs may be sought;
 - (xi) Since there are no significant differences in cultural and socio-economic identity among the different language groups, no specific adverse impacts are anticipated to warrant separate indigenous peoples' plans. To ensure that the different language groups fully participate in planning and implementing resettlement, discussions and reports will be prepared and disclosed appropriately in the relevant languages. RPs will also include provision for any special measures that may be required.
 - (xii) Resettlement planning decisions will be preceded by a social preparation phase where consultations will be held with APs, community leaders, local administrators, and NGOs, as applicable, to enhance the participation of these APs in negotiation, planning, and implementation;
 - (xiii) Payment for physical assets, i.e. houses, buildings and other structures, and non-physical assets such as lost income from productive assets or jobs, will be calculated at replacement cost and included in the RP;
 - (xiv) APs losing only part of their physical assets will not be left with a proportion inadequate to sustain their current standard of living. Such a minimum size will be identified and agreed upon during the resettlement planning process, and total restoration of the assets provided to restore or improve pre-project income and livelihoods;
 - (xv) Land for land or asset for asset compensation is always the preferred method. However, if insufficient land or assets are available, or if the APs have a preference and the resettlement impacts are considered to be minor and do not undermine the livelihoods of APs, cash compensation at replacement costs will be provided based on negotiation with APs. For those experiencing significant impacts, assistance will be given to identify and purchase alternative land. Provision will be made in sub-project RPs for sustainable livelihood restoration

measures so that affected people can improve or at least restore their standard of living to pre-project levels.

- (xvi) A grievance redress mechanism, linked with existing traditional formal and informal systems and cognisant of cultural requirements, will be established to solve resettlement related disputes and complaints from APs;
- (xvii) The full cost of land acquisition and resettlement, including the cost of surveys and of incremental administration by MPW/PMU and MOJ/DLPCS will be included in the project resettlement cost and adequate budgetary provision shall be made available during implementation;
- (xviii) All land acquisition, compensation, and resettlement activities will be satisfactorily completed and the subproject areas cleared of all obstructions before the commencement of civil works; and
- (xix) No works with resettlement impacts will be implemented before a RP has been prepared and approved in line with this RF.

Entitlements

14. The MPW/PMU will establish a cut-off-date for each sub-project prior to the census of APs. People who move into the area after this date will not be entitled to any compensation.

15. All eligible APs will be provided adequate compensation at replacement cost for land, assets (houses, structures, etc.), crops, trees and other impacts. While APs with recognizable land rights will receive compensation for land, those without such rights will be compensated for assets attached to land such as houses, kiosks, and other structures. They will also be entitled to assistance for restoring their incomes. Vulnerable persons and women headed households will qualify for additional assistance including extended transition allowance and measures for income restoration.

16. An entitlement matrix is in Table 2. Each subproject-level RP will include a detailed Entitlement Matrix identifying the following main components:

- Description of relevant impact (permanent, temporary, land, structure, crops, access, employment, business, communal facilities, public buildings and utilities etc.);
- Definition of affected person for each category of impact;
- Specific entitlement for each type of loss;
- Agency responsible for each entitlement.

Table 2: Entitlement Matrix

Type of Loss	Entitled Persons	Entitlements	Responsibility
1. Temporary use of land	Owners/claimants of affected land	Affected landowners/APs will be paid rent on terms negotiated with them based on replacement value. The land will be returned to respective landowners/APs after its restoration.	PMU with assistance of local authorities and community leaders.
2. Permanent loss of land	1. Land owners or customary owners, leaseholders 2. Others with	1. Land for land compensation is the preferred option. If land is not available then: <ul style="list-style-type: none"> • The AP keeps the remaining land and compensation at replacement cost and assistance is paid to the AP for the land to be acquired 	PMU assisted by District, Sub-District, Suco officials, and the DLPCS, will help identify alternative replacement land and determine replacement

