REPÚBLICA DEMOCRÁTICA DE TIMOR LESTE
Ministry of Public Works

SECOND TIMOR-LESTE BRANCH ROADS PROJECT (TLBRP2) – P516518

ENVIRONMENTAL AND SOCIAL SCOPING REPORT OF 5.4-KM ROAD FROM HATUBUILICO JUNCTION TO RAMELAU SANCTUARY, TIMOR-LESTE

DRAFT

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Abbreviations and Acronyms

ANLA	*Agência Nacional de Licenciamento Ambiental* (National Environmental Licensing Agency)
ANM	*Autoridade Nacional de Minerais* (National Mineral Authority)
AoI	Area of Influence
BMP	Biodiversity Management Plan
CEDAW	Convention Against All Forms of Discrimination Against Women
CESMP	Contractor Environmental and Social Management Plan
CHA	Critical Habitat Assessment
CMIP6	Coupled Model Intercomparison Project Phase 6
DED	Detailed Engineering Design
DL	Decree-Law
E&S	Environmental and Social
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
ELL	Environmental Licensing Law
EMP	Environmental Management Plan
ESCOP	Environmental and Social Codes of Practice
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESRS	Environmental and Social Review Summary
ESSs	Environmental and Social Standards
FPIC	Free, Prior and Informed Consent
FS	Feasibility Study
GBV	Gender-Based Violence
GFPP	Grant Facility for Project Preparation
GIIP	Good International Industry Practice
GoTL	Government of Democratic Republic of Timor Leste
GRM	Grievance Redress Mechanism
IBAT	Integrated Biodiversity Assessment Tool
IDA	International Development Association
ILO	International Labor Organization
IP	Indigenous People
IPCC	Intergovernmental Panel on Climate Change
IPP	Indigenous Peoples Plan
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LMP	Labor Management Procedures
MPW	Ministry of Public Works
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
OHS	Occupational Health and Safety
PCR	Physical Cultural Resources
PMU	Project Management Unit
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
ROW	Right of Way
SEA	Sexual Exploitation and Abuse
SEIS	Simplified Environmental Impact Statement
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment

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TA	Technical Assessment
TLBRP	Timor-Leste Branch Roads Project
TOR	Terms of Reference
WBG	World Bank Group
WGM	Workers Grievance Mechanism
WHO	World Health Organization
WMP	Waste Management Plan

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Executive Summary

Project Development Objective. The proposed Second Timor-Leste Branch Roads Project (TLBRP2) aims to improve resilient transport connectivity and enhance market access for agricultural producers along selected sections of the Gleno–Maubisse corridor by upgrading priority branch road sections that connect rural communities with agricultural production areas, tourism destinations, and places of cultural and religious significance, including access to Mount Ramelau. The Project will be financed through an IDA credit of approximately US$37.2 million and implemented by the Ministry of Public Works (MPW) through the Road Sector Project Management Unit (PMU).

Project Interventions. TLBRP2 comprises two components. Component 1 will finance the upgrading of the Gleno–Maubisse corridor, including civil works, construction supervision, and maintenance arrangements. The Aituto–Hatubuilico Junction Road (Subcomponent 1.1), approximately 12 km long, will be upgraded to national road standards, while the Hatubuilico Junction–Ramelau Sanctuary Road (Subcomponent 1.2), approximately 5.4 km long, will be upgraded to municipal road standards. Works are expected to include pavement upgrading, selective widening, drainage and culvert improvements, slope stabilization, bioengineering measures, road safety improvements, and maintenance of upgraded sections. The DED and E&S assessment and related documents for the 5.4-km road project will be prepared as part of the project implementation. Component 2 will finance detailed designs and environmental and social instruments for potential future road-sector investments, including the Oeleu–Fatumea road. The detailed design for Subcomponent 1.1 has been prepared, while Subcomponent 1.2 remains at an early stage and has not yet been designed.

Environmental and Social Impact Scoping of 5.4-km long Hatubuilico Junction–Ramelau Sanctuary Road. This environmental and social (E&S) scoping report applies only to Subcomponent 1.2 of the Project and has been prepared for the Bank's appraisal report based on site observations, discussions with PMU personnel and review of readily available data and information.[1] This scoping report will serve as the basis for PMU to subsequently prepare the associated site-specific E&S assessment/managemetn plan (ESMP) based on the key details including the final design, construction methods, ancillary facility locations, material sources, spoil disposal areas, temporary access arrangements, and sensitive receptors will be confirmed during detailed engineering design (DED) and implementation. It establishes the principles, procedures, institutional responsibilities, screening requirements, mitigation measures, monitoring arrangements, consultation processes, grievance mechanisms, and budget provisions needed to manage environmental and social risks in accordance with Timor-Leste's regulatory framework and the World Bank Environmental and Social Framework (ESF). It also provides guidance for preparation of site-specific instruments, integration of requirements into procurement and contracts, contractor management through Contractor ESMP (CESMP), monitoring, reporting, corrective action, and disclosure.

Potential Environmental and Social Impacts and Risks. The Project is expected to generate positive impacts by improving safe, reliable, and climate-resilient access for rural communities, road users, agricultural producers, service providers, visitors, and tourism-related livelihoods within Ainaro and Ermera Municipalities as well as surrounding areas. Improved pavements, drainage, culverts, slope

[1] The ESIA/ESMP of the 12-km road project was prepared in 2019 and related detailed engineering design (DED) is available.

stabilization, and road safety measures are expected to reduce access disruption, washouts, erosion, landslide and rockfall risks, and safety hazards along the Hatubuilico Junction–Ramelau Sanctuary road.

The main environmental and social risks identified in the scoping process are summarized below:

- **Pre-construction phase:** Risks relate to incomplete screening, drainage and slope design, land and asset verification, sensitive receptor identification, biodiversity and cultural heritage screening, environmental licensing, procurement requirements, and stakeholder disclosure before works commence.
- **Construction phase:** Risks include erosion, sedimentation, slope instability, drainage failure, water-quality impacts, dust, noise, vibration, emissions, spoil and waste disposal, hazardous materials, quarry, borrow area and haulage impacts, temporary access disruption, construction traffic, road safety hazards, worker-community interaction, Sexual Exploitation and Abuse / Sexual Harassment (SEA/SH) risks, communicable disease, sanitation, emergency response, land, asset and livelihood impacts, biodiversity disturbance, ecosystem service impacts, and cultural heritage risks.
- **Operational phase:** Risks include increased vehicle speeds, visitor pressure, waste generation, disturbance to sensitive habitats and cultural areas, induced roadside activity, and inadequate maintenance of drainage, culverts, slope protection and bioengineering measures.

The preliminary assessment identifies potential **cumulative impacts** where the 5.4 km Hatubuilico Junction–Ramelau Sanctuary road upgrade combines with the approximately 12 km Aituto–Hatubuilico Junction works, shared facilities and transport routes, existing land-use pressures and possible visitor growth to affect the same receptors over time. Potential effects include increased sediment in connected waterways, reduced habitat connectivity, prolonged dust and noise, compounded traffic and access disruption, pressure on community water supplies, inadequate waste and sanitation capacity, and repeated livelihood disruption. These pathways require verification, particularly shared drainage connections, construction schedules, water sourcing and service capacity. Completing both sections could also improve access to markets and services. This qualitative scoping assessment is not a verified inventory or final significance determination: significant cumulative effects have not been demonstrated but cannot currently be ruled out.

Key Stakeholders/Project Affected People include **affected parties**—residents along the road, farmers, tourism businesses, visitors and communities near the protected-area boundary—who stand to benefit from improved access, market connectivity and employment opportunities; and **other interested parties**, including government agencies, pilgrimage organisers, civil-society organisations, environmental NGOs, academic institutions and media, whose interests encompass environmental protection, cultural heritage, tourism, public services, road safety, land administration and public communication.

Institutional Arrangements for E&S Instrument Implementation. TLBRP2 will maintain the implementing arrangements as the ongoing TLBRP. The Administrative Council of the Infrastructure

Fund and the Ministry of Finance will provide overall oversight of project implementation, and MPW will be the Implementing Agency. The existing Road Sector PMU within MPW will prepare and implement the Project and will be responsible for day-to-day management, including E&S risk management. The PMU has developed substantial environmental and social (E&S) management experience through World Bank-financed road projects, with strengthened capacity in safeguards implementation, grievance handling, stakeholder engagement, SEA/SH risk management, contractor oversight, and reporting. Building on this progress, there are opportunities to further enhance implementation by promoting greater continuity among specialists, engaging dedicated resettlement expertise, facilitating timely contract renewals, strengthening site supervision, progressively embedding capacity within institutional structures, and supporting more consistent contractor compliance. Under the proposed Project, the PMU will advance these priorities by engaging additional international and national specialists, including a full-time national resettlement specialist, allocating a dedicated supervision budget, and providing targeted training on the World Bank Environmental and Social Standards to support consistent performance throughout the Project cycle.

Scope of E&S Assessment. The site-specific E&S assessment/management plan (ESMP) for the 5.4 km Hatubuilico Junction–Ramelau Sanctuary Road will be prepared during detailed design in accordance with Timor-Leste law and the World Bank ESF, proportionate to the works and the sensitivity of the Mount Ramelau setting. It will define, justify, map a receptor- and impact-pathway-based Area of Influence covering the road footprint, temporary and associated facilities, and indirect, induced and cumulative impact areas, with boundaries extending to affected communities, services, water resources, livelihoods, biodiversity, cultural heritage and other sensitive receptors. Field reconnaissance, geospatial and design analysis, and meaningful consultation will verify the assessment boundaries and support geo-referenced mapping, documentation of assumptions and limitations, and consideration of construction, operation, maintenance and closure timeframes. The assessment will address geohazards and climate resilience; erosion, drainage and water resources; pollution prevention and resource efficiency; biodiversity and habitat; land access, displacement and livelihoods; labour and occupational safety; community health, traffic, security and gender-based violence risks; cultural heritage; and stakeholder engagement and grievance management, including traditional mechanisms such as *Tara Bandu*. For each E&S aspects/topics, it will identify activities, impact pathways, receptors, baseline evidence, data gaps, assessment methods, mitigation, monitoring, design responses, implementation arrangements and contractor obligations.

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1. Project Description

1.1. Background

Timor-Leste's road infrastructure is particularly susceptible to climate-related and natural disaster risks due to the country's mountainous terrain, unstable soils, intense rainfall, landslides, high runoff, sediment flows, and river course changes. These hazards regularly damage roads and bridges, disrupt connectivity, and necessitate substantial investments in rehabilitation and maintenance. The effects are expected to intensify under climate change, principally through increased rainfall intensity, greater erosion and runoff, and more severe drought conditions that diminish vegetation cover and reduce water retention capacity.

Responsibility for road management rests with MPW, through the Directorate General for Roads, Bridges and Flood Prevention and Control (DGRBFPC), which oversees road construction, maintenance, planning, inspection, research, and flood prevention functions. Since 2011, the World Bank has provided sustained support to Timor-Leste's road sector through investments aimed at strengthening climate resilience and improving access along strategic corridors, including the Timor-Leste Road Climate Resilience Project (TLRCRP) and the ongoing Timor-Leste Branch Roads Project (TLBRP). The proposed TLBRP2 would build on these efforts by upgrading a critical missing road link that connect communities to markets, services, coffee-producing and tourism areas, and destinations associated with Mount Ramelau while remaining consistent with Timor-Leste's Strategic Development Plan, climate policy framework, National Adaptation Plan, and Nationally Determined Contribution to the Paris Agreement (NDC 2026-2035) priorities for adaptation and resilient infrastructure.

The proposed Project is classified as having ***Substantial environmental and social risk***, reflecting the nature of civil works in mountainous terrain of Mount Ramelau Montane Forest area and community settlements, the potential for land acquisition and temporary land use, and the need for strong stakeholder engagement, labor management, community health and safety, and environmental protection measures.

1.2. Project Components

TLBRP2 is a proposed Investment Project Financing operation to be financed by an IDA credit in the amount of US$37.2 million equivalent. The Project beneficiaries are 211,000 people (16 percent of the country's population) living in the two municipalities (Ainaro and Ermera) directly served by the project roads, and the Implementing Agency is MPW. The proposed ***Project Development Objective is to improve resilient transport connectivity and enhance market access for agricultural producers along selected sections of the Gleno–Maubisse corridor***. The road corridor serves rural communities, agricultural production areas, and tourism destinations in the western region of Timor-Leste.

1. The Project comprises two components: Component 1: Gleno–Maubisse Corridor Upgrading (i.e., Subcomponent 1.1: Aituto–Hatubuilico Junction road upgrading and Subcomponent 1.2:Hatubuilico Junction–Ramelau Sanctuary road upgrading) with an estimated cost of US$ 35.2 million; and Component 2: Institutional Strengthening with an estimated cost US$2.0 million. Component 1 will finance civil works, related construction supervision, and maintenance arrangements for selected road sections. Component 2 will finance detailed designs and

environmental and social instruments for potential future road sector investments. Further, this component would also finance activities to strengthen MPW's capacity in road asset management and maintenance.

Subcomponent 1.1 will upgrade the Aituto–Hatubuilico Junction Road, approximately 12 kilometers, to national road standards, including a 6 meter carriageway, 2 meter shoulders, and 1 meter drainage. The works will include pavement upgrading, selective widening, culvert and drainage improvements, slope stabilization structures, bioengineering measures, and road safety improvements. Existing feasibility study, detailed design, bidding documents, Environmental and Social Impact Assessment, Environmental and Social Management Plan, and Land Acquisition and Resettlement Action Plan prepared in 2019 will be reviewed and updated to align with the World Bank ESF and the applicable Environmental and Social Standards (ESSs).

Subcomponent 1.2 will upgrade the Hatubuilico Junction–Ramelau Sanctuary Road, approximately 5.4 kilometers, to municipal road standards, including a 5 meter carriageway, 2 meter shoulders, and 1 meter drainage. The works will include pavement upgrading, selective widening, culvert and drainage improvements, slope stabilization structures, bioengineering measures, and road safety improvements. Detailed design for this section is planned to be prepared using grants from the Grant Facility for Project Preparation, and the subcomponent will also finance related construction supervision consultancy services.

1.3. Project Location and Area of Influence (AoI)

The Project will be implemented along sections of the Gleno–Maubisse corridor in Timor-Leste, principally within the municipalities of Ainaro and Ermera. The corridor traverses rural and mountainous terrain and provides access to settlements, agricultural areas, coffee-producing communities, and tourism locations, including areas connected to Mount Ramelau. The immediate Project footprint is expected to be largely within existing road corridors and associated drainage systems, although selective widening, drainage improvements, slope stabilization, construction staging areas, material handling, spoil disposal, and temporary access arrangements may extend the area of influence beyond the existing carriageway.

The broader area of influence includes communities and road users that depend on the corridor for access to markets, health and education services, administrative centers, agricultural processing points, and transport links to the Dili–Ainaro and Gleno–Tibar corridors. The Project area is exposed to high rainfall, steep slopes, erosion, landslides, surface water runoff, drainage blockages, and other climate-related hazards. These conditions make climate-resilient design, construction supervision, and long-term maintenance central to the Project's environmental and social management approach.

1.4. Objective, Scope and Methodology

1.4.1. Objective

The objective of the environmental and social scoping is to identify, at an early stage, the key environmental and social risks, impacts, opportunities, and constraints associated with the proposed road upgrade. The scoping will provide a proportionate basis for defining the depth and breadth of

subsequent environmental and social assessment in accordance with applicable national requirements and the World Bank Environmental and Social Framework.

The scoping process will establish the environmental and social baseline issues that require further investigation and determine the relevance of the World Bank Environmental and Social Standards to the project.

This scoping report is informed by preliminary site observations. The findings will guide avoidance and minimisation measures, influence engineering and construction planning, and support preparation of the appropriate environmental and social instruments, such as an Environmental and Social Impact Assessment or Environmental and Social Management Plan, Resettlement Plan or Livelihood Restoration Plan, and other topic-specific plans as applicable.

1.4.2. Scope

At this Project preparation stage, some detailed engineering design elements, construction methods, ancillary facility locations, material sources, spoil disposal areas, temporary access arrangements, and site-specific environmental and social sensitivities have not yet been fully defined for the ***Subcomponent 1.2 (Hatubuilico Junction–Ramelau Sanctuary Road*** upgrading). As a result, the precise nature, location, scale, and significance of potential environmental and social risks and impacts cannot be determined comprehensively at this stage. Environmental and Social Scoping is therefore required to define the scope of assessment by screening proposed activities, identifying sensitive environmental and social receptors, characterizing potential risks and impacts, applying the mitigation hierarchy, clarifying institutional responsibilities, establishing stakeholder engagement requirements, and specifying the site-specific instruments and management plans to be completed before works commence.

1.4.3. Methodology

The TLBRP2 Environmental and Social Scoping Report for Subcomponent 1.2 has been prepared using a risk-based and proportionate methodology consistent with the World Bank ESF, the relevant ESSs, and applicable national requirements.

- **Document review.** Relevant Project documents, feasibility and design information under TLBRP, national environmental and social legislation, World Bank ESF requirements, applicable ESS guidance, and lessons from other World Bank and ADB-supported road projects in Timor-Leste were reviewed to confirm the regulatory context, likely risk areas, and requirements for subsequent site-specific instruments.
- **Field verification and initial screening.** Field visits and corridor observations were undertaken to verify existing environmental and social conditions and identify sensitive receptors, including slopes, natural waterways, community water points, roadside assets, land uses, biodiversity values, cultural heritage features.
- **Preparation of the E&S Scoping Report.** The findings from document review, field verification, and consultations were consolidated into this E&S Scoping Report, including screening procedures, criteria for identifying sensitive receptors, institutional responsibilities, requirements for site-specific assessment and management plan, Resettlement Framework and Contractor

ESMP preparation, mitigation and monitoring measures, reporting arrangements, and linkages with the project's ESCP, LMP, SEP, and GRM.

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2. Policy, Legal and Regulatory Framework

The proposed TLBRP2 will comply with applicable laws and regulations of Timor-Leste, as well as relevant World Bank requirements. The Project will also take into account applicable World Health Organization (WHO) guidance and other relevant environmental directives that complement Government of Timor-Leste legislation, consistent with Decree-Law No. 26/2012, the Basic Law for the Environment.

This section summarizes the national regulatory framework and international good practice guidelines applicable to the Project, with particular emphasis on environmental and social aspects. It outlines the requirements for environmental assessment and the preparation of E&S instruments to support Project compliance with applicable obligations, including laws, regulations, guidelines, and standards relating to environmental quality, occupational and community health and safety, protection of protected and sensitive areas, conservation of vulnerable and endangered species, land use controls, and other environmental and social matters.

With respect to regulatory compliance, where national environmental quality standards have not yet been established, the Project will apply the relevant international standards identified in this chapter, in accordance with the Basic Law for the Environment (Decree-Law No. 26/2012).

2.1. National Requirements

The national legal and regulatory framework relevant to road-sector investments in Timor-Leste is summarized below, with emphasis on the requirements that guide environmental licensing, environmental assessment, land access and acquisition, labor and occupational health and safety, biodiversity protection, cultural heritage, public consultation, and grievance management. For the purposes of this E&S Scoping Report, these national requirements provide the domestic compliance baseline for TLBRP2 and will be applied together with the World Bank ESF, including the applicable ESSs. Where gaps arise between national legislation and World Bank requirements, the Project will apply the ***more stringent standard*** or additional measures necessary to achieve outcomes consistent with the ESF, including proportionate risk assessment, meaningful stakeholder engagement, protection of disadvantaged or vulnerable groups, and implementation of appropriate mitigation, monitoring, and reporting arrangements throughout the project cycle.

Table 1. National Regulatory Framework for E&S Risk Management

Legal Instrument	Formal Citation	Relevance to TLBRP2
Constitutional environmental duties and rights	Constitution of the Democratic Republic of Timor-Leste (20th May 2002), including constitutional provisions on environmental protection, natural resources, property rights, and cultural rights.	Provides the constitutional basis for environmental protection, sustainable use of natural resources, protection of property rights, compensation for expropriation, and preservation of cultural heritage.
Environmental framework law	Decree-Law No. 26/2012 of 4 July 2012, Environmental Basic Law / Basic Environmental Legislation.	Establishes the core principles for environmental policy, conservation, sustainable use of natural resources, pollution control, waste management, environmental information, environmental education, liability,

		and integration of environmental considerations into sectoral policies including transport.
Environmental Licensing Law (ELL)	Decree-Law No. 5/2011 of 9 February 2011 on Environmental Licensing, as amended and republished by Decree-Law No. 39/2022 of 8 June 2022.	Creates the environmental licensing system for public and private projects that may negatively affect the environment. It establishes project categories, environmental assessment requirements, environmental license procedures, public consultation, environmental management plans, monitoring, and compliance obligations.
Screening, scoping, terms of reference, EIA, and EMP requirements	Ministerial Decision No. 46/2017 on Detailed Requirements for Screening, Definition of Scope and Terms of Reference of Environmental Impact Assessment and Environmental Management Plans for Environmental Evaluation.	Provides detailed procedural requirements for environmental screening, scoping, preparation of terms of reference, environmental impact assessment, and environmental management plans for road projects requiring environmental evaluation.
Public consultation in environmental assessment	Ministerial Decision No. 47/2017 on Procedures for Public Consultation and Requirements during the Process of Environmental Assessment.	Requires consultation and disclosure during environmental assessment. It is relevant to engagement with affected communities, road users, landowners, *suco* and *aldeia* authorities, women, vulnerable groups, and other stakeholders.
Land expropriation for public utility	Law No. 8/2017 of 26 April 2017 on Land Expropriation for Public Utility.	Defines the legal regime for expropriation of immovable property for public utility, including public roads, highways, tunnels, railways, public transport systems, drainage, sanitation, protective structures, and other public infrastructure. It establishes procedures, guarantees for affected parties, and requirements for fair compensation.
Land and property regime	Law No. 1/2003 on Land and Property	Foundational land law; sets out the four categories of potential land claimants (customary occupiers, Portuguese-era title holders, Indonesian-era title holders, current possessors) and distinguishes public- and private-domain state land. Governs how customary land rights along the COI are recognized.
	Law No. 6/2017 on Basic Law of Land Use Planning	Land use planning is subject to the following general principles: Coordination of the various public interventions with a territorial impact and a fair balance between public and private interests; Sustainability of the solutions contained in the instruments of territorial planning, in the economic, social, cultural and environmental dimensions; subsidiarity and coordinating the processes.
	Law No. 8/2017 on Land Expropriation for Public Utility	This Law establishes the legal regime governing the expropriation of immovable property and related private property rights or interests where the State, in pursuit of a public purpose, must acquire property in the absence of viable alternative solutions. It defines expropriation as any legally admissible restriction on private property or related rights or interests,

