ENVIRONMENTAL MANAGEMENT PLAN (EMP) – BAUCAU MUNICIPAL CAPITAL WATER SUPPLY PROJECT (UPDATED)

THE DEMOCRATIC REPUBLIC OF TIMOR-LESTE - THE MINISTRY OF PUBLIC WORKS

MAY 2026

Note:

The Environmental Management Plan (EMP) has been prepared by AdP Timor-Leste/ENGIDRO Engineering Solutions (as the Consultant consortium) for the Baucau Municipal Capital Water Supply and Sanitation Project in 2022 on behalf of and for exclusive use of the Government of the Democratic Republic of Timor-Leste, through the Ministry of Public Works and Be'e Timor-Leste in accordance with the legal requirements in effect in Timor- Leste. This work was undertaken based on the Contract RFP/039/MOP-2019 on Consulting Services for Detailed Engineering Design of Timor-Leste Four Municipal Capitals Water Supply and Sanitation Project. AdP/Engidro and its partner companies accept no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party, or any versions of said document, in any language other than English.

Subsequent to the changes in the project design to only focus in implementing the water supply component in Baucau municipal capital, including replacement of the spring water source and new/adjustment locations for water storage/distribution tanks, the EMP has been updated ("this document") by the Project Management Unit (PMU) of the Ministry of Public Works in April 2026.

ACRONYMS AND ABBREVIATIONS

ADB	:	Asian Development Bank
ACM	:	Asbestos Containing Materials
ANLA	:	*Agencia National de Licenciamento Ambiental* (The National Agency for Environmental Licensing)
BTL	:	*Bee Timor-Leste Empresa Publica*
CESMP	:	Construction Environmental and Social Management Plan
CMD	:	Cubic Meter Per Day
CFU	:	Colony Formed Unit
DED	:	Detailed Engineering Design
DMA	:	District Metered area
DiMA		Dili Metropolitan Area
EHS	:	Environment, Health and Safety
EMP	:	Environmental Management Plan
ESF	:	Environmental and Social Framework
ESS	:	Environmental and Social Standards
GoTL	:	Government of Timor-Leste
GMP	:	Grievance Management Procedure
IBA	:	International Bird Areas
IEE	:	Initial Environmental Examination
IFC	:	International Financial Cooperation
MCM	:	Million Cubic Meter
MPW	:	Ministry of Public Works
PMC	:	Project Management Consultant
PMU	:	Project Management Unit
PPE	:	Personal Protective Equipment
SEIS	:	Simplified Environmental Impact Statement
The Bank	:	The World Bank
WHO	:	World Health Organization
WTP	:	Water Treatment Plant

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1. EXECUTIVE SUMMARY

1.1. History of the Project

Around 3,456 m^3/day was supplied to the population for Baucau city of 24,358 people in 2020 through a total of transmission and distribution pipelines of approximately 70-km long. However, the water supply has not been able to meet the growing demand and good quality for the consumers, because the existing springs are not producing sufficient flow and the capacity of water storage tank is very small. On the other hand, national BTL as the water supply and sanitation company was only established in 2020 and has limited capacity and management system to operate the water supply system.

On the other hand, the existing distribution network is not quite integrated due to various old pipes built during the Indonesian occupancy combined with several NGO projects, leading to constant leakages. Issues of intermittent water supply and high incidence of illegal connections are part of the main issues, resulting in the water system is unable to adequately serve the Baucau population and revenue loss for the government. As of April 2026, the water supply system in Baucau has approximately 2,000 customers, comprising about 1,300 connections installed with water meter and 700 connections without water meters.

The Baucau Municipal Capital Water Supply Project ("the project") is one of the four Municipal Capitals Water Supply Project (4MWSP) designed under the Master Plan of water supply and sanitation designed under the Master Plan for Baucau, Lautem, Viqueque and Manufahi municipal capitals under the Technical Assistance from Asian Development Bank (ADB) in 2016. Prior to this, the consultancy firm Aurecon (ADB, 2016), commissioned by the ADB to carry out the Technical Assistance (TA-8064) for the Second (2nd) District Capitals Water Supply Project (46160-001) and produce a demand responsive investment Masterplan to meet the water supply and sanitation needs of Timor-Leste's urban populations in Baucau, Lospalos, Viqueque and Same Municipalities in line with the Timor-Leste Strategic Development Plan 2011 – 2030.

However, shortage of investment funds, skilled personnel, and inadequate operation and maintenance (O&M) budgets, hinders the municipalities from providing adequate, cost-effective water supply, even though the Decentralization Policy (2016) and the Statute of the Municipal Authorities (2016), establishing municipalities as an autonomous government institution with responsibility for these services, after a transition period. Therefore, implementation of the Baucau water supply project planned to start in 2027 is well justified (after cancellation in 2025), and it will be funded through the International Development Assistance loan administered by the World Bank.

The Ministry of Public Works (MPW) is responsible for planning, implementation, regulation, and monitoring of the project construction, and then handed over to Be'e Timor-Leste (BTL) of Baucau Municipality for operation and maintenance of the water supply system, scheduled for 2030/2031. The project will now focus in implementing the water supply component for the municipality with a replacement of one of the spring water sources, from Sirimanamana to Uaisarake, and replacement/adjustment of the water storage/distribution tanks site.

1.2. The Scope and Schedule of the Proposed Project

The scope of the project is designed to include two components as follows:

- **Component 1: The Construction of the Centralized Water Supply System.** This component will be implemented to deliver a safely managed (potable) water supply of up to 90 liters per second (at the end of the project implementation by 2031) with the following scope of works:
  - Detailed engineering design (DED) updates and/or rehabilitations necessary to ensure the sustainability and climate resilience of the water supply system, including hydraulic modelling, mechanical and electrical control, and technical specifications;
  - Rehabilitation of existing spring water intakes and construction of the new ones, covering Uailewa (currently used to supply water to Baucau), Uailia Mata, Uialia Bere, and Uaisarake springs and protecting the respective water sources;
  - Increase in storage tank capacity, including construction of bulk, ground-level and elevated water storage tanks, total 9 tanks.
  - Installation of water softener and chlorination facilities;
  - Construction of storage room and water quality laboratory including provision of associated analytical equipment;
  - Replacement and extension of the transmission and primary distribution mains and existing pumps, including installation of bulk meters and SCADA system; and
  - Replacement and extension of water distribution network, with household connections and micro-metering to serve 9 water distribution zones.
- **Component 2: Project Supervision Consultant**. This component will include: Construction supervision works (including environmental and social safeguards, gender, and technical reporting; Part 2: Operation and Maintenance (O&M) Technical Assistance; DED modification and adjustment; and Sustainability Improvement Plan.

1.3. Environmental and Social Impact Assessment and other Studies

The MPW recognized its regulatory duty, as project proponent, as mandated in Decree Law No. 5/2011 on Environmental Licensing, to prepare the Simplified Environmental Impact Statement (SEIS) and Environmental Management Plan (EMP) following classification of the project as Category B. Following the evaluation of the SEIS and EMP, the environmental license of the project was granted by ANLA in October 2024. Further, the SEIS and EMP has been updated in April 2006 to align with the changes in the project scope described earlier. (Note: The current Environmental License will be expired in October 2026 and will need to be renewed prior to commencement of the construction.) In addition, field investigation and other studies that have been conducted for the project are summarized in the following table.

Table 1.1. Field Investigation and Design Conducted

Study/Field Investigation	Description Activities
Geological study in October 2021	Identify the local geology and geomorphology for Baucau Municipality as well as its geotechnical implications for the engineering design. The site investigation works have been done, however, very little information obtained, essentially concerning bibliographical data coming from diverse sources, namely *Instituto do Petróleo e Geologia*, investigation works and scientific papers.

Study/Field Investigation	Description Activities
Hydrogeological study in November 2021	Pumping tests have been conducted by the research team in the existing springs to estimate the hydraulic properties of aquifers to evaluate the well performance and identify aquifer boundaries. The test activity includes a field experiment in which a well is pumped at a controlled rate and water-level response is measured in one or more surrounding observation wells (control well) itself.
Topography survey In January 2021	A topographic survey was conducted for the proposed water tank sites along with associated access road to obtain the main physical features on the ground.
Water quality testing in October 2014, February – April 2018, and October – November 2021, and Mar – April 2026	The water quality testing was conducted as part of the initial environmental examination (IEE) document to meet ADB requirements. The other water quality testing for Uailewa Spring was conducted by the National Directorate for Sanitation and Water (now BTL) to detect any occurrence of water contamination for human consumption including analyses of physical, chemical and bacteriological analyses defined in the relevant WHO Standards.
Preliminary Engineering Design of Four Municipal Capitals Water Supply & Sanitation Project – Baucau City (March to Feb 2021) – ADB Technical Assistance	This preliminary engineering design provides a framework/scope for the detailed engineering design (DED), water sources and infrastructure locations, layouts and main characteristics of the proposed systems and reviews the water demands estimation; and provides a preliminary cost estimate of all infrastructures including different scenarios and options. In parallel, an initial environmental examination (IEE) document was prepared to meet the Safeguard Policy Statement (2009) of Asian Development Bank (ADB). This environmental assessment was conducted for the Baucau city water supply and sanitation project, based on the preliminary engineering design, and (ii) most likely environmentally sensitive components
Social baseline survey (June 2021)	The main objectives of the mentioned survey were: • To calculate the number of consumers that is currently and will be served with a water distribution system by 2040. The team has been referencing the 2015 Census and 2015 Masterplan for this analysis. • To conduct inventory of landowners and farmers that will be affected by the project and provide them with a grievance redress mechanism in the event that they have complaints.
Geotechnical studies (December 2021 to January 2022)	Standard Penetration tests (SPT) and Lefranc water tests were done for determining geomechanical and hydraulic properties of foundations for water tanks and water treatment plants. Trial pits were useful to investigate ground properties for pipes and small structures. Both boreholes and trial pits samples were submitted to laboratory tests to investigate physical and mechanical properties of the soil. 25 boreholes were drilled and 3 piezometers installed to evaluate geotechnical characteristics underlying the water pressure release tanks and water storage tanks. A total of 48 soil analysis was performed for sieve analysis, Atterberg limits, moisture content

Study/Field Investigation	Description Activities
	and bulk specific gravity; 20-point load tests in rock specimens; and 18 tests of the soil chemical properties. Soils sampled by trial pits along the transmission mains (TM) pipes total 34 units and 45-meter-long excavation. Majority of the trail pits has a depth of less than 1.5m, due to the hardness of ground materials. Laboratory tests performed over collected samples consisted of 34 identification tests for sieve analysis, Atterberg Limits, moisture content (W%) and specific gravity, 34 field density tests, and 20 proctor compaction tests.

1.4. E&S Risk and Impact Assessment, and Management Plan

Key Regulatory Framework and Applicable Standards. The updated environmental and social impact assessment ("this SEIS") of the project was prepared to be aligned with changes in the project scope and the requirements of the Decree Law 5/2011 and to accommodate the requirements of the World Bank Environmental and Social Framework (2017) including relevant Environmental and Social Standards (ESS). The EMP has also been updated and presented in a stand-alone document separate from the SEIS as required by the mentioned decree.

The SEIS covers the following chapters:

- Chapter 1 Executive Summary
- Chapter 2 The Project Proponent
- Chapter 3 The Consultant Preparing SEIS and EMP
- Chapter 4 Description of the Project
- Chapter 5 Key Policy and Regulatory Framework
- Chapter 6 Description of Environment and Social Baseline
- Chapter 7 Project Alternatives
- Chapter 8 Climate Change
- Chapter 9 Impact Assessment and Mitigation Measures
- Chapter 10 Summary of Environmental Management Plan
- Chapter 11 Public Consultation and Information Disclosure
- Chapter 12 Difficulties Encountered
- Chapter 13 Conclusions and Recommendations
- Chapter 14 Non-Technical Summary
- Chapter 15 Non-Technical Summary (in Tetum Language)
- Chapter 16 Bibliography

Environmental and Social Risk and Impacts of the Project. The SEIS assesses the project's impact significance through the application of an evaluation matrix and impact assessment rating for all components and activities in the Pre-construction, Construction, Operation and Decommissioning Phases of the Project. The significance of the impacts was assessed

according to the condition of the affected environmental and social components at the time of evaluation and the scale of impact should the impact persist.

The estimated negative environmental and social impacts of this project, , particularly the construction phase, is more likely to generate adverse impacts towards the environment and the local community than the remaining phases of the projects, albeit temporary. Other than the pipe laying works (new and/or rehabilitation), the remaining construction activities will be restricted to their respective confined area, thus the interference with the public and surrounding community should be minimal. Negative impacts to be generated are predicted as mostly temporary, such as noise and air pollution (that causes disturbance to the nearby dwellings and commercial buildings), construction waste (solid and liquid), increased traffic (especially in narrow roads), as well as health and safety risk to workers, declining of water quality, soil erosion, etc.

Table 1.2. Summary of Potential Significant Impacts

Potential Significant Impact	Project Implementation		
	Pre-Construction	Construction	Operation and Maintenance
Water source quality (spring/sink hole)	Water pollution due to inadequate protection Drying up of the boreholes & private wells due to over extraction	Silt runoffs and soil wastes without final disposal site will trigger underground water contamination	Expansion of housing in the upstream with inadequate sanitation facility leading to water deterioration in the sources
Noise	-	Increase in noise level from construction works, particularly nearby the affected households	-
Air Quality	-	Increasing dust concentration	-
Socio-economic	Water conflicts between communities	Job opportunities and skill enhancement for local communities	Increasing life quality in health and hygiene sector due to the depleting rate of mortality and waterborne diseases. The community will be able to be more productive.
Odour	-	Organic wastes from construction materials without proper treatment and designating final disposal site will reduce aesthetic view and produce odour nuisance	Irregular maintenance e.g., cleaning and treated sludge kept in an open space for certain period of time.
Soil	-	Silt runoffs can cause traffic accident and increasing volume of soil wastes (spoils, spare materials, etc)	Runoff from the construction sites

Potential Significant Impact	Project Implementation		
	Pre-Construction	Construction	Operation and Maintenance
		can lead to possible soil contamination, attract pests and serve as vectors for disease carrying insects, and negative visual impact	
Traffic Management		Heavy load trucks mobilization and construction sites without barriers, signages and velocity limit that may cause traffic accident towards the affected community	-
Occupational and Community Health & Safety	Health hazard arising from inadequate design and/or handling of facilities for receiving, storing and handling of chlorine and other hazardous chemicals	Accidents and even mortality for the worst scenario towards the workforces without utilizing proper PPE	Health hazards due to chlorine exposure

The EMP including for social aspects of each significant impact is presented as a stand-alone document as required by the environmental licensing law and Ministerial Diploma No. 47/2017. The EMP addresses E&S impacts evaluated in the SEIS and associated mitigation measures to apply during the different phases of the project, as well as the monitoring programs to keep up-to-date with the progress of the project as well as a grievance redress mechanism (GRM) to process complaints and concerns that may be raised during project implementation. Upon contract award, the Contractor is required to develop a specific Construction Environmental and Social Management Plan (C-ESMP) for the project, which is a detailed plan that sets out the contractor's approach to implementing the required mitigation measures, including GRM. The activities and mitigation measures should be specific to the conditions of the project components and of Baucau Municipal Capital.

Stakeholder Engagement and Information Disclosure. Throughout the DED phase and the IEE under the ADB process, the consultants undertook Public Consultation for Baucau city in the Baucau Municipality Administrative Assembly Room on 3 October 2020, participated by local government agencies and authorities (Chief of Suco and Village), and representative members of the communities within the project area, where the issues of significant social concern, predicted environmental impacts and proposed mitigation measures were presented, in order to collect all useful and relevant inputs from them, for the project construction phase. The stakeholders presented their concerns, suggestions and recommendations for the project implementation, focusing mainly on issues such as Land & Property, Acceleration of the Project Implementation, Project Area, Water distribution system does not serve all villages, misuse by consumers (and direct impact on water availability in the distribution system and measurement for structural preservation of cultural and religious assets within the project area.

The team involved and collaborated with several local and national level institutions, including Baucau Directorate of Water and Sanitation; Chief Department of the Environment for Baucau BTL; Ministry of Agriculture and Fisheries; Secretary of State for Arts and Culture; and Local Authorities of Chief of Suco Bahu, Caibada, Buibau, Tirilolo, Uailili, Samalari, Triloca, and Buruma.

In addition, 7 other Public Consultations were carried out on 4 February 2021 in Suco Caibada, Suco Bahu and Suco Tirilolo, on 5 February 2021 in Suco Gariuai, Suco Tiriloca, on 6 February 2021 in Suco Buibau and on the 9 February 2021 in Suco Uailili. Further, the public consultation as part of SEIS preparation was carried out on 1 - 2 June 2022 in Suco Bahu and Tirilolo. These consultations were aimed to address expectations and concerns raised in the previous public consultations in February 2021 and reassured the team that there is very little risk of any water conflicts or impacts felt by the community during implementation and operation of the future system.

2. DETAILS OF THE PROJECT PROPONENT

The Ministry of Public Works (MPW) is responsible for planning and implementation of the water supply project and is the proponent for the Baucau Water Supply Project, supported by a dedicated project management unit (PMU) who will oversee the overall project preparation and construction activities. Be'e Timor-Leste (BTL) in Dili and Baucau will be the future operator of the water supply system. The project proponent and representative details/contacts for the project is as follows:

Proponent Ministry of Public Works (MPW), Mr. Samuel Marçal, Minister MPW Corporate Services Building Avenida 20 de Maio, Caicoli, Díli, Timor-Leste	**Proponent Primary Contact** Be'e Timor-Leste (BTL EP) Mr. Gustavo da Cruz, President Compound Avenida 20 de Maio, Caicoli, Díli, Timor-Leste Telephone: +670 7732 6859
Proponent Secondary Contact Be'e Timor-Leste (BTL EP) Mr. Joao Babtista da Cruz Cardoso, Dir. DEI BTL Office Avenida 20 de Maio, Caicoli, Díli, Timor-Leste (Telephone: 7777 4344)	**Proponent Tertiary Contact** BTL Baucau Regional Office Mr. Adriana Belo da Rosa, Team Leader Suco Tirilolo, Vila nova, Baucau, Timor-Leste (Telephone: +670 77312363)

In undertaking his day-to-day task in relation to the project, the Project Management Unit (PMU) has been established under the MPW and it will be responsible for overseeing and implementation of the required procurement process, project construction, supervision and commissioning. The PMU will be assisted by a project supervision consultant (PSC) which will be tasked to supervise the contractor mobilization, construction and commissioning activities and assist the PMU in preparing the required progress reports as well as other reports as required by the Government and the World Bank.

3. THE CONSULTANTS PREPARING THE SEIS AND ESMP

The draft of the SEIS and EMP documents of the Baucau Water Supply Project was prepared by the Ministry of Public Works (MPW) in 2021 – 2022 who contracted the consortium Águas de Portugal Timor-Leste and Engidro to prepare these documents. Mr Vasco Leitão is the Environmental specialist responsible in preparing these documents under the lead of Mr Mario Santos on behalf of ADP-TL/Engidro. The lead specialist was supported by several OASIS technicians. This consortium consultant also prepared the Detailed Engineering Design of Four Municipal Capitals Water Supply and Sanitation Project of Baucau, Manufahi, Lautem and Viqueque, financed by the Infrastructure Fund of the Government of Democratic Republic of Timor-Leste.

The latest draft of the SEIS and EMP was submitted to the Bank in 2022 for review, but then the project was cancelled. Subsequently, the project was reactivated for implementation in early 2026 at the request of the Government of Timor-Leste and, therefore, the draft SEIS and EMP shall be updated to reflect changes in the scope of the project to focus on the water supply component and updates on environmental and social baseline information as well as the risk and impact assessment. This document update was undertaken by the PMU of the project assisted by an environmental consultant.

4. SUMMARY OF PROJECT DESCRIPTION

Detailed project description is described in the SEIS of the project and shall be referred to when reading this EMP, which both documents are complementary in nature.

The area of the Baucau Municipal Capital water supply project including selected nine villages (Suco) is located within approximately 15-km radius from the capital city. The project area generally borders with Vemasse Administrative Post (to the west), Laga and Quelicai Administrative Posts (to the east), Venilale Administrative Post (to the south) and Banda Sea (to the north) as shown in the following figure. Geographic coordinates of the project site are in the South-West latitude of 8°32'22.81" South and longitude of 126°23'29.15" East and North-East latitude of 8°24'20.39" South and longitude of 126°31'36.24" East.

Based on the DED and follow-up conversations with the PMU, the construction project to be put out for tender will cover the following scope:

(a) Rehabilitation and expansion of the existing water supply system to deliver a safely managed water supply system at 90 liters per second (L/S) for a total of up to 5,700 connections that would benefit up to 37,000 beneficiaries by 2031 (at the end of the project timeline). Unaccounted water is designated at 20% from the overall system, primarily within the transmission mains, treatment plans and distribution network.

(b) Rehabilitation/improvement of the existing Uailewa spring intake located in Baucau city and currently used to supply clean water for the community; and Waisarake spring intake; and construction of new water intakes for Uailia Mata and Uailia Bere springs to supply the water.

(c) Rehabilitation/improvement of three existing water storage tanks and construction of six new water storage tanks for a total capacity of up to 6,300 m^3 to distribute water to the service connections;

(d) Improvement of water treatment equipment for injection of for a water softener agent (known as 'Calgon') and disinfection using calcium hypochlorite; One building will be constructed for storage and preparation of these chemicals

(e) Rehabilitation/improvement of up to 36.15-km long water transmission mains and 104.62-km long pipeline to distribute water to Baucau municipal capital including nine (9) selected 'sucos' (villages) i.e., Bahu, Buibau, Buruma, Caibada (Makasae), Caibada (Uaimoa), Gariuai, Tiriloca, Trilolo, and Uailili.

(f) Rehabilitation and improvement of the associated pumping systems, primarily to deliver raw water from the intake to the water storage tanks and relatively small power supply required to operate dosing pumps, storage area and small offices to support the water supply operation. Water distribution from the storage tanks to individual connection at households and other public facilities will be through pipelines using gravity system.

(g) Installation of SCADA system and new bulk metering system within the distribution network and replacement and/or installation of domestic meters for all existing and new water connections for proper accounting of water use.

The following figures present an overview of the project's key water supply components, from the intake at the springs up to storage/distribution tank arrangements.

Figure 4.1. Key Components of the Baucau Water Supply System

5. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

5.1. Constitution of the Democratic Republic of Timor-Leste, of 20 may 2002

One of the most important pieces of legislation in Timor-Leste, it provides the guiding principle for environmental protection and recognizes the need to develop Timor-Leste's resources sustainably, providing a better quality of life for its citizens and a responsibility of the Government. Its article 61 stipulates that: "Everyone has the right to a humane, healthy, and ecologically balanced environment and the duty to protect it and improve it for the benefit of the future generations; The State shall recognize the need to preserve and rationalize natural resources; and The State should promote actions aimed at protecting the environment and safeguarding the sustainable development.

