

# Initial Environmental Examination

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March 2021

## Timor-Leste: Water Supply and Sanitation Investment Project: Lospalos City

Prepared by the Ministry of Public Works for the Asian Development Bank.

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## ABBREVIATIONS

WSSIP	- Water Supply and Sanitation Investment Project
ACMs	- Asbestos Containing Materials
ADB	- Asian Development Bank
DED	- Detailed Engineering Design
DNAP	- National Directorate for Protected Areas
DNCP	- National Directorate for Pollution Control
EARF	- Environmental Assessment and Review Framework
EHS	- Environment, Health and Safety
EIA	- Environmental Impact Assessment
EIS	- Environmental Impact Statement
EMP	- Environmental Management Plan
EMR	- Environmental Monitoring Report
ESS	- Environmental Safeguard Specialist
ESA	- Environmental Safeguard Assistant
FSTP	- Faecal Sludge Treatment Plant
GRM	- Grievance Redress Mechanism
IEE	- Initial Environmental Examination
IFC	- International Finance Corporation
MPW	- Ministry of Public Works
PA	- Protected Area
PD	- Project Document
PDC	- Project Design Consultant
PSC	- Project Supervision Consultant
PMU	- Project Management Unit
SEA	- Superior Environmental Authority
SEIS	- Simplified Environmental Impact Statement
CEMP	- Site-specific Construction EMP
SMASA	- Municipal Water, Sanitation and Environment Services
SPS	- Safeguard Policy Statement
TOR	- Terms of Reference
WDZ	- Water Distribution Zone
WTP	- Water Treatment Plant
WHO	- World Health Organization
WSS	- Water Supply and Sanitation

## WEIGHTS AND MEASURES

\$	- United States Dollars
°C	- Celsius/centigrade
amsl	- above mean sea level
dBA	- decibel audible
ha	- hectare/s
km	- kilometre/s
km <sup>2</sup>	- square kilometre/s
lps	- litres per second
m	- meter/s
m <sup>3</sup>	- cubic meter/s
mg/l	- milligram/s per litre
mm	- millimetre/s
µg/m <sup>3</sup>	- microgram/s per cubic meter

## NOTES

In this report, “\$” refers to United States dollars and “SMASA” refers to SMASA-Lospalos unless otherwise stated.

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## EXECUTIVE SUMMARY

1. The Water Supply and Sanitation Investment Project (WSSIP) will support the Government of Timor-Leste to improve water supply and sanitation in the three project cities (Lospalos, Viqueque and Same) by drawing on experiences and lessons learned from the ADB Second District Capitals Water Supply Project.
2. This Initial Environmental Examination (IEE) has been carried out during the detailed engineering design (DED) phase for the proposed project, in accordance with ADB's Safeguards Policy Statement (SPS) 2009, and the Government of Timor-Leste environmental requirements and guidelines currently in effect. The objective of such a procedure is to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards.
3. The government intends to implement the project over a 7-year period (indicative implementation period is 2022 to 2028) and will be supported through ADB financing using a project lending approach. The MPW is the implementing agency responsible for the overall management, implementation and monitoring of the project and the SMASA office in Lospalos will manage day-to-day operation at the city level. The scope of the DED prepared for the project includes:
  - (i) Rehabilitate the potable water distribution network to consumers within the defined Water Zones;
  - (ii) Evaluate existing and new sources for possible supply of the water distribution system;
  - (iii) Evaluate the condition and scale of the sanitation situation in the project area and design infrastructure for 4 public toilets;
  - (iv) Evaluate and design a stand-alone Faecal Sludge Treatment Plant (FSTP) to receive the collection and treatment of septic tank sludge effluent from all households, buildings and schools within the 15 Km project range.
4. The DED scope also 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 for buildings, schools and housing within a diameter area of 15 Km around the city.
5. The various project infrastructure components are in poor condition and are required to be completely rehabilitated/substituted. These are the existing and proposed water origins i.e. springs and boreholes, water storage, water treatment facilities, transmission and distribution lines and public toilets and Faecal Sludge Treatment Plant (FSTP).
6. The water supply system will be composed of surface water sources namely Papapa, Paupopo springs and lagoon intake, with a current calculated production capacity of 20 L/s (1,728 m<sup>3</sup>/day) and 7 Boreholes with a calculated production capacity of 114 L/s (9,849 m<sup>3</sup>/day), to respond to a 2040 water demand of 88.4 L/s (7,637 m<sup>3</sup>/day). This yield will be responsible to supply 3 different zones encompassing all the existing and projected households in Lospalos city up to 2040.
7. After storage, distribution and consumption, the generated wastewater and sludge are then treated primarily in the household septic tanks and afterwards transferred into the proposed Faecal Sludge Treatment Plant in Parapata, Suco Fuiloro.
8. Clean, adequate drinking water is a basic human need and developing drinking water supply facilities has numerous beneficial impacts to individuals and communities. Furthermore, when coupled to sanitation improvement, there is a substantial increase in the quality of life within the project area. Some of the major beneficial impacts of the proposed project are the increase of local employment generation, skill enhancement, improved health and hygiene and also empowering more women.

9. However, this project is also estimated to have negative environmental and social impacts, particularly during the construction and operational stages, particularly the construction phase, which is more likely to produce negative 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.