		regardless of the persons or entities to which they belong and provides that community immovable property may also be subject to expropriation. Expropriation is permitted only where the use of the property serves a recognized public interest. The Law specifies the circumstances and procedures under which expropriation may take place, including applicable compensation principles. Accordingly, it governs the compulsory acquisition of private-domain land required for public infrastructure, such as road upgrading, and establishes the domestic procedures and compensation requirements that the Project's land acquisition process must follow.
	Law No. 13/2017 on the Special Regime for the Definition of Ownership of Immovable Property, together with related land administration legislation.	Relevant for identifying land ownership and claims, including private, state, community, and customary interests that may be affected by road widening, realignment, ancillary facilities, temporary works, quarries, borrow areas, and access roads.
Protected areas	Decree-Law No. 5/2016 of 16 March 2016 creating the National System of Protected Areas.	Applies where road works are located in or near protected terrestrial or marine areas, critical habitats, ecosystem service areas, or designated conservation areas. It supports avoidance, minimization, and management of impacts on protected areas.
Biodiversity conservation	Decree-Law No. 6/2020 of 6 February 2020 establishing the Legal Framework for the Protection and Conservation of Biodiversity.	Establishes rules for biodiversity protection and conservation, including species, habitats, ecosystems, access to biological and genetic resources, monitoring, and sanctions. It is relevant for vegetation clearance, habitat fragmentation, erosion, river crossings, borrow pits, quarries, and restoration measures.
Cultural heritage	Decree-Law No. 33/2017 of 6 September 2017 on the Legal Regime of Cultural Heritage.	Protects movable, immovable, material, and intangible cultural heritage, including archaeological, historical, architectural, ethnographic, linguistic, documentary, artistic, scientific, social, and technical heritage. It is relevant to chance-find procedures and avoidance of sacred, burial, archaeological, and culturally important sites.
Labor relations	Law No. 4/2012 of 21 February 2012, Labor Code of Timor-Leste.	Sets minimum labor standards (minimum age, working hours, occupational safety, non-discrimination) applicable to individual and collective labor relations. It is relevant to contractor workforce management, employment conditions, non-discrimination, worker rights, and labor compliance on road construction sites.
Occupational safety, health, and hygiene	Law No. 11/2023 of 19 April 2023 on Safety, Health and Hygiene at Work.	Establishes general safety, health, and hygiene requirements for workplaces in Timor-Leste. It applies to public, private, cooperative, and

		social sectors and is directly relevant to occupational health and safety plans, worker accommodation, PPE, incident reporting, emergency response, and management of construction risks.
Community land, customary interests, and local dispute resolution	Law No. 13/2017 of 5 June 2017 establishing the Special Regime for the Definition of Ownership of Immovable Property, including provisions on recognition of previous rights, informal property rights, community immovable property, community protection areas, equal property rights for men and women, the National Property Registry, and the Land and Property Commission.	Relevant to land due diligence, identification of formal and informal land claims, community and customary interests, overlapping rights, land disputes, gender-equal access to property rights, and documentation of land agreements for road widening, realignment, drainage, contractor facilities, quarries, borrow pits, spoil areas, and temporary access.
Suco governance, community representation, and customary practice	Law No. 9/2016 of 8 July 2016 establishing rules for the organization, competence, and functioning of s*ucos*.	Relevant to social assessment, stakeholder engagement, grievance resolution, community-level consultation, participation of *suco* and *aldeia* structures, promotion of social harmony, dispute resolution, protection of traditional practices and customs, gender equality in community development, and management of community assets affected by road projects.
Gender equality and gender mainstreaming	Decree-Law No. 74/2023 of 14 September 2023 on the Organic Structure of the Secretary of State for Equality, together with Timor-Leste's constitutional commitments to equality and non-discrimination and international commitments including the Convention on the Elimination of All Forms of Discrimination against Women.	Relevant to gender-responsive social assessment, gender action planning, inclusion of women in consultation and decision-making, gender-sensitive employment opportunities, gender-disaggregated monitoring, prevention of discrimination, and integration of gender equality into road project design, implementation, budgets, and grievance mechanisms.
Gender-based violence and domestic violence prevention	Law No. 7/2010 of 7 July 2010, Law Against Domestic Violence, together with national gender-based violence action plans and relevant criminal law provisions on violence, sexual offences, coercion, harassment, and protection of vulnerable persons.	Classifies domestic violence as a public crime (not a private/family matter resolvable only through customary mediation), mandates police investigation and victim access to health, shelter, psychosocial and legal support, the legal basis for routing sexual exploitation and abuse (SEA) and sexual harassment (SH) cases arising from the Project to the formal system.
	Penal Code (2009) and Civil Code (2011)	Provide the general criminal and civil law framework, including offenses relevant to SEA-SH, including SEA cases arising from the Project.
Social assessment, vulnerable groups, and inclusive consultation	Environmental Licensing Decree-Law No. 5/2011 as amended by Decree-Law No. 39/2022, Ministerial Decision No. 47/2017 on public consultation during environmental assessment, Law No. 9/2016 on *Sucos,* and constitutional protections for equality, participation, property, culture, and protection of vulnerable persons.	Relevant to preparation of social baseline studies, socioeconomic surveys, stakeholder engagement plans, identification of vulnerable households, consultation with women, persons with disabilities, poorer households, elderly persons, youth, road-side businesses, land users, and communities affected by temporary or permanent impacts.
Indigenous Peoples (IPs),	Constitution of the Democratic Republic of Timor-Leste, Law No. 9/2016 on *Sucos*,	Relevant to screening for culturally distinct communities, customary leadership and

ethnic groups, customary communities, and cultural identity	Law No. 13/2017 on the Special Regime for the Definition of Ownership of Immovable Property, and Decree-Law No. 33/2017 on the Legal Regime of Cultural Heritage.	decision-making structures, customary land and natural resource use, community protection areas, sacred and cultural sites, language needs, culturally appropriate consultation, and preparation of Indigenous Peoples, ethnic group, or culturally appropriate community development measures where required by the World Bank.

For the purposes of national environmental permitting and regulatory compliance, the Government of Timor-Leste's environmental classification system provides the basis for determining the level of environmental assessment and management documentation required for TLBRP2 activities. Given the nature of the proposed works, which are expected to involve rehabilitation of existing branch roads and associated facilities rather than major new greenfield infrastructure, the Project is anticipated to fall within Category B under the national environmental licensing framework. Category B projects generally require proportionate assessment, preparation of a Simplified Environmental Impact Statement (SEIS) and Environmental Management Plan (EMP), and implementation of mitigation, monitoring, consultation, and reporting measures commensurate with the scale and significance of potential impacts. The relevant classifications and associated permitting requirements applicable to the Project and its ancillary activities are summarized in the table below:

Table 2. EA Requirements for Projects and Activities

Component Description				
Sector		**Category B in accordance with DL5/2011 as amended by Decree-Law No. 39/2022**	**Scale**	**Environmental Assessment**
Transportation	V 1	Rehabilitation of an existing road, excluding community road (including toll roads, bridge crossing, each with two lanes).	All	SEIS and EMP
Transportation	V 2	Construction of Bridges	>300m	SEIS and EMP
Associated Activities				
Quarries				
Mining Sector	I 1	Exploitation of minerals (sand and gravel)	<30,000 m^3/year & >5,000 m^3	SEIS and EMP
Mining Sector	I 2	Processing and refinement of minerals / quarrying (non-toxic)	<30,000 m^3/year & >5,000 m^3	SEIS 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	SEIS and EMP

Notes: V 1 – Transportation Sector, activity 1; I 1 — Mining sector, activity 1:

I 2 — Mining sector, activity 2; IV 1 — Industrial sector, activity 1

Customary Acknowledgment. Timor-Leste's legal system operates two overlapping normative orders relevant to project: the formal state justice and administrative system, and customary (*adat/lisan*)

institutions, Rai Nain land authority, Tara Bandu, and the broader *lia-na'in* (customary elder) dispute-resolution tradition.

Constitution 2002 Section 2 on Sovereignty and Constitutionality stipulates that the State shall recognize and value the norms and customs (or hereafter known as Tara Bandu) of East Timor that are not contrary to the Constitution and to any legislation dealing specifically with customary law. Tara Bandu generally refers a traditional Timorese custom that enforces peace and recognition through the power of public agreement to define social norms and practices to a given community. The process of forming Tara Bandu represents a process of coming to communal agreement or 'social contract' that outlines the behaviors and practices that members of the community deem to be appropriate and want to enforce. As such the legitimacy of the Tara Bandu is largely dependent on the degree of local level consultation and engagement in the generation of the terms of such communal accord.

Basic Environment Law 2012 Article 8 contains relevant provisions on Tara Bandu, which stipulates that:
a. the State shall recognize the importance of all types of Tara Bandu as integral part of the culture of Timor-Leste and accepted traditional mechanisms regulating relationships between people and the environment around them;
b. Tara Bandu can be carried out according to the rituals preserved through the local customary law aiming at the preservation and promotion of environment and conservation and sustainable use of natural resources, provided that such action is consistent with the objectives and principles established by the law;
c. The state must ensure effective protection of the Tara Bandu.

In summary, the Constitution recognizes customary law as valid insofar as it does not conflict with the Constitution or legislation, and the Law of Sucos formally tasks Suco Chiefs with mediating community disputes, giving customary authorities a statutory as well as social role. However, national law is explicit that certain matters, most importantly domestic violence and other forms of gender-based violence, which the Law Against Domestic Violence defines as a public crime and fall outside the scope of customary/traditional resolution and must be referred to police and the formal justice system.

This dual structure directly shapes the Project's approach: customary authorities (Rai Nain, Suco Councils, Nai Liurai/Nai Dato) are appropriate partners for land verification, minor dispute resolution, and community mobilization, but are not an appropriate or lawful channel for GBV/SEA cases, which require a dedicated, confidential pathway.

2.2. World Bank Requirements

2.2.1. World Bank Environmental and Social Standards

For World Bank-financed Investment Project Financing prepared under the ESF, TLBRP2 is required to assess, manage, and monitor environmental and social risks and impacts in accordance with the applicable ESSs. Consistent with the ESF, this assessment should be risk-based, proportionate to the nature and scale of project activities, and adaptive over the project cycle. The table below summarizes the relevant ESS requirements and their applicability to TLBRP2.

Table 3. World Bank E&S Standards and Relevance to TLBRP2

ES Standards	Objectives	Relevance to TLBRP2
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the ESS's.	ESS1 is relevant. The Project will finance rehabilitation and upgrading of existing road sections and associated activities e.g. slope stabilization, quarry material sourcing, spoil disposal, worker facilities, etc.) These activities may generate site-specific E&S impacts and risks during design, construction and operation. An E&S screening and assessment process is therefore required under the Scoping Report. Screening will confirm subproject risk classification, identify sensitive receptors and exclusion conditions, determine the required site-specific instruments, and ensure that mitigation measures are reflected in the subsequent E&S instruments.
ESS2: Labor and Working Conditions	- Promote safety and health at work; - Promote the fair treatment, non-discrimination and equal opportunity of project workers; - Protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate; - Prevent the use of all forms of forced labor and child labor; - Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law;	ESS2 is relevant. TLBRP2 will involve direct workers, contracted workers, consultants, government staff assigned to the PMU, and possibly community workers for selected local activities. Key risks include occupational health and safety hazards from road works, traffic exposure, working at heights or near slopes, use of machinery, worker accommodation, unequal treatment, and workplace harassment.

	- Provide project workers with accessible means to raise workplace concerns.	
ESS3: Resource Efficiency and Pollution Prevention and Management	- Promote the sustainable use of resources, including energy, water and raw materials; - Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; - Avoid or minimize project-related emissions of short and long-lived climate pollutants; - Avoid or minimize generation of hazardous and non-hazardous waste; - Minimize and manage the risks and impacts associated with pesticide use.	ESS3 is relevant. Road rehabilitation will require aggregates, bitumen/asphalt or concrete, water, fuel, lubricants and energy, and may generate dust, noise, vibration, wastewater, sediment runoff, spoil, construction waste, used oil, hazardous materials and emissions from vehicles, plants and equipment. Quarries, borrow areas, batching or asphalt plants, workshops and disposal areas may create additional pollution and resource-use risks.
ESS4: Community Health and Safety	- Anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances; - Promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams; - Avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials; - Have in place effective measures to address emergency events; - Ensure that the safeguarding of personnel and property is	ESS4 is relevant. TLBRP2 may expose nearby communities, pedestrians, road users, markets and roadside businesses to construction activities (traffic, temporary diversions, open excavation, slope works, etc.) dust, noise, vibration, machinery movement, influx related health risks, worker-community interactions and emergency events.

	carried out in a manner that avoids or minimizes risks to the project-affected communities.	
ESS 5: Land Acquisition, Restrictions on Land use and Involuntary Resettlement	Sets out the responsibilities of the borrowers to address project-related land acquisition and restrictions on land use. Project-related land acquisition or restrictions on land use may cause a physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both.	ESS5 is relevant. Although TLBRP2 is expected to focus mainly on existing road corridors, road widening, drainage improvements, temporary access, and construction facilities (quarries, spoil disposal, etc.) may require permanent or temporary land acquisition, restrictions on land use, loss of crops, trees, fences, kiosks or other assets, access disruption, or livelihood impacts. Screening must identify all land and asset impacts before works and determine whether due diligence, voluntary land donation documentation, an abbreviated resettlement plan or a full resettlement plan is required. Compensation and assistance must be complete before displacement or civil works commence in affected areas.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Applicable to projects that potentially affect biodiversity or habitats, either positively or negatively, directly or indirectly, or that depend upon biodiversity of their success. ESS 6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development.	ESS6 is Relevant. TLBRP2 activities may affect modified, natural or sensitive habitats through vegetation clearance, quarry and borrow area use, spoil disposal, etc. An early screening using IBAT platform has been conducted and included in this Scoping Report.
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Applies to communities or groups of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities who, during the lifetime of members of the community or group, have lost collective attachment to distinct habitats or ancestral territories in the project area, because of forced severance, conflict, government resettlement programs, dispossession of their land, natural disasters, or	ESS7 is relevant to the required IP screening to determine whether the standard is triggered and requires free, prior, and informed consultation leading to broad community support. ESS7 may not be formally triggered, as there is no distinct or vulnerable ethnic group within the corridor's area of influence that is set apart from the general population by the ESS7 criteria. Communities in the corridor Sucos share similar cultural, linguistic and social characteristics with the broader population of Ainaro Municipality and Timor-Leste as a whole. Nonetheless, the Project fully apply ESS7 by integrating its requirements into the Stakeholder Engagement Plan (SEP). This requires the project entities (the PMU, consultants, and contractors) to conduct consultations

	incorporation of such territories into an urban area.	that respect local traditional leadership and cultural protocols and incorporate traditional conflict resolution practices, ensuring local communities can voice concerns about construction impacts, land acquisition, or environmental disruptions in a culturally aligned manner.
ESS 8: Cultural Heritage	Recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of people's cultural identity and practice. ESS 8 sets out measures designed to protect cultural heritage throughout the project life cycle. This ESS sets out general provisions on risks and impacts to cultural heritage from project activities.	ESS8 is Relevant. The Project area has spiritual and cultural connection the communities maintain with their physical environment: - Sacred Sites (*Fatin Lulik)* such as ancient trees, large rocks, water springs, and mountain peaks—are considered *Lulik* (sacred) and are believed to house ancestral spirits. Road widening or heavy machinery operations can easily disturb these sites. - Graves and burial sites: It is common for family graces or historical burial plots to sit right alongside rural roads within the ROW. The Project will ensure adequate site screening (E&S sensitive receptors) along the road alignment. A Chance Find Procedure is included in this Scoping Report. If a road alignment impacts sacred sites or grave, the Procedure will be applied with local customary resolution. It is mandatory for contractor to coordinate with the local *Lian Nain* (traditional authorities/cultural custodians) to perform customary rituals and provide appropriate compensation or ritual items before any construction can begin.
ESS 9: Financial Intermediaries	This ESS applies to Financial Intermediaries (FIs) that receive financial support from the Bank. FIs include public and private financial services providers, including national and regional development banks, which channel financial resources to a range of economic activities across industry sectors.	Not relevant to the Project
ESS10: Stakeholder Engagement and	Recognizes the importance of open and transparent engagement between the Borrower and project	ESS10 Relevant. TLBRP2 will affect and benefit a broad range of stakeholders, including roadside communities, landowners and land users, road users, women, persons with disabilities, vulnerable households, local businesses,

Information Disclosure	stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. ESS 10 applies to all projects supported by the Bank through Investment Project Financing. The Borrower will engage with stakeholders as an integral part of the project's environmental and social assessment and project design and implementation	public facilities, transport operators, *suco* and *aldeia* authorities. Meaningful, inclusive, and culturally appropriate engagement is required throughout preparation, construction, and operation. The SEP will guide stakeholder identification, project information disclosure, consultation methods, engagement with vulnerable groups, documentation of issues raised, and feedback to communities. A project-level GRM will be maintained with accessible entry points, clear response timeframes, confidentiality options and records of grievances received, resolved and escalated.

2.2.2. WBG EHS Guidelines and GIIP

All activities financed through the Project are subject to the World Bank Group Environmental, Health and Safety (EHS) Guidelines including:

(1) Environmental,
(2) Occupational Health and Safety,
(3) Community Health and Safety, and
(4) Construction and Decommissioning.

These guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). Another GIIP that is relevant to the Project is: Water quality standards. World Health Organization (WHO - 2011 edition) and the Australian Drinking Water Guidelines (2011 edition) will be adopted; depending on parameter concerned, whichever guideline is stricter, shall be used.

2.3. Gap Analysis: WB ESF Requirements and Timor-Leste Regulatory Framework

This section builds on the review of Timor-Leste's relevant legal and regulatory framework and the World Bank ESF. It identifies the principal areas of alignment and any material gaps between national requirements and the applicable ESSs. For each ESS relevant to TLBRP2, corresponding national legislation or administrative requirements exist, although some gaps remain where the ESF sets more detailed project-level obligations. These gaps are addressed through the Scoping Report and associated environmental and social instruments. Table below summarizes the key requirements of Timor-Leste's legislative and regulatory framework against each relevant World Bank ESS.

Table 4. Gap Analysis E&S Requirements and Gap-Filling Measures

World Bank ESF	Timor-Leste Regulatory Framework	Level of Alignment	Recommended Gap-Filling Measures for TLBRP2
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Timor-Leste's Environmental Basic Law, Environmental Licensing Decree-Law, and related ministerial decisions require environmental screening, assessment, licensing, public consultation, environmental management plans, and monitoring for projects with potential environmental impacts.	Broadly aligned for environmental assessment and licensing, but the ESF is usually broader because it integrates environmental, social, labor, community health and safety, land, vulnerable group, and cumulative risk considerations into one risk-management system.	Prepare an E&S Scoping and any subsequent E&S risk management instruments that covers both national licensing requirements and ESF risk areas. Include a clear mitigation hierarchy, institutional responsibilities, budget, monitoring indicators, corrective action process, and ESCP commitments.
ESS2: Labor and Working Conditions	The Labor Code and workplace safety, health, and hygiene legislation regulate employment relationships, worker rights, workplace safety, and employer duties.	Partially aligned. National labor and OHS laws provide the core legal basis, while ESS2 adds project-specific requirements for labor management procedures, worker grievance mechanisms, contracted workers, community workers if used, primary supply risks where relevant, and explicit controls on child labor and forced labor.	Prepare Labor Management Procedures (LMP) and require each contractor to prepare a labor and OHS plan. Include worker codes of conduct, induction training, PPE, incident reporting, emergency response, worker accommodation standards if applicable, and a confidential worker grievance channel.
ESS3: Resource Efficiency and Pollution Prevention and Management	The Environmental Basic Law and environmental licensing system address pollution prevention, waste management, environmental quality, and environmental management conditions imposed through licenses and plans.	Broadly aligned on pollution prevention, but ESS3 may require more explicit treatment of resource efficiency, greenhouse gas considerations where relevant, material sourcing, hazardous materials, waste hierarchy, and good international industry practice.	Include contractor requirements for dust, noise, wastewater, fuel storage, hazardous materials, spoil, waste disposal, quarry and borrow area management, drainage, erosion control, and emergency spill response. Track material sources and require approved disposal and rehabilitation of disturbed areas.
ESS4: Community Health and Safety	Timor-Leste law addresses public safety through sectoral controls, environmental licence conditions, road and traffic management requirements, public administration responsibilities, and general civil and safety obligations.	Partially aligned. ESS4 is more explicit on community health and safety risk assessment, traffic and road safety, emergency preparedness, vulnerable road users, project-related security arrangements, communicable disease risk, and public exposure to construction hazards.	Include contractor requirements to prepare a Community Health and Safety Plan and Traffic Management Plan. Include road safety audits, safe access arrangements for public facilities, speed controls, signage, detours, stakeholder notifications, emergency response,

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			controls for worker-community interaction, and incident reporting to the implementing agency and the World Bank.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Law No. 8/2017 on Land Expropriation for Public Utility and Law No. 13/2017 on the ownership of immovable property provide the national basis for land acquisition, property identification, public utility expropriation, and compensation.	Partially aligned. National law provides procedures for expropriation and compensation, while ESS5 also requires avoidance and minimization of displacement, livelihood restoration, support to informal users and non-title holders where eligible, replacement cost principles, transitional assistance, consultation, grievance redress, and completion of compensation before displacement.	Prepare a Resettlement Plan, Abbreviated Resettlement Plan, or Land Due Diligence Report. Include census, asset inventory, eligibility cut-off date, entitlement matrix, replacement cost valuation, livelihood restoration, vulnerable household support, compensation payment records, voluntary land donation protocol if used, and independent completion review where required.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The Environmental Basic Law, National System of Protected Areas, and biodiversity conservation framework regulate protection of biodiversity, habitats, species, protected areas, and environmental management of activities affecting natural resources.	Broadly aligned on biodiversity protection. ESS6 may require more detailed classification of modified, natural, and critical habitat, ecosystem services assessment, biodiversity offsets only under strict conditions, and specific controls for primary suppliers where relevant.	Screen alignments, quarries, borrow pits, spoil disposal sites, bridges, and drainage works for biodiversity sensitivity. Avoid protected and critical habitats where feasible, limit vegetation clearing, prepare habitat restoration measures, control invasive species, and include biodiversity monitoring for sensitive locations.
ESS7: Indigenous Peoples / Culturally Distinct Communities	Timor-Leste's framework includes constitutional protections, cultural rights, local governance practices, customary land considerations, and consultation requirements, but there is no single national safeguards law equivalent to ESS7.	Gap area. National laws provide contextual protections, but ESS7 contains more detailed requirements for screening, culturally appropriate consultation, benefit sharing, impact avoidance or mitigation, and free, prior, and informed consent in specified circumstances.	Apply ESS7 principles through the SEP rather than a standalone IPP. Consult communities through recognized traditional leadership and cultural protocols. Ensure the GRM reflects traditional conflict-resolution practices so concerns on land, construction, and environmental impacts can be raised in a culturally appropriate way.
ESS8: Cultural Heritage	The cultural heritage legal regime protects tangible and intangible cultural heritage, including archaeological, historical, sacred, burial, architectural, ethnographic, artistic,	Broadly aligned. ESS8 adds project-level management requirements, stakeholder consultation on cultural heritage, assessment of impacts on both tangible and intangible heritage, and	Conduct cultural heritage screening before works. Avoid known heritage and sacred sites, include a chance-find procedure in all civil works contracts, train contractors, stop work in affected areas if objects or

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	scientific, and technical heritage.	chance-find procedures integrated into contracts.	remains are found, and consult relevant authorities and communities before works resume.
ESS10: Stakeholder Engagement and Information Disclosure	Environmental licensing and assessment regulations require public consultation and disclosure during the environmental assessment process. Local governance systems also support consultation through municipal, suco, and aldeia structures.	Partially aligned. National procedures provide consultation during environmental assessment, while ESS10 requires continuous stakeholder engagement throughout the project cycle, stakeholder identification and analysis, targeted inclusion of vulnerable groups, disclosure of draft and final instruments, and a functioning grievance mechanism.	Prepare and implement a SEP. Maintain a stakeholder register, consultation records, disclosure materials in appropriate languages, grievance log, response timeframes, escalation process, confidentiality provisions, and periodic reporting on issues raised and resolved.