5.2. Decree Law No. 26/2012 – Basic Environmental Law

Decree Law No. 26/2012 is the Basic Environmental Law, setting the framework for environmental protection in Timor-Leste, the environmental principles to follow and makes the State responsible to ensure that citizens are guaranteed for a healthy, ecologically balanced environment and the use of natural resources is undertaken in a sustainable way, It also sets the standard and commitment for all future environmental laws and policies (including all terrestrial and marine areas, soil and sub-soil), to single or collective persons, national or foreign, public or private, residing or undergoing activities in Timor-Leste.

It also commits the Government to compulsory Environmental Evaluation of its policies, plans and projects, and defines important procedures and requirements such as e.g., the Environmental Assessment and Licensing process and environmental standards, including the use of International Environmental Standards i.e., WHO or equivalent, if National Standards aren't established.

5.3. Decree Law No. 5/2011 – Environmental Licensing

As part of the E&S risk screening, the National Authority for Environmental Licensing (ANLA) of Timor-Leste classifies the Baucau Project under a Category B (e.g., similar to moderate-risk level project) acording to the Decree Law No. 5/2021 (dated 9 February 2011). The Category B assigned ton the project is justified, given that the project components does not fall within any sensitive or protected areas and it primarily comprise rehabilitation and expansion of the existing water network within a relatively developed landscape that have undergone significant land use change since almost 30 years ago. This classifciation is further justified based on the ANLA previously attributed Category B Environmental License for the Government Projects for Rehabilitation of Water Distribution Infrastructure in the District Capital Water Supply Project for Manatuto and Pante Macassar (2014). These two projects are of similar nature to the Baucau project while the scale of pipeline dimension and length, as well as water sourcing of the two projects mentioned earlier is larger than the ones of Baucau.

It is not likely that the rehabilitation and operation of these water sources will have significant adverse environmental impacts that are irreversible, diverse, or unprecedented, or that potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works and in most cases mitigation measures can be designed with uncomplicated measures commonly used and known by civil works contractors.

As amended through the Decree Law No. 39/2022, the project classification for the Bacau Project remains unchanged as the changes is mainly on administrative procedure related to

environmental classification/screening, evaluation, decision, licensing and monitoring of development projects, throughout their construction, operation and decommissioning phases.

The ANLA responsibility includes: (i) Reviewing the applications for Environmental Licensing; (ii) Screening for the project categorization; (iii) Reviewing environmental and social impact assessment reports and related documents; (iv) forwarding the reviewed impact assessment report together with its technical opinions, suggestions and decision proposal to the SEA Secretary of State for Environment; and (v) Monitoring and evaluation of the impacts during project implementation.

5.4. Decree-Law No. 31/2020: Potable Water Quality Standards

The following table presents the potable water quality standards stipulated by the Timor-Leste Government that will be adopted for the project in order to deliver a safely managed water supply for the beneficiaries. Relevant water quality standard published by WHO (2017) are included in the table below for comparison, indicating that the water quality standards imposed in Timor-Leste is comparable to the WHO standard.

Table 5.1. Water Quality Standard for Human Consumption

Parameters	Units	Decree-Law No. 31/2020	WHO Guidelines[1]
Bacteriological			
Total Coliform	CFU/100 ml	0	0
Escherichia coli (E. coli)	CFU/100 ml	0	0
Physical and Chemical			
Aluminium	mg/l	0.2	0.2
Arsenic	mg/l	0.01	0.01
Ammonia	mg/l (3)	0.5	1.5
Calcium	mg/l	100	100 - 300
Chlorides	mg/l	250	250
Chlorine	mg/l	0.2 - 0.6	5
Conductivity	µS/cm	2,500	
Colour	mg/l Platinum-Cobalt Scale	20	15
Fluoride	mg/l	1.5	1.5
Hardness	mg/L $CaCO^3$	110 - 500	200 - 500
Iron (Fe)	mg/l	0.3	0.3
Langelier Index	-	-0.5 to 0.5	-
Magnesium	mg/l	50	-
Manganese	mg/l Mn	0.05	0.1
Nitrate	mg/l (4)	11	50
Nitrite	mg/l (5)	0.15	3
pH	Sorensen	6.5 - 8.5	6.5 - 8.5
Sulphate	mg/l	250	250
Taste and odour	dilution rate	Free of taste and odour	Free of taste and odour
Total dissolved solids	mg/L	1000	1000
Turbidity	NTU	5	4

Note:

[1]Guidelines for drinking-water quality: fourth edition incorporating the first addendum, World Health Organization, 2017
2The values are guideline values for microbiological indicators or chemicals that are of health significance in drinking water or recommended values based on other reasons, like the acceptability of water and corrosion control;
[3]Ammoniacal nitrogen (mg NH4/l) for WHO and Decreto-lei nº 152/2017 and mg/l NH4-N for Timor-Leste legislation
[4] Nitrate (mg NO3/l) for WHO and Decreto-lei nº 152/2017 and mg/l NO3-N for Timor-Leste legislation
[5] Nitrite (mg NO2/l) for WHO and Decreto-lei nº 152/2017 and mg/l NO2-N for Timor-Leste legislation

5.5. Other Key Laws and Regulatios of Timor-Leste

The table below summarizes all other national laws, policies and guidelines stipulated by the Timor-Leste Government that are relevant to the project.

Table 5.2. Other relevant National Laws, Policies and Guidelines in Timor-Leste

Policy/Law/ Guideline	Key Provisions	Implications for the Project
Decree-Law No. 6/2020: Legal Framework for Protection and Conservation of Biodiversity	This Law establishes guidelines for biodiversity conservation and sustainable use in Timor-Leste, covering both special areas within and outside the National Protected Areas System (Article 26). It also includes managing unique ecosystems such as swamps, estuaries, mangroves, coral reefs, marine grasses, and sacred Lulik sites. It includes the List of Protected (Annex I) and Exotic/Invasive Species (Annex II) and the rules and prohibited activities for their management (Chapters IV and V) and requires considerations to be taken in Environmental Impact Evaluations (Chapter VII).	These provisions do not directly apply for the project as none of its components overlap with key biodiversity area, except sacred Lulik sites. All the existing water sources in Baucau Municipal Capital and other areas are considered sacred according to the Timor-Leste's customs and norms.
Decree-Law No. 5/2016: National System for Protected Areas (PA)	It establishes the necessary legal instruments for the protection of declared sensitive ecological areas in Timor- Leste (Article 11) and their allowed and prohibited activities. It provides the list of Protected Areas (Article 50 and Annex I), their typology (Article 12) and geographical demarcation (Article 17) and management instruments (Article 23) for approved activities within Areas (Article 32) such as Land Use Zone i.e., allows infrastructure installation for human use.	These provisions do not apply for the project as none of the components are within a protected area defined by this Law.
Law no. 14/2017 – General Framework for Forestry	It defines the fundamental principles and norms on management, protection, conservation and sustainable use of forests and watersheds (Article 1), Forest Classification [State, Community and Private] (Article 8) and Forest (Article 14) and River Basin (Article 17) Management Plans and Forbidden Activities in these areas (Article 24). It also includes Climate Change requirements for Forest development (Article 28), for emissions	This may be relevant if the project components that traverse or are located within any type of forest in the project area.

Policy/Law/ Guideline	Key Provisions	Implications for the Project
	reduction and conservation of carbon stocks.	
Regulation UNTAET no.17/2000: Prohibition of Logging Operations and Wood Export	It establishes the prohibition for felling, burning or destroying trees or forests (Article 2) and the activities exempt of these prohibitions (Article 3)	Relevant to project components that will require cutting trees within alignments and ROWs.
Government Resolution No. 33/2011 – National Adaptation Plan of Action (NAPA) for Climate Change	It adopts trans-sectoral measures to reduce Climate Change vulnerability in essential sectors in Timor-Leste (Agro-forestry, water supply, biodiversity, health, infrastructure, natural disasters). Definition and Prioritization of Proposed Adaptation measures for said sectors (NAPA Table 13), particularly those indicated in Annex 2 Adaptation measures for the Water Sector (no. 1, 2, 4, 5, 6, 9, 11 and 13) and for Natural Disasters (no. 3)	Relevant to the project.
Decree-Law No. 33/2008: Hygiene and Public Order	This law establishes the administrative policy for Districts on hygiene and public order, defining the relations between public administration and the citizens in urban areas including specific locations within the districts. It defines the prohibitions in general (Article 5) regarding impact to public infrastructure and land, from the discharge of polluted waters, faecal sludge/sludge, waste in streets, drainage obstruction; spoils and construction material on sidewalks; and noise to community.	Relevant regarding project Work Camps, construction ROW.
Decree-Law No. 4/2004: Distribution of Water for Human Consumption	It establishes the conditions for the water distribution system for human consumption (Article 2). The Water and Sanitation Services are required to supply water to the public (urban) which is safe, sustainable with adequate quality.	Compliance with the Water Quality Standards in effect in Timor-Leste is required for the project.
Decree-Law No. 33/2017: Legal Framework for Cultural Heritage	It defines the concept of cultural heritage and the measures for its support, protection, preservation and conservation in Timor-Leste (Article 1) and its different cultural classification (Article 21). It also defines and regulates a 50 metre Protection Zone around immovable Heritage (Article 23) and the licensing requirements for general work within these Zones (Article 26).	It applies for the project on siting the construction camps, ROW construction, etc. When Heritage sites Protection Zones cannot be avoided, the project should consult with the authority.
Decree-Law No. 4/2012: Labour Code	It describes the duties and obligations of the private employer and employee while exercising their function within the scope of work, or within the bounds of a work contract (Chapter 1), with the aim of creating good working conditions	It applies for the project and its contractors and workers.

Policy/Law/ Guideline	Key Provisions	Implications for the Project
	(Article 20) and a fair, safe and healthy working environment (Article 35).	
Law No. 6/2017: Base Law for Planning	It provides basic rules for territorial planning in Timor-Leste, intended for the sustainability of urban areas and improvement of living conditions for citizens. Further it establishes the provisions on different soil uses (Article 8) and the Municipal Territory Plan and the Land Use Plan (Article 17).	Relevant to location of all project components.
Law No. 8/2017: Public Expropriation	Rules on land expropriation for public interest reasons, responsibilities, procedures, fair compensation, respect for vulnerable groups (Article 10) and project planning requirements that include expropriation, such as public consultation (Article 22), environmental licensing, and social/economic impact assessment (Article 19).	Relevant to location of all project components, particularly ROW. EMP implementation, Social Safeguards and LARAP are the overall measures to mitigate adverse impacts
Decree-Law No. 3/2016: Municipal Administration Statutes	It provides the local government with duties and powers to, among others: (i) conserve and protect their local environment and natural resources; (ii) plan, implement and/or operate and maintain local water supply projects; (iii) implement or arrange for implementation local sanitation/ sewerage/ solid waste and drainage projects; (iv) protect cultural heritage and religious sites; and/or (v) monitor project activities within their jurisdictions.	It provides the power/authority for the Municipality to monitor the environmental and social management performance of the project.
Decree-Law No. 2/2017: Urban Solid Waste Management System	It defines the rules that the urban solid waste management system led by the Municipal Authority (Article 2) as well as the obligations of all users of the system (Article 16) on management and collection of waste from construction works (Article 33). It also defines the requirements for disposal, import and production of plastic bags, packaging and and introduction to consumption (article 4) which prohibited to introduce for consumption any packaging or non-recyclable, oxo- biodegradable or oxo-degradable single-use plastic object.	Relevant regarding the use of plastic in the project site particularly for food catering for workers

5.6. The World Bank Environmental and Social Framework

The project is an investment project financing (IPF) funded through loan from the International Development Association to the Government of the Democratic Republic of Timor-Leste, and therefore, is subject to due diligence process of the WB ESF to ensure this Project is implemented in a sustainable manner from E&S perspectives. The gaps between

the relevant Timor-Leste laws and regulations and those of the World Bank Environmental and Social Standards (ESS) are identified in the following table, and therefore, gap filling measures are undertaken to bridge these gaps

Table 5.3. The Bank ESS Requirements Applicable for the Project

ESS	Key Requirements
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	This ESS is relevant for the project in identifying, assessing and mitigation of E&S risks and impacts, and the ESIA also includes: – Description of key legal and institutional setting and responsibilities – Scope of ESIA including potential indirect and cumulative E&S risks and impacts – Mitigation measures and monitoring (ESMP) and reporting arrangements – Capacity building – Budget items to implement the ESMP – Resettlement Action Plan describing people, land and assets that may be affected by the project including relevant mitigation measures – Labor Management Plan (LMP) – Prevention procedures on sexual exploitation and abuse/ sexual harassment (SEA/SH) – Grievance Redress Mechanism (FGRM)
ESS2 Labor and Working Conditions	This ESS is relevant for the project as it would require construction workers. Another risk is the use of child labor and/or forced labor particularly in areas where job opportunities are scarce. The ESIA needs to include an assessment of potential risks and impacts related to labor and working conditions. Mitigation measures will be specified in the Labor Management Procedure (LMP), including guidance to address potential child and forced labor and arrangements for the labor's Grievance Mechanism. Bidding documents and civil work contracts will need to include requirements for labor and working conditions reflecting the relevant elements specified in the LMP.
ESS3 Resource Efficiency and Pollution Prevention and Management	This ESS is relevant for the project where its DED incorporate climate resilience water supply design, good engineering and efficiency intended to minimize non-revenue water and energy use by distributing water using gravitational systems. Sourcing of construction materials will be undertaken from facilities and quarries that have valid operating permits. Hazardous and non-hazardous waste management, particularly construction wastes, spoils and used lubricants, will be conducted as an integral part of the Project implementation. The Project should identify for possible presence of asbestos containing materials and any hazardous substances and define

ESS	Key Requirements
	safe handling and disposal of these materials and substances according to prevailing laws and regulations.
ESS4 Community Health and Safety	This ESS is relevant for the project. Community health and safety risks and impacts will arise from the project's construction and operation activities and are assessed in the ESIA. Measures to avoid, mitigate, and address potential safety impacts will be included in the ESMP. Health risks for the community in the surrounding areas may arise due to potential labor influx during construction, and mitigation measures will be developed in the ESMP. The Project will include requirements and procedures for GBV/SEAH risks management to be applied for project workers and subcontractors including feedback and grievance redress mechanisms and confidential reporting with safe and ethical documentation of GBV/SEAH cases.
ESS5 Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	This ESS is relevant for the project. The project will not require land acquisition as most land is owned by the state and few plots required for the project have been donated by the community for the project. A resettlement action plan (RAP) has been prepared and updated for the project to identify affected people and impacts that may occur to them, considering changes in the location of spring water to be abstracted and adjustment/new location for the storage/distribution water tanks.
ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	This ESS is not relevant as the preliminary screening indicates that none of the project footprint overlaps with protected areas or key biodiversity areas.
ESS7 Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	All communities in Timor-Leste are considered Indigenous People considering they have collective attachment to the areas, and therefore, ESS 7 is not relevant.
ESS8 Cultural Heritage	This ESS is relevant as the springs as the water source of the project is considered sacred sites according to Timor-Leste culture and norms. Therefore, some cultural practices may need to be undertaken as part of the project implementation, and therefore, included in the ESIA.
ESS9 Financial Intermediaries (FI)	The project will not involve financial intermediaries and will be direct lending instead, and therefore, ESS 9 is not relevant in this regard.
ESS10 Stakeholder Engagement and Information Disclosure	As part of the project preparation since 2020, stakeholder engagement at various levels, including government authorities, project management entities, and affected peoples have been undertaken. The recent engagement activity was undertaken in April 2026. The current project's Stakeholder Engagement Plan (SEP) will be updated, ensuring its relevance with the updated project's DED and implementation plan.

5.7. Good Industry International Pratice on Pollution Control

In regards to pollution prevention and control technologies and practices, the Government of Timor-Leste has not yet stipulated the National Standards for air, water, and noise, and therefore, under the legal requirements of the Base Law for Environment, the use of international standards are recommended such as those published by World Health Organisation (WHO) guidelines and, where non-existent, the IFC Environmental, Health and Safety Guidelines are usually referred to as international good practice. Key environmental quality standards applied in Timor-Leste are listed below.

- *Ambient Air Quality Standards*

Table 5.4. WHO Air Quality Guidelines (2000) and Global Update (2005)

Parameter	Averaging Period[a]	WHO Air Quality Guidelines (µg/m3)	Standards to be followed by Project	Parameter
		Global Update 2005[b]	Second Edition 2000[c]	
PM_{10}	Annual	20	-	20
	24-Hour	50	-	50
$PM_{2.5}$	Annual	10	-	10
	24-Hour	25	-	25
SO_2	24-Hour	20	-	20
	10-minute	500	-	500
NO_2	1-year	40	-	40
	1-Hour	200	-	200
CO	8-hour	-	10,000	10,000
	15-minute	-	100,000	100,000
Pb	1-year	-	0.5	0.5

[a] Due to short term duration of civil works, the shortest period will be more practical to use.
[b] Source: World Bank Group. IFC. 2007. Environmental, Health and Safety General Guidelines.
[c] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

- *Ambient Noise Level Standard*

Table 5.5. IFC's EHS General Guidelines (2007) – Noise Level

Receptor / Source	Standards to be Used for Project WHO Guideline Values for Noise Measured Out of Doors [a] (one hour LAq in dBA)	
	Time: 07:00 – 22:00	Time: 22:00 – 07:00
Industrial Area [a]	70	70
Commercial Area [a]	70	70
Educational Area [a]	55	45
Rural Residential Area	55	45

Receptor / Source	Standards to be Used for Project WHO Guideline Values for Noise Measured Out of Doors [a] (one hour LAq in dBA)	
	Time: 07:00 - 22:00	Time: 22:00 - 07:00
Urban Residential Area	55	45
Mixed Residential Area	55	45
Quiet Area	55	45

Note: [1] WHO Guideline Values for Noise Measured Out of Doors (one hour LAq in dBA)

6. INSTITUTIONAL ROLES AND RESPONSIBILITIES

The key institutions, organizations and stakeholders relevant to the environmental management are set out below. The Administrative Council of the Infrastructure Fund (CAFI) is the project Executing Agency (EA), and the Ministry of Public Works (MPW) is the project Implementing Agency (IA). The overall responsibility for EMP implementation and compliance with loan assurances lies with the MPW as the Implementing Agency. The MPW has established a Project Management Unit (PMU) based in Dili, responsible for general project implementation and will be responsible for day to day management of the project including implementation of requisite safeguards measures and requirements. A summary of the key functions for project implementation and environmental safeguards and detail on the responsibilities of each function is in the following table.

Table 6.1. Roles and Responsibilities on EMP Implementation

Pre-Construction Phase	Construction Phase	Operation Phase
Ministry of Public Works/Project Management Unit (Implementing Agency)		
• Overall responsibility for project design and implementation • Provide support and operating budget to the PMU • Ensure that sufficient funds are available to properly implement all agreed environmental safeguards measures • On behalf of the GOTL, ensure that the project, regardless of financing source, complies with the Bank's E&S requirements	Supervision of implementation and management of all activities under the project according to the SEIS and EMP, Timor-Leste laws and regulations, and good international industry practices	Oversee environmental regulatory compliance and reporting requirements by BTL/PMU, to ANLA.
Project Management Unit (PMU)		
• Include EMP and related clauses are incorporated in bidding documents, contracts • Ensure that all necessary approvals (e.g.: Environmental License from ANLA, Culture Licenses, construction permits) are secured prior to civil work contract award	• Conduct inspections and spot checks to monitor performance of the Contractors in implementing the C-ESMP • Collect and review monthly EMRs from the Contractors	• Conduct water quality tests for baseline data • BTL/PMU shall be responsible for: i) setting up a team to manage EMP implementation and reporting; and ii) implementing mitigation and protection measures

Pre-Construction Phase	Construction Phase	Operation Phase
• Review/endorse final CEMP of the winning or selected Contractor. • Conduct affected people consultation. • Establish a functional GRM and making affected persons aware of GRM focal points, contacts and procedures	• Prepare and submit semi-annual E&S monitoring report to the Bank • Oversee management and resolution of grievances as well as effectiveness of the established GRM • Conduct appropriate consultation and monitoring of effect of construction on affected people	specified in the Component's EMP, O&M Manuals and other relevant documents • Ensure all GRM complaints are closed out to affected person's satisfaction.
The Contractor		
• Appoint a HSE Manager/supervisor for the project • Finalize C-ESMP with inputs/comments from PMU and WB clearance • Organize disclosure of the relevant project's information before commencement of civil works.	• Engage or mobilize engineers to manage the C-ESMP's implementation and reporting • Implement all environmental mitigation and protection measures, conduct environmental monitoring activities and ensure preparedness for emergency responses • Observe the GRM in addressing complaints • Prepare monthly reports including summary of E&S aspects	-
Construction Supervision Consultants (CSC)		
• Provide technical advice/ assistance on C-ESMP implementation. • Provide E&S related training for PMU, contractors and stakeholders • Assist the PMU in reviewing the bidding documents and C-ESMP	• Conduct monitoring performance of the Contractor in implementing the C-ESMP • Collect monthly progress report from the Contractors, and prepare and submitting semi-annual E&S monitoring report to the Bank, PMU and related agencies. • Oversee/monitor the management/ resolution of grievances logged and effectiveness of the GRM	• Conduct inspections to monitor performance of the ESMP implementation. • Conduct a periodic water quality monitoring and review the associated analytical results

Pre-Construction Phase	Construction Phase	Operation Phase
Local and National Authorities		
• ANLA to review the updated SEIS and EMP; and issue the renewal of environmental license as required during the life of the project • Concerned 'Chefes de Suco' and Aldeia shall be involved in: – Cooperating with the contractor to engage local workers based on the skill and project needs – Community awareness program on health and safety impacts of the EMP implementation;	• ANLA to monitor compliance with SEIS and EMP • Municipality and Suco Council to participate in the monitoring of the Contractor performance in EMP implementation • 'Chefes de Suco' and 'Aldeia' shall be involved in grievance resolution pursuant to grievance redress mechanism	• ANLA shall review EMRs and results of environmental monitoring • ANLA shall conduct validation and provide technical guidance on environmental effects and quality monitoring, when necessary

7. SUMMARY OF PROJECT ACTIVITIES AND ASSOCIATED IMPACTS

The impacts of the project are influenced by the presence of receptors in the project area. Without receptors, there will not be any impacts. While the detailed impact assessmet is provided in the SEIS, this chapter presents a summary of the project's activities and its related impacts, namely during the construction and operation phases, where the impacts are assessed and expected to be significant. In addition to facility-specific receptors, there are housing, business, cultural sites and access requirements that are also considered impact receptors at all locations where construction and operation of the components occurs. This pertains to construction activities of the project's main components, from the intake up to water service/household connections.