Type of Loss	Entitled Persons	Entitlements	Responsibility
	traditional land rights	<ul style="list-style-type: none"> • The entire plot including the residual plot is acquired, if the owner wishes that the MPW/PMU will also acquire the residual plot. • If the AP is from a vulnerable category, assistance to purchase land if preferred by the AP. <p>2. Transitional and livelihood support. If more than 10% of an APs land is acquired and sufficient land is not available as compensation, cash payments will not be enough and transitional support and other livelihood supports e.g. training will be needed to ensure APs can improve or at least restore their standards of living to pre-project levels</p> <p>3. All fees, taxes and other charges, as applicable under relevant laws incurred are to be borne by the project.</p>	<p>cost through valuation in consultation with community leaders and APs.</p> <p>Training and skills will be arranged through contractors or existing government programs.</p>
3. Loss of residential/commercial structures	Owners/claimants of affected structures	<p>1. AP will be provided with replacement house/structure(s) with necessary amenities or compensation at replacement value.</p> <p>2. Transitional assistance (amounts to be determined in the RP according to severity of impacts). If the household is vulnerable additional transitional allowance may be needed.</p> <p>3. A lump sum shifting allowance for temporary, semi-permanent and permanent structures. Amounts to be determined in the RP.</p> <p>4. Right to salvage materials from the demolished structure</p> <p>5. Training will be provided to upgrade skills.</p> <p>6. Vulnerable APs will be provided additional rehabilitation support. The RP to determine in-kind support or cash amounts.</p>	<p>PMU as above.</p> <p>Affected structures may be replaced by the civil works contractor under each sub-project civil works contract under the direction of the PMU.</p>
4. Loss of rented land or structure	Affected Tenants	<p>1. The amount of deposit/advance paid to the landlord or the remaining amount at the time of purchase (to be deducted from the payment to the landlord)</p> <p>2. Transitional and shifting allowance (amount to be determined in the RP).</p> <p>3. Payment at replacement cost for any structure the tenant has erected on the property (to be deducted from the payment to the landlord)</p> <p>4. Vulnerable APs will be provided additional rehabilitation support. The RP to determine in-kind or cash amounts.</p>	<p>PMU in consultation with local officials, NGOs, APs, community leaders, relevant government agencies.</p>
5. Loss of income from business or land through wages and other employment	Affected persons	<p>1. A lump sum grant as a transitional allowance (amount to be determined in the RP).</p> <p>2. Training to upgrade skills for vulnerable groups and linked to jobs. Livelihood support activities to ensure APs can restore income base.</p> <p>3. Vulnerable APs will be eligible for additional support.</p>	<p>PMU as above</p>
6. Loss of	Affected	Grant for lost crop due to forced relocation, equal to	PMU with assistance

Type of Loss	Entitled Persons	Entitlements	Responsibility
annual / seasonal crops	owners/claimants/persons	market value of crop for three years plus cost of replacement of seeds for the next season.	from relevant government ministries and valuation expert.
7. Loss of perennial crops / trees	Affected owners/claimants/persons	1. Compensation for trees based on timber value at market price to be determined by valuation specialist. 2. For perennial trees, compensation will be depend on species, current average yields and expected life of the trees.	PMU as above. Shade trees will be replaced as roadside tree planting.
8. Structures of squatters and informal settlers	Affected persons	1. Compensation for loss of structure at replacement cost paid by project. Asset for asset compensation is preferable. 2. A lump sum amount depending on the type of structure: temporary, semi-permanent or permanent house for shifting household assets 3. Transitional allowance to be determined in the RP. 4. Training and livelihood support activities to ensure APs can restore income base. 4. Vulnerable APs will be provided additional rehabilitation support. RP to specify in-kind or cash support. 5. Right to salvage material from the demolished structure.	PMU.
9. Shifting business (Kiosks)	Affected households	Ambulatory vendors will be considered as kiosks and will receive a lump sum shifting allowance or replacement structure with improved standards built by project.	PMU. Roadside kiosks and stalls may be rebuilt by civil works contractors under PMU direction.
10.Primary source of income	Affected individual	1. Income generating and livelihood support activities to ensure APs can restore income base. May include starting production or business activity and rehabilitation support. The RP to specify needed support. 2. Preferential employment in the project, especially for women and the poor	PMU
11. Severely affected households	Severely affected households identified by social assessment.	Severely affected households will receive (i) additional transition allowance (ii) priority employment in project construction and maintenance works, and (iii) income restoration measures under a gender and livelihoods restoration program Amount to be confirmed in the RP for each sub-project.	PMU with the help of safeguard specialists and relevant stakeholders.
12. Impacts on vulnerable APs	Vulnerable AP households identified by social assessment.	Vulnerable households will receive (i) additional transitional allowance (ii) priority employment in project construction and maintenance works, and iv) income restoration measures under a gender and livelihoods restoration program Amount to be confirmed in the RP for each sub-project.	PMU with the help of safeguard specialists and relevant stakeholders.
13.Community infrastructure and amenities	Affected community and public service agencies	Replacement of public buildings and utilities (schools, transmission lines, markets, clinics, offices). Cultural properties will be conserved by special measures such as relocation in consultation with the community. Safety measures will be provided for pedestrians,	These replacement works will be carried out by civil works contractors under instruction from PMU.