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3. Environmental and Social Baseline

This environmental and social baseline has been prepared based on site visits, field observations, and available secondary information to provide an initial understanding of the existing environmental and social conditions within the Project area of influence. Consistent with the World Bank ESF, the baseline is preliminary and proportionate to the current stage of project preparation. It is intended to support early identification of environmental and social risks, sensitive receptors, and information gaps. The baseline will be further verified and detailed during detailed design and preparation of site-specific Environmental and Social Management Plans (ESMPs), based on additional field investigations, updated engineering design, stakeholder engagement, and any supplementary studies required to inform risk management and mitigation measures.

3.1. Physical Environment

3.1.1. Location and Geography

The project road is located in the central highlands of Timor-Leste, within Ainaro Municipality, and provides access from the Hatubuilico area toward the Ramelau Sanctuary at the base of Mount Ramelau, also known as Tatamailau. Mount Ramelau is the highest peak in Timor-Leste, reported at approximately 2,963 m above sea level, and is a nationally important religious, cultural, tourism, and ecological destination. The wider landscape is characterized by steep mountainous terrain, narrow valleys, ridgelines, seasonal drainage lines, and scattered rural settlements. The road corridor is therefore situated in a highland setting where slope stability, drainage management, erosion control, and protection of community access are central environmental management considerations.

The road is expected to serve local residents, visitors, small-scale traders, and service providers associated with Hatubuilico and the Ramelau Sanctuary. The area is remote relative to the national capital and municipal service centers, and access conditions may deteriorate during periods of heavy rainfall. The baseline geography indicates a corridor with high sensitivity to cut-slope failure, watercourse crossings, sediment movement, traffic safety constraints, and temporary construction access impacts.

3.1.2. Geology and Soils

Ainaro lies within the rugged uplifted mountain belt of Timor, where complex tectonic processes have produced steep slopes, folded and faulted sedimentary rocks, limestone, marl, shale, and locally metamorphosed materials. The mountainous terrain around Mount Ramelau is generally formed by highly dissected ridges and valleys, with soils derived from weathered bedrock and colluvial deposits. These soils are likely to be shallow to moderately deep on steep slopes, deeper in valley bottoms and gentler foot slopes, and variable in texture depending on parent material and local drainage.

The key soil-related baseline issues for road rehabilitation or improvement are erosion susceptibility, sediment generation from exposed cuts and fills, slope instability, and loss of topsoil from construction footprints, borrow areas, spoil disposal sites, and temporary access tracks. Where limestone or fractured rock occurs, localized infiltration may be high, but thin soils and steep gradients can also generate rapid runoff during intense rainfall. For ESMP development purposes, the design should be supported by site reconnaissance to identify

3.1.3. Rainfall and Temperature

Ainaro Municipality experiences a marked seasonal rainfall pattern, with a wet season generally extending from about November or December to April and a pronounced dry season from around May to October. Available climate datasets for Ainaro indicate tropical wet-and-dry conditions and show the highest rainfall typically occurring between December and March, with much lower rainfall during the mid-year dry months. In highland areas near Hatubuilico and Mount Ramelau, local rainfall may be influenced by elevation, orographic effects, cloud cover, and exposure to prevailing winds.

Figure 1. Surface Temperature in Ainaro, Timor-Leste

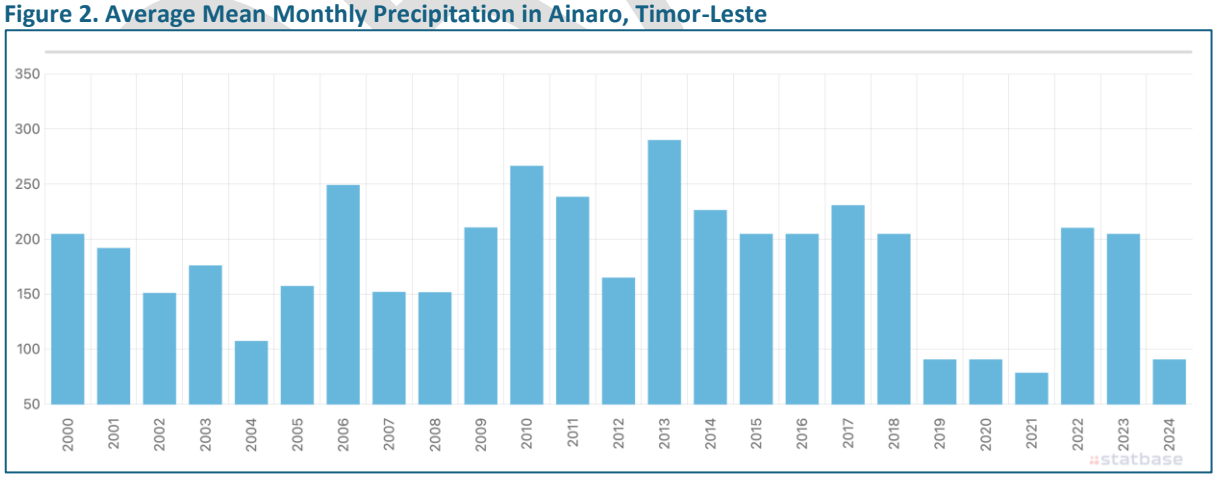
Temperature (°C)		
Average	Maximum	Minimum
17	22.7	11.4

Precipitation (mm)	
Precipitation Driest Month	Precipitation Wettest Month
20.8	386

Annual precipitation	Annual precipitation prediction for 2050	Change in Annual Precipitation in 2050
2,250.8	2,441.5	190.74

Source: WBG Geospatial Platform

Figure 2. Average Mean Monthly Precipitation in Ainaro, Timor-Leste



Source: Climate Change Knowledge Portal

Rainfall is a primary driver of construction and operational risk along the corridor. Intense rain can cause rapid surface runoff, blocked drains, sediment-laden discharge, slope failures, washouts, and temporary isolation of communities. The project should therefore assume that drainage capacity, erosion control, slope stabilization, and staged construction during drier months will be critical for environmental performance and climate resilience.

3.1.4. Climate Conditions and Natural Hazards

The climate of Ainaro is generally classified as tropical savanna or tropical wet-and-dry, modified locally by altitude. Compared with lowland coastal areas, the highland corridor near Hatubuilico and Mount Ramelau can experience cooler temperatures, higher humidity, frequent cloud cover, and greater exposure to wind and fog. Seasonal climatic variability affects road conditions, construction scheduling, worker safety, material handling, and community access.

The principal natural hazards relevant to the road corridor are landslides, rockfall, erosion, flash flooding, drainage overtopping, and damage from intense rainfall events. Timor-Leste is also exposed to seismic risk due to its regional tectonic setting, and earthquake shaking may exacerbate slope instability in steep terrain. Climate change is expected to increase the importance of resilient drainage, slope protection, and maintenance systems, particularly where road infrastructure crosses steep catchments or supports access for isolated communities.

3.1.5. Water Resources

The road corridor is located within a mountainous catchment setting where water resources are likely to include seasonal streams, springs, seepage areas, small drainage channels, and community water supply points. Surface water flows are expected to vary strongly by season, with high runoff and sediment transport during the wet season and reduced flows during the dry season. Springs and local water sources may be important for domestic use, livestock, agriculture, and visitors to the sanctuary area.

Initial environmental and social screening indicates that the Project corridor is located within approximately 1 km of inland surface-water features and intersects or is in close proximity to 21 waterways along the 5.4 km Hatubuilico Junction–Ramelau Sanctuary Road. These features include seasonal streams, drainage lines, seepage areas, and community water-use points that could be sensitive to construction-related sedimentation, altered drainage, accidental spills, wastewater discharge, and spoil or material stockpiling

3.1.6. Land Use

Land use in the project area is predominantly rural and highland in character. Existing uses include village settlement areas, smallholder agriculture, grazing land, eucalyptus regrowth, grassland, footpaths, roadside stalls or informal stopping areas, and tourism-related use associated with access to Mount Ramelau. The upper slopes and ridgelines around the Ramelau landscape have ecological and cultural significance and may contain areas that communities regard as sensitive or subject to customary management practices.

The existing road corridor is an established transport route, but widening, drainage works, slope stabilization, borrow extraction, spoil disposal, and temporary contractor facilities may affect adjacent land uses. Particular attention should be given to avoiding unnecessary land take, maintaining access to homes and farms, protecting productive trees and crops, and managing construction impacts during pilgrimage or tourism periods. Land use information should be confirmed through field mapping and consultation with *suco* and aldeia representatives, land users, and sanctuary stakeholders

3.1.7. Air Quality

Ambient air quality in the project area is expected to be generally good because the corridor is rural, has limited industrial activity, and experiences relatively low traffic volumes compared with urban roads. Existing sources of air emissions are likely to include vehicle exhaust from light vehicles and occasional trucks, dust from unsealed or degraded road surfaces, smoke from household cooking or vegetation burning, and localized emissions from small generators or maintenance activities.

3.1.8. Noise

Baseline noise levels are expected to be low to moderate and typical of a rural highland environment. Existing noise sources include intermittent traffic, motorcycles, agricultural activity, community activities, livestock, natural sounds, and visitor movements associated with the sanctuary and Mount Ramelau access. Sensitive receptors may include homes, schools, places of worship, small shops, community gathering areas, and visitor rest areas.

Construction noise will be temporary but may be noticeable near settlements and sanctuary access points, particularly during excavation, compaction, rock breaking, aggregate transport, and operation of heavy equipment. Noise management should prioritize daytime works, community advance notice, maintenance of equipment mufflers, avoiding unnecessary idling, and scheduling of disruptive works to avoid major religious, tourism, or community events where feasible.

3.2. Biological Environment

3.2.1. Flora and Fauna

The project area is characterized by a modified montane landscape consisting of grassland, grazing areas, eucalyptus regrowth, shrubland, remnant montane forest patches, roadside vegetation, smallholder agricultural plots, and locally planted or protected trees. Regional biodiversity information for Mount Tatamailau indicates that the wider mountain landscape historically supported extensive montane forest, but that natural tree cover has been substantially reduced, with remaining old-growth forest largely confined to limited patches near mountain crests. Upper slopes have been described as supporting eucalyptus open shrubland to closed shrubland, including *Eucalyptus alba* and *Eucalyptus urophylla*, with heath and herbaceous understory vegetation.

The biological baseline for fauna is expected to include common highland birds, small mammals, reptiles, amphibians, invertebrates, and domesticated animals associated with rural settlements and grazing areas. The Mount Tatamailau/Ramelau Key Biodiversity Area has been identified as internationally significant partly because it supports restricted-range birds associated with Timor and nearby islands. Bird records from the wider Mount Ramelau area include honeyeaters, fantails, whistlers, leaf warblers, white-eyes, island thrushes, flycatchers, bushchats, raptors, swiftlets, and pigeons. These records indicate that the road corridor and adjacent habitats may provide foraging, nesting, dispersal, or refuge habitat, particularly where remnant forest, shrubland, eucalypt regrowth, and riparian vegetation persist.

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Mammals in the broader Timor-Leste landscape may include native bats and shrews as well as introduced or long-established species such as rats, mice, civets, deer, pigs, livestock, dogs, and cats. Amphibians and reptiles may be present in moist microhabitats, around springs, seasonal streams, rock crevices, agricultural areas, and shaded drainage features. Fauna disturbance risks during road works include vegetation clearance, noise and vibration, vehicle strike, temporary lighting, increased human access, hunting or collection pressure, disturbance of nesting birds, sedimentation of streams used by aquatic or semi-aquatic species, and spread of invasive species through construction materials and disturbed ground.

3.2.2. Vulnerable or Endangered Species

The wider Mount Ramelau landscape is important for endemic and restricted-range species. Available KBA information notes that ten restricted-range bird species have been recorded from the area and identifies the Endangered Timor Imperial-pigeon as one species of conservation concern. Other bird species recorded in the Mount Ramelau area include Timor-associated species such as Timor Leaf Warbler, Timor Heleia, Timor Bushchat, Black-breasted Myzomela, Yellow-eared Honeyeater, Streak-breasted Honeyeater, and Timor Friarbird. The presence, abundance, breeding status, and use of habitats within the specific road corridor remain to be confirmed.

This E&S Scoping Report uses two IBAT reports: the Proximity Report and the Estimated Species Report. The Proximity Report identifies all species whose raw geographic range polygons overlap the defined 1 km buffer area, which can result in a broad or less refined species list. In contrast, the Estimated Species Report filters species according to the Area of Habitat (AoH) available within each species' range, excluding unlikely occurrences and providing greater analytical precision.

IBAT – Proximity Report. The following table, drawn from the Proximity Report, lists species potentially occurring within the 1 km buffer applied to the Area of Influence (AoI). It counts of species categorized as Endangered (EN) or Vulnerable (VU) under the IUCN Red List of Threatened Species and found within 1 km of the Project's Area of Influence/Impact (AoI).

Table 5. Species Listed Within Buffer of 1 km – IBAT Proximity Report

Species Name	Common Name	Taxonomy	IUCN Category	Biome
Acerodon mackloti	Sunda Fruit Bat	Mammalia	VU	Terrestrial
Macaca fascicularis	Long-tailed Macaque	Mammalia	EN	Terrestrial
Pteropus griseus	Gray Flying Fox	Mammalia	VU	Terrestrial
Numenius madagascariensis	Far Eastern Curlew	Aves	EN	Marine, Freshwater, and Terrestrial
Calidris tenuirostris	Great Knot	Aves	EN	Marine, Freshwater, and Terrestrial
Calidris ferruginea	Curlew Sandpiper	Aves	VU	Marine, Freshwater, and Terrestrial
Calidris falcinellus	Broad-billed Sandpiper	Aves	VU	Marine, Freshwater, and Terrestrial
Pluvialis squatarola	Grey Plover	Aves	VU	Marine, Freshwater, and Terrestrial
Eucalyptus urophylla	Timor White Gum	Magnoliopsida	EN	Terrestrial

IBAT Proximity Report (Within Buffer of 1km). Generated on 26 September 2026 (GMT). www.ibat-alliance.org

IBAT – Estimated Species Report. The E&S Scoping applies a 2.2 km evaluation zone encompassing the project's physical footprint and a 100 m buffer. The table presents the species that collectively contribute 90% of the site's Species Threat Abatement and Restoration (START) score, excluding species that contribute less than 2%. Higher-scoring species are more threatened and/or have a larger proportion of their global Area of Habitat within the site and buffer.

Table 6. Estimated Species Identified Within 100 meter Buffer

Taxonomic group	Scientific name	Common name	Red List category	Percentage of global AoH	Percentage of $START_T$ score
BIRDS	Ducula cineracea	Timor Imperial-pigeon	Near Threatened	0.277	94.7
MAMMALS	Pteropus griseus	Gray Flying Fox	Vulnerable	0.005	3.5

Source: Species Report IBAT – Accessed on Sep 27, 2026

Ducula cineracea* (Timor Imperial Pigeon) – Nearly Threatened (NT):** Available information indicates that the proposed road-upgrade corridor may support suitable habitat for *Ducula cineracea*, but it ***does not currently demonstrate that the Project Area of Influence constitutes Critical Habitat. The species is endemic to Timor-Leste and uses forest and woodland canopy in foothills and mountains, including secondary habitat and coffee plantations with retained trees. Its ecological requirements therefore overlap with the project setting, and ***occurrence is considered moderately to highly likely*** where mature fruiting trees, connected forest, wooded gullies or well-treed coffee agroforest remain. However, the modelled Area of Habitat overlap, reported as 0.6% (IBAT), does not by itself establish that the corridor supports a globally or nationally significant proportion of the species' range, population or habitat. The screening conclusion should be confirmed during the DED stage, supplemented by local interviews, in suitable habitat and at associated facilities such as potential laydown areas, workers' accommodation and quarries.

- Criterion (a), habitat of significant importance to Critically Endangered or Endangered species, is not triggered because the species is reported as Near Threatened rather than Critically Endangered or Endangered.
- Criterion (b), habitat of significant importance to endemic or restricted-range species, is potentially relevant but not demonstrated. The species' restricted distribution and the presence of ecologically suitable montane habitat warrant precautionary field verification. Nevertheless, the reported 0.6% Area of Habitat overlap does not establish that the Project Area of Influence supports a significant proportion of its range, population, breeding habitat or essential foraging resources.
- Criterion (c), habitat supporting globally or nationally significant concentrations of migratory or congregatory species, is not currently triggered. The available information does not identify a significant seasonal aggregation, communal breeding site or other concentration within the Project Area of Influence. Local observations of several birds feeding together would not alone satisfy this criterion unless they represent a material proportion of the relevant population.
- Criterion (d), highly threatened or unique ecosystems, is not currently demonstrated. Although the road corridor may retain wooded gullies and well-treed coffee agroforest used by the species, available information does not establish that these habitats constitute a highly

threatened, globally or nationally rare, or unique ecosystem within the Project Area of Influence. This criterion should be reassessed during the DED stage through field verification of ecosystem type, condition, extent, connectivity and threat status, including at associated facilities.

- Criterion (e), ecological functions or characteristics necessary to maintain the viability of qualifying biodiversity values, is not demonstrated. Mature fruiting and nesting trees, connected forest, wooded gullies and well-treed coffee agroforest may support local feeding, breeding and movement, but there is currently no evidence that habitat within the road corridor is indispensable to the species' viability.

***Pteropus griseus* (Gray Flying Fox) – Vulnerable (VU):** Available information and the IUCN species profile do not indicate that the proposed road-upgrade corridor constitutes Critical Habitat for *Pteropus griseus*. On Timor-Leste, the species has been recorded in coastal forest roosting alone or in small groups (Goodwin 1979, as cited by IUCN). This supports possible local occurrence in suitable low-elevation habitat but does not, by itself, indicate a globally or nationally significant aggregation.

- Criterion (a), habitat of significant importance to Critically Endangered or Endangered species, is not triggered because the species is assessed as Vulnerable rather than Critically Endangered or Endangered, subject to confirmation of its current national and global conservation status.
- Criterion (b), habitat of significant importance to endemic or restricted-range species, is not demonstrated. Although the species is native to Timor and occasional occurrence cannot be excluded, available records associate it principally with primary and secondary lowland forest, coastal forest and mangroves, generally from sea level to about 190 m. On Timor, it has been observed roosting alone or in small groups in coastal forest (Goodwin 1979, as cited by IUCN). These habitat and roosting records contrast with the predominantly montane road corridor (project Area of Influence). The modelled Area of Habitat overlap of 0.01% also indicates that the Project Area of Influence is unlikely to support a significant proportion of the species' range, population or habitat.
- Criterion (c), habitat supporting globally or nationally significant concentrations of migratory or congregatory species, is not currently triggered. Individuals roosting alone or in small groups in Timor-Leste's coastal forest (Goodwin 1979, as cited by IUCN) indicates that roosting may occur without the formation of large colonies. Although small or solitary roosts are ecologically relevant and should be protected where practicable, they do not, by themselves, constitute the significant concentration required for Critical Habitat. This criterion should be reassessed if surveys during the DED stage identify a regularly occupied roost of material local, national or global importance, particularly within areas proposed for construction facilities such as laydown areas or quarries.
- Criterion (d), highly threatened or unique ecosystems, is not currently demonstrated. Available information indicates that the road corridor comprises predominantly modified habitat associated with existing settlements. No evidence has been identified to confirm the presence of ecosystems that are highly threatened, globally or nationally rare, or unique within the subproject Area of Influence. Accordingly, the available evidence does not support designation of Critical Habitat under this criterion.

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- Criterion (e), ecological functions or characteristics necessary to maintain the viability of qualifying biodiversity values, is also not demonstrated. No ecological functions necessary to support biodiversity values described under criteria (a) to (d) have been identified

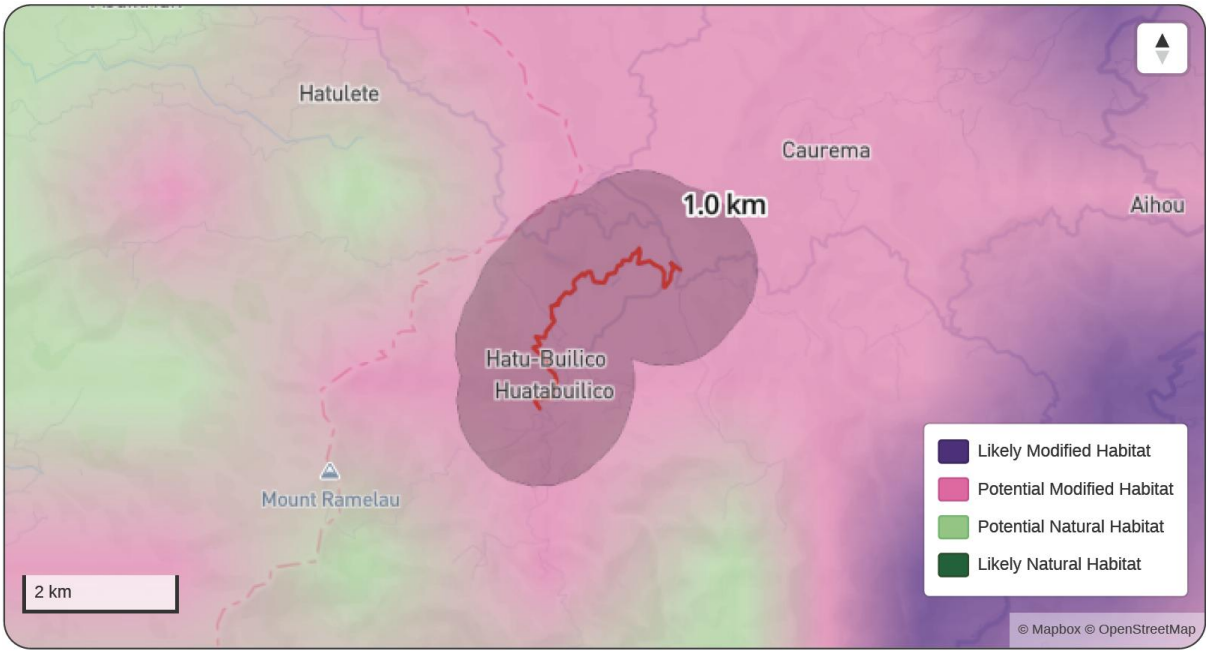
Overall, regular occurrence within the 5.4km road corridor remains ***unlikely and project relevance is low***. Solitary or small-group roosting in Timor-Leste's coastal forest increases the plausibility of occasional use of suitable lower-elevation habitat, but it does not provide evidence of a significant concentration or habitat essential to the species' viability. Accordingly, ***Pteropus griseus*** **does not currently trigger an ESS6 Critical Habitat designation for the Project Area of Influence**. This screening conclusion should be confirmed during the DED stage, with particular attention to associated construction facilities, including laydown areas, workers' accommodation and quarries. Any confirmed roost—particularly a maternity roost, recurrent communal roost or other locally important roost—together with important feeding trees and movement features, should be avoided where practicable.