The following table summarize receptors potentially affected by construction of the project. No protected areas and/or ecologically sensitive areas overlap or within the vicinity of the project area.

Table 7.1. Summary of Receptors in Project Area

Receptor / Project's Components	Water Resources	Socio-Economic and Cultural	Ecological Resources
Uailewa Spring	Overflow (not abstracted) to the North and West through the drainages of the community	Adjacent to rural road, community houses, and scattered vegetation such as trees	Low vegetation cover with tree species, shrubs and brushes
Uailia Mata and Ualia Bere Springs	No surface water systems	No agricultural or other uses in the area	Agricultural use, no natural spaces
Uaisarake	No surface water systems	Adjacent to rural road, community houses, agriculture land, irrigation canal, community-based tourism site.	Low vegetation cover with tree species, shrubs and brushes
Water Storage/ Distribution Tanks, Transmission Mains and Distribution Networks	No surface water systems	Houses, shops, gardens, etc, adjacent to distribution alignments Cultural/sacred sites	Urban and semi-urban Area

The following table summarize potential E&S impacts anticipated from the project implementation.

Table 7.2. Summary of Potential E&S Impacts

E&S Components	Potential Significant Impacts		
	Pre-Construction	Construction	Operation and Maintenance
Water source quality (spring/sink hole)	Water pollution due to inadequate protection Drying up of the boreholes & private	Silt runoffs and soil wastes without final disposal site will trigger	Expansion of housing in the upstream with inadequate sanitation facilities that may lead

E&S Components	Potential Significant Impacts		
	Pre-Construction	Construction	Operation and Maintenance
	wells due to over extraction	underground water contamination	into deterioration of the water sources.
Noise	-	Increase in noise level from construction works, particularly nearby the affected households	-
Air Quality	-	Increasing dust concentration	-
Socio-economic	Water conflicts between communities	Job opportunities and skill enhancement for local communities	Increasing life quality in health and hygiene sector due to the depleting rate of mortality and waterborne diseases. The community will be able to be more productive.
Odour	-	Construction materials mixed-up with household-typed wastes from construction sites without proper handling and disposal	Irregular maintenance e.g., cleaning and treated sludge kept in an open space for certain period of time.
Soil	-	Silt runoffs can cause traffic accident and increasing volume of soil wastes (spoils, spare materials, etc) can lead to possible soil contamination, attract pests and serve as vectors for disease carrying insects, and negative visual impact	Runoff from the construction sites
Traffic Management		Heavy load trucks mobilization and construction sites without barriers, signages and velocity limit that may cause traffic accident towards the affected community	-
Occupational and Community Health & Safety	Health hazard arising from inadequate design and/or handling of facilities for receiving, storing and handling of chlorine	Accidents and even mortality for the worst scenario towards the workforces without utilizing proper PPE	Health hazards due to chlorine exposure

E&S Components	Potential Significant Impacts		
	Pre-Construction	Construction	Operation and Maintenance
	and other hazardous chemicals		

The following table presents

Table 7.3. Summary of Receptors in Project Area

Component	GPS	Surface Water	Receptors	Land Cover/ Ecological	Protected Area Status
			Socio-Economic and Cultural		
Water Sources					
Uaileua Spring		Overflow (Not abstracted) to the North and West through the drainages of the community	Adjacent to rural road, community houses, and scattered vegetation such as trees	Low vegetation cover with tree species, shrubs and brushes	None
Uailia Mata		No surface water systems	No agricultural or other uses in the area	Agricultural use, no natural spaces	None
Uailia Bere		No surface water systems	No agricultural or other uses in the area	Agricultural use, no natural spaces	None
Uaisarake			Adjacent to rural road, community houses, agriculture land, irrigation canal, community-based tourism site.	Low vegetation cover with tree species, shrubs and brushes	None
Storage, Transmission and Distribution					
General		No surface water systems	Houses, shops, gardens, etc, adjacent to distribution alignments Cultural/sacred sites (See Appendix 3 – Cultural Heritage Sites, and Appendix 4 – Baucau Cultural Sites within the Project Area)	Urban and Peri-Urban Area	None

8. PROPOSED MITIGATION MEASURES

The mitigation measures defined in this EMP should be implemented at re-Construction, Construction, and Operation and Decommisioning phases based on the potential E&S impacts throughly assessed in the SEIS. The EMP will be updated if necessary during the construction stages. Management of potential risks and impacts for the project is required to follow good practices as described in the following WBG General EHS Guidelines. These include guidelines for Environmental Management (air emission, water quality, waste management, noise, etc.), Occupational Health and Safety (OHS), Community, Health and Safety, and Construction and Decommissioning.

The Contractor is expected to develop a specific Construction Environmental and Social Management Plan (C-ESMP) for the project, which is a detailed plan that sets out the contractor's approach to implementing the required mitigation measures, based on the present EMP requirements. These activities and mitigation measures reflect best-practice measures typical of the project's nature and, where relevant, specific to the conditions of the project components and of Baucau City.

The E&S impacts and correspndomg mitigation measures that should be implemented for each phase of the project, from pre-constructing to decommissioning are presented in the following sub-chapters

8.1. Air Quality

<table>
<tr><td rowspan="2">Impacts</td><td colspan="2">C3. Construction and dust to the community</td><td>Negative significance and temporary</td></tr>
<tr><td colspan="2">C3. Stockpiling and Storage of Construction materials and dust</td><td>Negative significance and temporary</td></tr>
<tr><td colspan="4">Mitigation Measures</td></tr>
<tr><td>Pre-Construction</td><td>Construction</td><td>Operation</td><td>Decommissioning</td></tr>
<tr><td rowspan="5">N/A</td><td>All stockpiles will be situated within the campsite or designated areas on-site that can easily be accessed by equipment and personnel to cause minimal interference to the movements of vehicle and personnel in the project site.</td><td rowspan="5">N/A</td><td rowspan="5">N/A</td></tr>
<tr><td>Reuse excess spoils and materials at all times</td></tr>
<tr><td>Covering stockpiles of loose construction materials with impermeable material like plastic, to protect from wind and rain events.</td></tr>
<tr><td>Excess rocks and sand as a result of excavation activities to be disposed properly and not dumped next to surface waters or left prior to departure.</td></tr>
<tr><td></td></tr>
</table>

	Implementation of Air Quality and Dust Management System		
	Watering of road surface and worksite using water truck, sprinklers or hoses, 2 - 3 times/day depending on the weather condition		
	Minimize movement of heavy vehicles and Limit velocity to 40 km/h in residential and 50 Km/h maximum in urban area		

8.2. Noise

Impacts	PC4. Noise nuisance towards the nearby community -due to improper selection of Water Source location		Negative significance and temporary
	C3. Noise due to construction activity to the surrounding communities and sensitive areas		Negative significance and temporary
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
Proposed location should be distant from residences or sensitive areas, close to farming areas and river receptor	Implementation of working hours (permissible working activity from 7 AM to 7 PM)	N/A	N/A
	Queuing and idling of construction vehicles outside the premises of the camp site and operating hours is prohibited		
	Use of power horns is banned. Dissemination of information to the community		

8.3. Soil and Land Use

Impacts	PC4. The Water source might be located in private land		Negative significance and temporary
	C3. Modification of site topography, soil erosion and sedimentation to surrounding receptors		Negative moderate significance, permanent
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
Resettlement plan and	Excavations will only be started once all required	N/A	N/A

compensation to the affected party	materials and services are on their allocated sites and a layout already established for the transport of materials.		
	Excavations, cuttings and fillings will be carried out in a manner to reduce soil erosion.		
	Sand, aggregates and cement will not be situated in areas prone to soil erosion		
	Provide for temporary passageways and communicate/inform dwellers and institutions		

8.4. Flora and Fauna

Impacts	PC1. The Uaileua spring and Uailia Mata spring and intake located in sensitive area - Nuisance to the biodiversity		Negative moderate significance, permanent
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
Apply mitigation measures in the transmission line rehabilitation to springs i.e., Papapa System especially in the sacred areas. Guarantee contractor is trained, accepts and follows all operational procedures applicable within the protected areas	Vegetation and tree re-planting Limitation of noisy works in order to stabilize the fauna's mobility Restrict haphazard site clearing, parking, and movement of heavy vehicles and equipment stockpiling	N/A	N/A

8.5. Water (Ground and Surface)

Impacts	PC1. Water competition between environment, communities and water distribution system	Negative significance, temporary
	PC1. Insufficient water for all users	Negative significance, temporary

	C1. The water from intake will flow and may cause soil/silt erosion		Negative moderate significance, temporary
	C3. Water contamination at construction campsite & water source for campsite may compete with community source		Negative significance, temporary
	C3. Water source for campsite may compete with community source		Negative moderate significance, temporary
	O1. Declining of the water source quality		Negative insignificance, permanent
	O4. Groundwater contamination from sludge disposal		Negative moderate significance, permanent
	D4. Leftover Solid waste reduces environment aesthetic, and stockpile runoff may cause decline of water quality		Negative moderate significance, permanent
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
Define the water for ecological service (after abstraction for the project) at 30% of total flow for wet season and 10% of total flow for dry season	Temporary drainage provision that links to safe surface water drainage	Treated dried sludge is distributed for application at agricultural area	Recycling and reuse of all wastes generated
	Installation of appropriate latrine with Septic Tank for construction workers in the camp site, at least 30 m away from any water source or constructed downhill from water sources within 30 m.	If the treated effluent consistently fails to meet discharge standards, operator to discuss and agree with MPW and SSE on a way forward to return to compliance.	Implementation of Upstream Watershed Protection Programs, with restriction to water quality impacting activities i.e., animal husbandry, slash and burn, etc
	Establish a water tank and source water for construction from BTL authorised sources	Discharge to be tested prior to release into the environment	Involve the lia naín and communities for cultural ceremony preparation and Tara Bandu protection of the source
	Purchasing sufficient potable water supply in for all construction worker	-	Improvement program for all existing and future dwelling with adequate sanitary infrastructure for the community surrounding the spring water sources

8.6. Solid Waste Management

Impacts	C3. Non-hazardous Solid Waste Improper handling and storage and vector diseases	Negative moderate significance, temporary
	D4. Leftover Solid waste reduces environment aesthetic, and stockpile runoff may cause decline of water quality	Negative moderate significance, permanent

Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
N/A	Minimize domestic waste production on site and implement reuse of waste where possible	N/A	Reuse of all wastes generated during operation to the extent possible
	Immediate disposal of waste in designated bins/areas by the contractor		
	Waste bins will be kept closed to prevent the accumulation of water during rain events		
	Regular waste removal ns and transport to approved disposal sites, with coordination with local authorities		

8.7. Community and Occupational Health & Safety (H&S)

Impacts	PC3. Preparation of Project for H&S ad O&M	Negative permanent significance,
	C3. Storage and Management of Hazardous chemicals and materials may bring spills, fire hazards and H&S problems	Negative permanent significance,
	C3. Risk of communicable diseases between workers and community in Camp and Work sites	Negative permanent significance,
	O2. Mishandling of chlorine will cause health hazards towards the operators	Negative permanent significance,
	O4. Community and occupational health and safety risks of the wtp infrastructure	Negative moderate significance, temporary

Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
Preparation of a C-ESMP including Traffic Management Plan as the Appendix. Disseminate project information i.e. flyers to the community within the 15 km radius of the project area	Allocation of proper containments and labelled, suited for the nature of chemicals and/or waste will be provided by the contractor and maintained throughout the duration of the Construction phase Refuelling only in designated areas which are to be 50 m from a water course and drip trays to be used when refuelling or topping up / changing machinery fluids Materials hauled directly to work front, minimizing storage at campsite Asbestos containing material i.e. used pipes to be confined covered, unbroken and with limited access from people Regularly clean and disinfect.	Ensure proper storage and handling practices for chemicals Ensure the knowledgeable and skilled person is in charge of chlorine handling Ensure use of PPE while using chemicals Prevent public access to the WTP with fencing and appropriate signage	N/A

8.8. Culture

Impacts	PC1. Social and cultural disruption due to tara bandu and lulik/sacred area		Negative moderate significance, temporary
	C1. Socio-cultural impact due to inadequate protection of the spring intake structures during rehabilitation		Negative significance, temporary
	C3. Impacts on socioeconomic resources, infrastructure and utilities and cultural sites		Negative significance, permanent
Mitigation Measures			
Pre-Construction	Construction	Operation	Decommissioning
Involve lia na'in in frequent cultural ceremonies i.e.,	Involvement of lia naín for cultural ceremony preparation	N/A	N/A

"opening" for Authorization to use cultural/natural water resource	Follow the Heritage License rules for each site, defined by the SS Culture and apply measures		

8.9. Odour

Impacts	O4. Odour occurrence during operation of the wtp		Negative insignificance, temporary
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
N/A	N/A	Odour monitoring and procedures for recording and managing complaints from the public.	N/A
		Consult with residents to identify record odour or nuisance issues – preferably date, time and duration of odorous events.	

8.10. Socio-Economic (Accessibility)

Impacts	C3. Impacts on socioeconomic resources, infrastructure and utilities and cultural sites		Negative significance, permanent
	C3. Local employment generation and enhance workers' skills		Positive significance, permanent
Mitigation Measures			
Pre-Construction	**Construction**	**Operation**	**Decommissioning**
N/A	Make available temporary access ways to all businesses and activities affected	N/A	N/A
	Determine compensation to business justifiably affected and demonstrate reduction of income due to project		
	Recruitment of skilled and unskilled workers from affected community, in coordination with the local authorities		
	Provide "on-the-job" training program for workers, particularly unskilled workers		

	Obligation for contruction companies to hire local labor and promote training and qualification initiatives in order to maximize the volume of the labour		
	Principle of equity (gender equality). Employment opportunities must also be provided for woman. Not discriminate against women, who should receive a salary equivalent to that of men performing the same functions.		
	Where feasible, the use of manual labour should be preferred to the use of machinery in order to create more employment.		
	Carry out, whenever possible and if the necessary skills are available, the hiring of local labour, following the following priorities: i) affected families; ii) affected villages; iii) affected Sucos; iv) Baucau Administrative Post; v) Baucau Municipality; and vi) other locations outside Baucau Municipality.		
	Assign fair wages and respect working hours. Overtime work, when performed at the request of construction companies, must be remunerated.		

9. GOVERNING PARAMETERS

This section provides information on relevant standards applicable to the project activities that should be adhered to during construction phase and operation phase of the project. All limits/threshold values included in each component standard are proposed and to be followed by the contractor and the proponent, for the duration of the project lifetime including any updates that may be applied in the near future.

9.1. Ambient Air Quality Standards

The following ambient air quality standards apply for the project as adopted from the WHO Air Quality Guidelines (2000) and Global Update (2005).

Table 9.1. Summary of Receptors in Project Area

Parameter	Averaging Period [a]	WHO Air Quality Guidelines (µg/m^3)		Standards to be followed by Project (µg/m^3)
		Global Update 2005[b]	Second Edition 2000[c]	
PM_{10}	Annual	20	-	20
	24-Hour	50	-	50
$PM_{2.5}$	Annual	10	-	10
	24-Hour	25	-	25
SO2	24-Hour	20	-	20
	10-minute	500	-	500
NO2	1-year	40	-	40
	1-Hour	200	-	200
CO	8-hour	-	10,000	10,000
	15-minute	-	100,000	100,000
Pb	1-year	-	0.5	0.5

[a] Due to short term duration of civil works, the shortest period will be more practical to use.
[b] Source: World Bank Group. IFC. 2007. Environmental, Health and Safety General Guidelines.
[c] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

9.2. Ambient Noise Standards

The following noise level standard applies for the project Source as adopted from the World Bank Group, IFC Environmental, Health and Safety General Guidelines (2007).

Table 9.2. Summary of Receptors in Project Area

Receptor / Source	WHO Guideline Values for Noise Measured Outdoor (one hour LAq in dBA)	
	Time: 07:00 - 22:00	Time: 22:00 - 07:00
Industrial Area	70	70
Commercial Area	70	70
Educational Area	55	45
Rural Residential Area	55	45
Urban Residential Area	55	45
Mixed Residential Area	55	45
Quiet Area	55	45

9.3. Water Quality Standards

The Government of Timor-Leste has developed new legislation in drinking water quality stipulated in the Decree Law No. 31/2020 on Water Quality Control for Human Consumption. This standard was drafted based on Guidelines for Drinking Water Quality (WHO, 1993), other guidelines in nearby countries, and various factors of natural, social and economic aspects in Timor-Leste. The document provides guideline values and testing methods on microbiological, chemical and physical properties of water quality safe for human consumption, ensuring that the drinking water does not pose any significant health risk to consumers and is aesthetically acceptable.

Table 9.3. Water Quality Standard for Human Consumption

Parameters	Units	Timor-Leste Standard (Decree Law No. 31/2020)	WHO Guidelines (1) (2)
Bacteriological tests			
Total Coliform	CFU/100 ml	0	0
Escerichia coli (E.coli)	CFU/100 ml	0	0
Physical and chemical tests			
Aluminum	mg/l	0.2	0.2
Arsenic	mg/l	0.01	0.01
Ammonia	mg/l	0.5	1.5
Calcium	mg/l	100	100-300
Chlorides	mg/l	250	250
Chlorine	mg/l	0.2 - 0.6	5
Conductivity	µS/cm	2500	
Colour	mg/l Pt-Co scale	20	15
Fluoride	mg/l	1.5	1.5
Hardness	mg/L	110 - 500	200 - 500
Iron	mg/l	0.3	0.3
Langelier Index		-0.5 – 0.5	-
Magnesium	mg/l	50	-
Manganese	mg/l	0.05	0.1
Nitrate	mg/l	11	50
Nitrite	mg/l	0,15	3
pH	Sorensen	6.5-8.5	6.5-8.5
Sulphate	mg/l	250	250
Taste and odour	dilution rate	Free of taste and odour	Free of taste and odour
Total dissolved solids	mg/L	1,000	1,000
Turbidity	NTU	5	4

Note:

(6) The values indicated are guideline values for microbiological indicators or chemicals that are of health significance in drinking water or recommended values based on other reasons, like the acceptability of water and corrosion control.

(7) Guidelines for drinking-water quality: fourth edition incorporating the first addendum, World Health Organization, 2017

(8) Ammonium-nitrogen (mg NH_4/l) for WHO and Decreto-lei nº 152/2017 and mg/l NH4-N for Timor-Leste legislation
(9) Nitrate (mg NO3/l) for WHO and Decreto-lei nº 152/2017 and mg/l NO3-N for Timor-Leste legislation
(10) Nitrite (mg O2/l) for WHO and Decreto-lei nº 152/2017 and mg/l NO2-N for Timor-Leste legislation

9.4. Wastewater Standards

Wastewater, excreta and grey water use in agriculture is considered a method that combines water and nutrient recycling, supporting increased household food security and nutrition in poor households. For the past few decades WHO guidelines have been influential regarding technical standard and policy level setting for this issue, and have been adopted by several countries for their wastewater and excreta use practices. They are also designed to protect the health of farmers (and their families), local communities and product consumers but adaptable to specific circumstances, to maximize overall public health benefits and the beneficial use of scarce resources.

The project intends to follow suit with this principle and use its resources efficiently and sustainably and attempt to have a positive influence on the local economy. WHO 1989 Guidelines for Wastewater Irrigation and its thresholds for the effluent discharge and treated dried sludge use in agriculture.

Table 9.4. Wastewater Standards

Item	BOD (mg/L)		NH_4-N (mg/L)	Helminth eggs (No. /filter)	FCU (No. /100 ml)
	Total	Filtered			
Liquid effluent - Discharge into receiving waters:					
Seasonal stream estuary	100 - 200	30 - 60	10-30	≤2-5	≤104
Perennial river or sea	200 - 300	60 - 90	20-50	≤10	≤105
For Reuse					
Restricted irrigation	n.c.		1)	≤1	≤105
Unrestricted irrigation	n.c.		1)	≤1	≤103
Treated Plant Sludge	n.c.				
Use in agriculture	n.c.		n.c.	≤3-8 g TS 2)	3)

NOTES:
1) ≤ Crop's nitrogen requirement (100-200 kg N/ ha-year)
2) Based on the nematode egg load per unit surface area derived from WHO guidelines for wastewater irrigation (WHO 1989) and on maturing rate of 2-3 tons of dry matter /ha-year
3) Safe level if egg standard is met.
n. c not critical

9.5. Occupational Health and Safety Standards

The Decree-Law No 04/2012 regarding to Labour Code, under article 35, states the aim of creating good working conditions and a fair, safe and healthy working environment. However, they are still broad in nature, focusing on the responsibility to provide the said conditions specifying H&S legal requirements and/or other guidelines. Therefore, the project intends to utilize the IFC EHS 2007 Guidelines that is more relevant and stringent, that can be applied during construction and operation as presented in the following table.

Table 9.5. Potential Hazards and Recommended PPE (IFC, 2007)

Workplace hazards	Objective	Recommended PPE
Welding, cutting, grinding, nailing, liquid chemicals, flying particles	Eye and face protection	Safety glasses and face shields
Falling objects, inadequate height clearance, and overhead power cords	Head protection	Plastic helmets with top and side impact protection
Falling or rolling objects, pointed objects, corrosive or hot liquids	Foot protection	Safety shoes and boots for protection against moving & falling objects, liquids and chemicals
Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	Hand protection	Gloves made of rubber or synthetic materials (neoprene), leather steel, insulating materials, etc.
Noise	Hearing protection	Hearing protectors such as ear plugs, ear muffs or dual protection
Dust, fogs, fumes, mists, gases, smokes, vapours	Respiratory protection	Facemasks with appropriate filters for dust removal
Extreme temperatures, hazardous materials, cutting and laceration	Body/leg protection	Body suits with sufficient heights

10. MONITORING PLAN

10.1. Monitoring Scope

This section details the monitoring plan including related supervisory activities that should be conducted by the project corresponding to the environmental impacts assessed in the SEIS. The objectives of the monitoring plan are to: (i) measure the impacts occurring during construction phase of the project; (ii) ensure compliance with legal and contract requirements; (iii) determine the effectiveness of the mitigation and enhancement measures; and (iv) facilitate management of unanticipated impects. The parameters for monitoring in the construction phase of the project are presented in Chapter 9 of this EMP.