Type of Loss	Entitled Persons	Entitlements	Responsibility
		including children. Landscaping of common areas, improved drainage, rest areas will be provided in the design of the roads. Trees will be replaced by compensatory replanting as required.	PMU will liaise with relevant agencies on replacement of buildings and utilities.
14. Other impacts not identified	Affected persons	Unforeseen impacts will be documented and mitigated based on the principles agreed upon in the RF.	PMU identifies and mitigates impacts as required.

17. Where public facilities such as schools, churches, clinics, electricity lines, water supplies, markets and government offices are affected, PMU will work with relevant authorities to plan for replacing or compensating them well in advance and ensure that the required funds are included in the resettlement budget.

F. Screening, Surveys and Social Impact Assessment

18. Each subproject will be screened for its land acquisition and resettlement impacts (screening form attached as Appendix 1). The screening will reflect if there will be any such impacts. The screening form will be completed after site visits, and, as relevant, in consultations with potential APs to understand land use/ownership arrangements. The screening will be conducted as a first step to see wherever resettlement impacts can be avoided, mitigated or minimized as much as possible. Where the screening identifies that a subproject will require land acquisition/resettlement, a social impact assessment (SIA) and various surveys need to be undertaken to prepare the RP.

19. An SIA involving a socio-economic survey of a 20% sample of APs will be conducted for each sub-project during project preparation. An inventory of losses (IOL) will be conducted at feasibility stage, to be followed by a Census and cadastral/DMS identifying APs. The SIA, DMS and RCS will be the basis for the preparation of a draft RP. Data will be disaggregated by gender, vulnerability, and any other social groups.

20. 100% census of APs, DMS and RCS will be conducted at the detailed design stage; which will confirm APs and their losses for purposes of negotiating land acquisition and compensation and related measures for land loss and other impacts. These surveys will:

- Define, identify and enumerate the people and communities affected;
- Describe the impacts due to acquisition of land and other assets;
- Identify the project's impacts on the poor, indigenous and/or ethnic minorities, and other vulnerable groups and their preferences and needs for income restoration or improvement of their livelihoods and wellbeing;
- Identify resettlement impacts on women, relating to their needs and priorities.
- Assess replacement cost of affected assets and required budgets for various activities.

21. **Gender.** Socio-economic surveys will collect sex-disaggregated data so that gender concerns can be addressed to ensure that women participate, through separate meetings and discussions, drawing on locally active formal and informal women's groups. The objective will be to ensure protection and enhancement of women's assets, land use rights, income and livelihoods, and ensure that women receive measures for rehabilitation and related support aimed at least restore and if possible enhance their incomes and livelihoods.

22. **Indigenous Peoples.** There are 17 languages spoken across the country. The social assessments undertaken for the ongoing ADB projects have not identified any distinct and vulnerable indigenous peoples that would trigger the IP safeguards. However, each sub-project will be screened to assess if there are distinct and vulnerable IP groups in the project area. If any such groups are identified, the project design, particularly the RPs, will address issues of indigenous peoples to ensure that they do not experience adverse impacts from project implementation, receive culturally appropriate benefits and livelihood restoration programs, and actively participate in the project activities. Since language could be a barrier for access to information and consultation, RPs will address necessary measures to disseminate project information in a language and manner understandable to local communities.

G. Resettlement Planning for Road Sub-Projects

23. The PMU in coordination with DLPCS and with the assistance of social safeguards specialists under PMU as well as the project design/supervision consultants (including international specialists), will prepare RPs for the sub-projects. The following are the main tasks in resettlement planning:

- Screen and assess sub-projects for resettlement impacts and categorize them
- Plan and conduct consultations and record all meetings
- Set cut-off dates and photo-record the proposed road section to avoid encroachment
- Schedule and conduct required surveys, including census, DMS, and RCS.
- Establish a provisional database of affected persons and impacts
- Based on census and DMS, demarcate affected land and assets, and finalize their ownership status
- Prepare entitlement matrix, and compensation, income restoration and relocation plans in accordance with this RF
- Prepare terms of reference and recruitment procedure in accordance with ADB procedures to recruit consultants/experts, as needed.
- Set up grievance redress mechanism
- Prepare a Project Information Booklet (PIB) in relevant local language (Tetum, Bahasa Indonesia, Portuguese, etc.) and distribute among stakeholders
- Identify and assign institutional responsibilities for land acquisition and resettlement
- Prepare resettlement budget, disbursement mechanisms and resettlement implementation schedule, including the cost of surveys and incremental administrative costs;
- Prepare draft RP in consultation with affected people
- Submit draft RP to ADB and respond to comments. Translate and disclose summary of draft RP locally. Conduct consultations with local people and amend RP as needed after consultations.
- Submit finalized RP to ADB for approval and disclose on Government, ADB website.