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3.2.4. Terrestrial Habitat

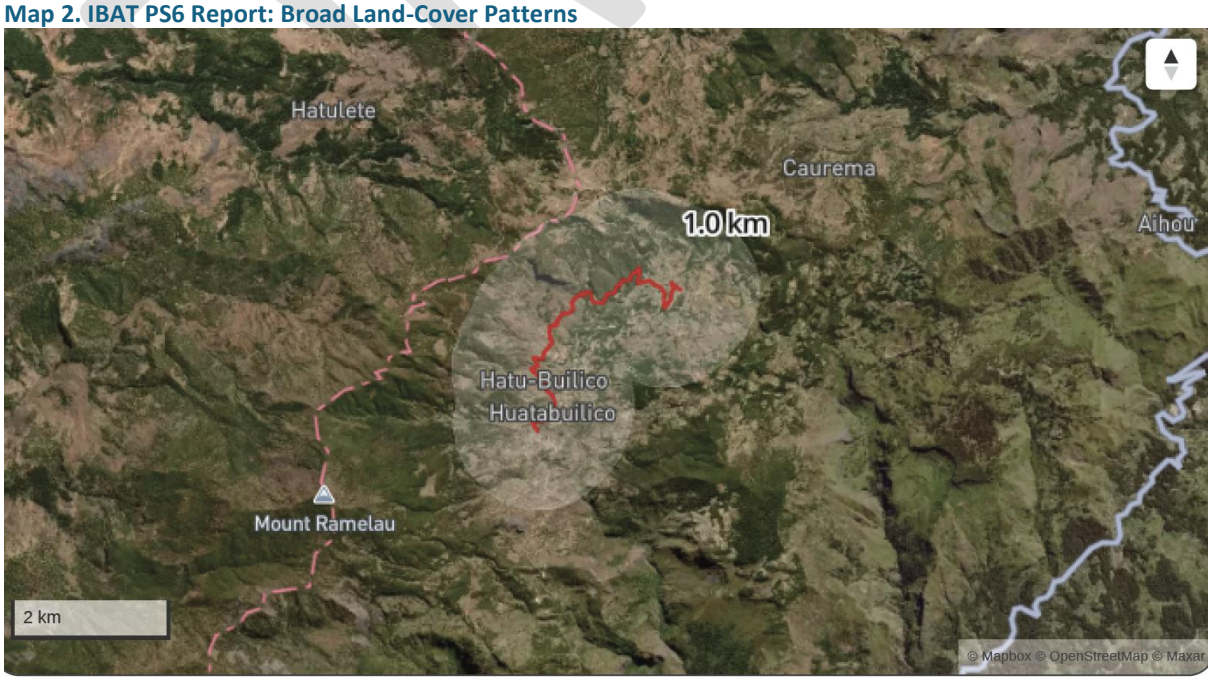
Terrestrial habitat condition was screened as Natural or Modified in accordance with the definitions set out in IFC Performance Standard 6 (PS6). A 1 km buffer was applied to assess potential direct and indirect impacts at the broader landscape scale. As shown in the maps below, the Area of Influence (AoI) is classified as Potential Modified Habitat. This screening-level classification is indicative and shall be verified and confirmed during detailed design stage.

Map 1. IBAT PS6 Report: Terrestrial Habitat Screening



Source: IBAT PS6 Report. Generated on 26 September 2026 (GMT). www.ibat-alliance.org

Map 2. IBAT PS6 Report: Broad Land-Cover Patterns

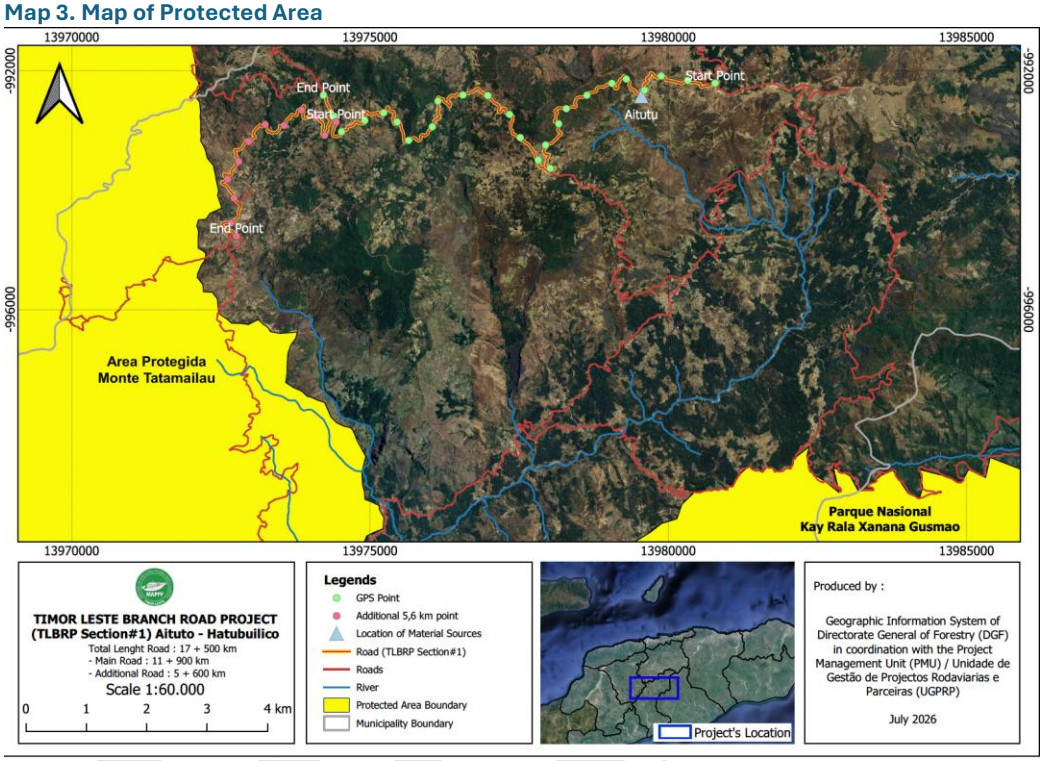


Source: IBAT PS6 Report. Generated on 26 September 2026 (GMT). www.ibat-alliance.org

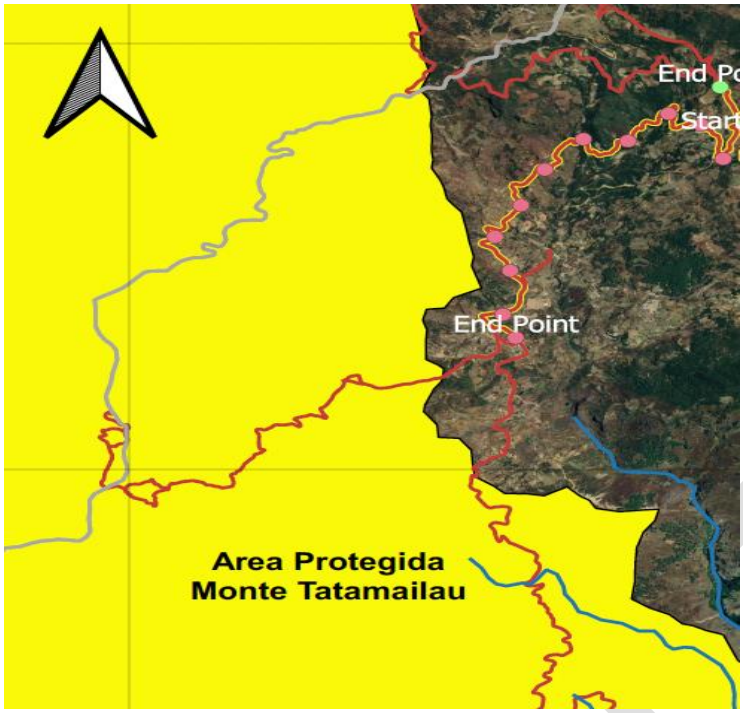
3.2.5. Protection Areas

The road provides access to the Ramelau Sanctuary and lies within or near the Mount Ramelau biodiversity landscape. Mount Ramelau is listed as a confirmed Key Biodiversity Area with terrestrial habitat, an elevation range of approximately 600 m to 2,972 m, an area of about 301.8 km², and partial overlap with protected area coverage. Mount Ramelau is also reported as a protected landscape in Ainaro and Ermera municipalities and is a nationally important pilgrimage and trekking destination.

Map 3. Map of Protected Area



Map 4. Road Proximity to Protected Area



Based on discussions with the Department of Protected Areas of the Ministry of Agriculture and Fisheries, the PMU prepared Map 3 to confirm the relationship between the Hatubuilico Junction–Ramelau Sanctuary Road and nearby protected areas. The mapping indicates that the 5.4 km road corridor is located adjacent to, but not within, the protected area boundary. This proximity makes biodiversity, habitat connectivity, water resources, and cultural landscape values, key considerations for detailed design and construction planning.

Given the corridor's proximity to protected areas, environmental risk management should prioritize avoidance and minimization at the design stage, followed by targeted mitigation and monitoring during construction and operation. Measures should include: avoidance of new access tracks, construction camps, stockpiles, spoil disposal sites, borrow areas, and quarry-related activities within or toward sensitive habitats; strict demarcation of the approved construction footprint and no-go areas; minimization of vegetation clearance and protection of mature, native, riparian, culturally valued, or habitat trees; prohibition of hunting, wildlife capture, plant collection, and worker entry into protected areas; erosion and sediment controls at all cut slopes, fills, drainage outlets, water crossings, stockpiles, and spoil areas; pollution prevention measures for fuel, lubricants, wastewater, waste, and hazardous materials; maintenance of natural drainage connectivity and community water sources; traffic, speed, dust, noise, and visitor-safety controls; restoration and revegetation of disturbed areas using locally appropriate non-invasive species; and coordination with relevant government agencies, sanctuary managers, Church representatives, local communities, and customary authorities.

Traditional resource governance mechanisms, including *Tara Bandu* where applicable, should be reflected in consultation, awareness, worker induction, and community-based monitoring arrangements.

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3.2.6. Ecosystem Services

The highland ecosystems surrounding Hatubuilico and Mount Ramelau provide important provisioning, regulating, cultural, and supporting ecosystem services. Provisioning services include fuelwood, fodder, timber and poles for local use, wild plants, medicinal resources, agricultural land, water for households and livestock, and materials used in community practices. Regulating services include slope stabilization, soil retention, moderation of runoff, groundwater recharge around springs and seepage areas, local climate regulation, carbon storage in vegetation and soils, and reduction of sediment transport to downstream catchments.

Cultural ecosystem services are especially significant. Mount Ramelau/Tatamailau is an important national landmark, pilgrimage destination, sacred landscape, and tourism asset. The road supports access for residents, pilgrims, guides, small businesses, and visitors, while the surrounding landscape contributes to identity, spiritual practice, recreation, scenic value, and local livelihoods. Construction planning should therefore avoid degrading visitor experience, sacred or customary areas, community water sources, and landscape values. Supporting services include habitat connectivity, pollination, seed dispersal, soil formation, and ecological processes that sustain the remaining montane vegetation and associated fauna.

3.2.7. Other Biodiversity and Ecological Considerations

Other relevant baseline considerations include habitat fragmentation along the road corridor, fire risk during the dry season, grazing pressure, informal cutting of trees and shrubs, invasive or weedy species on disturbed ground, waste accumulation linked to visitor use, and the potential for road improvement to increase access to sensitive areas. The current road is an existing route and the project is expected to modify an already disturbed corridor; however, even small-scale widening, drainage improvement, spoil disposal, quarrying, or temporary works can create disproportionate impacts in steep highland terrain if not carefully managed.

3.3. Socio-Economic Conditions

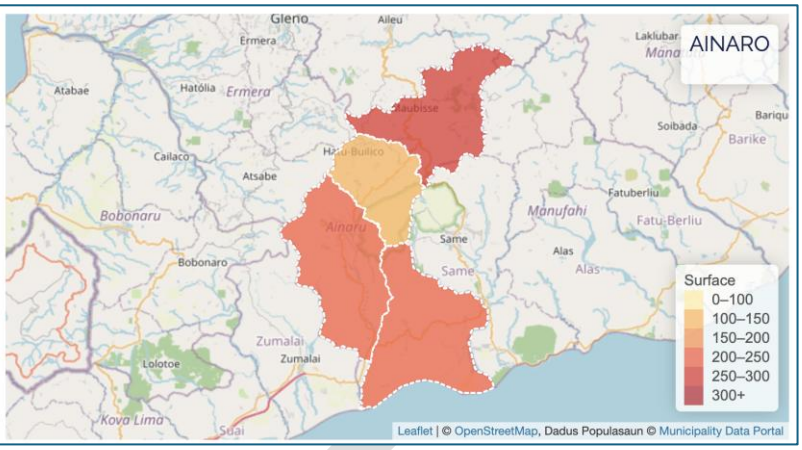
3.3.1. Administration and Demographics

The project is located in Ainaro Municipality, within Timor-Leste's central highlands. Ainaro is organized into administrative posts, including Hatu-Builico, Ainaro, Maubisse, and Hato-Udo, with local governance operating through municipal authorities, administrative post administrators, *suco* councils, aldeia leaders, customary authorities, and community institutions. The Hatubuilico Junction–Ramelau Sanctuary Road is expected to serve rural settlements and access points used by residents, pilgrims, visitors, small traders, guides, and service providers associated with Mount Ramelau/Tatamailau.

According to Ainaro Municipality data for 2026, the municipality has an estimated population of 84,607 people, of whom approximately 51 percent are male. With a total land area of about 869.8 km², the municipality has an estimated population density of 97.27 persons per km². These demographic characteristics indicate a largely rural and dispersed settlement pattern, which has implications for access to basic services, market connectivity, emergency response, and the design of inclusive stakeholder engagement under the Project.

Map 5. Administration Boundaries

Administrative post	Surface(Km^2)
Ainaro	235.90
Hato-Builico	129.90
Hato-Udo	243.00
Maubisse	261.00



Source: Ainaro Municipality Data Portal – Accessed 20 September 2026

Available municipal information indicates that Ainaro has a predominantly rural population distributed across mountainous terrain, dispersed settlements, agricultural areas, and valley communities. Accessibility constraints, seasonal road disruption, long travel times to services, and limited local market depth are important socio-economic baseline features. The improved road is therefore likely to have social benefits through safer and more reliable access to schools, health posts, markets, municipal services, religious activities, and tourism opportunities, while also requiring careful management of construction disturbance and land-related impacts.

3.3.2. Livelihoods and Local Economy

Livelihoods in the road corridor are expected to be based mainly on smallholder agriculture, livestock, seasonal wage work, petty trade, tourism-related services, religious visitor services, remittances, and use of natural resources. Common highland livelihood activities may include maize, root crops, vegetables, coffee or mixed agroforestry where suitable, grazing, fuelwood collection, sale of local products, guiding, transport services, and informal roadside commerce. Household economies are likely to be diversified but vulnerable to climate variability, road disruption, price changes, illness, and limited access to formal employment.

The road improvement may generate short-term construction employment and longer-term livelihood benefits by improving access to markets, services, agricultural inputs, emergency transport, pilgrimage routes, and tourism-related activities. However, construction may temporarily affect roadside stalls, farm access, livestock movement, footpaths, small water points, and household mobility. The ESMP should include measures to maintain safe access, provide advance notice of works, prioritize fair local employment where feasible, manage labor influx risks, and avoid disproportionate impacts on low-income households and small informal businesses.

3.3.3. Gender Issues

Women and men are likely to use the road in different ways and may experience different project impacts and benefits. Women may rely on the road for access to markets, health services, schools, water sources, religious activities, and family care responsibilities, while also participating in agriculture, petty trade, household production, and community events. Female-headed households,

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elderly women, women with disabilities, widows, and women engaged in informal roadside trade may be particularly affected by temporary access disruption or safety risks during construction.

Gender-sensitive engagement should be built into project preparation and implementation. Consultation should include women-only or gender-balanced discussions at times and locations that are accessible to women, and should address road safety, lighting and visibility at congregation points, access to health services, risks of SEA/SH , grievance channels, construction worker behavior, and equitable access to project employment. Contractor requirements should include a worker code of conduct, community awareness, confidential grievance pathways, and measures to prevent gender-based violence and harassment.

3.3.4. Land Tenure, Access and Acquisition

Land tenure in rural Timor-Leste commonly includes a combination of formal rights, customary claims, inherited use rights, communal resource areas, family land, cultivated plots, roadside occupation, and areas governed by local institutions or customary practices. Along the project road, affected assets may include small strips of land, crops, productive trees, fences, walls, water pipes, footpaths, livestock access routes, roadside kiosks, and temporary structures. Even where works remain within an existing road corridor, widening, drainage improvements, slope stabilization, spoil disposal, stockpiles, camps, and borrow areas may create land access or acquisition issues.

For World Bank purposes, the project should apply the mitigation hierarchy to avoid or minimize land take and should screen for impacts consistent with ESS5 on land acquisition, restrictions on land use, and involuntary resettlement. Affected persons should be identified through a census, asset inventory, and participatory transect walk before construction. Any land donation, negotiated settlement, temporary occupation, or compensation arrangement should be documented transparently, free of coercion, and supported by meaningful consultation, grievance redress, and special attention to vulnerable households and users without formal title.

3.3.5. Solid Waste Management and Sanitation

Solid waste management in the project area is expected to be limited by rural service coverage, dispersed settlements, difficult terrain, and seasonal access constraints. Existing waste streams may include household waste, market or roadside stall waste, packaging from visitors and pilgrims, organic waste, plastic bottles, food wrappers, construction debris from small works, and occasional hazardous materials such as used oil, batteries, paint containers, or fuel residues. Waste accumulation around visitor stopping points, viewpoints, trailheads, water points, and sanctuary access areas may affect landscape values, public health, drainage, livestock, and biodiversity.

During construction, the contractor should implement a site-specific waste management procedure covering segregation, safe storage, reuse or recycling where available, controlled removal to approved disposal sites, prohibition of open dumping and burning, spill prevention, and management of worker sanitation facilities. Camps, stockpiles, concrete works, equipment maintenance areas, and fuel storage should be located away from waterways, springs, houses, schools, religious areas, and sensitive habitats. Public awareness and coordination with local authorities may be needed where improved road access increases visitor waste pressure at Ramelau Sanctuary.

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3.3.6. Social Cohesion, Inclusion and Vulnerable Groups

Community life in the highland areas around Hatubuilico and Mount Ramelau is likely to involve strong place-based identity, customary practices, religious activities, family networks, and collective decision-making through formal and informal institutions. Mount Ramelau/Tatamailau has national spiritual and cultural significance, and road access supports pilgrimage, local tourism, and community interaction. The project should therefore avoid creating tensions over employment, compensation, access restrictions, spoil disposal locations, sacred or customary sites, or perceived unequal distribution of benefits.

Vulnerable or potentially disadvantaged groups may include low-income households, households without secure land documentation, female-headed households, elderly persons, persons with disabilities, children, youth with limited employment opportunities, households living close to construction work fronts, informal roadside vendors, and people dependent on foot access, water points, or small agricultural plots. Engagement should use inclusive methods, accessible meeting locations, local languages, and culturally appropriate communication. The grievance mechanism should be simple, widely communicated, free to use, and capable of handling land, access, labour, safety, gender, and community health concerns.

3.3.7. Projected Climate Change and Social Impacts

Climate projections for Timor-Leste indicate continued warming over coming decades, with higher average temperatures and increased heat stress likely across both lowland and highland areas. The World Bank Climate Change Knowledge Portal presents country-level Coupled Model Intercomparison Project Phase 6 (CMIP6) projections for Timor-Leste, including projected mean temperature and precipitation indicators under Shared Socioeconomic Pathway scenarios, at approximately 0.25° spatial resolution and for standard future climatological periods. Under a high-emissions pathway, the median annual temperature for Timor-Leste is projected to increase by around 1.16°C by mid-century relative to the 1995–2014 baseline, while rainfall projections remain more uncertain but indicate continued variability and potential changes in seasonal rainfall distribution. For the Hatubuilico–Ramelau highland corridor, warming may reduce the moderating effect of altitude, increase evapotranspiration during the dry season, and place additional stress on vegetation, springs, smallholder agriculture, livestock, and worker health during construction (World Bank Climate Change Knowledge Portal, Timor-Leste country overview and CMIP6 projections).

Projected changes in rainfall are particularly important for road planning. Even where annual rainfall totals remain uncertain, climate-risk guidance for Timor-Leste identifies heavy rainfall, flooding, erosion, landslides, drought, and climate-sensitive infrastructure as key concerns for adaptation planning. More intense rainfall events can increase rapid runoff, culvert blockage, gully erosion, sediment discharge, flash flooding, landslides, rockfall, and washout of unprotected road sections. Steep cut slopes, fill embankments, drainage outlets, stream crossings, spoil disposal areas, borrow pits, and construction access tracks are therefore likely to be the most climate-sensitive components of the project. The road design should apply climate-resilient drainage standards, avoid undersized cross-drainage, provide scour protection at outlets, stabilize exposed slopes quickly, and ensure that maintenance arrangements include routine drain clearance before and during the wet season (ADB

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and World Bank Climate Risk Country Profile: Timor-Leste; Timor-Leste National Adaptation Plan 2020–2030).

Climate-related impacts may also affect communities and ecosystem services. The IPCC Sixth Assessment Report notes that small islands are particularly exposed to increasing temperatures, changing precipitation patterns, sea-level rise, extreme weather events, freshwater stress, ecosystem degradation, and impacts on settlements, infrastructure, food and water security, health, economies, and culture. In the project area, more frequent access disruption could isolate households, interrupt access to schools, health services, markets, pilgrimage activities, and tourism services, and increase pressure on community water sources during dry periods. Increased erosion and slope instability may also degrade downstream water quality and affect riparian and montane habitats. The ESMP should therefore protection of springs and water intakes, revegetation of disturbed slopes, and post-construction monitoring of drainage and slope-stabilization performance (IPCC AR6 Working Group II, Chapter 15: Small Islands; Timor-Leste National Adaptation Plan 2020–2030).

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4. Potential Environmental and Social Impacts and Risks

4.1. Overview and Approach

This chapter identifies the potential environmental and social impacts and risks associated with upgrading the 5.4 km Hatubuilico Junction–Sanctuary Road, taking into account the environmental and social baseline presented in Chapter 4 and Project interventions. The assessment is preliminary and proportionate to the current stage of project preparation. It focuses on risks that may arise from Project interventions. The risks and impacts will be further verified during detailed engineering design, site-specific screening, preparation of the ESMP and CESMP, stakeholder engagement, and confirmation of sensitive receptors within the road corridor and ancillary facilities.

4.2. Potential Positive Environmental and Social Impacts

The project is expected to generate important positive impacts by improving safe, reliable, and climate-resilient access between Hatubuilico Junction and the Ramelau Sanctuary. Pavement upgrading and selective widening will improve year-round mobility for residents, visitors, service providers, small traders, agricultural producers, students, and people seeking health care or municipal services. Drainage improvements and culvert upgrading are expected to reduce road washouts, localized flooding, erosion, sediment movement, and access disruption during heavy rainfall. Slope stabilization and bioengineering measures can reduce landslide and rockfall risks, improve cut-and-fill stability, and support gradual revegetation of disturbed areas. Road safety improvements are expected to reduce traffic conflicts, improve pedestrian and visitor safety, and support safer access to the Sanctuary and surrounding communities.

4.3. Design/Pre-Construction-Phase Environmental and Social Impacts and Risks

During the design and pre-construction phase, the main risks relate to whether the engineering design, site investigations, permitting, consultation, land due diligence, and procurement documents adequately reflect the environmental and social baseline (Chapter 4). The Hatubuilico Junction–Sanctuary Road traverses generally flat to gently undulating terrain, with steep mountainous areas in its proximity. The project area is characterised with erosion-prone soils, seasonal drainage lines, springs, community water points, remnant montane vegetation, cultural and pilgrimage values, and scattered rural livelihoods. If these conditions are not fully verified before works, the detailed design may unintentionally increase environmental and social risks during construction and operation.