The monitoring of the mitigation measures and responsibilities will be conducted on daily basis by the contractor as part of the construction activities. The Project Supervison Consultant (PSC) will make weekly checks on the implementation of monitoring for all water sources, water tanks, and water transmission and distribution lines to be constructed and the off-site installations. The PMU of MPW will make regular spot checks on all activities under the project scope. There will be regular joint monitoring of the mitigation measures by the key representative of the PMU, PSC, and Contractor.

The project monitoring conducted under this EMP includes:

- *Project readiness* - Monitoring to check progress on project readiness and close gaps through corrective actions.
- *Environmental quality sampling and analyses* - To be conducted by a competent person/party appointed by the contractor, involving the collection and analyses air quality, noise and water quality data at designated monitoring locations for assessing compliance with applicable environmental quality and emission standards during construction.
- *EMP compliance* - To be conducted by the PMU assisted by PSC to verify EMP compliance during project implementation.
- *Affected people/household* - to be conducted by the PMC via discussion/ consultation with them particularly on the impacts during construction.
- *Operational monitoring* - This is required as part of the operations of the project and will be undertaken by the relevant government department or nominated operator.

10.2. Project Readiness Assessment

Before construction, the PMC will assess the project readiness to demonstrate that E&S commitments are being carried out and environmental management systems are in place before construction starts or suggest corrective actions to ensure that all requirements are met. The readiness criteria include, among others:

- Valid environmental and construction licenses
- Compliance with loan covenants
- Public involvement effectiveness
- Environmental supervision and monitoring in place
- Bidding documents and contracts with environmental Safeguards
- Adequate financial and personel resourrces
- Finalization of the C-ESMP by the contractor and endorsement of it by PMU.

10.3. Environmental Quality Monitoring

During construction, the contractor is expected to maintain an adequate budget to ensure environmental monitoring can be undertaken as specified in the following table. Impact on sensitive environmental receptors will be monitored and compared against the relevant national standard.

During operation, the relevant operator will be expected to maintain an adequate budget to ensure environmental monitoring can be undertaken as specified.

In order for the C-ESMP to be effective, all its mitigation measures must be monitored to ensure they are implemented. Compliance monitoring requirements are summarized in Table 10.1. Note this applies to construction only; during operation, it is the responsibility of the BTL to ensure monitoring of operational facilities is incorporated in the operations and maintenance manual and carried out routinely.

Table 10.1. Environmental Quality Monitoring

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
CONSTRUCTION PHASE										
C1. WATER SOURCES										
1.0 Activities related to Infrastructure Construction	1.0.1. General Impacts (noise, air quality, siltation, H&S, etc)	(See C3. Water Distribution for related impacts mitigation measures)	Noise through *ad-hoc* assessment by answering the question such as: "Do you have to raise your voice to talk to someone?'	Nearest residential receptors (2 locations)	Complaints from surrounding communities	Daily	Included as part of the project inspection checklist	Contractor & PSC	-	IFC/WHO
-	-	-	Air quality Visual assessment during the works	Construction sites	Complaints from surrounding communities Ambient air quality data	During high wind events & excessive dust formation	Environmental & Sosial Monitoring Report	Contractor & PSC	-	WHO/Global Update
-	-	-	Water quality Sampling every 3 months during construction period.	Upstream & downstream of construction sites - two samples per site (Monitor when construction active)	pH BOD5 COD TSS Oil & Grease Turbidity (NTU)	Construction period Every 3 months	Environmental & Social Monitoring Report	Contractor & PSC	$700/sampling period	DL No. 31/2020
-	-	-	Complaints In response to complaint not resolved after application of (additional) mitigation measures	-	-	Response to complaints: Every 6-month	Environmental & Social Monitoring Report	Contractor & PSC	$700/sampling Period	DL No. 31/2020
-	-	-	H&S Prepare C-ESMP and guarantee the implementation as	Construction sites particularly in the upstream and	Complaints from the personnel	Daily	Accidents Registry Report which should also be included in the HSE	Contractor & PSC	-	IFC/WB, SEFOPE

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
			adherence to the established plan	downstream of the water sources			Montlhy Monitoring Report			
1.1. Inadequate protection off spring intake structures during rehabilitation	1.1.1. The water from intake and river will flow and may cause soil/silt erosion.	1.1.1.1. Temporary drainage provision that links to safe surface water drainage.	Inspection through visual observation in the water sources sites	Construction – water sources sites (upstream & downstream)	Turbidity level & colour	Daily or as needed during construction lifespans	Included as part of the project inspection checklist	Contractor & PSC	Included in Bid price	DL No. 31/2020
	1.1.2. Socio-cultural impact	1.1.2.1. Involvement of 'lia naín' for cultural ceremony preparation	Ensuring the 'lia nain' and other important local stakeholders are informed prior the commencement of construction	Upstream water source-construction site	Complaints from surrounding communities	During cultural ceremony (as needed)	Environmental & Social Monitoring Report	Contractor and PMU	Included in Bid price	WB ESF
C2. WATER TREATMENT AND PROPOSED STORAGE TANKS										
2.0.Activities related to Infrastructure Construction	2.0.1. General Impacts (noise, air quality, siltation, H&S, etc)	(See C3. Water Distribution for related impacts and mitigation measures)	See C1.0	See C1.0	See C1.0	See C1.0	See C1.0	See C1.0	See C1.0	See C1.0
2.1. Upgrading construction activities for water tanks and water treatment plant	2.1.1. Chemical substance exposure towards the workforces due to disinfection installation	2.1.1.1. Provision and obligatory use of PPE for chemical handling	Number of PPE should be sufficient according to number of workers	Construction site	Quantity of PPE	Daily during working hours	Environmental & Social Monitoring Report	Contractor & PSC	Included in Bid price	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
C3. PROPOSED DISTRIBUTION NETWORK										
3.1. Induction of Contractor	3.1.1. Enhanced impacts because of Lack of knowledge of the EMP	3.1.1.1. Induction meeting for EMP understanding and Project "Go-ahead"	-	-	-	-	-	PSC / PMU	Included in Project Cost	-
3.2. Construction Activities – Macro Benefits	3.2.1. Local Employment Generation	3.2.1.1. Recruitment of skilled and unskilled workers from affected community, in coordination with the local authorities	Open recruitment at the affected areas or nearby, selection of candidates appraisal according to procedures	Number of locations for open recruitment will be designated according to necessity	Number of candidates selected	During recruitment	Environmental & Social Monitoring Report	Contractor	Included in Project Cost	WB ESF & SEFOPE
	3.2.2. Enhance workers' skills	3.2.2.1. "on-the-job" training program for workers, particularly unskilled workers	Monitor and receive information from the site inspectors in regards to the workers progress	Construction sites	Quality of the work and level of mastering the work	As needed	Environmental & Social Monitoring Report	SEFOPE & Contractor	Included in Project Cost	SEFOPE
3.3. Construction campsite	3.3.1. Campsite Location and Landslides	3.3.1.1. Establishment of camp on stable and flat surface area, and where it would not cause soil erosion.	Inspection of excavation land to avoid new slope formation	Contractor's campsite & vicinity	Elevation profile	As needed during constructing campsite	Environmental & Social Monitoring Report	Contractor	Included in Bid price	
	3.3.2. Wastewater and soil/water contamination	3.3.2.1. Establishment of a Proper Latrine System Installation of appropriate latrine with Septic Tank for construction workers in the camp site, at least	Good housekeeping for latrine system through regular emptying and cleaning	Campsite	Volume of septic tank	Regulalrly	Environmental & Social Monitoring Report	Contractor	Included in Bid price	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		30 m away from any water source or constructed downhill from water sources within 30 m.								
-	3.3.3. Water Source for Campsite may compete with Community Sources	3.3.3.1. Establish a water tank and source water for construction from BTL authorised sources	-	Campsite	-	As needed	-	Contractor	Included in Bid price	DL No. 26/2012 (Art. 24) & DL No. 4/2004 (Art. 13-15)
-	-	3.3.3.2. Purchasing sufficient potable water supply in the form of litre bottles or in gallons, for all construction staff throughout the duration of the construction activities.	-	Campsite	-	As needed	-	Contractor	Included in Bid price	DL No. 26/2012 (Art. 24) & DL No. 4/2004 (Art. 13-15)
	3.3.4. Storage and Management of Hazardous chemicals and materials may bring spills, fire hazards and H&S problems	3.3.4.1. Proper storage and handling of chemicals and materials Allocation of proper containments and labelled, suited for the nature of chemicals and/or waste will be provided by the contractor and maintained throughout the	-	Construction site	Volume of hazardous chemicals and materials	Daily	Environmental & Social Monitoring Report	Contractor & PSC	Included in Bid price	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		duration of the Construction phase; Refuelling only in designated areas which are to be 50 m from a water course and drip trays to be used when refuelling or topping up / changing machinery fluids Materials hauled directly to work front, minimizing storage at campsite. Asbestos containing material i.e., used pipes to be confined covered, unbroken and with limited access from people; Train/Inform workers/draft Guideline on identifying and risks of mishandling ACMs Prepare special team to remove ACMs from construction areas Coordinate with DNCP to determine final solution for ACMs								

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
	3.3.5. Non-hazardous Solid Waste Improper handling and storage and vector diseases	**Implementation of Solid Waste Management System** Minimize domestic waste production on site and implement reuse of waste where possible; Immediate disposal of waste in designated bins/areas induced by the contractor; Waste bins will be kept closed to prevent the accumulation of water during rain events; Regular emptying of waste bins and transport to approved disposal sites, with coordination with local authorities of appropriate dumpsites. If no accredited landfills exist near the area or service contractors are not available, burning of solid wastes may be	-	Camp site	Condition of waste bins	Emptying when waste bin is almost full, and others will be required as needed	Environmental & Social Monitoring Report	Contractor & PSC	Included in Bid price	DL No. 26/2012 (Art. 39), IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		permitted only in controlled conditions under the guidance of the Environmental authority; Minimize single use plastic by adapting 4R concepts (i.e., Reduce, Reuse, Recycle and Refuse):								
	3.3.6. Food for construction personnel may compete with food Supply for the local communities	Food for Workers may conflict with local community supply Ensuring adequate source or supply of food for workers so as not encourage poaching or interfering with the local food production unauthorized. Prohibition of poaching in the protected area or anywhere else Encouraging purchase of food from local vendors. Provision of cooking facility so as not to encourage the use of firewood for cooking If the availability of fuel is limited, the		Camp site	Complaints from surrounding community	As needed		Contractor	Included in Bid price	

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		use of firewood for cooking will be confined in designated areas and the use of wood will be limited from timbers harvested from the project's clearing activity and no other.								
3.4. Construction Materials	3.4.1. Sand And stone Extraction and disturbances to environment	3.4.1.1. Sand and Stone Sourcing Management Contractor to source its materials from duly authorised/licensed suppliers Contractor to ensure these suppliers carry out their extraction activities without provoking unacceptable environmental damage	Regular inspection whether or not the extraction process follows the procedures and is granted a license or permission or clearance from relevant authority.	Designated location/constr ucti on sites	• Total volume of materials extracted • Land contour Soil status	Regular during extraction	EMC	Contractor & PSC	Included in Bid price	DM No. 64/2016 if needed for Mineral Licensing
3.5. Construction Work Front: All Infrastructure	3.5.1. Servicing and Fuelling of Construction Equipment and spills and pollution	3.5.2.1. Equipment and Vehicle Maintenance and Monitoring Ensuring all construction vehicles are in good condition and an acceptable state of repair before the start of the construction phase; Prohibition of use of dilapidated equipment and vehicles with leaks and causing	Identification of vehicles or mechanical problems according to Contractor's diagnostic in the logistic report	Construction and camp sites	Total numbers of construction vehicles both are still functioning or not functioning anymore	Quarterly	EMC	Contractor & PSC	Included in Bid price	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		spills; Designating suitable locations for re-fuelling and changing oil and lubricant; Accidental spills will be cleaned immediately and provision of drip trays to collect any oil or fluid drips; Fuel will be stored in a central depot, made of concrete slab or impermeable surface capable of containing at least a volume of one container, located within the central base camp.								
	3.5.2. Excavation, Cutting and Filling and safety hazards to Public and workers	3.5.2.1. HSE demarcations and signage Set up adequate demarcations/barriers and establish visible warning signs in excavated, cut and filled areas for safety precautions (pedestrians and traffic).	Ensure that the signages are installed properly: the distance between incoming drivers/people passing by with alerted/hazardous areas should be set in order to avoid traffic accident	Construction sites	• Location of hazardous areas Type of signages needed	Daily	EMC	Contractor & PSC	Included in Bid price	IFC/WB
	3.5.3. Stockpiling and Storage of Construction materials and dust,	Spoils and Stockpiles Handling and Storage Plan Preference must be given to use of	-	Construction sites	Ambient air quality Quality of nearby water body i.e.	During rain and high wind events	EMC	Contractor & PSC	Included in Bid price	DL No. 26/2012, IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
	water runoff damage to existing utilities due, buildings and drainage blockage	spoil other construction sites, or disposed in spent quarries or borrow pits Uncontaminated spoil to be disposed of in Government approved sites, which will not be on agriculturally productive land, within 50m of a water course, including stream, river or irrigation channel, on sloped land, within 50 m of cultural heritage sites, within 100 m of any other culturally or ecologically sensitive feature. All stockpiles will be situated within the campsite or designated areas on-site that can easily be accessed by equipment and personnel and will cause minimal interference to the movements of vehicle and personnel in the project site. Identify stockyard areas in consultation			siltation & turbidity					

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		with local administration, if not in base camp Reuse excess spoils and materials at all times; Covering of stockpiles with impermeable material like plastic, to protect from wind and rain events. Excess rocks and sand as a result of excavation activities to be disposed properly and not dumped next to surface waters or left prior to departure. Design with adequate drainage for outlets to prevent wastewater into water sources								
	3.5.4. Excavation, Cutting and Filling and soil Erosion	<u>Excavation procedures</u> Excavations will only be started once all required materials and services are on their allocated sites and a layout already established for the transport of materials. Excavations, cuttings and fillings will be carried out in a	-	Construction sites	Management of traffic and material disposal	As needed	EMC	Contractor & PSC	Included in Bid price	3.5.4. Excavation, Cutting and Filling and soil Erosion

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		manner to reduce soil erosion. Sand, aggregates and cement will not be situated in areas prone to soil erosion. Where access is impeded, provide for temporary passageways and communicate/inform dwellers and institutions								
	3.5.5. Construction and Noise Disturbance to surrounding communities and sensitive areas	<u>Implementation of Noise Management</u> Implementation of working hours (from 7 AM to 7 PM) Queuing and idling of construction vehicles outside the premises of the camp site and outside operating hours specified is prohibited Use of power horns is banned. Dissemination of information to the community	Inspection through rough assessment by answering the question: ‘’Do you have to raise your voice to talk to someone respectively 1 m and 2 m away?’	Nearest residential receptors (2 locations)	Complaints from surrounding communities	Daily	-	Contractor & PSC	Included in Bid price Included in subproject design	IFC/WHO
			Complaints In response to complaint not resolved after application of (additional) mitigation measures	Nearest Complaining Receptor	dB(A)	Response: 3 times sampling/year	-	Contractor & PSC	$1,500 /Sampling Period	WHO Community Noise
	3.5.6. Construction and dust (Air quality decrease) to	<u>Implementation of Air Quality and Dust Management</u>	Visual assessment during the works	Construction sites	Complaints from the surrounding communities and intensity of dust	Daily	EMP	Contractor & PSC	Included in Bid price	DL No. 26/2012 (Art. 33), IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
	the community	Watering of surface through water truck, sprinklers or hoses, 2-3 times a day, particularly during dry season and high traffic volume or whenever required due to inspection and/or GRM complaint. Keep a detailed log of incidents when excessive visible dust emissions occur, the actions taken and an approximate rate of water application noted. Covering of stockpiles during periods of high wind Minimize movement of heavy vehicles and Limit velocity to 40km/h in residential and 50 Km/h maximum in urban area.			in the project area					
	3.5.7. Construction and Impact on Ecological Resources	Sensitive Areas Management Plan as included in Point 'PC1.1.1.2' Vegetation and tree re-planting Limitation of noisy	-	Construction sites	Sites cleared, waste removed, complaints	As needed during site clearing and construction	EMC	Contractor & PSC	Included in Bid price	DL No. 26/2012, IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		works in order to stabilize the fauna's mobility Restrict haphazard site clearing, parking, and movement of heavy vehicles and equipment stockpiling								
	3.5.8. Impacts on Socio-economic mic Resources, Infrastructure and Utilities and Cultural Sites	Reduction of Impact on established business activities and others Make available temporary access ways to all businesses and activities affected Determine compensation to business justifiably affected and demonstrate reduction of income due to project Follow the Heritage License rules for each site, defined by the SS Culture and apply measures in PC1.2.3.1 and PC3.1.1.1.		Location where business activities and cultural heritage sites are identified within the project area	Number of businesses buildings e.g. kiosks, shops, markets/su permarket s, etc. Number of cultural heritage sites identified Complaints from the affected persons	As needed during construction activity	Complaints registry	Contractor & PSC	Included in Bid price	WB ESF, DL No. 33/2017
3.6. Site clean-up and rehabilitation of locations	3.6.1. Unattended construction materials left on	Site Clean-up All temporary structures, materials,	-	Construction sites	Disposal site, residues of materials and	Duration of site clean-up	EMC	Contractor	Not applicable	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
	site may pose health and safety hazards to the public.	waste and facilities used for construction activities will be removed upon completion of the project. Excess rocks and sand as a result of excavation activities are not to be dumped next to surface waters and left prior to departure. Coordinate with local authorities of appropriate sites where mass load is needed. This had to be spread in natural looking manner and left in a stable state. Latrines will be covered with soil prior to departure. If full, cover with 30 cm of soil mixed with dry plant matter.			non- hazardous wastes					
OPERATIONAL AND MAINTENANCE PHASE										
O1. WATER SOURCES										
1.1. Protection of the water source	1.1.1 Declining of the water source	Implementation of Upstream Watershed Protection Programs,	-	Upstream watershed/wate	Type of activities implement ed in the forbidden or	Quarterly or yearly	Follows BTL report	PMU	O&M Costs	DL N0. 26/2012, DL No. 33/2011,

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
quality	quality	with restriction to water quality impacting activities i.e. animal husbandry, slash and burn, etc;		r sources vicinity	restricted area Water quality		formatting			Law No.14/2017,
		Improvement program for all existing and future dwelling sanitary infrastructure i.e. BTL septic tank design template, in the community surrounding the water source	Implementation of workshops and trainings	Within project area	Type of houses' sanitary facility	Quarterly or yearly	-	PMU & Contractor	O&M Costs	Gov.Resolution No. 8/2012 & DL No. 33/2008
		Involve the lia naín and communities for cultural ceremony preparation and Tara Bandu protection of the source	Ensuring of the lia-nain and other important local stakeholders are informed & invited prior the commencement of construction activity	Upstream of water source	Complaints from surrounding communities	Only during cultural ceremony (as needed)	-			WB ESF
O2. WATER TREATMENT AND PROPOSED STORAGE										
2.1 Mishandling of chlorine	2.1.1 Health hazards towards the operators	Ensure proper storage and handling practices for chemicals Chemicals should be placed properly in an indoor warehouse, bunded, with no sun exposure and room temperature control	-	WTP & Water tanks attributed with treatment facility	Leaks, visual spillage and strong odour	Daily	-	PMU & Contractor	O&M Costs Included in subproject design	IFC/WB

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		and access limited to authorized personnel only								
		Ensure the knowledgeable and skilled person is in charge of chlorine handling Provide training with simulation performances and equipment to improve worker on handling the Chlorine	-	Construction sites	Workers/operators capacity in on-site	Quarterly or yearly	-			IFC/WB, SEFOPE
		Ensure use of PPE while using chemicals	-	Construction sites	Number of PPE provided Number of personnel umber of accidents occurred	Daily	H&S report			IFC/WB, SEFOPE
O3. DISTRIBUTION NETWORK										
3.1. Sound Operation of Clean Water Distribution System	3.1.1. Improved Health and Hygiene	Proper operation of the Distribution system Regular maintenance of the project's components, monitoring and running the system and enforcing policies	-	Served areas	Decreasing rate of mortality	Yearly	-	PMU & Contractor	O&M Costs Included in subproject design	DL No. 4/2004

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		and procedures								
3.2 Drinking water supply system	3.2.1 Delivery of unsafe Water	Contractor to prepare operations and maintenance plan for the whole water system, particularly for water treatment and storage	-	Served areas	-	Once with some revisions if required	-	Contractor & PMU	O&M Costs	DL No. 4/2004
		Implement Water Quality Monitoring Program (as per DL31/2020) that: • Identifies the location of water sources (ground or surface) • Identification of Supply Zones • Description of the water treatment applied • Average daily Volume per Supply Zone • Population served by supply zone • Identification of sampling points per supply zone • Sampling Plan (Chronogram) with sampling points and dates	-	-	-	As needed	-	PMU & Contractor	O&M Costs	DL No 31/2020

Activity	Potential Impact	Mitigation Measures	Monitoring & Management						Indicative Cost (US$)	Relevance to Legal/Policy Guidelines
			Activities	Location	Parameter	Frequency	Reporting Requirement	Responsibility		
		• Monitor is according to DL31/2020 Annex II (Daily Routine Control at each WTP exit and monthly Full Control at Sampling point grid)		Selected sampling points	pH, BOD5, COD, TSS, oil & grease, turbidity	Monthly	Water quality records	Contractor	$700/sample	DL No 31/2020
	3.2.2 Detection and repair of leaks and pipe bursts	Ensure leak detection and restoration time is minimized to the extent possible	-	Project site	Water loss & complaints from customers	As needed	-	PMU / PSC	O&M Costs	
	3.2.3 Excessive algal growth in Tanks.	Water Tank Maintenance and Cleaning Schedule Close water tanks all the time to avoid algae growth Clean tanks as per the O&M frequency schedule.	-	Project site	Clogs, dirts & algae presence	Frequently	-	PMU / PSC	O&M Costs	
	4.2.3. Odour occurrence	4.3.3.1. Odour Management Measures Odour monitoring and procedures for recording and managing complaints from the public. Consult with residents to identify record odour or nuisance issues – preferably date, time and duration of odorous events.	Odour boundary monitoring method to be established	Water Treatment Plant	Complaints from surrounding communities	As needed	Complaints registry	PMU / PSC	O&M Costs	

Table 10.2. EMP Compliance Monitoring

Environmental Indicators	Location	Method and Frequency	Responsibility		Estimated Costs ($)
			Verification	Implementation	
Air quality	Civil works sites	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Noise	Civil works sites	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Flora	Civil works sites	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Water quality	Civil works sites	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Soil and land resources	Quarries, Borrow and Spoil Disposal Sites	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Resource use and natural resource contamination	Implementation site of Solid and Liquid Waste Management Sub-Plan B	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Human health and safety	Implementation of Community and Occupational H&S and Emergency Response Sub- Plan C	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Contamination of water, soil, waste production and social issues	Implementation of Construction Workers Management Sub-Plan E	Monthly checking against mitigation measures specified in this EMP	SMASA / PSC	Contractor	Included in contract
Community Issues • Environmental impacts of civil works (e.g., solid and liquid waste, erosion, local flooding, and pollution). • Any unforeseen impacts caused accidentally e.g., through spillages	At construction locations Accessibility – at all sites of pipe excavations in urban areas	Consultation with community and distribution of Public Information Booklet (PIB) prior to start of construction in a section. Consultation interview with Affected People Using the form in 4-6 weeks after construction starts Every 3 months until end of construction	PMU	SMASA / PSC	O&M Costs

Environmental Indicators	Location	Method and Frequency	Responsibility		Estimated Costs ($)
			Verification	Implementation	
• Civil nuisance (e.g., noise, disrupted business and farming activity, social issues, community health and safety). • Impaired use of access roads (e.g., traffic issues and access). • GRM and its procedures & key contacts • Accessibility					

11. REPORTING REQUIREMENTS

A set of environmental and social monitoring reporting will be prepared by the contractor, PSC, PMU and other parties as described in this section. The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators, and will include relevant national environmental quality standards. Checklists, monitoring forms and supporting documents required to complete the reporting requirements should be prepared in consultation and concensus among the the contractor, PSC, and PMU. Minutes or notes of discussion or consultation with the communities and project affected persons, including the performance evaluation of the programs/mitigation measures implementation will be summarized.