An RP outline is in Appendix 2.

H. Stakeholder Consultations, Participation and Disclosure

24. Consultations with APs will be organized to ensure APs understand and support the project, and actively participate so that conflicts are avoided. A key requirement for this is that APs concerns are adequately taken into account. The following guidelines will be adopted:

- Involve local authorities and communities and through them all APs, in planning and decision making. The PMU will maintain continuous dialogue with relevant officials, community leaders, NGOs (already active in the project areas) and APs, including women, starting with sub-project planning and right through to implementation;
- Make arrangements through a semi-formal process to share project information and to get feedback, and to provide opportunities for APs to contribute to design, mitigation measures and sharing in project benefits;
- Disadvantaged and vulnerable groups such as the elderly, the poor, the landless and women headed households and indigenous people will be included in the consultations;
- Record all proceedings of consultation and other meetings with stakeholders;
- Prepare and distribute a project information brochure in relevant local language(s) (Tetum, Portuguese and Bahasa Indonesia, etc.); outlining a brief description of the project and its impacts, eligibility for entitlements, responsible agencies, cut off date/s for compensation eligibility, and grievance redress procedure.
- Maintain transparency in all actions and documentation related to resettlement.

25. The RPs will be prepared in consultation with APs and endorsed by the MPW/PMU, DLPCS and ADB. Once the document has been approved, it will be uploaded to web-sites of ADB and the government. Relevant information from the RF and RPs will be summarized in a resettlement brochure and translated into the relevant local language(s) (Tetum, Portuguese, Bahasa Indonesia, etc.) and disclosed in the project affected areas. The RF and RPs will be distributed in such a way as to be available to central and local government agencies, NGOs and potential APs requesting the complete version of the RF and RP.

I. Land Acquisition, Compensation and Assistance

26. Land and assets required for the project will be acquired according to the provisions set out in this RF and in sub-project RPs, which are consistent with the draft EL and ADB SPS. The draft EL requires that in the first instance attempts should be made to obtain the land privately. Expropriation may be exercised only after the MOJ and the Council of Ministers are convinced that private acquisition has failed (once the EL is promulgated).

27. Specific provisions under the draft EL which are included in this RF are:

- MPW /PMU must first try to acquire land through private negotiation;
- Compensation must be fair;
- MOJ/ Council of Ministers require documentary justification for any expropriation;
- Public notice of intention to expropriate must be issued;
- A registration survey is required for land to be acquired;
- Disputes arising on land issues should be resolved according to the provisions of the Land Law;

- The procedure for expropriation specified in this RF and in the draft law must be adhered to. The following actions are required: (a) inspection of the land; (b) a report to be prepared including valuation/RCS of the land and the estimated and agreed compensation costs; (c) expropriation decision; (d) attempts made to acquire land privately; (e) conveyance of the land through a public deed; (f) application for notice of expropriation, where private acquisition has failed; (g) publication of notice of public purpose; (h) vesting of the acquired property; (i) arbitration as required to determine fair compensation; (j) notice of results of arbitration; (k) payment of compensation.

28. Until the draft EL is promulgated, the land can be obtained only through negotiation with APs based on the cadastral/DMS, valuation/RCS and consultations. Compensation payment for affected land, other physical assets, i.e. houses, buildings and other structures, and non-physical assets such as lost income from productive assets or jobs, will be based on provisions of this RF and of an approved RP for each sub-project. MPW/PMU will ensure that any negotiations with APs address the risks of asymmetry of information and bargaining power of the parties involved. For this, an independent external party such as an NGO and/or members of the District and Suco level groups will be engaged to facilitate the process of negotiated settlement. The processes applicable to such transactions are described in the following paragraphs.

29. APs will be well informed of their rights and entitlements regarding compensation, so they can make an informed decision. Once the subproject and potential impacts have been identified, and consultations and surveys are taking place, APs will be informed of their options and of the impact and compensation which is proposed, including estimated market land prices or replacement cost of land, trees and structures. The consultation with APs will provide details of land required to construct or facilitate the works as well as some basic socio-economic information about the APs.

30. The PMU will obtain the views of the APs to assess their support for the subproject in general and the proposed works specifically, and whether they will agree to the acquisition of their land with fair compensation. If APs agree, a negotiation will be conducted and land/assets will be acquired and compensated following the provisions in the RF. Any land ownership issues or disputes will be satisfactorily resolved to complete land acquisition in a timely manner.