For **pavement upgrading and selective widening**, design-stage risks include inadequate confirmation of the existing right-of-way, failure to minimize widening footprints, and insufficient attention to houses, roadside stalls, productive trees, fences, footpaths, water pipes, access steps, livestock routes, and informal land uses located close to the road edge. Where widening is required to meet municipal road standards, the design should avoid unnecessary land take, reduce impacts on livelihoods and community assets, and incorporate safe temporary access arrangements before works begin. If land and asset impacts are not identified through early transect walks, asset inventories, and consultation with affected users and customary authorities, there is a risk of delayed compensation, disputes, and access disruption.

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For **culvert and drainage improvements**, the key pre-construction risk is under-design or poor siting of cross-drainage, side drains, drainage outlets, and scour protection in a corridor exposed to intense rainfall, rapid runoff, landslides, sediment movement, and possible climate-related increases in rainfall intensity. Inadequate hydrological assessment could lead to blocked culverts, concentrated discharge, downstream erosion, flooding of adjacent land, sedimentation of seasonal streams, and impacts on springs or community water sources. Design-stage assessment should also confirm whether works intersect waterways, seepage lines, ground water-fed springs, or seasonally saturated soils, as these receptors may be sensitive to short-term disturbance, turbidity, pollution, or flow diversion. The design should therefore verify catchment conditions, existing drainage failures, watercourse crossings, downstream receptors, community water points, and maintenance access before finalizing culvert capacity, outlet protection, sediment controls, and drainage-management measures.

For **slope stabilization** structures and bioengineering measures, design-stage risks include inadequate geotechnical investigation, inappropriate cut-slope angles, insufficient retaining or drainage provisions, delayed revegetation, and use of plant species that are unsuitable for local conditions or could become invasive. Because Chapter 4 identifies shallow soils, steep slopes, slope instability, rockfall, and erosion as key baseline sensitivities, the design should identify unstable sections, drainage seepage zones, spoil disposal constraints, and areas requiring temporary stabilization before construction. Seepage-related risks include reduced slope strength, discharge of sediment-laden water, and damage to agricultural land if subsurface flows are intercepted without appropriate subsoil drainage. Bioengineering measures should be integrated with structural stabilization and should include realistic maintenance requirements, replacement planting provisions, and monitoring responsibilities during the defects-liability or maintenance period.

Biodiversity, ecosystem service, and cultural heritage risks may arise if pre-construction screening does not adequately identify sensitive receptors within and near the road corridor. The road is associated with the Mount Ramelau landscape, which has biodiversity, spiritual, tourism, scenic, and customary importance. Design and ESMP preparation should verify any overlap with protected areas, Key Biodiversity Areas, remnant forest patches, riparian vegetation, mature or culturally valued trees, springs, water intakes, graves, sacred trees, sacred rocks, ritual areas, and other tangible or intangible cultural heritage. Failure to identify such receptors before tendering could lead to disturbance to threatened or restricted-range species, disruption of ecosystem services, community conflict, delays caused by chance finds, or construction in culturally sensitive locations without appropriate consultation and customary protocols.

For **road safety improvements**, pre-construction risks include insufficient consideration of pedestrians, motorcycles, livestock, roadside vendors, school children, elderly persons, persons with disabilities, tourists, and other vulnerable road users. If road safety measures are limited to vehicle movement and do not consider local walking patterns, stopping points, steep gradients, sharp curves, visibility, speed management, drainage crossings, and construction-stage diversions, the upgraded road may create residual or induced safety risks. The design should therefore include a road safety review, safe pedestrian and community access provisions, signage, barriers or guardrails where needed, speed-management measures, and construction traffic-management requirements suitable for the highland and pilgrimage-access context.

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Additional pre-construction risks include (a) incomplete environmental licensing, (b) inadequate integration of ESMP requirements into bidding documents, (c) selection of unapproved quarry or borrow sources, (d) poorly located camps or laydown areas, (e) insufficient spoil-disposal planning, (f) lack of baseline water-quality or receptor records, and (g) inadequate disclosure of construction schedules and access arrangements to affected communities. These risks should be managed before mobilization through preparation and disclosure of the site-specific ESMP (including E&S screening for sensitive receptors), confirmation of permits and land-access agreements, inclusion of E&S clauses and monitoring requirements in procurement documents, preparation of the Contractor ESMP and supporting plans, and early engagement with *suco* and aldeia authorities, sanctuary stakeholders, affected land users, women, vulnerable groups, and road users. With these measures, design and pre-construction risks are expected to be manageable, although localized substantial risks may remain where works interface with unstable slopes, drainage crossings, sensitive habitats, culturally important sites, community water sources, or land and livelihood assets.

4.4. Construction-Phase Environmental Impacts and Risks

Construction-phase environmental risks will be managed in accordance with the applicable World Bank ESSs, particularly ESS1 on assessment and management of environmental and social risks and impacts, ESS3 on resource efficiency and pollution prevention and management, ESS4 on community health and safety where environmental conditions affect the public, ESS6 on biodiversity conservation and sustainable management of living natural resources, and ESS8 on cultural heritage where environmental works may disturb culturally important places. The World Bank Group Environmental, Health and Safety Guidelines will be applied as relevant Good International Industry Practice (GIIP), including guidance on construction and decommissioning, noise and vibration, soil erosion, air quality, solid waste, hazardous materials, wastewater discharges, traffic safety and general site controls. Consistent with these standards, the Contractor will be required to avoid impacts where feasible, minimize and control unavoidable impacts, restore disturbed areas progressively, monitor performance, and implement corrective actions where non-compliance or unanticipated impacts occur.

4.4.1. Labor and Working Conditions

Labor influx is expected to be limited because the works are small in scale and local labor may be available; however, even a modest external workforce can create risks if recruitment, worker behavior, accommodation, occupational health and safety, and interactions with communities are not properly managed.

Occupational Health and Safety (OHS). Project workers may be exposed to OHS risks associated with road construction in steep and remote highland conditions, including unstable cut slopes and embankments, rockfall, excavation collapse, heavy machinery, construction traffic, asphalt or concrete works, manual handling, working at heights, slips and falls, dust, noise, vibration, hazardous materials, severe weather, limited emergency access, and fatigue from remote work conditions.

Worker conduct and community relation. Potential social and community risks include tension over employment opportunities, pressure on local services, inappropriate worker conduct, harassment, conflict with residents, disturbance near sacred or culturally important places, increased demand for accommodation or food, and perceived unequal access to project benefits.

Contractor will be required to prioritize transparent and fair local recruitment where feasible, provide written terms and conditions, ensure non-discrimination, prevent child and forced labour, manage worker accommodation and sanitation where applicable, provide PPE, conduct site induction and toolbox talks, supervise subcontractors, maintain emergency response and incident reporting procedures, and establish worker and community grievance mechanisms. Worker codes of conduct will cover respectful behavior toward communities, SEA/SH prevention, alcohol and drug controls on site, and sanctions for breaches. Supervisors will monitor worker-community interactions and OHS performance and address breaches promptly through contractual disciplinary procedures.

4.4.2. Resource Efficiency and Pollution Prevention and Management

Earthworks, erosion and sedimentation. The most significant construction-phase environmental risk is soil erosion and sediment transport from clearing, grubbing, excavation, cut-and-fill works, slope trimming, embankment formation, drainage excavation, spoil handling, quarry access, temporary tracks and exposed stockpiles. Because the road is located in steep highland terrain with shallow soils, seasonal drainage lines and intense rainfall, even small disturbed areas may generate sediment-laden runoff if works are poorly sequenced. Uncontrolled side-casting, unstable spoil placement, blocked temporary drains or works during heavy rainfall could affect downstream water quality, damage agricultural land, increase gully erosion and undermine road structures. The Contractor will be required to implement an erosion, drainage and sediment control plan before earthworks commence, including staged clearing, diversion drains, silt fences, sediment traps, check dams, temporary slope protection, prompt compaction or stabilization of exposed surfaces, separation of clean and dirty water, and inspection after rainfall events.

Drainage, water quality and aquatic receptors. Culvert replacement, drain cleaning, outlet construction, stream crossings, concrete works, material washing, fuel storage and camp sanitation may affect surface water, springs, seepage areas and community water sources. Potential impacts include turbidity, sedimentation, altered drainage patterns, scour at outlets, concrete wash water discharge, contamination from fuel or oil, and obstruction of natural flow paths. Works within or adjacent to waterways may affect downstream users if temporary diversions or machinery access, spoil placement are not controlled. No spoil, fuel, chemical storage, batching activity, vehicle washing or equipment maintenance will be permitted within sensitive drainage areas, springs or community water source protection zones unless specifically approved through the CESMP. Works near watercourses will be scheduled for suitable weather conditions where feasible, temporary flow diversion and sediment controls will be installed before disturbance, and water quality monitoring will be undertaken at selected upstream and downstream locations where sensitive receptors are present.

Dust, air emissions, noise and vibration. Construction activities may generate fugitive dust from earthworks, aggregate handling, hauling, stockpiles, unsealed access roads and exposed soil. Exhaust emissions may arise from vehicles, generators, asphalt or concrete equipment and machinery. Noise and vibration may occur from excavation, compaction, rock breaking, heavy equipment, hauling and operation of temporary plants. These impacts are expected to be localized and temporary but may be significant near houses, schools, health posts, community gathering areas, pilgrimage routes, visitor stopping points and livestock areas. The Contractor will apply dust suppression, covered haulage, speed limits, regular equipment maintenance, mufflers, restrictions on unnecessary idling, daytime

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scheduling of noisy activities, community notification before disruptive works, and avoidance of prolonged high-noise activities near sensitive receptors where feasible.

Spoil, waste and hazardous materials. Construction will generate spoil, vegetation debris, packaging, scrap metal, concrete residues, domestic waste from workers, used oil, oily rags, filters, batteries, empty containers and other hazardous or non-hazardous waste. Poor management could cause visual impacts, blocked drains, pollution of soil and water, attraction of pests, harm to livestock, and risks to communities and workers. The Contractor will prepare and implement a spoil and waste management procedure that prohibits uncontrolled dumping, burning and side-casting; requires segregation, reuse where suitable, safe temporary storage, transport by approved operators where available, disposal at approved locations, and documentation of waste movements. Fuel, lubricants, bitumen, chemicals and hazardous materials will be stored in secure, labelled and bunded areas with spill kits, trained personnel, emergency procedures and incident reporting.

Quarry, borrow areas, material sources and haulage. Environmental risks may arise from extraction of aggregates, borrow materials, sand, gravel and rock, as well as haulage to the work site. Risks include vegetation clearance, slope instability, dust, noise, vibration, sediment runoff, traffic safety hazards, riverbed disturbance, water-quality impacts, community conflict and incomplete site rehabilitation. The Project will use only approved and legally permitted material sources. Where new or project-specific quarries or borrow areas are required, the Contractor will prepare a Quarry or Borrow Pit Management Plan and obtain all required approvals before extraction. The plan will address siting, land access, drainage, erosion control, blasting or rock-breaking controls where applicable, traffic management, operating hours, worker and community safety, progressive rehabilitation, closure and post-use stabilization.

4.4.3. Community Health and Safety

Temporary access disruption and mobility impacts. Construction may temporarily disrupt access to houses, farms, footpaths, grazing routes, water points, schools, health services, roadside stalls, community facilities, pilgrimage routes, visitor stopping points and emergency travel. Risks may arise from excavation, stockpiles, blocked paths, temporary traffic diversions, narrowed carriageways, drainage works, slope stabilization areas, culvert replacement, material storage, and temporary closures during unsafe weather or blasting/rock-breaking if required. These impacts could disproportionately affect elderly persons, persons with disabilities, children, women with care responsibilities, low-income households, informal vendors, livestock owners, and people without alternative routes. The Contractor will maintain safe temporary access wherever feasible, provide advance notice of work schedules and access restrictions, install temporary crossings or footpaths where needed, coordinate with *suco* and *aldeia* authorities, and ensure emergency access is available or alternative arrangements are communicated before temporary closures occur.

Construction traffic and road safety. Construction vehicles, haul trucks, machinery, worker transport, material deliveries and temporary diversions may increase safety risks for pedestrians, motorcycles, livestock, roadside vendors, pilgrims, tourists, school children and local traffic. The narrow and steep road geometry, sharp bends, limited sight distance, variable weather, fog, rain, dust, loose gravel and mixed road users may increase the likelihood of accidents if traffic controls are not actively managed. The Traffic Management Plan will define haul routes, speed limits, warning signs, flag persons,

barriers, safe pedestrian routes, livestock crossing controls, reversing procedures, night-time restrictions where appropriate, parking and loading areas, community notification requirements, and emergency vehicle passage. Road safety awareness will be provided to workers and nearby communities, and traffic controls will be adjusted during market days, major religious or pilgrimage periods, school hours or other high-use periods.

Community exposure to physical hazards. Communities and road users may be exposed to construction hazards including open excavations, unprotected drainage trenches, unstable slopes, falling rocks, moving machinery, stockpiled materials, temporary spoil areas, incomplete culvert works, sharp drop-offs, unsecured fuel or chemical storage, dust, noise, vibration and reduced visibility. Children, pedestrians, visitors unfamiliar with the road, and people travelling at night or during heavy rain may be particularly at risk. The Contractor will secure work fronts with barriers, warning tape, signage and lighting where required; restrict public access to hazardous areas; maintain safe separation between the public and machinery; cover or barricade open excavations; stabilize excavated slopes; manage spoil piles; and provide daily inspections of public interfaces. High-risk areas will require additional supervision, especially near settlements, schools, health posts, water points, religious or visitor areas and steep slope sections.

Worker-community interaction and social safety risks. Potential community health and safety risks may also arise from worker-community interactions, including tension over employment opportunities, pressure on local services, inappropriate worker conduct, harassment, conflict with residents, disturbance near sacred or culturally important places, increased demand for accommodation or food, and perceptions of unequal access to project benefits. These risks may occur where workers interact with roadside communities, land users, visitors, pilgrims, informal vendors, women, children, elderly persons, persons with disabilities, and other vulnerable road users. The Contractor will manage these risks through the Community Health and Safety Plan, traffic and access controls, community notifications, emergency response procedures, the community grievance mechanism, and implementation of the worker Code of Conduct. Supervisors will monitor worker-community interactions and community safety performance and will address breaches promptly through contractual disciplinary procedures.

SEA/SH and gender-based safety risks. The Project will apply a precautionary approach to SEA/SH risks, even where labor influx is expected to be low. Risks may arise from unequal power relationships between workers and community members, limited local reporting channels, women's restricted access to information, isolated road sections, temporary worker presence, or interaction between workers and women, girls, informal vendors, service providers and visitors. The Contractor will implement a SEA/SH-sensitive Code of Conduct signed by all workers, induction and refresher training, community awareness on expected worker behavior and reporting options, confidentiality provisions, survivor-centered handling of complaints, referral pathways to available service providers where identified, and sanctions for breaches. Grievance channels will allow confidential reporting and will not require survivors or complainants to confront alleged perpetrators.

Community health, communicable disease and sanitation. Construction may create localized public health risks if worker accommodation, sanitation, wastewater, solid waste, food handling, dust, noise, standing water or hazardous materials are poorly managed. Communicable disease risks may increase through worker movement, shared transport, close contact at camps or work sites, and inadequate

hygiene arrangements. Dust and noise may also affect nearby houses, schools, health posts, roadside businesses and visitor congregation areas. The Contractor will provide adequate sanitation and handwashing facilities, potable water for workers, waste collection, vector control where needed, health and hygiene induction, first-aid arrangements, control of standing water, and site housekeeping. Community-facing controls will include dust suppression, safe fuel and chemical storage, spill response, controlled waste disposal, and advance notification of activities that may create temporary nuisance or health impacts.

Emergency preparedness and response. The highland location, steep terrain, rainfall, landslide and rockfall risks, limited alternative access and distance from emergency services increase the importance of emergency preparedness. Emergency scenarios may include road traffic accidents, slope failure, rockfall, flooding, culvert collapse, fuel or chemical spills, fire, serious worker or community injury, medical evacuation, blocked emergency access, or extreme weather events. The Contractor will prepare an Emergency Preparedness and Response Plan covering emergency contacts, site evacuation routes, communication protocols with local authorities and communities, first-aid and rescue equipment, spill response, traffic incident response, weather monitoring, temporary road closure procedures, and post-incident reporting. Emergency arrangements will be communicated to workers and nearby communities before high-risk works commence.

Information disclosure, grievance management and residual significance. Effective communication will be essential to reduce construction-related social and community safety risks. The Contractor, Supervision Consultant and PMU will disclose work schedules, temporary access changes, traffic arrangements, high-risk activities, grievance channels and contact persons in forms accessible to affected communities and road users. The project GRM will receive, and track grievances related to access, safety, dust, noise, traffic, land and assets, worker conduct, SEA/SH, cultural heritage and other construction impacts, with clear timeframes for response and escalation. With implementation of the CESMP, Traffic Management Plan, Community Health and Safety Plan, Code of Conduct, SEA/SH measures and GRM, most residual risks are expected to be moderate and manageable. Residual risk may become substantial where works occur near schools, health posts, dense settlement clusters, steep unstable slopes, pilgrimage routes, major visitor periods, community water sources, sacred sites or locations with unresolved land or livelihood issues.

4.4.4. Land acquisition, restriction on land use, and involuntary resettlement

Land and livelihood risks are expected to be limited but require careful screening and management under ESS5 because the corridor includes rural settlements, agricultural land, customary land interests, community assets, and tourism-related livelihood activities. Selective widening, drainage works, slope stabilization, temporary access, spoil disposal, camps, laydown areas or material storage may affect small strips of land, crops, productive trees, fences, roadside structures, informal stalls, walls, access steps, footpaths, water supply pipes, or livelihood access. All land requirements and asset impacts should be confirmed before construction through a participatory transect walk, asset inventory, consultation with affected users and customary authorities, and application of ESS5 procedures. Where impacts cannot be avoided, compensation, assistance, land-access agreements, voluntary land donation documentation where applicable, and any required resettlement or livelihood-restoration measures must be completed before displacement or civil works commence in affected areas.

4.4.5. Biodiversity Conservation and Sustainable Management of Living Natural Resources

Biodiversity, Natural Habitat and Ecosystem Service Risks. The road is located within a sensitive highland landscape associated with Mount Ramelau. Although the works will largely follow an existing road corridor, biodiversity risks may arise from vegetation clearance, disturbance to remnant montane vegetation, riparian areas, mature trees, nesting birds, fauna movement, and habitats used by restricted-range or threatened species. Risks may also arise indirectly if improved access increases visitor pressure, waste, informal vegetation cutting, hunting, or disturbance in sensitive areas. Ecosystem service risks include temporary or permanent effects on springs, community water sources, grazing areas, productive trees, fuelwood resources, slope-stabilizing vegetation, scenic values, and sacred landscape features. Invasive species risks may arise from movement of weed seeds along haul routes and drainage lines.

These risks could reduce native vegetation recovery, increase maintenance burdens, and spread weeds into adjacent agricultural land, waterways, and Mount Ramelau areas if not managed through clean-down procedures, and use of locally appropriate native species, and post-construction monitoring. These impacts should be managed through avoidance of high-value habitat, pre-clearing checks, biodiversity screening, restrictions on workers, control of access to no-go areas, progressive revegetation, and coordination with sanctuary stakeholders and local authorities.

Temporary facilities, camps, laydown areas and site restoration. Camps, laydown areas, workshops, stockpiles, fuel storage, equipment parking, sanitation facilities and temporary access tracks may create localized impacts if poorly sited or managed. Such facilities will be located away from watercourses, springs, unstable slopes, houses, schools, health facilities, sacred sites, productive land, remnant habitat and high-use community or visitor areas unless no feasible alternative exists and additional controls are approved. The CESMP will define siting criteria, drainage and erosion controls, waste and wastewater management, fuel and chemical storage, emergency response, access controls, reinstatement requirements and post-demobilization clean-up. All disturbed temporary facilities will be decommissioned, cleared of waste, stabilized, recontoured where necessary and revegetated or returned to agreed post-use condition before final acceptance.

Construction-phase environmental significance. With application of ESMP and CESMP measures, most construction-phase environmental impacts are expected to be temporary, localized and reversible. However, the residual risk may be moderate to substantial at locations involving unstable slopes, wet-season earthworks, drainage crossings, community water sources, spoil disposal, quarry or borrow activities, remnant vegetation, sensitive habitats, sacred landscape features or proximity to the Ramelau Sanctuary. These locations will require enhanced supervision, rainfall-triggered inspections, corrective action tracking and, where necessary, temporary suspension of works until risks are controlled.

4.4.6. Cultural Heritage

Cultural heritage risks should be managed separately under ESS8 because works may occur near graves, sacred trees, rocks, springs, ritual areas, pilgrimage routes, or other tangible and intangible cultural heritage within the Ramelau landscape. Known cultural heritage, sacred sites and community-valued places should be avoided wherever feasible through design adjustment, no-go demarcation, work sequencing, and consultation with relevant communities, *suco* and *aldeia* authorities, and

customary custodians. A Chance Find Procedure and culturally appropriate consultation requirements should be included in all civil works contracts and implemented before works in sensitive areas. If previously unidentified cultural heritage is encountered, works must stop in the affected area, the site must be secured, relevant authorities and customary representatives must be consulted, and works may resume only after agreed protection, documentation, compensation or ritual measures have been completed.

4.5. Operational and Induced Risks

During operation, the upgraded road is expected to improve access and resilience, but residual and induced risks will require attention. Increased vehicle speeds may create road safety risks for pedestrians, motorcycles, livestock, pilgrims, tourists, and roadside communities if engineering, signage, speed controls, and awareness measures are inadequate. Improved access may increase visitor numbers, waste generation, traffic, roadside commerce, disturbance to the sanctuary landscape, and pressure on sensitive habitats and cultural areas. Poor maintenance of drains, culverts, slope protection, and bioengineering measures could allow erosion, blockage, flooding, slope failure, and sediment discharge to recur. Operational risks for waterways, and seepage areas include blocked culverts, scour at outlets and altered baseflow to springs, and progressive slope instability if drainage structures are not inspected after heavy rainfall and maintain before the wet season. Invasive species may also spread during operation through vehicle movement and visitor activity, requiring periodic weed surveillance and rapid removal. The operations and maintenance arrangements should therefore include routine drain clearing, inspection after heavy rainfall, maintenance of road safety features, monitoring of revegetation and slope-stabilization performance, and coordination with local authorities and sanctuary stakeholders.

4.6. Potential Cumulative Impacts

A cumulative impact arises when the project's contribution combines with other activities or existing pressures affecting the **same receptor**, either simultaneously or over time. The Hatubuilico Junction–Ramelau Sanctuary upgrade may interact with the Aituto–Hatubuilico Junction works, shared ancillary facilities and transport routes, existing land-use pressures, and potential access-related visitor growth. Priority receptors are connected waterways and community water sources, unstable slopes, road users, local livelihoods and visitor-sensitive landscape areas. Significant cumulative effects have not been demonstrated but cannot presently be ruled out.

Table below describes potential cumulative impacts at Scoping stage. This is a **qualitative, preliminary assessment** based on the project description, baseline and E&S screening; and not a verified inventory of other developments or a final determination of significance.