A monthly environmental monitoring report to PMU should be prepared by the contractor, containing a summary of the implementation of environmental mitigation measures implemented. The monthly report will be reviewed by PSC prior to endorsement by PMU. Further, the contractor should prepare a quarterly environmental monitoring report to PMU (and reviewed by PSC) and this report shall contain the details of environmental monitoring/sampling results and the implementation of mitigation measures.

The PMU will report every six months on the environmental mitigation and monitoring undertaken for the project to the Ministry of Public Works and the World Bank with a summary of environmental monitoring and the implementation of mitigation measures for all sections of the road Project and the off-site installations if any. This report will be prepared for the January – June and July – December period, incorporating the main items described in the monthly and quarterly environmental monitoring reports.

Internal monitoring and inspection consist of environmental monitoring for pre-construction and construction phases (under the CESMP) and the operation phase (under the current EMP). The Environmental Monitoring will be done at a weekly/monthly frequency during construction phases and with varying frequencies of reporting during the operation phase, to ensure that all project activities conform to the EMP.

11.1. Log of Project-Related Injuries and illnesses

Incidents related to occupational and public health and safety should be reported by PMU, PSC and the contractor during pre-construction and construction phases, and by BTL during the operational phase of the project. Project-related injuries and illnesses will be reported through registering it in a Log of Project-Related Injuries and Illnesses (This will help in the assessment and improvement of monitoring and operational procedures of projects to prevent reoccurrence).

The PMU/MPW is required to promptly notify the World Bank within 24 – 48 hours of any incident or accident related to the project which has, or is likely to have, a significant adverse effect on the environment, workers, affected communities and wider receptors including, inter alia, sexual exploitation and abuse (SEA), sexual harassment (SH) cases and occupational related injuries or illnesses.

11.2. Complaints Register

Although the PSC will take precautionary measures to prevent the occurrence of grievances and complaints, in the event that a complaint has been lodged, it should be rectified immediately, and a solution be implemented as soon as possible, under the Grievance Redress Mechanism and escalated accordingly if needed. All complaints should be recorded

in the Complaints Register. In cases where it cannot be rectified immediately, immediate temporary control measures must be applied effectively to mitigate the adverse effects. Temporary control measures shall be maintained until such time that the issue has been resolved to the satisfaction of both parties (i.e., PMU and Complainer).

11.3. Emergency Register

Emergency events related to environment, occupation and community health and safety i.e., chemical spills, fire, pollution (water, noise, air etc.), waste, should be reported by the contractor and PSC and registered by PMU for notification to the relevant HSE authorities and Suco Administration, where relevant. All emergencies should be recorded in an Emergency Register to be established by the project.

11.4. Measuring, Interpreting and Acting on Performance Indicators

Indicators of mitigation measures and monitoring should be checked and addressed before the start of the pre-construction phase. The PMU should ensure that all indicators are met by the PSC and contractor. Unaccomplished indicators will be escalated to the PMU for immediate action to be taken. Checking of indicators will be carried out before the start of pre-construction phase and on a weekly basis during pre-construction and construction phases.

11.5. Training and Reporting Types

Training programs for the project should require, at minimum, Environment and Occupational Health and Safety Training throughout the project lifetime, at different levels of project management, where required (see Chapter 15). Competent personnel should carry out the training programs in a language that could be understood by the contractor staff and especially when contracting new workers. Registry of all attendees, date, place where training is held, and the person who conducted the training should be filed. The training programs will be a requirement prior to commencement of project activities, particularly during the construction phase.

The following types of internal and external reporting are proposed for implementation throughout the project cycle.

Table 11.1. Types of Reporting

Reporting Types	Frequency	Purpose	Prepared by	Submitted to
INTERNAL REPORTING				
E&S compliance inspection during construction	Weekly	ESMP implementation progress and monitoring results	Contractor	PSC
Complaints register	Updated on monthly basis	Community grievance monitoring and resolution	Contractor, Chefes de Suco during construction) and BTL (during operation)	PSC/PMU
Emergency event register	Updated on monthly basis	Reporting on E&S including health and safety emergency related events	Contractor and Chefes de Suco (during construction) and BTL	PSC/PMU

Reporting Types	Frequency	Purpose	Prepared by	Submitted to
			(during operation)	
E&S monthly progress report	Monthly	E&S mitigation and monitoring activities including assessment of compliance status are summarized. Relevant monitoring data/lab report can be included as appendix of the progress report.	Contractor	PSC
EXTERNAL REPORTING				
Project's E&S Monitoring Report	Semi-annual i.e., January – June and July – December period	Detailed report of E&S mitigation activities and monitoring/laboratory results, including health & safety, grievance, non-compliance, corrective actions, etc.	PMU (assisted by PSC) for construction BTL for future operation	The World Bank, ANLA and MPW

12. RESPONSIBILITITES FOR MITIGATION AND MONITORING

Monitoring activity is usually conducted during the Construction, Operational and Decommissioning Phases. Whereas taking the mitigation actions start from the early cycle of the project up to the final. Monitoring activity aims on assuring the Contractor's compliances with the written Environmental Management Plan and to take immediate decisions by diverting the technical mistakes made by the Contractor in the site visit so neither construction nor operational activity will not exacerbate the environment and social stability.

This monitoring of project activities and indicators is the responsibility of the Environmental Management Team and is the most pivotal aspect of environmental management during the project cycle. Ministry of Public Works (MPW) as the proponent of this project shall be committed to enforce environmental responsibilities at all levels of the project management.

It is important to note that ANLA, as the Environmental Regulator, is not part of the Environmental Management Team.

Table 12.1. Key Roles and Responsibilities for E&S Mitigation and Monitoring

Agency	Responsibility
Project Proponent – MPW	• Ensure that the PMU team is dully assisted by the HSE and Social teams with the requirements to perform efficient and effectively in implementing and monitoring the EMP and Mitigation Measures; • Ensure all potential Environmental and Social impacts are addressed by the Environmental Management Team to ANLA satisfaction
PMU Team	• Ensure compliance with the Environmental License, Laws and Regulations; • Ensure compliance with ANLA and Local Authority requirements; • Ensure the Contractor's EMP (CEMP) and Mitigation Measures comply with the ones in the IEE and ideal to address any issue arising from project activities; • Ensure that the PMU team undertake immediate warning on the oversight in the field that is not in adherence to the EMP and mitigation measures; • Hold regular internal meeting with the PMU to review the implementation and progress of the environmental commitments; • Work closely with Baucau Administration Municipality and its local authorities to assure that the EMP and HSE components are properly implemented and to address possible issues arising from project activities; • Provide regular updates to the President of BTL about the progress status of the project, namely environmental related issues; • Ensure periodic environmental evaluation to the Environmental Authority;

Agency	Responsibility
	• Ensure that the contractor performance is in accordance with the Key Performance set out in the contract
Project Supervision Consultant (PSC)	• Provide environmental safeguard training and capacity to building to MPW, BTL and PMU staff (including management), and contractor prior to the submission of contractor's CESMP; • Update, based on detailed design, the ESMPs and other environmental and social protection and management measures as required in the contract documents; • Notify PMU of any change in the project design/components and provide all necessary information to the PMU to facilitate preparation of any additional environmental and social assessment prior to project construction as required in the ESMP (e.g., preparation of new or supplementary environmental and social assessment in case of change in project scope that will result in adverse environmental and social impacts that are not within the scope of the ESIA prepared during loan processing, etc.); • Assist PMU in the review and approval of the contractor's CESMP document prior to the submission for WB clearance; • Undertake monitoring of the implementation of the ESMP (mitigation and monitoring measures) including the incorporation of reports from the contractors; • Assist PMU to prepare quarterly progress reports and semi -annual safeguards monitoring reports for submission to WB and MPW as necessary including the incorporation of reports from the contractors and corrective action requests to Contractor; • Based on the results of CESMP monitoring, identify and prepare environmental and social corrective actions plan, as necessary, and ensure its proper and time-bound implementation for submission to PMU and WB.
Contractor	• Mobilize HSE Specialist as per contract requirement • Carry out site inspections to confirm and/or supplement the previous technical studies (existing data), as well as to support the existing environmental reports of the

Agency	Responsibility
	project with more detail information (if any), which will contribute to the improvement of the EMP; • Prepare a Construction specific EMP (CEMP) based on the present EMP requirements and obligations; • Carry out and implement all mitigation measures in accordance to the contract and EMP requirements and/or additional official requests, to the satisfaction of the authorities and the project proponent; • Provide support and adequate tools and protective equipment to the employees; • Protect the surrounding environment and limit damage and nuisance of the construction activities to a minimum, when planned and predicted in the EMP and the contract; • Immediately inform the PMU of any grievance on cultural items and/or findings of Human remains or other conspicuous heritage objects during the construction and operation phases; • Prepare environmental report of the project activities to the proponent • Monitor all daily HSE activities in the construction site and front; • Ensure all HSE contract and legal obligations are implemented accordingly; • Ensure all EMP and Environmental License requirements are implemented;

13. EMERGENCY PLAN

In Emergency preparedness, it is important to understand: a) What risks are more significant from the project, especially if they go beyond the borders of the project, impacting the community; b) Analyse and prevent said risks/hazards, allocating responsibility for their management; prepare for those risks and equipment to combat the hazards; c) Respond to them with the right human resources and equipment, when they/if they occur; and d) Recover to normality, implementing lessons learned from the experience.

Table 13.1. BMCWSP Identified Hazards and Risks

Hazard	Description	Safeguard	Risk Assessment
Fire and explosion on- site	• Fuel leaked from a project's truck or inspection cars, and also from the fuel tank in the Contractor's campsite; • Organic wastes residue generated from the construction activity.	• Fire truck provided on-site; • Designate of proper disposal site and implement waste recycling and reusing; • Frequent maintenance of the project's transportations and other heavy machineries that use fuel/gas (trucks, inspection cars, etc); • Fuel tank in the contractor's campsite needs to be covered under a roof to avoid heat from the sun triggering ignition	The risk would be low to moderate to occur
Exposure to toxic and harmful gases/chemical substances	• Leakages from the disinfectant unit that affect the operator to be exposed with chlorine and other chemical substance, leading to intoxication; • Exposure to asbestos particle during pipe replacement	• Proper use of PPE especially face-mask and gloves; • Regular monitoring on each unit in case there's any damages or leakages; • If the worker/operator is intoxicated, the first emergency response is to bring the patient • to the nearest hospital or clinic as soon as possible	The risk is low

Hazard	Description	Safeguard	Risk Assessment
Exposure to biological hazards-disease	Risk of diseases spreading through the workers and the population i.e., COVID-19 and transmitted sexual disease	• All personnel wear PPE on-site at all times; • Apply COVID-19 measures; • Annual medical screening and inoculation programme for site workers	Risk is moderate to high
Safety hazards	The site contains a number of safety hazards such as excavations, ditches, uneven terrain, heavy vehicles, etc	General safety precautions such as PPE, high visibility vests worn, speed limits, training and procedures apply	Risk is high
Noise	Intense noise from heavy equipment hinders communication on-site and ability to warn of danger	• Hearing guards to reduce hearing impairment; • Visual demarcations and audible warnings	Risk is high

Contact numbers of nearby emergency facilities should be written in a clear text and posted in a place that can easily be seen by all personnel, at all times. Some emergency facilities are outlined in table below including the corresponding contact numbers.

Table 13.2. Emergency Contacts

Major Injuries	
National Emergency Hotline	112
Baucau National hospital	TBC
Hospital Nacional Guido Valadares	TBC
Stamford Medical Emergency Hotline	+670 77721111
Fire	
National Operations Center (NOC) – Fire	115
Covid-19 National Response Center	119
Incidents	
Baucau PNTL	TBC

14. DECOMMISIONING PLAN

The decommissioning phase is the dismantling of the project's facilities due to the incapacity of the facilities to be operating. The BTL will be responsible for evaluation on whether or not the facilities should be improved. Distribution pipes which are no longer used will be removed and exchanged with new pipes, while the older pipes will be buried in the ground or moved to a final disposal area depends on the technical design. Smaller water tanks that are no longer functioning will be decommissioned.

15. CAPACITY DEVELOPMENT AND TRAINING

As described in the SEIS, the provision of trainings and capacity building has been identified to be one of the project's positive impacts and, it is the contractor's responsibility to provide for such requirement. Currently there is limited experience of monitoring and implementing environmental mitigation measures, especially at a Municipal level, as well as limited enforcement of EHS legislation or undertaking of routine environmental monitoring apart from infrequent projects under environmental impact assessment licensing procedure in urban centres (air and noise quality) or regular sampling in river systems (water quality).

The MPW has a number of people with capacity and experience who have fulfilled the role of 'focal point' for safeguards on project-by-project basis, particularly those that have had hands-on and safeguard experience in PMUs. Recently, dedicated Environmental and/or Social staff have been recruited at the PMU, but there is a pressing need for PSC to engage competent E&S officers to be based at the project site.This is paramount to project success as the PSC will perform key roles on behalf the PMU in implementing the CESMP.

In addition, through understanding the existing operations for the Water Distribution System in Baucau, it is clear that the ability for operation and maintenance is still not at the required level. The limiting factors affecting the operators' ability to maintain adequate standards are likely to be a function of (i) a lack of technical capacity and experience; (ii) lack of staff; and particularly (iii) insufficient budget.

A proposed training program is set out in the following table to address the safeguard reporting requirement and implementation of C-ESMP. This is subjet to discussion and mutual agreements by the PSC and PMU.

Table 15.1. Capacity Building and Training Requirements

Subject / Content	Participants	Trainer / Organization	When / Frequency	Number of events	Duration (days / event)	No of participants	Cost $ (USD)
EMP Development and Implementation EMP function, Roles and responsibilities, EMP monitoring (site visits) Reporting on Environmental Safeguards	PMU BTL Contractors	PSC	Twice -Once prior to, and once after 6 months of construction	2	2	10	$2,000

Subject / Content	Participants	Trainer / Organization	When / Frequency	Number of events	Duration (days / event)	No of participants	Cost $ (USD)
Consultation with Affected People Consulting during construction, types of consultation, methods	PMU BTL	PSC	Once before Construction	16	1	8	$16,000
Grievance Redress Mechanism Roles, responsibilities and implementation	PMU BTL Contractors Municipality Suco and Aldeia	PSC	Twice - Once prior to, and once after 6 months of construction	2	2	30	$4,000
						TOTAL	$24,000

16. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

16.1. Public Consultation Conducted to Date

The Public Consultation of the Baucau project was first undertaken in the Assembly Room of the Baucau Municipality Administration Office on 3 October 2020, participated by local government agencies and authorities (Chiefs of Suco/Village), and representative members of the communities within the project area. This consultation was undertaken as part of the SEIS and EMP preparation in alighment with the ADB Safeguard Policy Statement (2009) in which this MDB provided assistance to the governnment in preparing the Master Plan/DED of Timor-Leste Four Municipal Capitals Water Supply and Sanitation Project including for Baucau. Subsequently, the World Bank participated in the Baucau project.

BTL, as the project proponent at that time, presented the arrangement of the proposed project, predicted environmental and social impacts, and proposed mitigation measures in order to collect all useful and relevant inputs from the stakeholders attending the event in readines for the project construction phase. The stakeholders presented their concerns, suggestions and recommendations for the project implementation, focussing mainly on issues regarding the beneficial of the existing water source for agriculture, sucos that are not included in supply zone, possibility of extracting water from Uailia Mata spring, possibility to identify another water source and measurement for structural preservation of cultural and religious assets within the project area.

No issues of significant social concern or objections about the proposed project were raised and the stakeholders were positive about it, expecting for this project to be implemented as soon as possible, since they are facing crucial water issues for daily consumption and do not want to repeat uncertainty over the schedule for water delivery into the households in the future.

Figure 16.1. Public Consultation in Baucau City (2020)

The Consultant Team also engaged with several local and national level institutions that supported the study, in particular during the field study and data collection, namely:

- Baucau Directorate of Water and Sanitation (Mr. Pedro Alexandre Guterres and technician staff Mr. Natalino);
- Chief Department of the Environment for Baucau BTL, Mrs. Adriana;

- Ministry of Agriculture and Fisheries: General Director from Forestry, Coffee and Industrial Plants, (Mr.Raimundo Mau) and Chief of Department of Conservation (Mr. Joao Antalmo);
- Secretary of State for Arts and Culture: General Director from Secretary of State for Arts and Culture (Mr. Manuel Ximenes Smith), National Director of Cultural Patrimony (Mr. Gil Paulino dos Santos Oliveira) and Chief of Department of Archaeology (Mrs. Irene dos Reis Goncalves);
- Local authorities: Chief of Suco Bahu, Caibada, Buibau, Tirilolo, Uailili, Samalari, Triloca, and Buruma.

16.2. Public Consultation at Village (Suco) Level

In addition, seven (7) other Public Consultations were carried out under the social component, on the 4th February 2021 in Suco Caibada, Suco Bahu and Suco Tirilolo, on the 5th February 2021 in Suco Gariuai, Suco Tiriloca, on the 6th February 2021 in Suco Buibau, and lastly on the 9th February 2021 in Suco Uailili. These Consultations aimed at confirming the expectations and worries in the previous Public Consultation and reassured the team that there is very little risk of any water conflicts or impacts felt by the community during implementation and operation of the future system.

During the consultations as shown in the following photos, the Suco's communities acknowledged about the lack of proper water and sanitation system. Most of the questions were technical matters and the majority concerns from the community are the water sharing to other villages that are not mentioned in the design and water payments during operational and maintenance phase if water meters are to be installed in the future. However, the community is supportive, is willing to pay for water supply in their households and does not have any objection for future Public Toilets to be installed. Most women in all 7 Sucos do not have their own organizations or groups, but they are encouraged by the recognition of this project and will involve fully in the implementation of this project aiming to improve the quality of life through clean water and sanitary services.

Figure 16.2. Public Consultation at Suco Caibada (2021)

Figure 16.3. Suco Bahu Public Consultation

Figure 16.4. Suco Tirilolo Public Consultation

Figure 16.5. Suco Gariuai Public Consultation

Figure 16.6. Suco Triloca Public Consultation

Figure 16.7. Suco Buibau Public Consultation

Figure 16.8. Suco Uailili Public Consultation

16.3. Public Consultation Undertaken for the SEIS Process

To follow ANLA's request for Public Consultation under the Environmental Licensing process, two (2) other Public Consultations were carried out on the 1st and 2nd of June 2022 in Suco Bahu and Suco Tirilolo, with a total 156 participants. These consultations aimed at reviewing the expectations and concerns stated in the previous consultation events and reassured that there is a low risk of any water conflicts or impacts felt by the community during implementation and operation of the future project.

In general, during the consultations, several issues were raised and the consultant managed to clarify and inform the community members regarding their worries, where they were informed that most issues were already thought of, analysed and covered under the SEIS and the EMP.

Suco's communities acknowledged about the lack of proper water and sanitation system and voiced that they were positive about the proposed project, voicing their support and willingness to pay for water supply in their households, with no objection for future Public Toilets to be installed.

Women in particular were encouraged by their recognition in this project and will involve fully in the implementation of this project aiming to improve the quality of life through clean water and sanitary services.

The communities supported to the project implementation, thanking the consultants for the designs and the strategy to supply them with water on 24/7 basis. They expect this project to be implemented as soon as possible, with better coordination with local administration and Suco and Aldeia leadership, and printed project information i.e. brochures, since they are facing crucial issues with water for daily consumption and don't want to repeat uncertain schedules for water delivery into their households, as have occurred in the past.

Figure 16.9. Suco Bahu Pulic Consultation

In this regard, the DED consultant emphasized the importance of the EMP as the rules to safeguard these concerns, for the future contractor to follow during construction and the need to draft project-specific Construction-ESMP, adapted to the contractor's project scope and area, based on the current EMP requirements. It was further explained that there are indirect impacts issues that fall under the general responsibilities and coordinated effort of the Local Authorities and the community, such as: adaptation to urban planning; improving domestic and building sanitation installations to avoid contamination of sources; or control of illegal connections.

Figure 16.10. Suco Tirilolo Public Consulation

However, a few issues and concerns were discussed further during the public consultation, due to their significance, namely:

- *Downstream water uses and potential for water conflict* – the community are concerned of reduction of water due to extraction for water distribution. This is particularly relevant for the Uailewa and Sirimanana sources. However, while Sirimanana has a Non-objection letter from the community, the consultant explained that the Project has calculated the water use in Uailewa based on the existing and future water needs and the volume of extracted water now and in 2040 is a small percentage of the whole of the Uailewa system and the current Uailewa water users within the proposed water distribution areas downstream will become BTL clients so the water they use today will be the same volume in the future but potable and safe to drink, and the extra water will continue to flow to non-BTL surface water users.
- *Cultural and Heritage issues* – any issues in this regard within the project ROW must be managed locally: Suco Bahu voiced their concern about the need for local management of these issues. The Consultant informed that the SEIS has already identified several important cultural and architectural heritage sites for the project area and has included rules for the contractor to follow in his/her contract, especially to review the conditions of each component before construction and together with the 'Chefe de Suco' and 'Lia Nain'. These components are as follows:
    - All water sources are defined as "sacred" even if they are not, because of their importance and opening and yearly ceremonies will be done according to the Lia Nain of each project component area.
    - The transmission lines and distribution network are to be placed under the road to minimize impacts to persons and physical assets. Contractor to request a license to the Secretariat of State for Culture (in coordination with Chefe de Suco and Lia Nain) regarding Heritage sites that are within 50m of the project components, as demanded by the Cultural Laws in effect.
    - Tirilolo Tank location to be changed: the Land and Property Representative advised that this land was already earmarked for a Municipality project. The team advised they would coordinate again with Land and Property and Municipality to confirm the location.