31. In the event that the owner does not support the acquisition of land for use by the project, MPW/PMU will assist and participate as necessary in arbitration and resolution of the dispute following the project's grievance redress mechanism. MPW/PMU will place the estimated compensation and other entitlements in escrow pending a resolution.

32. Where MPW/PMU and APs have agreed to acquisition of land/assets for the project, it will be documented in writing describing the basis on which the transfer will proceed including the agreed compensation. The PMU will ensure that negotiated settlement is voluntary, and that people are not coerced or pressured in any way. For negotiated settlement, it will be ensured that land is not under dispute or the subject of an unresolved claim.

33. All land acquisition/resettlement will be carefully documented. MPW/PMU will obtain agreed legal documents between MPW/PMU, MOJ/DLPCS, and the land owners supporting land/asset transfer. The legal documents will establish the obligations of each party to the agreement. If the obligations are agreed, the legal documents will be signed by the parties being the land owners, representative(s) of MPW/PMU, and representative(s) of DLPCS.

34. The social safeguards specialists at PMU will verify all land acquisition processes, and document the consultations and agreements reached, on behalf of the PMU. It is of utmost importance to verify that APs are fully informed of the compensation payments that they are entitled to. A third party, such as a civil society organization, will be contracted by the PMU to facilitate the transaction and to validate that (i) the consultations have been undertaken, meaningfully, freely, and in good faith; and (ii) the land owners have been informed of their choices and been part of the process and support transfer and use of land for the project works.

35. MPW /PMU will coordinate with relevant agencies to disburse or pay compensation to APs. Compensation will be paid and affected structures relocated before taking possession of land/properties, and prior to the start of civil works. Besides direct compensation, implementation of other measures for APs such as employment in project, skills training, assistance to vulnerable groups may continue during construction.

J. Grievance Redress Mechanism

36. It is important to deal effectively with APs concerns. Courts should be the last resort. To ensure this a simple, accessible, transparent and effective grievance redress system will be established. There may be mainly three categories of grievances on subprojects with involuntary resettlement impacts. They relate to: (a) land and associated assets; (b) compensation rates, measurements, and payments, and (c) impacts during project implementation. MPW will coordinate with DLPCS to resolving disputes on land issues.

37. To address disputes and complaints from APs, a grievance redress mechanism will be established, including: (i) a PMU focal point (e.g. subproject manager) at sub-project level; and (ii) committees/groups at District and Suco levels. They will include government representatives, village chiefs, APs, and recognized civil society leaders. The mechanism will try to resolve grievances at local level with the assistance of local leaders. ITA NIA RAI’s experience with conflict resolution and dispute mediation in property rights will be drawn upon as necessary to strengthen PMU’s capacity in addressing land related issues. Experience from the Justice for the Poor (J4P) program in grievance redress will also be drawn upon, as appropriate. APs will not be liable for any costs associated with the project’s grievance redress process.

38. The chairperson of Suco level group will be the initial grievance focal point to receive and facilitate project related concerns or disputes. She/he will immediately advise the PMU focal point/subproject manager, who will arrange for any matters concerning the project to be addressed immediately through a site visit and consultations. Any grievance which cannot be settled at the Suco level will be submitted to the District level committee or PMU. At each stage the conduct of grievance resolution will be done in coordination with local authorities, MOJ/DLPCS and MPW/PMU. Other than disputes relating to land ownership rights, most grievances related to resettlement benefits, relocation of structures, and other assistance will be resolved at subproject level. When grievances have finally not been resolved at the project level, the AP can submit the case to the civil courts for an early resolution.

39. Table 3 summarizes the grievance redress mechanism adopted for the project.

Table 3: Grievance Redress Mechanism

Stage	Process	Duration
1	AP submits grievance to the Suco level resettlement and grievance group in person. She/he notifies the PMU focal point/subproject manager.	

Stage	Process	Duration
2	The Suco level group will review and meet with the AP and PMU focal point/subproject manager to try to resolve the issue.	7 days
If unresolved or if AP wanted to go to the District Resettlement and Grievance Committee or PMU		
3	AP or sub-project manager will take grievance to District level resettlement and grievance committee and/or PMU	Within 2 weeks of receipt of decision in step 2
4	Subproject manager will discuss and review the issue with the district level committee and/or PMU	1 week
5	Subproject manager reports back to the Suco level group and to the community/AP	5 days
If unresolved or at any stage if AP is not satisfied		
AP can take the matter to appropriate civil court		As per judicial system

K. Institutional Arrangements and Implementation

40. The PMU under the MPW will have overall responsibility for implementing the sub-projects. The PMU capacity will be strengthened by appointing an MPW focal person for land issues and by recruiting an international and a national social safeguard specialist. An Environmental and Social Unit (ESU) will be established in the PMU, which will manage resettlement issues under the project. The design and supervision consultants for subprojects will also include social safeguards specialist for resettlement planning and monitoring at subproject level.