Table 7. Potential Cumulative Impacts

Potential cumulative impact	Project-specific example	Receptor potentially affected
Increased sediment in connected waterways	Earthworks on the 5.4 km road, works on the approximately 12 km Aituto–Hatubuilico Junction section, and erosion from agricultural land could together increase sediment entering a shared downstream catchment, **if drainage connections are confirmed**.	Streams, and downstream water users

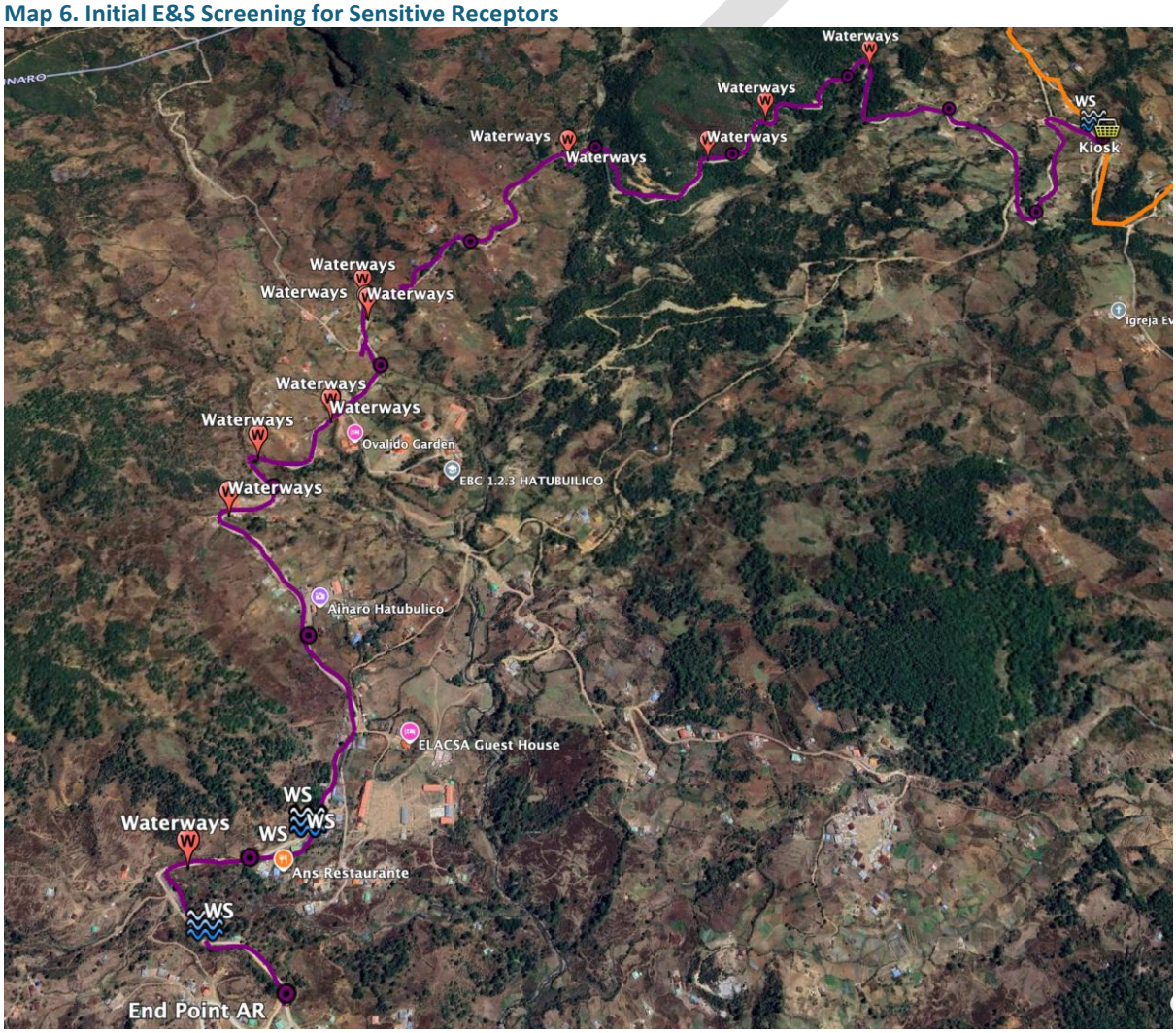
Progressive loss of habitat connectivity	Small areas of clearing for road widening and ancillary sites could combine with existing vegetation cutting and grazing to reduce connections between remnant vegetation patches.	Remnant forest, and species using connected habitats.
Prolonged dust and noise exposure	Residents near a shared haul route could experience dust and noise from both road contracts, material processing and existing traffic. Sequential works could extend disturbance even without simultaneous construction.	Households, businesses and gathering points along shared routes.
Compounded traffic and access disruption	Closures on one road section could coincide with restrictions on the other, leaving communities with fewer practical access options. Combined truck movements could also increase conflicts with local and visitor traffic.	Residents, agricultural transport, visitors and emergency access.
Pressure on community water supplies	Contractors for both sections could draw from the same sources already used by communities. Additional visitor demand could further constrain supply during dry periods, **if shared sourcing and limited capacity are verified**.	Springs, public taps and existing water users.
Waste and sanitation capacity exceeded	Construction waste could add to existing visitor litter, while improved access could increase demand for waste collection and sanitation faster than services expand.	Visitor-sensitive areas, drainage channels and local waste services.
Repeated livelihood disruption	The same household or enterprise could face temporary land occupation, haul-route disturbance and restricted customer or agricultural access from different project activities. Individually minor disruptions could become substantial in combination.	Affected households, farms and roadside businesses.
Positive network-connectivity effects	Completing both road sections could provide more reliable end-to-end access than either upgrade alone, strengthening connections to markets and services. Benefits would depend on maintenance and available, affordable transport.	Communities and businesses served by the connected road network.

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5. Initial Screening Sensitive Receptors

Broad screening of the road network sections identified for Subsection 1.2 under TLBRP2 was undertaken through a combination of a desktop study and site visit. The map is not exhaustive and should not be considered by users of this Scoping Report to be complete list of sensitive receptors. It is to be considered as a guide to the preparation of ESMP and give indication of density and distribution of key sensitive receptors and used as a starting point for more detailed screening and documentation of assets.

Map 6. Initial E&S Screening for Sensitive Receptors

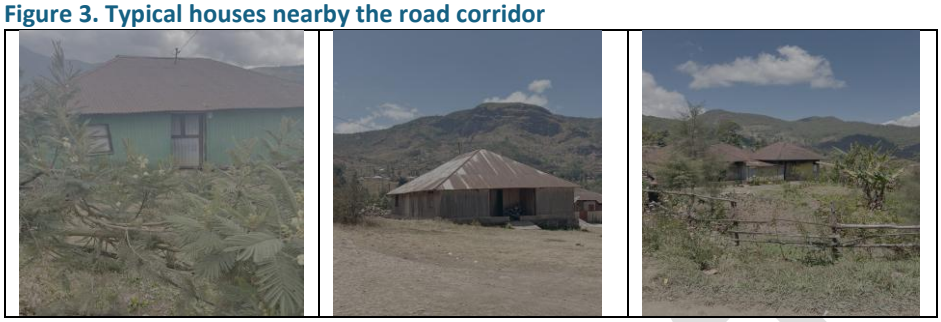


5.1. Rural Settlement

Based on preliminary screening, there are approximately 39 houses located along the road corridor may be affected by the proposed works, depending on the final engineering design, right-of-way requirements, construction methodology, and location of ancillary facilities. These potential impacts will be further verified during detailed design through a census, asset inventory, socioeconomic survey, and meaningful consultation with affected households and local authorities. Any site-specific

Resettlement Plan or due diligence instrument will define eligibility, entitlements, compensation and assistance measures, livelihood restoration requirements, vulnerable household support, consultation and grievance procedures, implementation responsibilities, budget, and monitoring arrangements. Compensation and assistance will be completed before displacement or commencement of civil works in affected areas.

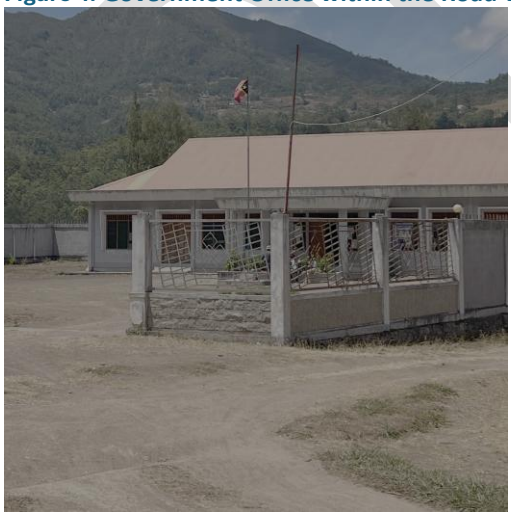
Figure 3. Typical houses nearby the road corridor



5.2. Community Facilities

Public Building. No public schools have been identified along the 5.4 km Hatubuilico Junction–Ramelau Sanctuary Road corridor. However, a community health center and government office are located in the vicinity of the road and may be affected by construction-related disturbances, including temporary access restrictions, traffic safety risks, dust, noise, vibration, and construction vehicle movements. During detailed design and preparation of the site-specific ESMP, these receptors will be confirmed and mapped, and appropriate mitigation measures will be incorporated, including maintenance of safe and continuous access, advance notification of works, traffic management, dust and noise controls, signage, barriers where required, and coordination with facility managers and local authorities to avoid disruption to essential public services.

Figure 4. Government Office within the Road vicinity



Water supply. Four community water taps located along the road corridor have been identified as sensitive social receptors and may be affected by the proposed works. These water points should be verified during detailed design, protected from construction-related damage and contamination, and maintained with safe and uninterrupted community access throughout construction. Where

temporary disruption or relocation is unavoidable, the Project should provide advance notice to affected users and ensure equivalent alternative water access before works commence.

Figure 5. Community Water Taps



5.3. Natural Waterways

There are 21 natural waterways along the road corridor. The photo below shows typical small natural watercourse or drainage channel with shallow, slow-flowing water and exposed boulders, located within a vegetated roadside or bridge/culvert area. The channel is surrounded by grasses, shrubs, and riparian vegetation and appears to receive surface runoff from the surrounding slope. This feature should be treated as a sensitive environmental receptor because it may support downstream water quality, aquatic or semi-aquatic habitat, local drainage functions, and possible community or livestock water use. Construction activities near this location could cause sedimentation, turbidity, accidental contamination, or blockage of the channel if not properly managed.

Figure 6. Natural Waterways



5.4. Water Seepage

Field observations identified water seepage at approximately KM.0+500 and KM.2+500, with affected sections extending for approximately 100 m to 200 m. The seepage occurs on a vegetated slope where groundwater or subsurface runoff appears to emerge through an exposed soil and rock face before flowing downslope into a small drainage pool. The area is characterized by saturated dark soil, moss growth, and localized erosion, indicating persistent moisture and a potential slope-stability concern if drainage is not properly managed. This location should be further inspected during ESMP preparation to confirm the seepage source, assess erosion and slope-stability risks, and determine whether drainage control, slope protection, or bioengineering measures are required. The seepage is relevant

to road works in relation to slope stability, drainage design, sediment control, and protection of natural water sources.

Figure 7. Water Seepage



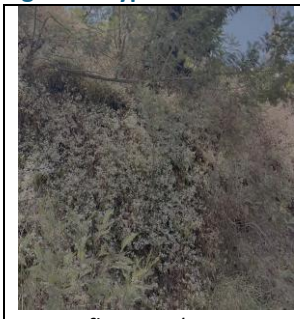
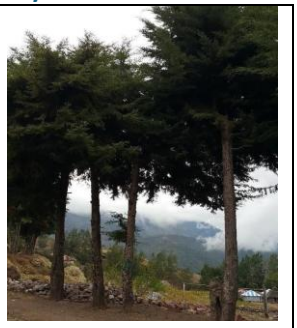
5.5. Vegetation Cover and Identified Species

Field observations indicate that vegetation along the 5.4 km road corridor is predominantly composed of modified roadside and secondary vegetation rather than intact natural habitat. The corridor passes through a rural landscape where vegetation cover has been shaped by existing road access, small-scale agriculture, settlement activity, previous disturbance and natural regeneration. Common species recorded along the road margins include *Ageratina riparia* (mist flower), *Falcataria moluccana*, *Pinus* spp. and other planted or naturally regenerated trees and shrubs. These species occur mainly cut slopes, drainage edges and disturbed verge areas, where they provide localized soil-binding and slope-stabilization functions but also reflect a vegetation community that has been substantially altered from original forest conditions.

The presence of *Ageratina riparia*, an invasive weed species, is particularly relevant for the purpose of detailed assessment during DED stage, because vegetation clearance, soil movement and construction traffic could increase the risk of further spread if appropriate spoil management and revegetation measures are not implemented.

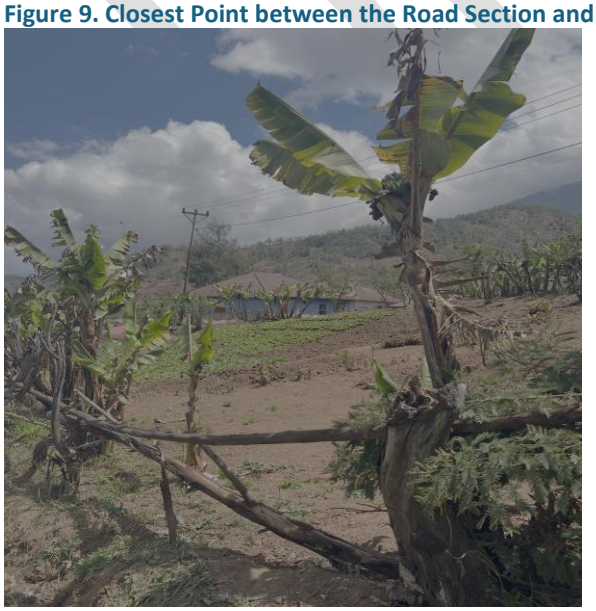
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Figure 8. Typical Roadside Vegetation along Hatubuilico Junction – Ramelau Sanctuary Road

 Mist flower (*Ageratina riparia*)	 Silver wattle (*Acacia montana*	 Moluccan Albizia *(Falcataria molucanna)*	 *Araucaria heterophylla*

The photo below shows a rural agricultural landscape characterized by banana plants, cultivated soil, and scattered secondary vegetation. The agricultural plot is located at least 200 m from the existing ROW. At this location, approximately KM 3+500, is approximately 90 m from the boundary of the protected area, representing the closest point between the road section and the protected area boundary. Based on this spatial relationship, the agricultural area shown in the photograph appears to fall within the protected area rather than within the road corridor or direct construction footprint. Although the land use is already modified for smallholder agriculture, its location within the protected area indicates the need for careful screening under ESS6, including confirmation of protected area boundaries, verification of land use and tenure, consultation with relevant authorities and local land users, and application of the mitigation hierarchy to avoid or minimize any direct or indirect impacts on biodiversity values, ecosystem services, and protected area management objectives. Any construction-related access, spoil disposal, materials storage, drainage discharge, vegetation clearance, or worker activity must ***be excluded*** from this area unless specifically assessed, permitted, and managed through the site-specific ESMP and relevant protected area requirements.

Figure 9. Closest Point between the Road Section and PA Boundary



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5.6. Sacred House (*Uma Lulik)*

During the initial E&S screening, a sacred house was identified at approximately KM-4 within the area of influence of the Hatubuilico Junction–Ramelau Sanctuary Road. The sacred house is considered a culturally significant receptor and may be associated with customary practices, ancestral identity, ritual obligations, local governance, and intangible cultural heritage. Although the final design and exact construction footprint have not yet been confirmed, any works in the vicinity of this location could create risks of physical disturbance, restricted access, dust, noise, vibration, accidental damage, inappropriate worker behaviour, or perceived disrespect of local cultural protocols.

In accordance with ESS8 on Cultural Heritage and ESS10 on Stakeholder Engagement and Information Disclosure, the sacred house will be treated as a sensitive no-go or controlled-access receptor until its significance, ownership or custodianship, use patterns, access requirements, and any required buffer or ritual protocols are confirmed through culturally appropriate consultation with the relevant custodians, *lia-na'in*, customary authorities, affected households, *suco* and aldeia leaders, and other locally recognized representatives.

The detailed design and site-specific ESMP will avoid physical impacts to the sacred house to the greatest extent feasible, maintain safe and continuous access for customary and community use, and define site-specific protection measures before works commence. These measures may include demarcation of an exclusion zone, prohibition of stockpiling, parking, waste disposal, vibration-intensive works, or heavy equipment movement near the site, worker induction on cultural heritage protocols, advance notification of nearby works, and supervision by the PMU environmental and social specialists and local cultural representatives where required. If avoidance is not feasible, the Project will not proceed with works affecting the sacred house until meaningful consultation has been completed, culturally acceptable mitigation measures have been agreed and documented, any required customary processes have been undertaken, and all national cultural heritage requirements have been satisfied.

Figure 10. Sacred House



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6. Key Stakeholders / Project Affected People

A stand-alone Stakeholder Engagement Plan (SEP) has been prepared by PMU to describe the Project's program for stakeholder engagement, public information disclosure and consultation. The main objective of the SEP is to ensure timely, transparent, inclusive, and meaningful engagement with stakeholders throughout the Project life cycle. It aims to identify and understand project-affected and interested stakeholders; provide accessible and culturally appropriate information; facilitate meaningful consultation and participation in project planning and implementation; ensure that stakeholder concerns and feedback are documented and addressed; provide particular attention to vulnerable and disadvantaged groups; establish accessible grievance and feedback mechanisms; and define clear responsibilities and arrangements for implementing, monitoring, and updating stakeholder engagement activities.

6.1. Project Stakeholders: Affected Parties

Affected parties include local communities, community members and other parties that may be subject to direct impacts from the Project, positively or adversely. Specifically, the following individuals and groups fall within this category:

Table 8. Identification and Analysis of Project Affected Parties[2]

Affected parties	Interest / Relevance to the Project	Priority level
Residents and households along the Hatubuilico Junction–Ramelau Sanctuary alignment	Communities living along or adjacent to the road right-of-way. Direct beneficiaries of improved access to Mt Ramelau. Directly affected by land/asset impacts, construction disruption (noise, dust, access), and potential employment opportunities.	High
Farmers and coffee/horticulture producers in the Hatubuilico area	Beneficiaries of more reliable, year-round access to markets, processing points and agriculture value chains, including coffee. Exposed to temporary access disruption during construction.	High
Community-based ecotourism (CBET) operators — lodges, restaurants and handicraft producers in Maubisse and Hatubuilico	Direct beneficiaries of increased and more reliable visitor access; some may face temporary disruption to access/trade during construction.	Moderate
Pilgrims, hikers and visitors to the Mt Ramelau summit and sanctuary	Beneficiaries of safer, improved access to the country's foremost tourism and religious destination. Exposed to temporary access disruption during construction.	Moderate
Communities and resource users associated with the Mt. Ramelau Protected Area / Important Bird Area boundary	Potential sensitivity to construction activity, slope cutting and disposal near the protected-area boundary; require impact avoidance measures and coordination with SNAP/PNAP.	High
Ministry of Public Works (MPW)	Implementing Agency; overall responsibility for planning, developing and maintaining the national and municipal road network.	High

[2] Table 9 presents the affected parties identified along the Gleno–Maubisse corridor, categorised by Project component and sub-component. It draws on the suco-level consultations held between September 12 and 26, 2018 (eleven sucos, about 450–500 participants), the site-specific concerns recorded in the DED Report (pp. 91–97), and the socio-economic baseline (population, agriculture, tourism, and poverty data) presented in Sections 4.5 and 6.3–6.4 of the SEIS/ESIA

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Suco and Aldeia leaders and customary/traditional leaders (Horai-Quic, Mulo, Nunomogue)	Primary channel for community consultation, land matters and protection of cultural heritage sites; representative of several hundred families along the alignment. Represent community interests, coordinate local recruitment, first point of contact for the community GRM	High
Municipality Administration; Administrative Posts	Local governance oversight and coordination role Local government coordination, community liaison and support to consultation and grievance processes.	High
Civil Works Contractor and subcontractors	Direct responsibility for on-the-ground community liaison, GRM operation and Code of Conduct implementation. Responsible for implementing ESMP/Construction ESMP requirements; require environmental permits/licenses for extraction and processing sites.	High
Ministry of Social Solidarity and Inclusion	Coordinates the national GBV referral network	Moderate
State Secretary of Art and Culture	Oversight of cultural heritage protection, including any chance finds	Moderate

6.2. Project Stakeholders: Other Interested Parties

Other interested parties who may have an interest in the Project. They include individuals or groups whose interests may be affected by the Project and who have the potential to influence the Project outcomes in any way.

Table 9. Identification and Analysis of Other Interested Parties[3]

Other interested parties	Interest / Relevance to the Project	Engagement Priority
Religious authorities and pilgrimage organizers (Mt. Ramelau/Foho Ramelau)	The Sanctuary-access section serves pilgrimage traffic to a nationally significant religious site; scheduling and cultural sensitivities apply	Moderate
Ministry of Agriculture, Forestry and Fisheries, including the National Protected Areas System	Interest in the boundary and management of the Mount Tatamailau (Ramelau) Protected Area and forest resources adjoining Sub-component 1.2.	Moderate
Ministry of Tourism, Arts and Culture	Interest in tourism development, including community-based ecotourism (CBET), around Hatubuilico and Mt Ramelau as a tourism/pilgrimage destination	Moderate
Ministry of Education	Interest in school safety and access along the alignment	Moderate
Ministry of Health	Interest in access to health facilities and management of construction-related public-health risks (e.g., communicable diseases, HIV/STIs).	Moderate
National Directorate of Pollution Control and Environmental Impact Assessment (DNCPIA)	National environmental licensing authority; reviews and clears the SEIS/ESIA and monitors implementation of the ESMP.	Moderate
National Directorate for Land Transport, Ministry of Transport	Shared responsibility for road-safety regulation and enforcement along the project roads.	Moderate

[3] Table 10 presents the affected parties identified along the Gleno–Maubisse corridor, categorised by Project component and sub-component. It draws on the suco-level consultations held between September 12 and 26, 2018 (eleven sucos, about 450–500 participants), the site-specific concerns recorded in the DED Report (pp. 91–97), and the socio-economic baseline (population, agriculture, tourism, and poverty data) presented in Sections 4.5 and 6.3–6.4 of the SEIS/ESIA.

and Communication; Traffic Police, Ministry of Interior		
National Directorate of Land, Property and Cadastral Services	Land administration authority; supports resolution of land claims and implementation of LARAPs.	Moderate
Civil-society and community organisations	Interest in environmental protection, gender equality and community welfare potential partners in consultation and monitoring.	Moderate
NGOs related to the environment and cave exploration	Interest in environmental protection, including horizontal cave protection.	High
University/ Academicians/ Think tanks	Collaboration on geological assessments, potential technical partner on geotechnical, climate-resilience and agricultural aspects of the corridor; monitor project implementation and provide feedback.	Moderate
National and local media (eg: state news agency, radio, private media)	Interest in monitor project implementation. Practical channel for the Project's information disclosure and public communications	Moderate

6.3. Project Stakeholders: Disadvantaged/Vulnerable Groups

The affected and interested stakeholders may also include disadvantaged/vulnerable individuals or groups requiring differentiated engagement. As mapped in Table 9 above, the vulnerable or disadvantaged groups may include but are not limited to the following:

- Women and female-headed households across the project corridor. Historically under-represented in project consultations, and differentiated benefits (market access, school access, safety) and risks (GBV/SEA-SH, traffic safety, unequal access to compensation and employment). Female-headed households are especially vulnerable to economic shocks and temporary land acquisition impacts due to limited labor availability and reliance on subsistence farming.

- Poor and vulnerable households: Highest sensitivity to livelihood disruption and asset loss, priority group for the grievance redress mechanism (GRM) and livelihood-restoration support. Temporary loss of roadside vending spots, minor land acquisition affecting crops or fruit trees, or temporary access blockages to local markets can severely impact household food security and daily income.