16.4. Stakeholder Engagement and Information Disclosure during Construction

Prior to the start of construction, the appointed contractor and PMU will conduct information dissemination sessions and request support of the local community leaders to encourage the participation of the people to discuss the E&S concerns they mahve on the project during construction. At each Aldeia/Suco, focus group meetings in appropriate format/scale would be conducted to discuss the construction plan with local communities and thus reduce disturbance and other impacts, as well as provide a mechanism through which stakeholders can participate in project monitoring and evaluation. Constant communication will be established with the residents to address E&S issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism, and overall EMP implementation. Meetings will also be organized at potential hotspots/sensitive locations before and during the construction i.e., water Sources and/or close to cultural sites where considered appropriate.

For disclosure and information purposes, a copy of the SEIS and EMP with the Executive summary translated into Tetum (local language) will be distributed to each of the Chiefs of

Aldeia, for local public access to information, creating wider public awareness. An electronic version of the SEIS and EMP in English and Executive Summary in Tetum will be placed in a website indicated by the MPW, BTL, WB, Consultant or other, and the stakeholders will be made aware of the grievance redress mechanism.

Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plans. A board showing the details of the project will be displayed at the construction site for general public information.

17. GRIEVANCE REDRESS MECHANISMS

The main objective of the Grievance Redress Mechanism (GRM) is to provide a transparent mechanism for the stakeholders and public to express their E&S concerns or issues linked to the project, arising during the project implementation, with the objective of ensuring that concerns and potential conflicts can be satisfactorily addressed. The function of GRM is to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project in a form of forum which can be accessible to other related parties with a provision of Complaint Registry Form by the Contractor as described below.

The proposed mechanism for grievance redress of environmental matters in construction and operation of the project's infrastructure subcomponents uses existing Suco ("village") and Aldeia ("Hamlet") administrative structures (affected persons/ village committees/ village groups), any of which can be complainants.

The benefits contribute to the project itself and also the affected persons and other stakeholders. The benefits of the project will resolve any relative disputes before they escalate to a higher level, help building trust and confidence to the related community members, create productive relationships between the parties, and helps avoid project delays and increasing of costs, thus will improve the quality of work. Other benefits that can contribute to the affected persons and stakeholders are easing and facilitating access to information and providing an effective way to report their grievances and complaints.

Every grievance shall be registered by the Contractor and PSC under a carefully documented process. The PMU will also be involved in the clients' complaints and establish a good network with the chefe suco and aldeia for cultural facilitation purposes. The environmental and social safeguards officer will be fully responsible on the overall grievance redress issues particularly on the environmental and social issues using a combination mechanism.

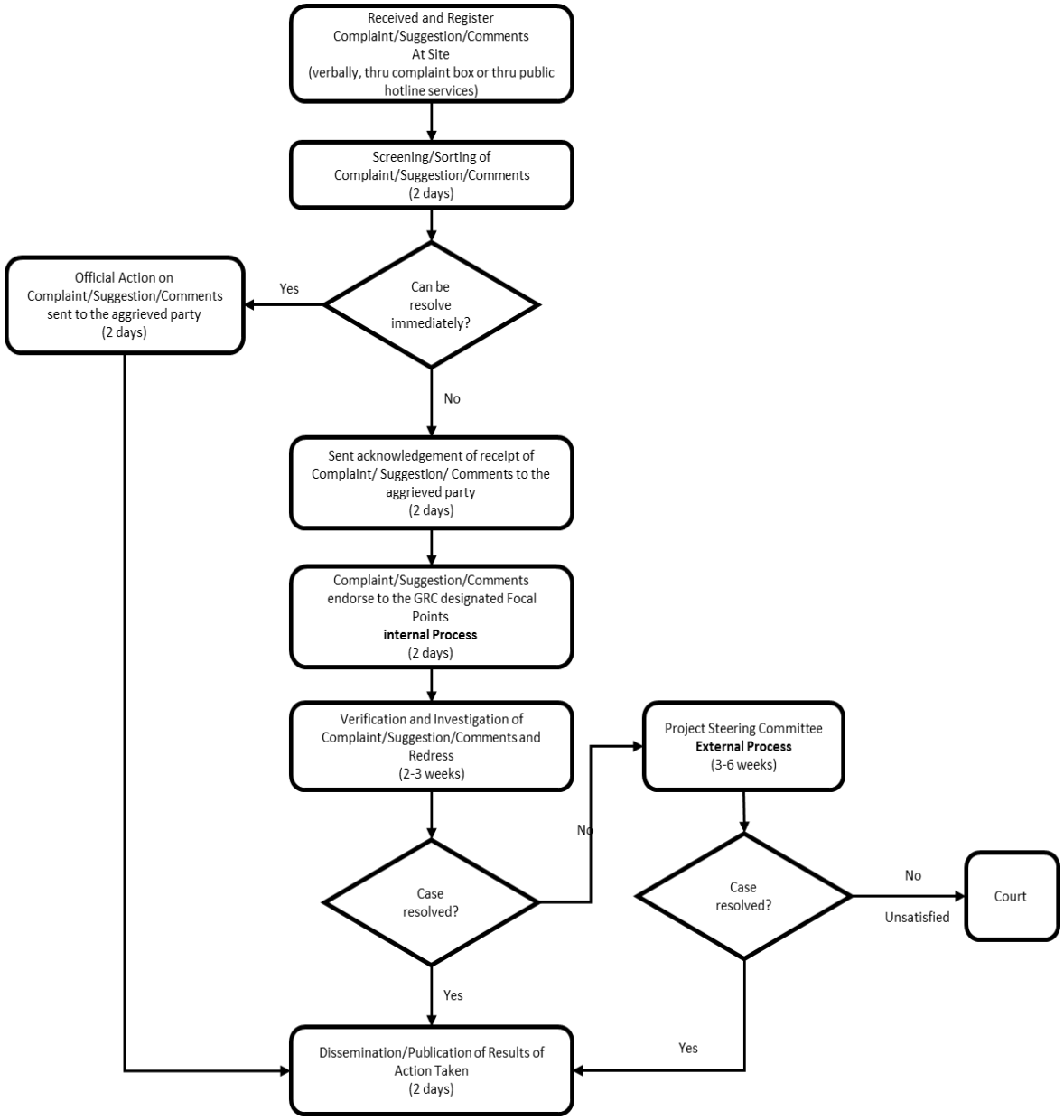
Grievance regarding the process can be redressed at two levels, which are during the construction, and during Operation of the project, following the process in the following figure.

At the project level, a complaint registry shall be set up in the project work area, under the responsibility of the contractor, identifying a staff member that is management level and whom, due to the nature of his/her function, will always be available on site and people shall be informed of his/her presence.

The contractor representative shall accept complaints on environmental safeguards issues during the rehabilitation works, by registering them in the Complaint Template, identifying the name of the complainant and the date of receipt. For a verbal complaint the contractor must make written records properly and record them in a complaint register.

The contractor representative will inform the PMU representative of the occurrence and review the nature of the complaint with PMU to make sure it is environment related. PMU performs an internal review of the issue, contacting the safeguards specialist for technical support to solve the grievance, if required, and after will agree with the Contractor on the necessary action and reasonable timeframe for correction/response to the grievance.

Figure 17.1. Grievance Redress Procedure for the Project



If the grievance requires local mediation, PMU, PSC, and contractor representatives should consult quickly with local Chefes de Suco and Aldeia (in the area of related grievance) and the affected stakeholder/person to arrive at a conclusion on the correction of the grievance.

PMU must follow up on the corrective measure, within the agreed timeframe. If the Contractor has not taken any satisfactory corrective action within the defined timeframe, PMU will take action in accordance to environmental legal and contractual clauses in effect.

If the Grievance cannot be solved at the project level, by PMU, the case will be referred to the court of law to adjudicate the matter. Complainants can also file a direct complaint to PMU-BTL, under their official Department for Client Support (Address: BTL Compound, Caicoli, Díli; Telephone: 331 71 57), who will follow up directly with the project complaint registry at the construction level.

This BTL Department for Client Support is the official grievance redress representative for water supply purposes, when the operation phase of the project comes online.

18. WORK PLAN AND IMPLEMENTATION SCHEDULE

This project work plan comprises of several activities starting from the preparation of Detailed Engineering Design process until the Project is able to accomplish all of the planned objectives. Below are several project activities with estimated dates. This duration below may change due to various technical reasons and conditions.

Table 18.1. Baucau Activities

Task Name	Status
Detailed Engineering Design	Updated in Q1-2026
Environmental Licensing Process	Subject to renewal in October 2026
Advanced procurement process	Ongoing in 2026 with contract award by the end of 2026/early 2027
Construction activities	2027 – 2030
Operational activities	2031

19. COST ESTIMATES

The costs for the EMP implementation are summarized in the table below and regarding the construction period (3-4 years) and an initial 1-year operation phase/liability period post construction (under the contractor support). The total indicative cost for EMP implementation for the project comprises the followings:

- The cost of the mitigation measures is to be included in the construction contract and operations budget –hence no additional cost.
- Contractor's environment, H&S officer(s) including contractor's GRM focal point, for construction – this cost is included in the construction contract price and to be estimated by the contractor. The amount estimated for one environment H&S officer is $72,000 ($1,500/month for 48 months).
- The cost of environmental quality monitoring, detailed in Table 19.1, is to be included in construction contract and operations budget – for construction this cost is estimated at $46,000 for a period of 48 months and for operation is estimated at $5,600;
- EMP preparation, implementation monitoring and compliance monitoring, including public consultations (affected People and GRM) is covered under the contract, hence no additional cost. The amount estimated is about $20,000 over the 48 months construction period.
- The cost of Capacity Building and Training (excludes Affected people and GRM) during construction and Operation is estimated $41,800.
- Therefore, the overall cost of preparing and implementing the EMP including measures during construction and supervision is estimated to be approximately $179,800.

Table 19.1. Indicative Cost for EMP Implementation

	Particulars	Stages	Unit	Total Number	Rate ($)	Cost ($)	Cost covered by:
A	**Mitigation Measures**						
1	Mitigation Measures per Project Activity	Construction and Operation	N/A	N/A	To be defined in Bid	To be defined in Bid	Contractor
2	Contractor's HSE Officer	Construction	Person	1	$1,500 / month	$72,000	Contractor
	Subtotal (A)					**$72,000**	
B	**Environmental Monitoring Measures**						
1	Water Quality (upstream and downstream of Waisarake and Uailewa Spring)	Construction	(as in DL31/2020)	24	$700	$16,800	Contractor
2	Complaints in relation to after application of mitigation measure	Construction	(as in DL31/2020)	8	$700	$5,600	Contractor
3	Noise (if complaint at sensitive/residential location)	Construction	dBA	12	$1,500	$18,000	Contractor
4	Water Quality	Operation	(as in IFC Guidelines)	8	$700	$5,600	Contractor
	Subtotal (B)					**$46,000**	
C	**Capacity Building and Training**						
1	EMP Development and Implementation	Before and during Construction	Training Session	2	$1,000	$2,000	Contractor
2	Consultation with Affected People	Before and during Construction	Training and PC Sessions	16	$1,000	$16,000	Constructor
3	Grievance Redress Mechanism	Before and during Construction	Training Session	2	$2,000	$4,000	Constructor
4	Environmental Protection	Before Construction	Training Session	1	$1,000	$1,000	Constructor
5	Environmental Monitoring	Before Construction	Training Session	1	$1,000	$1,000	Constructor
	Subtotal (C)					**$24,000**	
	TOTAL (A+B+C)					**$70,000**	

20. EMP REVISION

The SEIS was conducted during the feasibility studies and DED phases, adopting the operational parameters from the feasibility studies and DED to guide the project owner into the final stage of Detailed Engineering Design for the project and, consequently, the contractor to follow through to produce his own Construction Environmental and Social Management Plan (C-ESMP). The C-ESMP is project-specific and prepared based on the EMP prepared as part of SEIS is a document that serves as a binding guideline for the Environmental and Social Management of the Project, where the ultimate accountability rest with the Ministry of Public Works (MPW) as the Proponent asssited by the PMU.

The EMP is a live document, updated when required by the Project Proponent and/or its consultants, to make sure it responds to the requirements defined for the construction and development phases. The EMP will be reviewed when change to the project is predicted regarding activities during the construction and operation phases. In this regard, possible changes may be needed when the Team submit the first draft of this EMP and receive technical comments afterwards from ANLA, according to the needs and evaluation from the regulator.

The CESMP will be reviewed and updated, if necessary, by the Contractor, under supervision of the PMU, at any stage if unforeseen issues appear, or at several key project stages, if there are significant foreseen deviations from the latest version of the SEIS and EMP. All changes and new versions of the EMP shall be drafted and reviewed by the PMU/PSC and then submitted to ANLA for revision and approval.

Requirement for EMP review

- New regulations, laws or standards published by ANLA or the Government of Timor-Leste;
- Significant incidents, both environmental and social, that require follow-up actions from the proponent;
- Situations where improvements are required to guarantee performance with the environmental and social areas;
- Equipment or procedural changes result in a positive or negative environmental and/or social change;
- Monitoring results require a change to the mitigation/monitoring system to manage the project impacts;
- Changes to the responsibility for EMP implementation; and
- Direct impact is predicted to influence to the following: i) Cultural Heritage; ii) Traffic; iii) Water; and iv) Legally responsible person.

Design/Pre-construction phase

- At final Detailed Engineering Design (DED) phase;
- After any additional specialist study (if required); and
- Completion of the pre-construction phase.

Construction phase

- Every 6 months and at first two years from License attribution for the purpose of Environmental License review; and
- Completion of the construction phase.;

Operational phase

- End of facility commissioning or at award of the Operations contract to incorporate operator-specific information; and
- Yearly and every two years for the purpose of Environmental License review.

21. NON-TECHNICAL SUMMARY

Context of the Project. The Baucau Municipal Capital Water Supply Project is a continuation of the Second District Capitals Water Supply Project of Asian Development Bank (ADB), which then proceeds into the Detailed Engineering Design (DED) phase. Its main objective is to provide improved water supply and sanitation services to Baucau city community, rehabilitating the existing infrastructures that are currently in a very poor condition, and to provide technical trainings to members of related stakeholders in maintaining the sustainability of the future facilities. The World Bank was engaged in the project preparation since 2020, but the project was cancelled in 2025. At the request of the Government of Timor-Leste, the project was reactivated in early 2026 with the focus to implement only the water supply component and exclude the sanitation component.

E&S Impact Assessment According to the Decree Law 05/2011. According to the Decree Law 5/2011 on Environmental Licensing, the Ministry of Public Works (MPW) submiited a Project Document as a scoping document for the National Authority for Environmental Licensing (ANLA) to determine the category for the Baucau project. ANLA determines that the project is classified as Category B, and therefore, the SEIS and EMP has been prepared by the consortium of Endidro/Aguas de Portugal/OASIS to obtain the required environmental license. The work undertaken in preparing this report was based on the information collected by the Environmental Consultant during the preliminary meetings with the proponent and project site visits. The SEIS comprises several key chapters that provide information on, among others:

- Project Proponent; and the Consultant who prepared the SEIS and EMP.
- Key Regulatory Framwork of the Country and International Standards
- Description of the Project and the Environment; Alternatives;
- Impacts, Mitigation Measures and Monitoring;
- Public Consultation;
- Issues occurred in the SEIS;
- Conclusions and Recommendations.

General Environmental and Social Setting of the Project Area. The project is situated in the Baucau Municipality, covering selected Sucos (villages), namely Bahu, Buibau, Buruma, Caibada (Makasae), Caibada (Uaimoa), Gariuai, Seical, Tiriloca, Tirilolo and Uailili. These Sucos population is the primary receptor of the water supply services from this project, which in 2018, counted 7,350 persons, therefore, water quality particularly Uailia Mata should also be the main focus for its treatment, given that in the future the Uailia Mata will probably have bacteriological contamination and suffers from high total hardness even though the current result is generally good, thus it is important that the water treatment facility will include the following treatment lines: Soften (calgon dosing) and disinfection.

The Uailia Mata spring is located in the plateau of Baucau, precisely in Suco Gariuai with high potential of aquifer and according to the BTL Baucau technician, the said spring currently serves to only certain groups or community in Suco Triloca and Gariuai, which is outside the urban area and proposed supply zone. The region of Baucau is formed of recent sedimentary materials, aged of the Pleistocene (Qpb) named Baucau Formation. The flat lying Baucau limestone consists of grey, hard, cavernous, massive white coral-reef limestone well developed around Baucau city. The topography of the project area is quite flat in the upper plateaus and landslide risk is unlikely and so location and routing of the water infrastructure is not considered to be a substantial problem.

Scope of the Project. It is expected to produce several outputs, as described in the following below:

- To rehabilitate and expanding the Baucau municipal capital urban water supply system in order to cover the potable water demand;
- Establish fully functioning water supply in Baucau Municipality and selected Sucos;
- Influence and facilitate achieving new or improved households' sanitation in all served households in the Baucau municipal capital and selected Sucos.

The Project scope includes all the areas that will be required to implement the Abstraction, Treatment and Distribution of Water for Human Consumption, as well as provide designs and solutions for Sanitation infrastructures encompassing 15-km diameter urban area of Baucau Municipal Capital. The existing water distribution system and future expansion on to new households in Baucau city will serve the following Sucos: Bahu, Buibau, Buruma, Caibada (Makasae), Caibada (Uaimoa), Gariuai, Triloca, Tirilolo and Uailili.

Why Do We Need the Project? The Project will contribute into enhancing the quality life of the local people in health and hygiene sector particularly on women. The future significant improvement in women's health will lead to low rate of mortality, balance family and individual level. Other than that, shaping the local economy and boosting the livelihood of the community are anticipated as job opportunities will be available once the Project is implemented.

What are the Anticipated Project Impacts? The implementation of the project is associated according to the cycle, which comprises of 4 phases, commencing from the design activity, aiming to meet the project's needs. The subsequent phases are the construction activities of infrastructures, following the operational and maintenances of the facilities, and the decommissioning. All possible adverse impacts associated with the respective activities have been identified and evaluated thoroughly in the SEIS. Based on the activities identified, the possible impacts are considered significant and mitigation measures for each of them as elaborated in the EMP are needed to mitigate the impacts on site.

Have Stakeholder Consultation been Conducted for the Project? The Public Consultation of the Baucau project was conducted at the Baucau Municipality Administration Office on the 3 October 2020, participated by local government agencies and authorities (Chief of Suco and Village), and representative members of the communities within the project area. In addition, 7 other Public Consultations were carried outon the 4 February 2021 in Suco Caibada, Suco Bahu and Suco Tirilolo; on 5 February 2021 in Suco Gariuai, Suco Tiriloca; on the 6 February 2021 in Suco Buibau, and lastly on the 9th February 2021 in Suco Uailili.

All PCs registered a significant attendance especially with a strong female participation. After the non-technical presentation of the project, the floor was given to the attendees to discuss water supply and sanitation issues related to the project. At the request of ANLA, two additional public consultations were undertaken in Suco Bahu and Suco Tirilolo on 1 – 2 June 2022 as part of the SEIS preparation and to better address expectations and concerns stated in the previous consultation events related to potential conflifct between water users downstream of the proposed springs and potential distrurbance to the spring considered sacred and culturally sensitive sites.

Conclusions. The SEIS concludes that the adverse impacts due to project implementation will be anticipated predominantly during the construction phases, but these are temporary, localised and reversible upon project completions. The affected community will have to

endure temporary disturbances and interferences from the project activities; however, mitigation measures for the impacts are set in the EMP and based on this, the Contractor will be required to prepare a construction environmental and social management plan (C-ESMP) for endorsement by PMU that will served as a guidance to mitigate impacts and conduct monitoring program during construction. The positive or beneficial impacts will likely occur during the Operation and Maintenance phase as the socioeconomic sector will grow significantly, for instance the livelihood, health and hygiene of the community are anticipated to improve through provision of a safely managed (potable) water supply on 24-hour/7-days per week.

22. NON-TECHNICAL SUMMARY IN TETUM (RESUMO NÃO TECHNICAL)

Resumo Não Technical

Kontestu Projetu nian. *Baucau Municipal Capital Water Supply Project* mak kontinuasaun ida husi Segundu Projetu Abastesimentu Bee ba Kapitál Distritu husi Banku Dezenvolvimentu Aziátiku (ADB), ne'ebé kontinua ona ba faze Dezeñu Enjeñaria Detalladu (DED). Ninia objetivu prinsipál mak atu fornese servisu abastesimentu bee no saneamentu ne'ebé di'ak liután ba komunidade sidade Baucau, reabilita infraestrutura ezistente sira ne'ebé atualmente iha kondisaun att nia laran, no atu fornese treinamentu tékniku sira ba membru parte interesada sira hodi mantein sustentabilidade ba fasilidade futuru sira. Banku Mundiál envolvidu iha preparasaun projetu ne'e dezde tinan 2020, maibé projetu ne'e kansela tiha iha tinan 2025. Ho pedidu husi Governu Timor-Leste, projetu ne'e reativa fial fali iha inísiu 2026 ho foku atu implementa de'it komponente abastesimentu bee nian no esklui tiha komponente saneamentu nian.

Avaliasaun Impaktu E&S Tuir Dekretu-Lei 05/2011. Tuir Dekretu-Lei 5/2011 kona-ba Lisensiamentu Ambientál, Ministériu das Obras Públikas (MOP) submete ona Dokumentu Projetu nian nu'udar dokumentu eskopu ba Autoridade Nasionál Lisensiamentu Ambientál (ANLA) atu determina kategoria ba projetu Baucau nian. ANLA determina katak projetu ne'e kalsifikadu nu'udar Kategoria B, tan ne'e, konsórsiu Endidro/Aguas de Portugal/OASIS prepara ona Deklarasaun Impaktu Ambiental Simplifikada (DIAS) no Planu Jestaun Ambiental (PJA) atu hetan lisensa ambientál ne'ebé presiza. Servisu preparasaun relatóriu ne'e bazeia ba informasaun ne'ebé Konsultór Ambientál sira halibur durante enkontru preliminário ho proponente no vizita sira ba fatin projetu nian. DIAS ne'e kompostu husi kapítulu xave sira ne'ebé fó informasaun kona-ba, inklui mos:

- Proponente Projetu; no Konsultór ne'ebé prepara DIAS no PJA.
- Kuadru Regulamentu Xave Nasaun nian no Padraun Internasionál sira.
- Deskrisaun Projetu no Ambiente; Alternativa sira.
- Impaktu sira, Medida Mitigasaun sira no Monitorizasaun.
- Konsultasaun Públika.
- Kestaun sira ne'ebé mosu iha DIAS laran.
- Konkluzaun no Rekomendasaun sira.