41. The PMU/ESU will be responsible for all environmental and social aspects of the project. On the social safeguards side, it will manage all land acquisition and resettlement activities. The following are its key functions:

- Planning, coordination, implementation and monitoring of land acquisition, compensation and resettlement;
- Preparing or contracting with specialists for various surveys and the preparation of RPs to comply with government and ADB policies;
- Conducting consultations and ensuring APs are informed and get a choice on their options for resettlement and compensation and can voice their ideas and concerns on the process;
- Assisting in acquiring land/assets required for road development;
- Coordinating with MPW and DLPCS and ensuring prompt, adequate and timely compensation payment according to entitlements;
- Monitoring of resettlement activities and reporting.

42. The PMU will work closely with the DPLCS/MOJ as well as MPW to deal with land acquisition/resettlement, and to resolve any conflicts that may arise during these processes. PMU will engage experienced NGOs or local consultants active in the project areas, to monitor and validate the negotiated land acquisition process, as needed. NGOs will also be engaged, as appropriate, to assist in consultations and in resolving disputes.

43. Table 4 summarizes the key tasks to be carried out by the respective agencies.

Table 4: Resettlement Implementation Structure

Agency	Roles and Responsibilities
Executing Agency (EA) / Implementing Agency (IA)	<ul style="list-style-type: none"> • Overall execution of the project • Provides funds for land acquisition and resettlement • Liaises with ADB • Coordinates the Working Group at national level
MOJ/ DLPCS	<ul style="list-style-type: none"> • Oversees and supports in land acquisition and resettlement process as the national regulatory agency for land.
PMU/MPW	<ul style="list-style-type: none"> • Manages the social and resettlement aspects of the road sub-projects • Manages design and supervision consultants on all matters dealing with resettlement and consultations • Directs and supervises the planning and implementation of land acquisition and resettlement • Organizes effective public consultation and disclosure of resettlement planning documents in appropriate languages • Obtains and manages the funds required for land acquisition and resettlement, administration and monitoring • Coordinates with the MOJ/DLPCS to ensure smooth land acquisition and assessment and payment of compensation at replacement rates • Ensures that effective monitoring of resettlement is conducted and reported to ADB • Ensures that the grievance redress system is effective in addressing APs concerns • Liaises with ADB on all matters relating to resettlement and submits regular reports. • Contracts NGOs or other third party to monitor land acquisition and resettlement, if needed.
Working Group at national level and District/Suco level resettlement committees/groups	<ul style="list-style-type: none"> • Ensures coordination among relevant ministries • Oversees and reviews implementation effectiveness of land acquisition and resettlement • Resolves land related issues and grievances arising during implementation • Guides and supports the PMU in addressing issues that require higher level intervention • Reviews and takes action on findings of monitoring reports
ADB	<ul style="list-style-type: none"> • Review and approve all resettlement documentation as required under their respective policies • Assist in capacity building in the PMU to manage social safeguards in road projects • Disclose RPs and RF on its websites • Provide guidance as required based on progress reports and supervision missions

L. Budget and Financing Arrangements

44. The MPW/PMU will ensure that adequate counterpart funds are available for land acquisition and resettlement - according to budgets prepared for each sub-project. The PMU will coordinate/undertake allocation of funds, approval of payments, and delivery of funds, monitoring of progress and reporting. All costs associated with land acquisition and resettlement will be provided by the government.

45. Budget items will include provision for the conduct of surveys and consultations with APs, preparing RPs, acquiring land and structures, payments of compensation for affected land and assets, transitional allowances and livelihood support for APs, and the incremental cost of administration. Land acquisition costs based on RCS will be applied for all types of losses and RCS will be the method that establishes those values (to be detailed in the RPs).

46. A provisional sum will be provided in civil works contracts for sub-projects for the undertaking by civil works contractors of restoration and improvement of affected structures and community facilities under the direction of the PMU.

M. Implementation Schedule

47. Each sub-project's RP will include a detailed time bound implementation schedule identifying each activity, showing milestones for completing each action and coordinated with the civil works. Depending on progress made this schedule will be updated from time to time.