- Persons with disabilities (PWDs): Limited baseline data currently available, but require accessible facilities (ramps, sidewalks, rest points) and inclusive consultation methods. PWDs face physical safety risks during road construction, risk exclusion from local hiring programs, and require universal access features (such as low-gradient pedestrian ramps and continuous paved shoulders) in final engineering designs.

- Children and Youth: Children and youth make up nearly half of the local population across the project corridor. During civil works, children face heightened risks from road traffic hazards, construction equipment, dust emissions, and noise, particularly near school zones and along the high-traffic route leading to the Ramelau Sanctuary.

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- Elderly Persons (Aged 60+): During project implementation, the elderly face heightened safety risks in built-up sections or steep terrain lacking dedicated sidewalks, wide shoulders, or safe pedestrian crossings, and may struggle to navigate temporary construction detours.

Vulnerable groups within the communities affected by the project will be further confirmed and consulted through dedicated means, as appropriate. Description of the methods of engagement that will be undertaken by the project is provided in the following sections

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7. Institutional Arrangements, Monitoring and Capacity Building

7.1. Institutions Arrangements

TLBRP2 will maintain the same implementing arrangements as TLBRP. The Administrative Council of the Infrastructure Fund and the Ministry of Finance will provide overall oversight of project implementation, and MPW will be the Implementing Agency. The proposed project will be prepared and implemented by the existing Road Sector PMU within MPW that is managing externally supported major road upgrading projects. The PMU will be responsible for day-to-day management of the project, including E&S risk management. The PMU is currently implementing TLBRP and two ADB-funded road projects. With the GFPP resources, it will be augmented with additional staff to manage the growing number of the projects.

Overall implementation responsibility. The PMU will retain overall accountability for implementation of E&S assessment and management plan, including environmental and social screening, preparation and clearance of site-specific instruments, stakeholder engagement, grievance management, land and livelihood impact management, contractor supervision, incident reporting, quarterly reporting to the World Bank, and corrective action follow-up. The PMU will ensure that all E&S obligations are integrated into engineering design, bidding documents, contract conditions, method statements, work programs, payment certificates, and maintenance arrangements.

Core institutional roles. The PMU will be supported by qualified environmental, social, occupational health and safety, land/resettlement, and stakeholder engagement specialists, either as direct staff or through dedicated consultant support. The Supervision Consultant will provide day-to-day verification of contractor compliance, review the Contractor Environmental and Social Management Plan (CESMP) and supporting plans, issue non-conformance notices, verify corrective actions, and advise the PMU when works should be suspended because of serious or repeated non-compliance. The Contractor will be responsible for implementing all measures in the ESMP, CESMP and its sub-plans (e.g., traffic management plan, OHS plan, labor management procedures, code of conduct, grievance procedures, cultural heritage chance-find procedure, spoil management plan, water quality monitoring protocol, and site restoration.

Minimum E&S staffing requirements. Before the commencement of civil works, the PMU will confirm that the following functions are in place and adequately resourced: Environmental and Social Specialist(s); an OHS Specialist or focal point; a GRM and Stakeholder Engagement Specialist or focal point; a Land Acquisition/Resettlement Specialist; a Gender/SEA/SH Specialist or focal point; and monitoring and reporting support. At a minimum, the Contractor will appoint a full-time, locally based National Environmental Specialist (NES); a full-time, locally based OHS Officer or focal point; a National Social Specialist (NSS)/Community Liaison Officer; a GRM/GBV/SEA/SH focal point; and trained traffic and safety personnel commensurate with the number and risk profile of active work fronts. The Contractor will also have access to intermittent support from an international E&S specialist. These personnel will be authorized to stop unsafe or non-compliant work, require immediate corrective action, and escalate serious issues to the Supervision Consultant and the PMU.

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Institutional responsibility matrix. The table below summarizes the minimum division of responsibilities for ESMP implementation. Detailed task allocation will be confirmed in the Project Operations Manual, site-specific ESMP, CESMP, and civil works contract.

Table 10. Institutional Arrangements

Institutions	Functions	Key Deliverables	E&S staffing requirements
Project Management Unit (PMU)	Provide overall ESMP governance and accountability; coordinate with the World Bank; maintain adequately resourced environmental, social, OHS, grievance, stakeholder engagement, land acquisition/resettlement, gender and SEA/SH functions; lead E&S risk management and updates to safeguard instruments; oversee stakeholder engagement and the grievance redress mechanism; track incidents and corrective actions; and manage E&S requirements during the maintenance period.	Approved E&S work plan; cleared and disclosed ESIA, ESMP, LARAP, SEP and LMP; cultural heritage and disclosure records; quarterly E&S reports; incident notifications; corrective-action tracker; stakeholder and grievance records; World Bank review-response records; and semi-annual E&S reports.	✓ Environmental and Social Specialist(s): International (Part time - PT) and National (Full time - FT) ✓ OHS Specialist or focal point; ✓ GRM and Stakeholder Engagement Specialist or focal point ✓ Land Acquisition/Resettlement Specialist ✓ Gender/SEA/SH Specialist or focal point.
Supervision Consultant	Independently supervise and verify contractor compliance with the ESMP, CESMP and applicable E&S requirements; conduct site inspections and performance monitoring; identify non-conformances and recommend stop-work action where warranted; verify corrective-action closure; support instrument updates and stakeholder engagement; and advise the PMU on compliance and payment implications.	Site inspection reports; non-conformance notices; stop-work recommendations; verified corrective-action closure records; monthly E&S performance summaries; inputs to updated E&S instruments; stakeholder and grievance monitoring records; and payment-related compliance advice.	✓ International Environmental Consultant (IEC) – PT ✓ International Social and Resettlement Consultant (ISRC) – PT ✓ National Environmental Consultant (NEC) & OHS - FT ✓ National Social Safeguards Consultant (NSSC) & Resettlement - FT ✓ GRM and Stakeholder Engagement Specialist or focal point ✓ Gender/SEA/SH Specialist or focal point.
Contractors	Prepare and implement the CESMP and supporting plans; deploy qualified environmental, social, OHS, community liaison, GRM/GBV/SEA/SH, traffic and safety personnel; undertake daily risk controls and inspections; train and induct workers; engage communities and operate the site-level grievance mechanism; report incidents and non-compliances; implement corrective actions; and stop unsafe or non-compliant work.	Approved CESMP and supporting plans; daily inspection and monitoring records; induction and toolbox-talk records; signed codes of conduct; traffic-control logs; spill records; waste manifests; stakeholder engagement and grievance logs; incident and non-compliance reports; and evidence of completed corrective actions.	✓ International E&S Specialist - PT ✓ National Environmental Specialist (NES) - FT ✓ OHS Officer – FT ✓ National Social Specialist (NSS) & Community Liaison Officer (CLO) - FT ✓ GRM/GBV/SEA/SH focal point

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7.2. Institutional Capacity Assessment

Institutional responsibility for the road sector, including environmental and social (E&S) management, rests with the Directorate General for Roads, Bridges and Flood Prevention and Control (DGRBFPC) under the Ministry of Public Works (MPW), supported by a Project Management Unit (PMU). The MPW has gained substantial experience in managing World Bank-financed road projects, including TLRCRP and TLBRP Phase 1. This experience encompasses ESMP and LARAP implementation, contractor E&S oversight, grievance redress mechanism (GRM) operation, gender-based violence and sexual exploitation and abuse/sexual harassment (GBV/SEA/SH) risk management, stakeholder engagement, and reporting. E&S capacity has strengthened considerably since the 2019 ESIA, when only two staff members were assigned E&S responsibilities. The current team comprises a Safeguards Coordinator, a National Environmental Officer, an Environmental Assistant, a Social Specialist, a Gender Specialist, and two Field Enumerators. Under TLBRP, the PMU has also advanced GRM and SEA/SH prevention and risk management through the preparation and implementation of a SEA/SH Action Plan and a GRM Manual. These instruments have been applied in practice and provide a sound basis for adaptation to the proposed Project, as appropriate. Overall, the institutional and procedural framework for E&S management and grievance handling is reasonably well established. At the same time, much of the relevant expertise remains concentrated in project-funded positions, and further strengthening of MPW's institutional capacity would be beneficial, particularly in relation to the E&S dimensions of operation and maintenance.

Experience from TLRCRP and TLBRP also points to several areas where institutional arrangements could be further reinforced. Safeguards implementation has, at times, been affected by specialist turnover. The departure of experienced resettlement personnel contributed to delays in consultations, validation of asset inventories, and compensation negotiations. Experience also indicated that combining environmental and resettlement responsibilities within a single position did not provide sufficient coverage; the current team does not include a dedicated resettlement specialist. In addition, occasional delays in annual contract renewals have affected the continuity of fieldwork, baseline studies, and LARAP updates. The PMU has drawn on external expertise for specialized assignments, while internal approval processes for travel and logistics have sometimes constrained the frequency of site supervision.

Contractor E&S capacity has not always developed at the same pace as contractual requirements. In some instances, the appointment of E&S and GRM focal points has been delayed, workplace signage and suggestion boxes have not been consistently available, and oversight of subcontractors and primary suppliers has required further attention. Effective day-to-day compliance will therefore depend on a suitably resourced Supervision Consultant, timely mobilizations of qualified contractor personnel, and clear incorporation and enforcement of E&S obligations in procurement and contract documents.

Under the proposed Project, the PMU will be further strengthened through the engagement of additional international and national specialists, including a dedicated, full-time national resettlement specialist. Measures to promote continuity will include renewing contracts sufficiently in advance of expiry, establishing clear handover arrangements, streamlining field-travel procedures, and providing a dedicated budget for supervision. Targeted training on the World Bank Environmental and Social Standards (ESSs) will also be provided to relevant MPW counterparts, the PMU, the Supervision Consultant, and contractors. Together, these measures are expected to consolidate existing capacity,

address identified implementation constraints, and support consistent E&S performance throughout the Project cycle.

7.3. Monitoring and Reporting

Monitoring system. Monitoring will combine contractor self-monitoring, Supervision Consultant verification, PMU oversight, community feedback, grievance analysis, and periodic World Bank implementation support. Monitoring will be risk-based and intensified during high-risk activities, including slope cutting, culvert works, blasting or rock breaking if used, operation of asphalt or batching facilities, works near water sources, works near sacred or culturally important sites, traffic diversions, land access activities, and construction during or immediately after heavy rainfall. Monitoring results will be used to determine whether mitigation measures remain adequate or require revision under adaptive management.

Reporting requirements. The Contractor will submit weekly site E&S reports to the Supervision Consultant and monthly consolidated E&S reports to the PMU through the Resident Engineer. The Supervision Consultant will provide monthly compliance verification reports, including non-conformance status, incident follow-up, and recommendations for payment certification or withholding where contractual E&S obligations are not met. The PMU will submit quarterly E&S monitoring reports to the World Bank and will immediately notify the Bank of any serious incident or accident in accordance with project incident reporting procedures. Reports will include data, analysis, photographs where appropriate, consultation and GRM summaries, corrective action status, and lessons learned.

7.4. Capacity Building Approach

Capacity building will be treated as a continuous implementation function rather than a one-off training event. The program will combine awareness raising, role-specific technical training, contractor induction, field coaching, refresher training, and learning from incidents, grievances, audits, and World Bank review comments. Training will be delivered before mobilization and updated when monitoring identifies performance gaps. Records will document topic, trainer, participants, sex-disaggregated attendance where appropriate, learning materials, competency checks, and follow-up actions.

Table 11. Capacity Building Approach

Training topic	Target participants	Timing / frequency	Key content
World Bank ESF, ESS requirements	PMU, Supervision Consultant, Contractor management	Before procurement and refreshed annually or when instruments are updated	Risk-based screening, ESMP/CESMP hierarchy, disclosure, documentation, reporting, and adaptive management.
OHS and emergency preparedness for mountainous road works	Contractor supervisors, operators, workers, flaggers, first-aid personnel	Before mobilization, before high-risk works, and monthly toolbox refreshers	Steep-slope work, machinery safety, traffic interfaces, emergency evacuation, incident reporting, PPE, and stop-work authority.

Slope stability, erosion control, drainage, and spoil management	Contractor engineers, Environmental Site Officer, Supervision Consultant, equipment operators	Before earthworks and before each rainy season	Sediment controls, temporary stabilization, bioengineering, drainage maintenance, spoil disposal, prohibition of uncontrolled side-casting, and rainfall-triggered inspections.
Stakeholder engagement, GRM, SEA/SH-sensitive referral, and worker conduct	PMU social team, Contractor Community Liaison Officer, supervisors, workers, local focal points	Before mobilization and refreshed every six months or after serious complaints	Meaningful consultation, disclosure, grievance intake and closure, confidentiality, survivor-centered referral pathways, code of conduct, and retaliation prevention.
Land access, livelihood impacts, and cultural heritage chance finds	PMU safeguards team, Contractor, Supervision Consultant, local authorities, traditional custodians where appropriate	Before site clearance and repeated before works in sensitive areas	Asset verification, compensation-before-impact principle, temporary access management, sacred-site avoidance, chance-find stop-work requirements, and documentation.

Adaptive management and corrective action. If monitoring, grievances, incidents, design changes, cultural heritage findings, or World Bank review identify new or greater risks, the PMU will require timely revision of the ESMP and CESMP. Corrective actions will specify the issue, required action, responsible party, deadline, verification method, and consequence for non-compliance. Where risks cannot be adequately controlled, the Supervision Consultant/Engineer and PMU will have authority to suspend the relevant activity until corrective measures are implemented and verified.

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8. Scope of the E&S Assessment/Management Plan

This chapter defines the scope site-specific environmental and social (E&S) assessment and management instrument to be prepared during the detailed engineering design stage for the Hatubuilico Junction–Ramelau Sanctuary Road. The instrument shall be proportionate to the nature and scale of the proposed works, the sensitivity of the Mount Ramelau setting, and the requirements of applicable Timor-Leste legislation and the World Bank Environmental and Social Framework. It shall translate the findings of this scoping assessment into design-stage impact assessment, mitigation, monitoring, consultation, implementation arrangements, and contractor obligations.

8.1. Project Area of Influence and Study Boundary.

Consistent with the World Bank Environmental and Social Framework, including ESS1, the assessment shall define, justify and map the Project's spatial and temporal Area of Influence (AoI) using a receptor- and impact-pathway-based approach. The AoI shall encompass:

- The direct footprint of the 5.4 km Hatubuilico Junction–Ramelau Sanctuary Road and all areas subject to permanent or temporary land take, vegetation clearance, excavation, cut-and-fill, widening, drainage improvement, slope stabilisation, bridge or culvert works and utility relocation;
- Associated construction /ancillary facilities that are necessary for the Project and would not be constructed, expanded or operated in the same manner without it, including access tracks, quarries and borrow areas, spoil-disposal sites, laydown and stockpile areas, batching or crushing plants, workers' accommodation, water-abstraction points, fuel and hazardous-material storage areas, maintenance yards and haul routes
- Downstream, downslope and cross-catchment receiving environments that could be affected by altered runoff, sediment transport, erosion, spoil placement, wastewater, accidental releases or changes to natural drainage; and
- Indirect, induced and cumulative influence areas where the Project may interact with existing, planned or reasonably foreseeable development, increased visitor access, land-use change, resource extraction or other pressures within the Mount Ramelau landscape.

The study boundary shall be differentiated by environmental and social topic and shall extend as far as credible impacts could occur. It shall include:

- Settlements and dispersed households
- Schools, health posts, places of worship and other community facilities
- Springs, water-supply points, irrigation features and downstream users
- Agricultural land, grazing areas, roadside enterprises and other livelihood assets
- Tourism and customary access routes
- Protected areas, Key Biodiversity Areas, natural or potentially critical habitat, ecological corridors and ecosystem-service areas
- Sacred, archaeological and other tangible or intangible cultural-heritage sites; and

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- Receptors potentially affected by traffic, road safety risks, access restrictions, dust, noise, vibration, labour influx, worker–community interactions, communicable disease, security arrangements or competition for local resources. Particular attention shall be given to vulnerable or disadvantaged groups and to people whose use of land, water, natural resources or cultural sites may not be formally recorded.

The AoI shall be verified through field reconnaissance, geospatial analysis, design review and meaningful consultation with affected communities, relevant authorities, sanctuary and Church representatives, customary leaders and resource users.

The assessment shall provide geo-referenced maps at an appropriate scale showing the Project footprint, ancillary and associated facilities, impact pathways, sensitive receptors and topic-specific study areas. It shall:

- Document the criteria, assumptions, data sources and limitations used to establish each boundary
- Distinguish construction, operation, maintenance and temporary-facility closure timeframes
- Identify transboundary or off-site linkages where relevant; and
- Establish a procedure for updating the AoI and assessment if the design, construction methodology, facility locations or evidence of affected receptors changes during detailed design or implementation.

8.2. Environmental and Social Scoped-In Topics.

8.2.1. General E&S Topics

At a minimum, the site-specific assessment shall scope in and address:

- Geology, seismicity and geohazards
- Erosion, slope stability, drainage, flooding, extreme weather and climate resilience, supported by refinement of baseline rainfall data using the nearest meteorological records and local knowledge of flood- and landslide-prone road sections
- Surface water, springs, groundwater where relevant, community water use, hydrological connectivity and water quality, including detailed-design mapping of water crossings and downstream receptors, assessment of flood and erosion risks, confirmation of community reliance on affected water sources, and definition of measures to protect water quality, drainage connectivity, communities and ecosystems
- Air quality, noise, vibration, waste, hazardous materials, resource efficiency and pollution prevention, including controls for construction dust from earthworks, hauling, exposed soil, aggregates and unsealed-road traffic through water spraying, covered loads, speed controls, equipment maintenance and sensitive siting of stockpiles, and controls for temporary construction noise through prioritisation of daytime work, community notification, muffler maintenance, limits on idling and avoidance, where feasible, of major religious, tourism or community events
- Biodiversity, natural and critical habitat, protected and internationally recognised areas, priority biodiversity features, ecosystem services, invasive species, restoration and potential induced-access impacts. Biodiversity assessment shall include pre-clearing surveys and

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retention-area demarcation to protect roadside vegetation, avoid mature or culturally valued trees and support restoration with suitable native or non-invasive species

- ❖ Land access and acquisition, physical or economic displacement, roadside assets, livelihood disruption and restrictions on access to land, water, natural resources, services or cultural sites
- ❖ Labour and working conditions, occupational health and safety, worker accommodation, labour influx, supply-chain labour risks and worker grievance arrangements
- ❖ Community health and safety, traffic and road safety, emergency preparedness, communicable disease, worker–community interactions, security arrangements and risks of sexual exploitation and abuse, sexual harassment and other forms of gender-based violence
- ❖ Tangible and intangible cultural heritage, sacred sites, customary practices, pilgrimage routes and tourism activities; and
- ❖ Stakeholder engagement, information disclosure, consultation and Project-level grievance management. Traditional governance mechanisms, including *Tara Bandu*, shall be reflected in consultation, worker induction, awareness activities and community monitoring.

For each scoped-in topic, a concise rationale identifying the relevant Project activity, impact pathway, spatial and temporal boundary, affected receptor, applicable legal or ESS requirement, available baseline evidence, data gaps, proposed assessment method and expected management instrument or design response. The rationale shall be supported, as appropriate, by desk review, current design information, field reconnaissance, specialist surveys, geospatial analysis and meaningful consultation with affected communities, relevant authorities, customary leaders, sanctuary and Church representatives, women, persons with disabilities, livelihood groups and other users of land and natural resources.

8.2.2. Detailed Assessment Needs

The initial screening findings should be followed by a structured, site-specific assessment during detailed engineering design and preparation of the Environmental and Social Management Plan (ESMP). The assessment should confirm receptor locations and sensitivities, determine the nature and significance of potential impacts, and establish avoidance, mitigation, monitoring, and management requirements before civil works commence.

(a) Cross-Cutting Assessment Requirements

- ❑ Receptor inventory and geospatial mapping: Undertake a chainage-referenced survey of all sensitive receptors within the direct footprint and wider area of influence, including houses, public facilities, water points, waterways, seepage zones, vegetation features, agricultural land, protected-area boundaries, and cultural heritage sites. Record coordinates, photographs, condition, ownership or custodianship, current use, access routes, seasonal use, and distance from the proposed works.
- ❑ Design-overlay and impact-footprint assessment: Overlay the verified receptor inventory with the final road alignment, right-of-way, cut-and-fill limits, drainage works, slope stabilization, temporary diversions, camps, stockpiles, borrow areas, quarries, spoil-disposal sites, batching areas, and construction access routes. Identify receptors subject to direct, indirect, temporary, induced, and cumulative impacts.

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- ❑ Alternatives and avoidance assessment: Document feasible alignment, design, drainage, construction-method, scheduling, and ancillary-facility alternatives that avoid or reduce impacts. Apply the mitigation hierarchy and justify any residual impact that cannot be avoided.
- ❑ Impact significance evaluation: Assess the likelihood, magnitude, duration, reversibility, geographic extent, and sensitivity of each receptor. Evaluate construction, operation, accident, extreme-weather, and cumulative-impact scenarios, including interactions between drainage, slope stability, community access, biodiversity, and cultural heritage.
- ❑ Stakeholder engagement and disclosure: Prepare and implement a consultation plan covering affected households, facility managers, water users, land users, customary authorities, women, vulnerable persons, local government, protected-area authorities, and relevant technical agencies. Record concerns, agreements, culturally appropriate protocols, and how feedback is incorporated into design and management measures.
- ❑ Management-plan integration: Translate assessment results into drawings, specifications, bills of quantities, contractor obligations, method statements, no-go zones, permit requirements, monitoring indicators, reporting arrangements, responsibilities, budget, and corrective-action procedures.

(b) Rural Settlements and Potential Land Acquisition

- ❑ Conduct a detailed census and socioeconomic survey of potentially affected households, disaggregated by sex, age, disability, livelihood, tenure status, and vulnerability.
- ❑ Complete a cadastral and asset inventory covering land, houses, structures, crops, trees, fences, utilities, access points, and livelihood assets, supported by measurements, photographs, and signed verification records.
- ❑ Confirm the legal and customary right-of-way, final acquisition requirements, temporary occupation needs, access restrictions, and risks of physical or economic displacement.
- ❑ Assess impacts on household access, safety, livelihoods, social networks, services, and vulnerable groups, including tenants, informal users, and persons without formal title.
- ❑ Undertake replacement-cost valuation and an entitlement analysis; determine whether a Resettlement Plan, abbreviated instrument, livelihood-restoration measures, or documented due diligence is required.
- ❑ Establish consultation, disclosure, grievance, compensation, assistance, relocation, livelihood restoration, implementation, budget, and monitoring arrangements. Verify that compensation and assistance are completed before displacement or works in affected areas.

(c) Community Facilities and Public Services

- ❑ Verify the locations, functions, operating hours, user groups, peak-use periods, entrances, emergency access, and utility connections of the health centre, government office, and any other public facility identified during detailed surveys.
- ❑ Assess potential effects from access restrictions, traffic changes, road-safety hazards, dust, noise, vibration, utility interruption, construction vehicles, and emergency-response delays.
- ❑ Prepare facility-specific access and continuity plans, including temporary access, safe pedestrian routes, traffic marshals, signage, barriers, notification procedures, work-hour restrictions, and coordination protocols with facility managers.

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- ❑ Establish baseline and construction monitoring requirements for noise, vibration, dust, access, complaints, and interruption of essential services.