Kondisaun Jerál Ambientál no Sosiál iha Área Projetu. Projetu ne'e situa iha Munisípiu Baucau, kobre Suku selesionadu sira, hanesan: Bahu, Buibau, Buruma, Caibada (Makasae), Caibada (Uaimoa), Gariuai, Seical, Tiriloca, Tirilolo no Uailili. Populasaun iha Suku sira-ne'e mak benefisiariu primáriu ba servisu abastesimentu bee husi projetu ne'e, ne'ebé iha tinan 2018 konta hamutuk ema na'in 7.350, tan ne'e, kualidade bee, liuliu iha be'e matan Uailia Mata mós tenke sai foku prinsipál ba nia tratamentu, konsidera katak iha futuru be'e matan Uailia Mata karik bele hetan kontaminasaun bakteriolójiku no husi nivel *hardness* (dureza) ne'ebé aas, maski rezultadu atual jerálmente di'ak, tan ne'e importante tebes ba fasilidade tratamentu bee nian sei liu husi liña tratamentu sira hanesan: hamihis (doze calgon) no dezinfeisaun.

Bee-matan Uailia Mata situa iha planaltu Baucau nian, iha Suku Gariuai ho potensiá akuíferu ne'ebé aas tuir tékniku BTL Baucau, bee-matan ne'e atualmente fornese de'it ba grupu ka komunidade balu iha Suku Triloca no Gariuai, ne'ebé sai husi área urbana no zona abastesimentu ne'ebé proposta ba. Rejiaun Baucau formadu husi materiál sedimentáriu foun husi kapa Pleistoseinu (Qpb) ne'ebé hanaran Formasaun Baucau. Fatuk-ahu ruin (limestone) Baucau nian kompostu husi fatuk-mutin ahu ruin nian ho kór-sinzentu, to'os, no kavernozu ne'ebé dezenvolve tebes iha sidade Baucau laran. Topografia área projetu nian tetuk ituan

iha planaltu leten nian, no laiha risku rai-halai, tan ne'e fatin no lalaok ba infraestrutura bee nian la konsidera nu'udar problema substansial.

Eskopu Projetu nian. Projetu ne'e hein katak sei produs rezultadu lubuk ida, hanesan deskreve iha kraik ne'e:

- Reabilita no loke-luan sistema abastesimentu bee urbana kapitál munisípiu Baucau nian atu kobre nesesidade bee moos;
- Estabelese abastesimentu bee ne'ebé fungsiona kompletamente iha Munisípiu Baucau no Suku selesionadu sira;
- Influénsia no fasilita hodi atinji saneamentu uma kain nian ne'ebe foun ou diak ba uma-kain hotu ne'ebé fornesidu iha kapitál munisípiu Baucau no Suku selesionadu sira.

Eskopu Projetu inklui área hotu ne'ebé presiza atu implementa Kaptasaun, Tratamentu no Distribuisaun Bee ba Konsumu Umanu, nune'e mós fornese dezeñu no solusaun ba infraestrutura Saneamentu nian kobre diâmetru 15-km iha área urbana Kapitál Munisípiu Baucau. Sistema distribuisaun bee ezistente no espansaun iha futuru ba uma-kain foun sira iha sidade Baucau sei serve ba Suku sira tuirmai: Bahu, Buibau, Buruma, Caibada (Makasae), Caibada (Uaimoa), Gariuai, Triloca, Tirilolo no Uailili.

Tanba Sá Ita Presiza Projetu Ne'e? Projetu ne'e sei kontribui hodi hasa'e kualidade moris komunidade lokál iha sektór saúde no ijiene, liuliu ba feto sira. Saúde feto nian ne'ebe diak signifikativu iha futuru sei hatun taxa mortalidade, no ekilíbriu iha nivel família no individuál. Iha sorin seluk, bele forma ekonomia lokál hodi haforsa komunidade nia moris ho oportunidade ba empregu wainhira projetu ne'e implementa ona.

Saida deit mak Impaktu Projetu ne'ebé prevee ona? Implementasaun projetu ne'e asosiadu tuir siklu ne'ebé kompostu husi faze 4, hahú husi atividade dezeñu ho objetivu atu kumpri nesesidade projetu nian. Faze sira tuirmai mak atividade konstrusaun infraestrutura, tuir kedas ho operasaun no manutensaun ba fasilidade sira, no desmantelamentu. Posibilidade husi impaktu negativu bo'ot sira ne'ebe asosiadu ho atividade sira-ne'e identifika no avalia ona ho didi'ak iha DIAS. Bazeia ba atividade sira ne'ebé identifika ona, impaktu sira ne'ebé sei mosu konsidera signifikativu, no presiza medida mitigasaun iha PJA ba kada impaktu sira-ne'e hodi mitiga impaktu iha terenu.

Konsultasaun ho Parte Interesada sira Hala'o Ona ka Lae? Konsultasaun ba projetu Baucau hala'o ona iha Edifísiu Administrasaun Munisípiu Baucau iha loron 3 Outubru 2020, ne'ebé partisipa husi ajénsia governu lokál no autoridade sira (Xefe de Suku no Aldeia), hamutuk ho reprezentante komunidade sira iha área projetu. Aleinde ne'e, Konsultasaun Públika 7 seluk mós hala'o ona iha loron 4 Fevereiru 2021 iha Suku Caibada, Suku Bahu no Suku Tirilolo; 5 Fevereiru 2021 halao iha Suku Gariuai no Suku Tiriloca; 6 Fevereiru 2021 iha Suku Buibau; no ikus liu 9 Fevereiru 2021 iha Suku Uailili.

Konsulta Públika hotu-hotu rejista partisipasaun ne'ebé signifikativu, liuliu ho partisipasaun feto ne'ebé as. Depois de aprezentasaun non-tékniku projetu nian, fó oportunidade ba partisipante sira atu diskute kestaun abastezimentu bee no saneamentu ne'ebé relasiona ho projetu. Ho pedidu husi ANLA, hala'o mós konsultasaun públika adisionál rua iha Suku Bahu no Suku Tirilolo iha loron 1 – 2 Juñu 2022 nu'udar parte husi preparasaun DIAS nian, hodi responde di'ak liután ba espetativa no preokupasaun sira ne'ebé hato'o iha eventu konsultasaun sira anterior kona-ba potensiá konflitu entre utilizadór bee iha parte mota-ain husi bee-matan sira ne'ebé propoza, no mós potensiá distúrbu ba bee-matan ne'ebé konsidera hanesan fatin lulik no area sensível kulturá sira nian.

Konkluzaun. DIAS ne'e konklui katak impaktu negativu sira tanba implementasaun projetu sei predominante mosu liuliu durante faze konstrusaun, maibé sira-ne'e temporáriu,

lokalizadu no bele fila fali ba kondisaun normál bainhira projetu remata. Komunidade afetadu sira sei sente no hasoru distúrbio no interferé temporaria husi atividade sira projetu nian; maski nune'e, medidas mitigasaun sira ba impaktu sira-ne'e kolokadu ona iha PJA no bazeia ba ida-ne'e, Kontrator sei rekere atu prepara Planu Jestaun Ambientál no Sosiál ba Konstrusaun (C-ESMP) hodi hetan aprovasaun husi PMU, ne'ebé sei serbí nu'udar matadalan hodi mitiga impaktu sira no hodi hala'o programa monitorizasaun durante konstrusaun. Impaktu pozitivu ka benefisiál sira karik sei mosu durante faze Operasaun no Manutensaun, tanba sektór sosioekonómiku sei dezenvolve signifikativu, hanesan lalaok moris, saúde no ijiene komunidade nian ne'ebé hein katak sei sai diak liuhusi provizaun abastesimentu bee moos (potável) ne'ebé seguru durante oras 24 no loron 7 iha semana laran.

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APPENDICES

APPENDIX 1. ENVIRONMENTAL MANAGEMENT PLAN MATRIX AND MITIGATION MEASURES

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
PRE-CONSTRUCTION (DESIGN) PHASE									
0.1 Disclosure & Engagement of community	(No impacts)					0.1.1. Initiate Information Disclosure and Grievance process of IEE in BAUCAU	BTL	PMU	Included in Project Cost
0.2. GRM Dissemination	(No impacts)					0.2.1. Establish GRM and clarify roles and responsibilities (see GRM section of EMP) 0.2.2. Provide contractor with GRM contact details to be used for: A. GRM sign boards; B. GRM Contact Cards for Affected People	BTL	PMU	Included in Project cost
						0.2.3. Erect sign boards at the construction site entrance with: A. Project details, B. GRM procedures and contact details 0.2.4. Print 'GRM Contact Cards' for all workers to give to complainants and keep cards with all vehicles, machinery and site managers/foremen 0.2.5. Affected People Training. Contractor to raise awareness of all workers on how to respond when an affected person or member of the public has a complaint i.e., direct the	Contractor	PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						person to the most senior site manager present at the time and provide a 'GRM Contact Card'			
0.3. IEE and EMP Updated	(ALL)					0.3.1. Updated IEE and EMP to include: A. Final detailed design B. Additional environmental protection measures C. Approved national SEIS/EMP requirements & mitigation measures. D. Environmental quality baseline monitoring (water, air, noise) E. SEIS/EMP approved by SSE prior to contract award	Local Consultant / PSC	PMU / ADB	Included in Project Cost
0.4. Construction EMP (CEMP)	(ALL)					0.4.1. The contractor(s) will develop a Construction EMP CEMP) that includes the mitigation measures set out in this table as a minimum and will include detailed individual management sub-plans for: A. Sensitive Areas Management Plan B. Cultural Sites Safeguard Plan	Contractor	PMU/ PSC	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						C. Noise Management Plan D. Air Quality and Dust Management Plan E. Spoil Management Plan F. Community OHSE and Emergency Response G. Campsite and Construction Front Management Plan (if required) H. Site Clean-up Plan I. Traffic Management Plan J. COVID Management Plan (see Appendix 17 for applicable COVID Protection and Mitigation Measures) K. Solid and Liquid Waste Management Plan			
						0.4.2. The CEMP will include a map of each construction site, with copies held by the Contractor and PIU, showing as a minimum: a) Access routes, b) storage areas for waste, c) storage area for chemicals such as fuels, d) concrete mixing, e) stockpile storage areas (on & off s1ite), f) first aid kit and equipment used in emergency response, g) location of worker	Contractor	PMU/PSC	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						camps (if required). Contractor PMU / PSC Included in Bid price			
0.5. Obtain & activate permits and licenses	Compliance Obligations					0.5.1. Contractors to comply with all statutory requirements set out by Government for use of construction equipment, and operation construction plants	Contractor	PMU / BTL	Included in Bid price
						0.5.2. Contractor to ensure all required permits are in place prior to construction, such as (but not limited to): Materials extraction permits; Cultural Site Construction Protection License (for each cultural	Contractor	PMU / BTL	Included in Bid price
PC1. WATER SOURCES									
1.1. Location of water sources in sensitive area (Component: Biodiversity and Water Resources)	1.1.1. Uailewa and Uailia Mata Springs - Nuisance to the more culture than environmental but nonetheless sensitive	2	1	2	IS-	1.1.1.1. Increase sensitivity for construction and protection mitigation measures identified in C3 that may prevent and manage the activities of the project when working in the ROW and accessory areas of the rehabilitation of the Uailewa and Uailia Mata springs.	PSC / PMU	BTL	Included in Project Cost

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						1.1.1.2. Guarantee contractor is trained, accepts and follows all operational procedures applicable within the protected areas. Contractor must not: • Kill, injure, damage, remove, handle, disturb or interfere with any endangered species or existing animals under any circumstances; • Bring domesticated animals on-site • Poaching on-site or the surrounding forests • sell endangered species or derivatives of these species; • export endangered or derivatives of these species; • cleared trees without DNAP/Forest Guard inspection for nesting birds prior to cutting. The nest will be transferred carefully to another tree safe from project activities. • carry out clearing of vegetation before a detailed layout of clearing is presented by	PSC/ PMU	BTL	Included in Project Cost

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						the contractor and approved by the DNAP plant new/non-invasive species in the Project area, for reforestation purposes			
1.2. Use water sources (springs) (Component: Water Resources and Social)	1.2.1. Available water for all users (Insufficient)	2	3	4	S-	1.2.1.1. Comprehensive monitoring and assessment of all water source availability throughout project life (springs and well monitoring program for aquifer performance tracking)	BTL / PSC	PMU - BTL	O&M Cost Includedin subproject design
	1.2.2. Water use between environment, communities and Water Distribution System	2	3	4	S-	1.2.2.1. Uailewa and Uailia Mata springs to be used for Social and Ecological flow (no extraction) Apply a minimum environmental flow for Uailewa and Uailia Mata springs (Wet Season 30% of mean monthly flow / Dry Season 10% of mean monthly flow), for Downstream free flow and usage	BTL / PSC	PMU - BTL	O&M Cost Included in subproject design
	1.2.3. Social and cultural disruption	2	3	4	S-	1.2.3.1. Involve lia na'in in frequent cultural ceremonies i.e., "opening" for authorization to use cultural/natural water resource	BTL	PMU	O&M Cost

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	due to tara bandu and lulik/sacred area					Project activities during construction phase will be monitored by assigned personnel from the Culture Department. The springs will be demarcated with tapes to limit construction works outside the area and restrict access to the springs unless authorized by relevant authority. Precautionary measures will be taken by all construction workers to prevent damage to the Lulic springs. After construction operations, the contractor shall seek clearance from relevant authorities that the springs are in its natural state prior to departure.			
1.3. Protection of the Water source for Distribution Purposes (Component:	1.3.1. BTL borehole excessive extraction	2	1	2	IS-	1.3.1.1. Land Use planning reclassification of the area around and upstream of the boreholes as “no abstraction” zones and implement Water Resource Management regulations to manage these areas and guarantee the present investment	BTL / PSC	PMU - BTL	O&M Cost Included in subproject design

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
Social)									
PC2. WATER TREATMENT AND STORAGE									
2.1.New installation of disinfectant systemin the proposed or selected storage (Component: Social and Water Resources)	2.1.1. Waterborne disease towards consumers due to Water sources with lower quality and not in compliance with WHO standards	3	2	4	MS -	2.1.1.1. Upgrade of the design of new treatment plant and storage facilities by applying disinfection, chlorination or Calgon dosing system	BTL and DED Consultants	PMU / BTL	Included in Project Cost Included in subproject design
2.2. Remodelling / rehabilitation of existing water tanks (Component:	2.2.1. Insufficient treated water due to leakages (poor infrastructure) and lesser capacity of the water tanks	2	2	8	S-	2.2.1.1. Increase the water storage capacity and design by adjusting water demand estimation for 2040	BTL and DED Consultants	PMU /BTL	Included in Project Cost Included in subproject design

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
Water Resources)									
PC3. PROPOSED DISTRIBUTION NETWORK									
3.1. Identification of cultural, historical & touristic sites (Component: Cultural)	3.1.1. Impairment of the cultural heritage properties due to construction activities	3	5	27	S-	3.1.1.1. Prepare Safeguard Plan for each cultural site under risk and request license for each at the Cultural Directorate Project activities during construction phase will be monitored by assigned personnel from the Culture Department. Preparation of the rehabilitation activity must be done together with the Directorate that represents the Secretariat of State for Culture at the Municipal level. Pre-construction, the contractor must review these immovable asset locations and request approval of a Safeguard Plan for each of the assets, making sure that during the Construction activities, those sensitive heritage sites within 50 m radius of the construction activities should not	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						be interfered with or impacted on, and the rules as mentioned in Decree Law No. 33 /2017 for Cultural Patrimony Protection are followed, with the request, by the contractor, of a license /authorisation for intervention in the area. The sites will be demarcated to limit construction works outside the area and restrict access to the sites unless authorized by relevant authority. In case a new cultural/historical heritage site is identified during the construction, the Contractor will notify the BTL and follow the same procedure regarding these sites. Precautionary measures will be taken by all construction workers to prevent damage to the sites. After construction operations, the contractor shall seek clearance from relevant authorities that the sites are in their natural state prior to departure			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
3.2 Preparation of Project for H&S and O&M (Component: Social)	3.2.1. Risk to Workers H&S - General	2	3	4	S-	3.2.1.1. Preparation of a Health and Safety Plan and definition of Contractor HSE representative (including COVID-19 related mitigation measures (see C.3.3.7 and Appendix 14 for applicable COVID Protection and Mitigation Measures)) Toolbox meeting Train all site personnel on environmental health and safety Provide personal protective equipment to workers and ensure their effective usage Maintain accident reports and records Make first aid kits readily available Ensure moving equipment is outfitted with audible backup alarms	Contractor	BTL / PSC/ PMU	Included in Bid price
		2	3	4	S-	3.2.1.2. Catalogues, manuals and signage shall be provided in Tetum translation	Contractor	BTL / PSC	Included in Bid price
	3.2.2. Risk to Community H&S - Traffic Accidents and	2	6	16	S-	3.3.2.1. Traffic management plan Prepare traffic management plan which will include:	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	Communicable Diseases					a) How the contractor will inform the community and businesses of construction traffic routes b) Any advice/information the contractor will give to affected people during construction c) How the contractor will manage traffic including any road closures. Trained traffic marshal will be used to direct vehicle movements on and around construction sites and in all urban areas. Disseminate information to the community on Safe Traffic during Construction Speed limits will be determined for vehicles, below 50 km/hour per hour in city area and <40 km/hour in residential areas Apply the H&S Plan and distance the community from physical, chemical or other hazards associated with sites under construction and decommissioning			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						(including COVID-19 related prevention and reaction (see Appendix 2 for applicable COVID Protection and Mitigation Measures)			
		3	2	4	S-	3.3.2.2. Disseminate information i.e., information flyers to the community within the 15 km radius of the project area related to transmissible disease i.e., COVID-19, etc and relation to project activities	Contractor	BTL / PSC	Included in Bid price
CONSTRUCTION PHASE									
C1. WATER SOURCES									
1.0. Activities related to Infrastructure Construction	1.0.1. General Impacts (noise, air quality, siltation, H&S, etc)					(See C3. Water Distribution for related impacts mitigation measures)			
1.1.Inadequate protection off spring intake	1.1.1. The water from the spring intake will	3	1	4	MS -	1.1.1.1. Temporary drainage provision that links to safe surface water drainage.	Contractor	BTL / PSC	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
structures during rehabilitation (Component: Water Resources and Cultural)	flow and may cause soil/silt erosion.								
	1.1.2. Socio-cultural impact	3	2	4	S-	1.1.2.1. Involvement of lia naín for cultural ceremony preparation	Contractor / BTL	PSC / PMU / BTL	Included in Bid price
C2. WATER TREATMENT AND PROPOSED STORAGE									
2.0. Activities related to Infrastructure Construction	2.0.1. General Impacts (noise, air quality, siltation, H&S, etc)					(See C3. Water Distribution for related impacts and mitigation measures)			
2.1.Upgrading construction activities for water tanks and water treatment	2.1.1. Worker exposure to disinfection chemicals during installation	2	3	8	S-	2.1.1.1. Provision and obligatory use of PPE for chemical handling	Contractor	BTL / PSC	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
plant (Component: Social)									
C3. PROPOSED DISTRIBUTION NETWORK									
3.1. Induction of Contractor (Component: Social)	3.1.1. Enhanced impacts because of lack of knowledge of the EMP	3	3	9	S-	3.1.1.1. Induction meeting for EMP understanding and Project "Go-ahead"	BTL / PSC / PMU	BTL	Included in Project Cost
3.2. Construction Activities – Macro Benefits	Local Employment Generation: • Hire additional labour to the construction companies • The workers will work continuously during 4 years from one infrastructure to another	3	3	9	S+	3.2.1.1. Recruitment of skilled and unskilled workers from affected community, in coordination with the local authorities. Obligation for construction companies to hire local labour and promote training and qualification initiatives in order to maximize the volume of the labour. Principle of equity (gender equality). Employment opportunities must also be provided for woman. The promoter and the construction companies articulate with the Suco Chiefs to plan hire the	Contractor	BTL / PSC / PMU	Included in Project Cost