48. The key activities to be included in the RP schedule will follow the guidelines set out in ADB SPS, and include:

- Conduct of Census of APs, IOL/DMS and RCS
- Approvals of RPs
- Disclosure of RP including providing relevant information to APs
- Mobilization of resettlement staff and consultants
- Consultations with APs and communities
- Setting up of a grievance redress mechanism
- Distribution of project information booklet
- Updating of draft RP based on detailed design and consultations with APs
- Obtaining approval of updated draft RP from ADB
- Finalizing entitlements
- Liaising with MOJ/DLPCS and MPW in land acquisition and compensation, ensuring this takes place prior to the start of civil works or land/asset acquisition
- Land acquisition and disbursement of compensation
- PMU instruction to civil works contractors for restoration of impacted structures.
- Liaising with NGOs, CBOs and other relevant organizations
- Clearance for commencement of civil works
- Monitoring schedule including reporting

N. Monitoring and Evaluation

49. RPs will set out in detail procedures for monitoring of resettlement implementation. Monitoring reports will be prepared by ESU and sent at specified intervals to the PMU/MPW, who will forward them to ADB on a six-monthly basis. The reports will highlight any issues that have been identified and indicate the actions that have been taken to resolve them.

50. The monitoring will include reporting on progress in the activities envisaged in the implementation schedule with particular focus on public consultations, land acquisition, record of grievances and status of complaints, financial disbursements, and level of satisfaction among APs with the advice and assistance of safeguard specialists.

51. In view of the limited level and extent of impact and loss, and the planned presence of DLPCS and resettlement consultants who will provide a high level of internal monitoring and reporting under the ESU, there is no general need for external monitoring. If decided to be necessary for specific reasons arising during project implementation, external monitoring will be undertaken by NGOs or other third party. The focus of any external monitoring will be to evaluate application of the agreed project resettlement policies, functioning of the institutional set up for resettlement implementation, timely delivery of entitlements, budget and disbursements, effectiveness of the consultative processes, and the grievance redress mechanism, and the general level of satisfaction among the APs. Lessons learned will be identified and reported to serve as guidance for future projects. The PMU/MPW will review and respond to any issues that the external monitors identify and report.

Appendix 1. Screen Form

<i>Project Title:</i>		<i>ADB Loan No:</i>			
Subproject:		Date:			
Location and impact area:					
Probable Involuntary Resettlement Effects		Yes	No	Not Known	Remarks
Acquisition of Land					
1. Will there be land acquisition?					
2. Is the site for land acquisition known?					
3. Is the ownership status and current usage of land to be acquired known?					
4. Will easement be utilized within an existing Right of Way (ROW)?					
5. Will there be loss of shelter and residential land due to land acquisition?					
6. Will there be loss of agricultural and other productive assets due to land acquisition?					
7. Will there be losses of crops, trees, and fixed assets due to land acquisition?					
8. Will there be loss of businesses or enterprises due to land acquisition?					
9. Will there be loss of income sources and means of livelihoods due to land acquisition?					
Involuntary restrictions on land use or on access to legally designated parks and protected areas					
10. Will people lose access to natural resources, communal facilities and services?					
11. If land use is changed, will it have an adverse impact on social and economic activities?					
12. Will access to land and resources owned communally or by the state be restricted?					
Information on Affected Persons:					
Any estimate of the likely number of persons that will be displaced by the subproject?		[]	No	[]	
Yes If yes, approximately how many? _____					
Are any of them poor, female-heads of households, or vulnerable to poverty risks?		[]	No	[]	
Yes					
Are any displaced persons from indigenous or ethnic minority groups?		[]	No	[]	
Yes					

Note: Please attach additional information on the project, as necessary.

Appendix 2. Outline of a Resettlement Plan

A resettlement plan is required for all subprojects involving land acquisition and resettlement impacts. Its level of detail and comprehensiveness will be commensurate with the significance of potential resettlement impacts and risks.

- A. Executive Summary:** This section provides a concise statement of project scope, key survey findings, entitlements and recommended actions.
- B. Project Description:** This section provides a general description of the project, discusses projects components that result in land acquisition, involuntary resettlement, or both and identify the projects area. It also describes the alternatives considered to avoid or minimize resettlement include a table with quantified data and provide a rationale for the final decision.
- C. Scope of Land Acquisition and Resettlement :** This section:
- (i) discusses the project's potential impacts, and includes maps of the areas or zone of the impact of the project components or activities;
 - (ii) describes the scope of land acquisition (provide maps) and explains why it is necessary for the main investment project;
 - (iii) summarizes the key effects in terms of assets acquired and affected persons; and
 - (iv) provides details of any common property resources that will be acquired.
- D. Socioeconomic Information and Profile:** The section outlines the results of the social impact assessment, the census survey, and other studies, with information and /or data disaggregated by gender, vulnerability, and other social groupings, including:
- (i) define, identify, and enumerate the people and communities to be affected;
 - (ii) describe the likely impacts of the land and asset acquisition on the people and communities affected taking social, cultural, and economic parameters into account;
 - (iii) discuss the project's impacts on the poor, indigenous and /or ethnic minorities, and other vulnerable groups; and
 - (iv) identify gender and resettlement impacts, and the socioeconomic situation, impacts, needs, and priorities of women.
- E. Information Disclosure, Consultations, and Participation:** This section:
- (i) identifies project stakeholders, especially primary stakeholders;
 - (ii) describes the consultation and participation mechanisms to be used during the different stages of the project cycle;
 - (iii) describes the activities undertaken to disseminate project and resettlement information during the project design and preparation for engaging stakeholders;
 - (iv) summarizes the results of consultations with affected persons (including host communities), and discusses how concerns raised and recommendations made were addressed in the resettlement plan;
 - (v) confirms disclosure of the draft resettlement plan to affected persons and includes arrangements to disclose any subsequent plans; and
 - (vi) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for consultation with affected persons during project implementation.