(d) Community Water Supply Points

- ❑ Confirm the coordinates, condition, ownership, source, users, seasonal reliability, flow or yield, collection patterns, and distribution connections for all community taps and associated infrastructure.
- ❑ Assess risks of physical damage, contamination, sediment entry, reduced yield, severed pipelines, unsafe access, and conflict among users.
- ❑ Undertake baseline water-quality testing where construction could affect a source or distribution system, selecting parameters relevant to the identified risks.
- ❑ Define protection zones, crossing details, pipeline relocation or support requirements, erosion controls, access arrangements, and emergency repair procedures.
- ❑ Where disruption is unavoidable, prepare a temporary water-supply plan that provides an equivalent safe supply before interruption and specifies notification, responsibility, monitoring, and restoration requirements.

(e) Natural Waterways and Drainage Crossings

- ❑ Survey and classify every waterway and drainage crossing by chainage, catchment, channel dimensions, flow regime, bank condition, erosion, sediment load, downstream receptors, existing structures, and possible community or livestock use.
- ❑ Undertake hydrological and hydraulic assessment to establish design flows, flood levels, scour potential, culvert or bridge capacity, overtopping risk, debris blockage, climate resilience, and downstream effects.
- ❑ Assess aquatic and riparian habitat condition, connectivity, sensitive species potential, and the need for specialist ecological surveys where suitable habitat or conservation concern is identified.
- ❑ Establish baseline water-quality and turbidity conditions at priority crossings and identify pollution pathways from earthworks, concrete, fuels, spoil, and wastewater.
- ❑ Prepare site-specific erosion and sediment controls, diversion and dewatering methods, in-stream work restrictions, spill prevention, spoil setbacks, revegetation measures, and post-construction channel restoration requirements.
- ❑ Obtain applicable watercourse permits and define inspection and monitoring requirements before, during, and after works, including rainfall-triggered inspections.

(f) Water Seepage, Geotechnical Conditions, and Slope Stability

- ❑ Undertake geotechnical and hydrogeological investigations appropriate to the risk, including soil and rock characterization, groundwater observations, drainage-path assessment, slope geometry, and stability analysis.
- ❑ Assess how excavation, loading, vibration, altered drainage, blocked outlets, intense rainfall, and climate change could affect slope stability and road performance.
- ❑ Develop and compare drainage, subsoil drainage, retaining, erosion-control, and bioengineering options. Ensure that drainage outlets do not create erosion, flooding, or impacts on water users or habitats.

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- ❑ Prepare construction-stage monitoring and emergency-response requirements, including trigger levels for movement, increased seepage, erosion, or cracking; inspection frequency; stop-work criteria; and responsibilities.

(g) Vegetation, Invasive Species, and Habitat

- ❑ Conduct a seasonally appropriate vegetation and habitat survey within the footprint and area of influence, mapping vegetation communities, mature trees, restoration areas, and any potential natural or critical habitat.
- ❑ Prepare a verified species inventory using qualified specialists (or officials from the Forestry Department) where necessary and screen recorded or potentially occurring species against national protection status and recognized conservation listings.
- ❑ Quantify anticipated vegetation clearance and distinguish temporary from permanent loss. Assess fragmentation, edge effects, erosion, habitat connectivity, fire risk and indirect effects from worker access and resource collection.
- ❑ Prepare a tree and vegetation-clearance protocol covering demarcation, minimization, pre-clearance checks, permits, supervision, material reuse, topsoil conservation, progressive rehabilitation, and revegetation with suitable native species.
- ❑ Map invasive-species infestations, particularly *Ageratina riparia*, and prepare a biosecurity and invasive-species management plan covering machinery hygiene, soil and spoil movement, weed disposal, clean-source materials, monitoring, and follow-up control.

(h) Agricultural Land and Protected-Area Interface

- ❑ Verify the protected-area boundary using authoritative spatial information and ground survey; map the road, agricultural plots, proposed works, drainage outlets, and all ancillary facilities relative to that boundary.
- ❑ Confirm land use, tenure, customary rights, livelihood dependence, access arrangements, and any restrictions applicable within or near the protected area.
- ❑ Consult the responsible protected-area authority and affected land users to identify conservation objectives, management rules, permits, sensitive seasons, and prohibited activities.
- ❑ Undertake an ESS6-aligned biodiversity assessment proportionate to risk, including direct, indirect, induced, and cumulative impacts on biodiversity values, ecosystem services, habitat connectivity, and protected-area management objectives.
- ❑ Define mapped exclusion zones and controls that prevent unauthorized access, spoil disposal, material storage, vegetation clearance, hunting, fuelwood collection, worker encroachment, and drainage discharge into sensitive areas.
- ❑ Where impacts cannot be avoided, undertake the additional specialist assessment and approval process required by national law and applicable environmental and social standards before work proceeds.

(i) Sacred House and Cultural Heritage

- ❑ Conduct a culturally appropriate cultural-heritage assessment with the custodians, *lia-na'in*, customary authorities, affected households, and local leaders. Confirm the sacred house

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location, significance, ownership or custodianship, associated landscape features, access routes, use patterns, ceremonies, intangible values, and confidentiality requirements.

- ❑ Determine an appropriate protection buffer or controlled-access zone and record any customary restrictions, ritual requirements, sensitive periods, or conduct expected of workers and visitors.
- ❑ Assess risks from land take, vibration, dust, noise, altered access, visual intrusion, drainage changes, accidental damage, and inappropriate worker behaviour. Prioritize redesign or construction controls that achieve avoidance.
- ❑ Prepare a cultural-heritage management plan specifying demarcation, no-go activities, access maintenance, notification, worker induction, supervision, monitoring, grievance handling, emergency response, and procedures for culturally acceptable mitigation if avoidance is demonstrably infeasible.
- ❑ Prepare and implement a project-wide chance-find procedure covering immediate work stoppage, protection of the find, notification, specialist assessment, authority and custodian consultation, authorization to resume work, and recordkeeping.
- ❑ Do not undertake works that could affect the sacred house until consultations, required customary processes, agreed protection measures, and applicable approvals have been completed and documented.

(j) Quarry Location Screening and Source Selection

- ❑ Quarry inventory and alternatives: Identify and map all proposed, existing, and currently active quarries that could supply the Project, including quarries supporting other road projects. Record coordinates, licence status, operator, material type, extraction footprint and capacity, haul routes, operating hours, rehabilitation status, and proximity to settlements, protected-area boundaries, sacred sites, waterways, slopes, agricultural land, and community facilities.
- ❑ Exclusion and avoidance criteria: Exclude quarrying within protected areas, mapped or customary sacred sites and their agreed buffers, critical or natural habitat where significant impacts cannot be avoided, culturally important landscapes, unstable slopes, riparian zones, water-source protection areas, and locations where safe access or rehabilitation cannot be demonstrated. Apply precautionary buffers until boundaries and cultural requirements are verified with competent authorities and customary custodians.
- ❑ Settlement and haul-route screening: Assess each quarry and haul route for proximity to houses and public facilities; land acquisition or access restrictions; dust, noise, vibration, traffic, pedestrian and livestock safety; road damage; drainage disruption; and effects on water supplies and livelihoods. Avoid routes through settlements where feasible and compare safer alternatives.
- ❑ Cumulative-impact assessment: Evaluate combined extraction, blasting, crushing, stockpiling, and haulage impacts from active quarries and concurrent road projects, including cumulative traffic, dust, noise, vibration, water demand, erosion, habitat disturbance, community safety risks.
- ❑ Site verification and consultation: Undertake field verification and meaningful consultation with affected communities, landowners and users, sacred-site custodians and *lia-na'in*, local authorities, protected-area managers, quarry operators, and relevant environmental, mining,

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and cultural-heritage agencies. Document objections, customary restrictions, access arrangements, benefit expectations, grievances, and agreed protection measures.

- ❑ Comparative screening and approval: Use a documented multi-criteria assessment to compare sources based on environmental and social sensitivity, material suitability, haul distance and route risk, cumulative impacts, legal compliance, rehabilitation feasibility, and whole-of-life cost. Select only licensed or otherwise lawfully authorized sources with acceptable risk, required permits, land-access agreements, and site-specific management and rehabilitation plans.
- ❑ Quarry management requirements: For approved sources, define extraction limits, no-go zones, blasting controls, dust and noise suppression, water management, erosion and sediment controls, traffic and haulage rules, worker and community safety measures, complaint response, biodiversity and cultural-heritage procedures, progressive rehabilitation, closure criteria, financial responsibility, monitoring, and corrective actions. The Project should not procure material from a source that fails these requirements.

(k) Construction-Phase Risk Assessments

- ❑ Prepare site-specific assessments and plans for traffic and road safety, community health and safety, occupational health and safety, hazardous materials, emergency preparedness, waste and spoil management, erosion and sediment control, pollution prevention, labour and worker conduct, camp management, and community grievance management.
- ❑ Assess cumulative disturbance where several receptors occur together or where multiple work fronts operate concurrently. Sequence works to preserve access and reduce simultaneous dust, noise, traffic, utility, and safety impacts.
- ❑ Define pre-construction condition surveys for structures and facilities potentially affected by vibration, excavation, or construction traffic, together with complaint-investigation and damage-remediation procedures.
- ❑ Community physical-hazard assessment: Identify and map locations where children, pedestrians, visitors, and nearby habitats may be exposed to open excavations, falling or rolling rocks, loose materials, construction plant, temporary diversions, and unprotected work areas. Treat open excavations and falling rocks as principal project risks to the community and habitat, and assess exposure in relation to schools, houses, public facilities, paths, visitor routes, steep slopes, work sequencing, rainfall, and periods of peak community use.
- ❑ Physical-hazard control plan: Specify engineered and administrative controls, including excavation covers or rigid barriers, fencing, exclusion zones, rock scaling and stabilization, catch fences or rockfall barriers, controlled access, safe pedestrian routes, warning signs in appropriate languages, traffic marshals, daily inspections, rainfall-triggered inspections, prompt backfilling, and community notification. Provide additional safeguards at locations frequented by children and visitors and prevent fallen material or construction debris from entering waterways or sensitive habitat.
- ❑ Emergency preparedness and monitoring: Define stop-work triggers, incident-response and rescue arrangements, responsible personnel, inspection records, rapid correction of defective barriers or unstable slopes, and reporting of near misses, injuries, rockfalls, habitat damage, and community complaints.

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(l) Indirect and Induced Impacts Assessment

- ❑ The assessment should also address induced and indirect impacts associated with improved access to Ramelau Sanctuary and potential tourism intensification. In coordination with sanctuary managers, protected-area authorities, local communities, tourism operators, and relevant government agencies, assess the sanctuary's ecological, social, infrastructure, and visitor carrying capacity, including seasonal and peak-use scenarios. Establish a baseline and projections for visitor numbers, access and parking demand, trail use, water and sanitation needs, solid-waste generation and collection capacity.
- ❑ Based on the assessment, define an adaptive visitor and environmental management framework with measurable thresholds, monitoring indicators, responsibilities, funding, and corrective actions. Measures should include waste avoidance and segregation, adequate bins and collection points, reliable transport and lawful disposal, prohibition of dumping and burning, litter monitoring and clean-up, visitor education, designated parking and trails, access controls or visitor limits where necessary, seasonal or area closures, habitat buffers, restoration of disturbed areas, fire and invasive-species controls, enforcement arrangements, and periodic review of carrying capacity as visitation patterns change.

(m) Required Outputs and Pre-Construction Verification

- ❑ A consolidated sensitive-receptor register and chainage-based map set, with photographs and receptor-specific sensitivity ratings.
- ❑ An impact and mitigation register linking each receptor to the relevant design decision, management measure, responsible party, timing, cost, monitoring indicator, and completion evidence.
- ❑ Specialist reports and approvals for resettlement, hydrology and hydraulics, geotechnical and hydrogeological risks, biodiversity and protected areas, water quality, and cultural heritage, as required by screening outcomes.
- ❑ Updated engineering drawings and tender documents incorporating exclusion zones, access provisions, drainage and slope measures, environmental specifications, and priced mitigation items.
- ❑ A site-specific ESMP and associated contractor plans, including monitoring schedules, reporting forms, incident and grievance procedures, and capacity-building requirements.
- ❑ A pre-construction compliance audit confirming that surveys, consultations, permits, compensation, alternative service arrangements, protection demarcation, contractor plans, inductions, and baseline monitoring have been completed before works commence.
- ❑ A process for managing design changes and unexpected findings so that new or altered impacts are screened, consulted upon, approved, and reflected in plans before the relevant work proceeds.

8.3. Environmental and Social Scoped-Out Topics.

The E&S aspects below are ***preliminarily scoped out*** of detailed assessment based on the current Project description and baseline. Each exclusion remains conditional and must be verified during detailed design, site-specific screening, consultation, permitting, and preparation of the site-specific

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assessment and management plan. If the stated evidence is unavailable, contradictory, or identifies a credible impact pathway, the aspect must be brought back into scope and assessed proportionately.

Aspect preliminarily scoped out	Current basis	Evidence required	Confirmation / decision gate
1. Marine and coastal impacts	The 5.4 km corridor is inland in the central highlands and has no evident marine, coastal, tidal, mangrove, or coral interface.	Georeferenced alignment and ancillary-site coordinates; topographic and catchment mapping; distance to coastline and estuarine/tidal influence.	Design consultant confirms that the direct and indirect AoI and all supply, disposal, and access locations have no pathway to marine or coastal receptors other than ordinary downstream watershed connectivity. If a material pathway is identified, assess it.
2. Major new greenfield development	Works upgrade an existing road and are expected to remain largely within the established corridor.	Final plan/profile drawings, existing and proposed footprint comparison, chainage-based widening schedule, land-cover mapping, and ancillary-facility layout.	Engineer and E&S specialists confirm that no substantial realignment, bypass, new access road, or new corridor through undisturbed land is proposed. Any such element is separately screened and assessed.
3. Major bridge construction	The Project description identifies culverts and drainage improvements rather than a major bridge.	Structure inventory, hydraulic design, drawings, span/length data, and national licensing threshold review.	Detailed design and environmental authority confirm that no bridge meeting the applicable major-project threshold is included. Reclassify and assess if a qualifying bridge is introduced.
4. Impacts on public schools along the corridor	Preliminary screening identified no public school on the 5.4 km section.	Updated receptor map, GPS field verification, education-authority and suco confirmation, school-route mapping, and consultation on student travel patterns.	Site-specific assessment and management plan confirms no school is within the defined construction AoI and no school access route is materially affected. Otherwise include school-specific traffic, dust, noise, and access measures.
5. Direct works within a legally protected area	Current mapping indicates the road is adjacent to, but outside, the protected-area boundary.	Official protected-area GIS layer, surveyed alignment and work limits, coordinates for camps/quarries/borrow/spoil sites, agency correspondence, and field demarcation.	Protected-area authority and design consultant confirm no permanent or temporary footprint enters the protected area. Any overlap requires renewed legal and ESS6 assessment, permits, and avoidance analysis.
6. Impacts on intact, extensive natural habitat	The corridor is preliminarily classified as modified habitat with disturbed roadside vegetation, agriculture,	Ground-truthed habitat-condition mapping, vegetation plots or rapid botanical survey, recent imagery, clearance quantities, and assessment of remnant/riparian patches.	Biodiversity specialist confirms no significant conversion or degradation of natural habitat. Natural-habitat patches and habitat trees remain in scope for avoidance and mitigation.

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Aspect preliminarily scoped out	Current basis	Evidence required	Confirmation / decision gate
	grazing, and regrowth.		
7. Pesticide procurement or pest-management activities	No pesticide purchase, distribution, or agricultural pest-control activity is described.	Bill of quantities, landscaping/bioengineering specifications, vegetation-management plan, procurement list, and contractor chemical register.	Site-specific assessment / management plan and bidding documents confirm herbicides/pesticides are not procured or used. If use is proposed, assess alternatives and prepare proportionate pest-management controls.
8. Large-scale labour influx and worker accommodation	The road is short and local labour is expected to be available.	Contractor workforce plan, local labour-market assessment, recruitment targets, origin of workers, peak workforce, accommodation strategy, and service-capacity review.	Before mobilisation, PMU confirms the external workforce and camp demand are limited. A larger-than-anticipated influx triggers updated social, SEA/SH, communicable-disease, accommodation, and community-service measures.
9. Transboundary environmental or social impacts	The works are localised within Ainaro Municipality and are distant from an international boundary.	AoI and catchment mapping, haul and supply routes, downstream drainage review, emissions/noise scale, and waste/material destination records.	Site-specific assessment/management plan confirms no credible pathway for significant effects in another country. Any cross-border sourcing, disposal, watershed, or transport pathway is re-screened.

8.4. Risk and impact assessment methodology.

The site-specific assessment shall apply a systematic, evidence-based and proportionate methodology consistent with ESS1 and the other applicable World Bank Environmental and Social Standards. The assessment methodology shall combine:

- Review of the latest engineering design, construction methodology and programme; relevant legislation, permits and institutional requirements; existing environmental and social studies; available meteorological, hydrological, geological, biodiversity, land-use, demographic, health, livelihood and cultural-heritage information; and applicable World Bank Group Environmental, Health and Safety Guidelines;
- Geospatial analysis and geo-referenced mapping of the road footprint, associated and ancillary facilities, catchments, slopes, habitats, land uses, settlements, community assets, cultural sites and other sensitive receptors;
- Field reconnaissance, measurements, sampling and specialist surveys using documented protocols; and
- Meaningful consultation with affected communities, women, vulnerable or disadvantaged groups, land and resource users, customary leaders, government agencies, sanctuary and Church representatives, road users and other relevant stakeholders.

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Baseline studies shall be sufficiently current, site-specific and disaggregated to support design decisions and mitigation. Survey locations, parameters, methods, equipment, detection limits, quality-control procedures and findings shall be documented and mapped.

For each Project activity and receptor, the assessment shall identify direct, indirect, induced and cumulative risks and impacts across pre-construction, construction, operation, routine and periodic maintenance, and closure or rehabilitation of temporary facilities. Impact pathways shall link the source or activity, the mechanism of change, the affected receptor and the resulting consequence. The analysis shall consider normal operations, non-routine activities, accidents and emergencies, reasonably foreseeable natural hazards and climate-related events, and interactions with associated facilities and other existing, committed or reasonably foreseeable developments in the Mount Ramelau landscape.

Risks and impacts shall be assessed separately for relevant receptor groups and locations, with particular attention to people or resources that may be disproportionately affected or have limited capacity to participate in consultation, access benefits or recover from adverse impacts. Impact magnitude shall consider nature and direction, geographic extent, duration, frequency, intensity, reversibility and the scale of physical, ecological, health, livelihood or cultural change. Receptor sensitivity or value shall consider legal protection, conservation or cultural importance, existing condition, scarcity, dependence, vulnerability, substitutability and capacity to recover.

Risk ratings shall combine consequence and likelihood, with explicit criteria for rare but high-consequence events. The methodology shall define rating categories and decision rules; identify the evidence and professional judgement supporting each score; and avoid averaging in a manner that obscures severe effects on a particular receptor or subgroup. Significance shall be reported before mitigation and after application of committed mitigation, and residual risks shall be clearly distinguished from construction risks that remain subject to design confirmation, contractor method statements or future monitoring.

The assessment shall examine technically and financially feasible alternatives, including the no-project alternative and, as relevant, alternative alignments, cross-sections, drainage solutions, slope-stabilisation techniques, construction methods, material sources, spoil-disposal locations, camp and plant sites, haul routes, work sequencing and timing. Alternatives shall be compared using environmental, social, technical, safety, climate-resilience, cost and constructability criteria, with the reasons for selecting or rejecting each option documented.

Mitigation shall follow the hierarchy of avoidance, minimisation, restoration or rehabilitation and, only for significant residual impacts where permitted and justified, offset or compensation. Preference shall be given to design-based avoidance and prevention over measures that rely solely on contractor behaviour or post-impact remediation.

For every material risk and impact, the assessment shall specify the proposed mitigation or design response, responsible party, implementation stage, location, timing, performance requirement, monitoring indicator, verification method, reporting frequency, budget allowance and corrective-action trigger. Residual significance shall be reassessed after mitigation, and any residual impact that remains significant shall be prominently identified together with additional measures, approval requirements and the rationale for acceptability.

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The methodology shall maintain a data-gap, assumptions and uncertainty register and distinguish verified information from inference. It shall define procedures for chance finds, unexpected biodiversity or cultural-heritage discoveries, previously unidentified land or resource use, unrecorded water sources, unstable ground, contamination, grievances, incidents and impacts exceeding predicted levels. These procedures shall include immediate protection or stop-work actions where warranted, notification and escalation lines, specialist review, consultation, corrective action, documentation and clearance to resume work.

Adaptive management shall be supported by measurable thresholds, hold points and responsibilities for updating the design, assessment, site-specific assessment/management plan and contractor obligations when monitoring results, stakeholder feedback, incidents or design changes indicate that impacts differ materially from those assessed.

8.5. Deliverables and reporting requirements.

A site-specific environmental and social assessment/management plan (ESMP) shall be prepared during detailed engineering design (DED) stage. The instrument shall include, at a minimum:

1. A stand-alone, non-technical executive summary suitable for disclosure
2. The legal, policy and institutional framework, including a gap analysis between national requirements and applicable ESS provisions and the measures proposed to address identified gaps
3. A detailed Project description covering the road works, associated and ancillary facilities, construction activities, workforce, material and water requirements, programme, operation and maintenance activities, and closure or rehabilitation of temporary facilities;
4. An analysis of technically and financially feasible alternatives, including the no-project alternative and design, siting, construction-method and sequencing options
5. The assessment methodology, topic-specific Areas of Influence, assumptions, limitations and quality-assurance procedures
6. An updated, geo-referenced and seasonally appropriate environmental and social baseline
7. A record of stakeholder engagement and how stakeholder inputs influenced the design and assessment
8. Assessment of direct, indirect, induced and cumulative risks and impacts, including climate and disaster risks and impacts associated with ancillary and associated facilities
9. Application of the mitigation hierarchy and assessment of residual significance
10. Conclusions identifying material commitments, outstanding information needs, approval conditions and any pre-construction hold points.

The ESMP shall convert each assessment into an implementable and auditable requirement. For every material risk or impact, it shall specify the relevant activity and receptor, exact location or chainage where practicable, mitigation or design measure, monitoring parameter and method, frequency, reporting requirement, budget provision, corrective-action threshold and close-out evidence. The ESMP shall clearly distinguish obligations of the implementing agency, design consultant, contractor, supervising engineer, relevant authorities and other responsible entities, and shall include an implementation schedule.

Supporting appendices shall include, as applicable:

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- Geo-referenced maps and editable spatial data
- Survey plans, protocols, raw or summarized results and laboratory certificates
- Photographic records
- Stakeholder consultation and disclosure records disaggregated where appropriate
- A permits and approvals register
- Land, asset, livelihood and access screening
- Biodiversity, natural-habitat and critical-habitat screening
- Cultural-heritage screening and chance-find procedure
- Labour-management requirements and worker code of conduct
- Occupational and community health and safety measures
- Traffic and road-safety management
- Emergency preparedness and response
- Pollution prevention, waste, spoil and hazardous-materials management
- Erosion, sediment, drainage and slope-stability controls; quarry, borrow-area, camp, plant and laydown-area screening criteria; grievance mechanisms for Project-affected people and workers; and
- Any topic-specific management plans required by the assessment.

Material design changes, newly identified facilities or receptors, survey findings, incidents, stakeholder concerns or changes in applicable requirements shall trigger targeted updates to the assessment and management measures before the relevant works proceed.

The Project shall disclose the draft and final instrument in accessible forms, locations and languages appropriate to Project-affected parties, with sufficient time and information for meaningful consultation.

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