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	• Community from Baucau Administrative post needs more jobs as currently the volume of unemployment is 6.3%					labour with the consideration for those who most vulnerable. In order to maximise the positive effects, the following measures are proposed: • Where feasible, the use of manual labour should be preferred to the use of machinery in order to create more employment. • Carry out, whenever possible and if the necessary skills are available, the hiring of local labour, following the following priorities: i) affected families; ii) affected villages; iii) affected Sucos; iv) Baucau Administrative Post; v) Baucau Municipality; and vi) other locations outside Baucau Municipality. • The hiring of local workers should be planned and implemented in articulation between the construction companies, the promoter, the Suco chiefs and the Aldeia chiefs. • A communication plan should be implemented in good time, in liaison with			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						the local authorities, with a precise indication of the number of jobs made available and the necessary requirements to fill them. • When hiring, give priority to the most deprived and vulnerable people. • Not discriminate against women, who should receive a salary equivalent to that of men performing the same functions. • In the performance of equivalent functions, locally hired workers should not receive a lower salary than workers integrated into the staff of construction companies. • Not resort to child labour. • Assign fair wages and respect working hours. Overtime work, when performed at the request of construction companies, must be remunerated. • Companies responsible for the construction works should promote the implementation of vocational training initiatives to increase			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						the skills of as many locally hired workers as possible.			
	3.2.2. Enhance workers' skills	3	3	9	S+	3.2.2.1. “on-the-job” training program for workers, particularly unskilled workers	Contractor	BTL / PSC / PMU	Includedin Project Cost
3.3. Construction campsite (Component: Social and Economic)	3.3.1. Campsite Location and Landslides	2	2	4	MS -	3.3.1.1. Establishment of camp on stable and flat surface area, and where it would not cause soil erosion. The contractor arranges all land, yards, stores, workshops, offices, etc. for the purpose of the contract. Apply mitigation measures to all sites to prevent impacts to surrounding community and environment. After use, sites shall be cleared and restored to status as they were or to stable conditions with vegetative cover. The contractor demonstrates and follows the CEMP specifications for the all sites to minimize obstruction and nuisance to the public e.g., pollution of fuel and oil spillages, washing of concrete mixers and etc.	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						The Contractor provides, maintain suitable and sufficient shelters, and mess rooms for his workmen, as well as provide sufficient closets or latrines to the Engineer and relevant authority, and the closets shall be screened and maintain in clean and sanitary state at all times. The mess rooms, closets and latrines shall be located in positions to be approved by the Engineer. The Contractor responsible for making arrangements for the disposal of waste from mess rooms, closets and latrines.			
	3.3.2. Wastewater and soil/water contamination	2	3	4	S-	3.3.2.1. Establishment of a Proper Latrine System Installation of appropriate latrine with Septic Tank for construction workers in the camp site, at least 30 m away from any water source or constructed downhill from water sources within 30 m.	Contractor	BTL / PSC / PMU	Included in Bid price
	3.3.3. Water Source for Campsite may	2	2	4	MS -	3.3.3.1. Establish a water tank and source water for construction from BTL authorised sources	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	compete with Community Sources								
						3.3.3.2. Purchasing sufficient potable water supply in the form of litre bottles or in gallons, for all construction staff throughout the duration of the construction activities.	Contractor	BTL / PSC / PMU	Included in Bid price
	3.3.4. Storage and Management of Hazardous chemicals and materials may bring spills, fire hazards and H&S problems	2	3	6	S-	3.3.4.1. Proper storage and handling of chemicals and materials Allocation of proper containments and labelled, suited for the nature of chemicals and/or waste will be provided by the contractor and maintained throughout the duration of the Construction phase; Refuelling only in designated areas which are to be 50 m from a water course and drip trays to be used when refuelling or topping up / changing machinery fluids Materials hauled directly to work front, minimizing storage at campsite. Asbestos containing material i.e. used pipes to be confined covered, unbroken and with	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						limited access from people; Train/Inform workers/draft Guideline on identifying and risks of mishandling ACMs Prepare special team to remove ACMs from construction areas Coordinate with DNCP to determine final solution for ACMs			
	3.3.5. Non-hazardous Solid Waste Improper handling and storage and vector diseases	2	2	4	MS -	Implementation of Solid Waste Management System; Minimize domestic waste production on site and implement reuse of waste where possible; • Immediate disposal of waste in designated bins/areas induced by the contractor; • Waste bins will be kept closed to prevent the accumulation of water during rain events; • Regular emptying of waste bins and transport to approved disposal sites, with coordination with local authorities of appropriate dumpsites. If no accredited landfills exist near the area or service contractors are not available, burning of solid wastes may be permitted only in	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						controlled conditions under the guidance of the Environmental authority. • Minimize single use plastic by adapting 4R concepts (Reduce, Reuse, Recycle and Refuse): 1. Reduce -Reduce plastic supply through minimizing procurement for plastic -Decrease excessive packaging of materials -Replacing plastic straws, plastic cutlery and plastic cups with paper, glass, metal or biodegradable alternatives; 2. Reuse - Use the reusable bags food, cups and drinks bottles instead of using the disposable bags; - Providing the workforce with re-usable PPE including re-usable eyewear and overshoes; - Providing the workforce with re-usable bags in order that operatives do not			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						bring their own single-use plastic bags onto site. 3. Recycle - Use eco-friendly products or use the products that are made up of recycled materials 4. Refuse - Avoid unnecessary product packaging - Use water Gallon instead of single-use plastic water bottles The single use plastic also can be used as aggregate and mix with hot bitumen which the result can be used for backfilling trenches during the construction phase.			
	3.3.6. Food for construction personnel may compete with food supply for the local communities	2	3	8	S-	3.3.6.1. Food for Workers may conflict with local community supply Ensuring adequate source or supply of food for workers so as not encourage poaching or interfering with the local food production unauthorized.	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						Prohibition of poaching in the protected area or anywhere else Encouraging purchase of food from local vendors. Provision of cooking facility so as not to encourage the use of firewood for cooking If the availability of fuel is limited, the use of firewood for cooking will be confined in designated areas and the use of wood will be limited from timbers harvested from the project's clearing activity and no other.			
	3.3.7. COVID-19 transmission risks between workers and community in Camp and Work sites	3	3	9	S-	3.3.7.1. COVID-19 Construction site and Work Site Management mitigation measures Follow Appendix 2 indications for campsite and worksite COVID-19 management Plan and execute work in compliance with country-specific COVID-19 risk management regulations and directives including directions of the General Department of Labour, Secretariat of State of Labour, and Vocational Training.	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						Conduct workplace risk assessment to identify low, medium or high exposure risk to COVID-19. Include an action plan for prevention and mitigation of the spreading of COVID-19 in the COHSE Plan. Risk communication, training, and education. Training of workers in infection prevention and control practices. Adopt engineering, organizational and administrative measures, plan work so employees can keep distance from each other and minimize contact. Provide clear and visible guidelines on how to prevent infection at the construction site and initiatives taken. Regularly clean and disinfect. Screen on entry the temperature of each person entering the work site and record their contact details to facilitate tracking of infected persons should there be a need Promote personal hygiene (including hand and respiratory hygiene), make wash basins and			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						sanitizers available at entry, break area, and washrooms. Provide PPE and inform workers of its correct use. Health surveillance and insurance. Consider other hazards, including psychosocial. Review emergency preparedness plans. Review and update preventive and control measures as the situation evolves and Involve workers/ occupational H&S groups in the review.			
3.4. Construction Materials (Component: Social and Ecological)	3.4.1. Sand and stone Extraction and disturbances to environment	3	5	27	S-	3.4.1.1. Sand and Stone Sourcing Management Contractor to source its materials from duly authorised/licensed suppliers. Contractor to ensure these suppliers carry out their extraction activities without provoking unacceptable environmental damage	Contractor	BTL / PSC / PMU	Included in Bid price
3.5. Construction Work Front: All Infrastructure (Component: Ecological	3.5.1. Servicing and Fuelling of Construction Equipment and spills and pollution	2	4	8	S-	3.5.2.1. Equipment and Vehicle Maintenance and Monitoring Ensuring all construction vehicles are in good condition and an acceptable state of repair before the start of the construction phase;	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
Resources and Social)						Prohibition of use of dilapidated equipment and vehicles with leaks and causing spills; Designating suitable locations for re-fuelling and changing oil and lubricant; Accidental spills will be cleaned immediately and provision of drip trays to collect any oil or fluid drips; Fuel will be stored in a central depot, made of concrete slab or impermeable surface capable of containing at least a volume of one container, located within the central base camp.			
	3.5.2. Excavation, Cutting and Filling and safety hazards to Public and workers	3	3	9	S-	3.5.2.1. HSE demarcations and signage Set up adequate demarcations/barriers and establish visible warning signs in excavated, cut and filled areas for safety precautions (pedestrians and traffic).	Contractor	BTL / PSC / PMU	Included in Bid price
	3.5.3. Stockpiling and Storage of Construction materials and dust, water runoff damage to existing	2	3	6	S-	3.5.3.1. Spoils and Stockpiles Handling and Storage Plan Preference must be given to use of spoil other construction sites, or disposed in spent quarries or borrow pits Uncontaminated spoil to be disposed of in Government	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	utilities due, buildings and drainage blockage					approved sites, which will not be on agriculturally productive land, within 50m of a water course, including stream, river or irrigation channel, on sloped land, within 50 m of cultural heritage sites, within 100 m of any other culturally or ecologically sensitive feature. All stockpiles will be situated within the campsite or designated areas on-site that can easily be accessed by equipment and personnel and will cause minimal interference to the movements of vehicle and personnel in the project site. Identify stockyard areas in consultation with local administration, if not in base camp Reuse excess spoils and materials at all times; Covering of stockpiles with impermeable material like plastic, to protect from wind and rain events. Excess rocks and sand as a result of excavation activities to be disposed properly and not			

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						dumped next to surface waters or left prior to departure. Design with adequate drainage for outlets to prevent wastewater into water sources.			
	3.5.4. Excavation, Cutting and Filling and soil Erosion	2	2	4	MS -	3.5.4.1. Excavation procedures Excavations will only be started once all required materials and services are on their allocated sites and a layout already established for the transport of materials. Excavations, cuttings and fillings will be carried out in a manner to reduce soil erosion. Sand, aggregates and cement will not be situated in areas prone to soil erosion. Where access is impeded, provide for temporary passageways and communicate/inform dwellers and institutions	Contractor	BTL / PSC / PMU	Included in Bid price
	3.5.5. Construction and Noise Disturbance to surrounding communities and sensitive areas	3	2	6	S-	3.5.5.1. Implementation of Noise Management System; Implementation of working hours (permissible working activity from 7 AM to 7 PM)	Contractor	BTL / PSC / PMU	Included in Bid price Included in subproject design

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						Queuing and idling of construction vehicles outside the premises of the camp site and outside operating hours specified is prohibited Use of power horns is banned. Dissemination of information to the community			
	3.5.6. Construction and dust (Air quality decrease) to the community	3	2	6	S-	3.5.6.1. Implementation of Air Quality and Dust Management System; Watering of surface through water truck, sprinklers or hoses, 2- 3 times a day, particularly during dry season and high traffic volume or whenever required due to inspection and/or GRM complaint. Keep a detailed log of incidents when excessive visible dust emissions occur, the actions taken and an approximate rate of water application noted. Covering of stockpiles during periods of high wind Minimize movement of heavy vehicles and Limit velocity to 40 km/h in residential and 50 Km/h maximum in urban area.	Contractor	BTL / PSC / PMU	Included in Bid price
	3.5.7. Construction and Impact on Ecological Resources	3	2	6	S-	3.5.7.1. Sensitive Areas Management Plan Apply measures in PC1.1.1.2 Vegetation and tree re-planting	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						Limitation of noisy works in order to stabilize the fauna's mobility Restrict haphazard site clearing, parking, and movement of heavy vehicles and equipment stockpiling			
	3.5.8. Impacts on Socioeconomic Resources, Infrastructure and Utilities and Cultural Sites	2	3	27	S-	3.5.8.1. Reduction of Impact on established business activities and others Make available temporary access ways to all businesses and activities affected Determine compensation to business justifiably affected and demonstrate reduction of income due to project Follow the Heritage License rules for each site, defined by the SSCulture and apply measures in PC1.2.3.1 and PC3.1.1.1.	Contractor	BTL / PSC / PMU	Included in Bid price
3.6. Site clean-up and rehabilitation of locations (Component: Social)	3.6.1. Unattended construction materials left on site may pose health and safety hazards to the public.	2	2	4	MS -	3.6.1.1. Site Clean-up Plan All temporary structures, materials, waste and facilities used for construction activities will be removed upon completion of the project. Excess rocks and sand as a result of excavation activities are not to be dumped next to surface waters and left prior to departure.	Contractor	BTL / PSC / PMU	Included in Bid price

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
						Coordinate with local authorities of appropriate sites where mass load is needed. This had to be spread in natural looking manner and left in a stable state. Latrines will be covered with soil prior to departure. If full, cover with 30 cm of soil mixed with dry plant matter.			
OPERATIONAL AND MAINTENANCE PHASE									
O1. WATER SOURCES									
1.1. Protection of the water source quality (Component: Water Resources and Cultural)	1.1.1 Declining of the water source quality	2	3	4	IS-	1.1.1.1 Implementation of Upstream Watershed Protection Programs, with restriction to water quality impacting activities i.e., animal husbandry, slash and burn, etc;	BTL / PSC	PMU / BTL	O&M Costs
						1.1.1.2. Improvement program for all existing and future dwelling sanitary infrastructure i.e., BTL septic tank design template, in the community surrounding the water source	BTL / PSC	PMU / BTL	O&M Costs
						1.1.1.3. Involve the lia naín and communities for cultural ceremony preparation and Tara Bandu protection of the source			
O2. WATER TREATMENT AND PROPOSED STORAGE									

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
2.1 Mishandling of chlorine (Component: Social)	2.1.1 Health hazards towards the operators	3	3	9	S-	2.1.1.1 Ensure proper storage and handling practices for chemicals Chemicals should be placed properly in an indoor warehouse, bunded, with no sun exposure and room temperature control and access limited to authorized personnel only 2.1.1.2 Ensure the knowledgeable and skilled person is in charge of chlorine handling Provide training with simulation performances and equipment to improve worker on handling the Chlorine 2.1.1.3 Ensure use of PPE while using chemicals	BTL / PSC	PMU / BTL	O&M Costs Included in subproject design
O3. PROPOSED DISTRIBUTION NETWORK									
3.1.Sound Operation of Clean Water Distribution System (Component: Social)	3.1.1. Improved Health and Hygiene	3	5	27	S+	3.1.1.1. Proper operation of the Distribution system Regular maintenance of the project's components, monitoring and running the system and enforcing policies and procedures	BTL / PSC	PMU / BTL	O&M Costs Included in subproject design

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
3.2 Drinking water supply system (Component: Water Resources and Social)	3.2.1 Delivery of unsafe Water	3	3	8	MS -	3.2.1.1 Contractor to prepare operations and maintenance plan for the whole water system, particularly for water treatment and storage	Contractor / BTL / PSC	PMU / BTL	O&M Costs
						3.2.1.2 Implement SPS-compliant EMP and a Water Quality Control Program (WQCP) (as per DL31/2020) that: • Identifies the location of water sources (ground or surface) Identification of Supply Zones • Description of the water treatment applied Average daily Volume per Supply Zone Population served by supply zone • Identification of sampling points per supply zone • Sampling Plan (Chronogram) with sampling points and dates	BTL / PSC	PMU / BTL	O&M Costs
						3.1.1.3 Monitor water quality Perform water analysis according to DL31/2020 Annex II (Daily Routine Control at each WTP exit and monthly Full Control at Sampling point grid)	BTL / PSC	PMU / BTL	O&M Costs

Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
	3.2.2 Detection and repair of leaks and pipe bursts	1	3	3	MS -	3.2.2.1 Ensure leak detection and restoration time is minimized to the extent possible	BTL / PSC	PMU / BTL	O&M Costs
	3.2.3 Excessive algal growth in Tanks.	1	3	2	MS -	3.2.3.1 Water Tank Maintenance and Cleaning Schedule Close water tanks all the time to avoid algae growth Clean tanks as per the O&M frequency schedule.	BTL / PSC	PMU / BTL	O&M Costs
DECOMMISSIONING PHASE									
D1. WATER SOURCES									
Abandoning certain low flow- water sources according to Scenario 1, 2 and 3	No expected impacts	0	0	0	-	N/A	N/A	N/A	N/A
D2. WATER TREATMENT AND PROPOSED STORAGE									
N/A	No expected impacts	0	0	0	-	N/A	N/A	N/A	N/A
D3. PROPOSED DISTRIBUTION NETWORK									

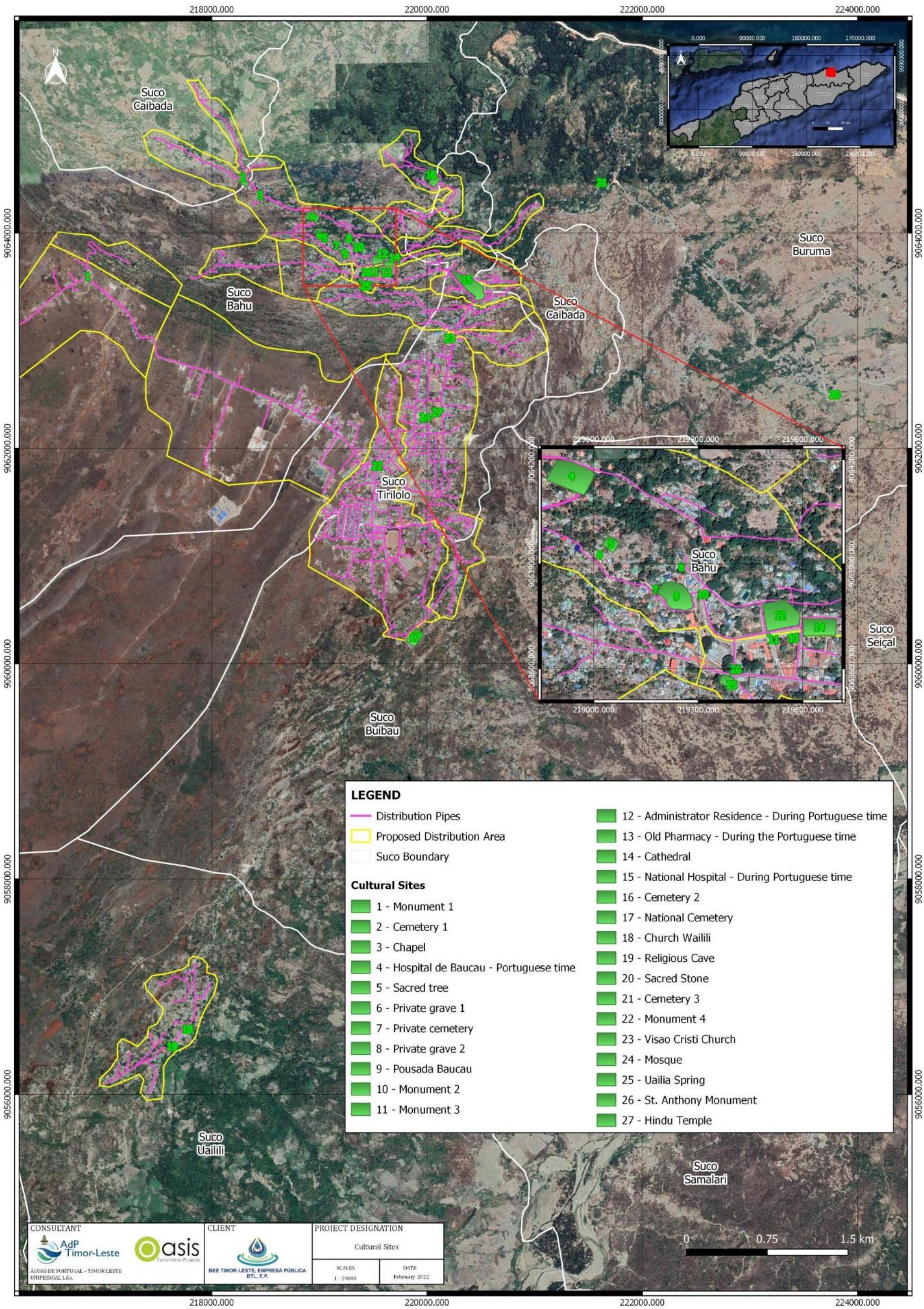
Activity	Potential Impact	Scale of present condition (1-3)	Scale of impact (1-6)	Product	Rating	Mitigation Measures	Responsibility		Estimated Cost ($)
							Implementer	Supervision	
Existing pipes to be deactivated	Reduce aesthetic value	2	1	2	IS-	Buried pipes located along the trench of new pipes are to be removed and all the material have to be transported to a final safe disposal area	Contractor	BTL / PSC/ PMU	Included in Bid price Included in subproject design
	Risk of asbestos particle becoming airborne from damaged AC Pipe	2	2	4	MS -	Buried pipes located outside the trench of the new pipes are to be maintained buried in order to avoid more works, costs and other impacts			
	Reduce aesthetic value	2	1	2	IS-	Buried pipes located along the trench of new pipes are to be removed and all the material have to be transported to a final safe disposal area			

APPENDIX 2. BAUCAU CULTURAL HERITAGE SITES

No.	Places	Type	Coordinates
1.	Monument 1	Heritage	8° 27.772'S / 126° 25.703'E
2.	Cemetery 1	Socio-cultural	8° 27.306'S / 126° 26.500'E
3.	Chapel	Socio-cultural	8° 27.365'S / 126° 26.579'E
4.	Hospital de Baucau – Portuguese administration	Heritage building	8° 27.478'S / 126° 26.843'E
5.	Sacred tree & traditional house	Socio-cultural	8° 27.590'S / 126° 26.920'E
6.	Private grave 1	Socio-cultural	8° 27.600'S / 126° 26.887'E
7.	Private cemetery	Socio-cultural	8° 27.656'S / 126° 26.972'E
8.	Private grave 2	Socio-cultural	8° 27.620'S / 126° 27.014'E
9.	Pousada de Baucau	Heritage, Touristic	8° 27.667'S / 126° 27.007'E
10.	Monument 2	Heritage	8° 27.663'S / 126° 27.046'E
11.	Monument 3	Heritage	8° 27.726'S / 126° 27.149'E
12.	Administrator Residence – during Portuguese time	Heritage	8° 27.701'S / 126° 27.165'E
13.	Old Pharmacy – during Portuguese time	Heritage building	8° 27.729'S / 126° 27.186'E
14.	Cathedral	Heritage building	8° 27.715'S / 126° 27.206'E
15.	National Hospital – during Portuguese time	Heritage building	8° 27.832'S / 126° 27.613'E
16.	Cemetery 2	Socio-cultural	8° 27.313'S / 126° 27.476'E
17.	National Cemetery	Socio-cultural, Heritage	8° 29.596'S / 126° 27.335'E
18.	Church Wailili	Socio-cultural	8° 31.560'S / 126° 26.175'E
19.	Religious Cave – Wailili	Socio-cultural, Heritage, Touristic	8° 31.652'S / 126° 26.106'E
20.	Sacred Stone	Socio-cultural	8° 28.391'S / 126° 269.478'E
21.	Cemetery 3	Socio-cultural	8° 27.328'S / 126° 28.334'E
22.	Monument 4	Heritage	8° 28.735'S / 126° 27.161'E
23.	Visão Cristão Church	Socio-cultural	8°28'6.06"S / 126°27'32.99"E

No.	Places	Type	Coordinates
24.	Mosque	Socio-cultural	8°28'29.72"S / 126°27'25.24"E
25.	Uailia Spring Altar Cultural	Socio-cultural	8°27'47.87"S / 126°27'4.62"E
26.	St. Anthony Monument	Heritage	8°27'47.23"S / 126°27'05.36"E
27.	Hindu Temple	Heritage, Socio- cultural	8°28'29.29"S / 126°27'25.31"E

BAUCAU CULTURAL SITES MAP



APPENDIX 3. COMPLAINTS REGISTRY FORM

Democratic Republic of Timor-Leste
Project RFP039- Consultancy Services for Detailed Engineering Design of Timor-Leste Four Municipal Capitals Water Supply and Sanitation

AdP Timor-Leste ENGIDRO engineering solutions

COMPLAINT REGISTRY FORM

DATE: _____/_____/_____ (dd/mm/yy) **CRF: 001**

Capital (please check) : [ ] Lospalos [ ] Viqueque [ ] Same

Complainant Profile

Name	:		**Age**	:	

Gender	:	[ ]Male	**Civil Status**	:	[ ] Single
		[ ] Female			[ ] Married
					[ ] Widow/er

Address	Aldeia	
	Suco	
	Administrative Post	

Complaint Details

Attending Officer:	
Name/Designation	Complainant Signature