F. Grievance Redress Mechanisms: This section describes mechanisms to receive and facilitate the resolution of affected persons' concerns and grievances. It explains how the procedures are accessible to affected persons and gender sensitive.

G. Legal Framework: This section:

- (i) describes national and local laws and regulations that apply to the project and identify gaps between local laws and ADB's policy requirement; and discuss how any gaps will be addressed;
- (ii) describes the legal and policy commitments from the executing agency for all types of affected person;
- (iii) outlines the principles and methodologies used for determining valuations and compensation rates at replacement cost of assets, incomes, and livelihoods; and set out the compensation and assistance eligibility criteria and how and when compensation and assistance will be provided; and
- (iv) describes the land acquisition process and prepare a schedule for meeting key procedural requirements.

H. Entitlements, Assistance and Benefits: This section:

- (i) defines affected persons' entitlements and eligibility, and describes all resettlement assistance measures (includes an entitlement matrix);
- (ii) specifies all assistance to vulnerable groups, including women, and other special groups; and
- (iii) outlines opportunities for affected persons to derive appropriate development benefits from project.

I. Relocation of Housing and Settlement: This section:

- (i) describes options for relocating housing and other structures, including replacement housing, replacement cash compensation, and /or self-selection (ensure that gender concerns and support to vulnerable groups are identified);
- (ii) describes alternative relocation sites considered; community consultations conducted; and justification for selected sites, including details about location, environmental assessment of sites, and development needs;
- (iii) provides timetables for site preparation and transfer;
- (iv) describes the legal arrangements to regularize tenure and transfers titles to resettled persons;
- (v) outlines measures to assist affected persons with their transfer and establishment at new sites;
- (vi) describes plans to provide civic infrastructure; and
- (vii) explains how integration with host populations will be carried out.

J. Income Restoration and Rehabilitation: This section:

- (i) identifies livelihood risks and prepare disaggregated tables based on demographic data and livelihood sources;
- (ii) describes income restoration programs, including multiple options for restoring all types of livelihoods (examples include project benefit sharing, revenue sharing arrangements, joint stock for equity contributions such as land, discuss sustainability and safety nets)
- (iii) outlines measures to provide social safety net through social insurance and /or project special funds;
- (iv) describes special measures to support vulnerable groups; and
- (v) describes training programs.

K. Resettlement Budget and Financial Plan: This section:

- (i) provides an itemized budget for all resettlement activities, including for the resettlement unit, staff training loan implementation;
- (ii) describes the flow of funds (the annual resettlement budget should show the budget-scheduled expenditure for key items);
- (iii) includes a justification for all assumptions made in calculating compensation rates and other cost estimates (taking into account both physical and cost contingencies), plus replacement costs; and
- (iv) includes information about the source of funding for the resettlement plan budget.

L. Institutional Arrangements: This section:

- (i) describes institutional arrangement responsibilities and mechanisms for carrying out the measures of the resettlement plan;
- (ii) includes institutional capacity building program, including technical assistance, if required;
- (iii) describes roles of NGOs, if involved, and organizations of affected persons in resettlement planning and management; and
- (iv) describes how women's groups will be involved in resettlement planning and management.

M. Implementation Schedule: This section includes a detailed, time bound, implementation schedule for all keys resettlement and rehabilitation activities. The implementation schedule should cover all aspects of resettlement activities synchronized with the project schedule of civil works construction, and provide land acquisition process and timeline.

N. Monitoring and Reporting: This section describes the mechanisms and benchmarks appropriate to the project for monitoring and evaluating the implementation of the resettlement plan. It specifies arrangements for participation of affected persons in the monitoring process. This section will also describe reporting procedures.