10. The project's environment and potential impacts were assessed through the use of an ADB REA (Rapid Environmental Assessment) Checklist, followed by 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.

11. It is thus concluded that the water supply and sanitation investment project in Lospalos can be categorized as a Category B (IEE) for environment, as per ADB SPS 2009, given it does not 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 at construction sites and known to civil works contractors.

12. Additionally, the project has presented a corresponding Project Document (PD) for the purpose of Timor-Leste's official environmental screening process and, will present a Simplified Environmental Impact Statement (SEIS) and an Environmental Management Plan (EMP) for a Category B classification, in accordance with the Government of Timor-Leste environmental legislation in effect.

13. The IEE procedure for Category B projects, under Decree-Law no. 05/2011, requires the proponent to undergo a full Public Consultation. Likewise, the project follows ADB's Safeguard Policy (ADB, April 2009), which requires borrowers/clients to perform meaningful consultation with affected people.

14. The ADB IEE (ADB, 2020) undertook Public Consultation for Lospalos in the Lospalos Cultural Centre on the 5<sup>th</sup> of 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.

15. 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.

16. In addition, 2 other Public Consultations were carried out under the social component in Suco Fuloro and Suco Home (7<sup>th</sup> December 2020) which registered a significant attendance and strong female participation and further confirmed 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.

17. Every grievance shall be registered by the Contractor within a carefully documented process during construction and development of the project. The MPW 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.



## 1. INTRODUCTION

### 1.1. Background

1. The Water Supply and Sanitation Investment Project (WSSIP) is a Government of Timor-Leste project that intends to provide access to improved water supply and sanitation in the three cities (Lospalos, Viqueque and Same) by drawing on experiences and lessons learned from the ADB Second District Capitals Water Supply Project.

2. The significant growing number of the population in all cities is resulting in the increase of water demand and wastewater production in the private and domestic sectors. Issues such as continuous water scarcity, poor infrastructures, inadequate water and wastewater quality has led the Government of Timor-Leste to focus on the water and sanitation improvement, particularly in the urban areas.

3. The WSSIP will build upon the current Government efforts in providing water supply and sanitation (WSS) services in Timor-Leste's urban areas, working towards the achievement of Sustainable Development Goal (SDG)-6 to ensure availability and sustainable management of water and sanitation for all by 2030, in line with the country's Strategic Development Plan 2011 – 2030 (G-RDTL, 2011), specifically the water sanitation strategy of "...providing a safe piped 24-hour water supply to households in 12 District [now "municipality"] centres..., by 2030,..." across Timor-Leste. It will also finance climate-resilient and inclusive WSS infrastructure in project municipalities and strengthen institutional and community capacity, sustainable service delivery, and project development.

4. The WSSIP is expected to impact on the quality of life for urban populations, especially the poor and marginalized, achieving inclusive and sustainable access to WSS services in the cities, through the improvement of water supply and sanitation infrastructure and strengthening of institutional and community capacities.

5. Shortage of investment funds, skilled personnel, and inadequate operation and maintenance (O&M) budgets, hinders municipalities from providing adequate, cost-effective services, even though the Decentralization Policy (2016) and the Statute of the Municipal Authorities (2016) establishes municipalities as an autonomous government institution with responsibility for WSS services, after a transition period.

6. While municipalities' capacity is being built, the government intends to implement the project over a 7-year period (indicative implementation period is 2022 to 2028) and will be supported through ADB financing using a sector lending approach. The MPW is the implementing agency responsible for the overall management, implementation and monitoring of the project and the SMASA offices will manage day-to-day operation at the municipality level.

### 1.2. The WSSIP and Lospalos City

7. This IEE report is prepared for the WSSIP – Lospalos City, within the Sucos Fuiloro and Home, which has the following components under the project Output 2:

- rehabilitate and expand the Lospalos municipal capital urban water supply system to cover the new demand volumes for the project horizon year of 2040, including:
  - (i) rehabilitation and improvement of the existing Papapa Spring intake and complement current water production through the drilling and activation of 5 boreholes in Zone 1.1, and 3 boreholes in Zone 2;

- (ii) Rehabilitation and improvement of existing water storage and treatment facilities;
  - (iii) Rehabilitation of 66,9 Km within the expanded water supply distribution pipe system (3 Zones), simplifying management and substantially improving the level of service and reducing water losses in the project area; and
  - (iv) Installation of bulk metering system within the distribution network and replacement and/or installation of domestic meters for all existing and new connections for proper accounting of water use and system losses.
- establish fully functioning water supply and sanitation infrastructure in 4 (four) public locations that is effectively operated, maintained and managed to provide a minimum level of service for water supply and sanitation to all municipal dwellers while they are active in the city premises;
  - establish septic tank sludge treatment and disposal facilities and associated sludge transport system within a diameter area of 15 Km around the Lospalos municipal capital that is effectively operated, maintained and managed and that safely transports the septic tank sludge effluent from all households, buildings and schools to a future stand-alone Faecal Sludge Treatment Plant (FSTP) in Parapata, Suco Fuiloro.

### **1.3. Purpose and Scope of the Initial Environmental Examination**

8. This Initial Environmental Examination (IEE) is the preliminary environmental evaluation for the Water Supply and Sanitation Investment Project – Lospalos City (known as WSSIP - Lospalos) and has been carried out during the Detailed Design phase, in accordance with ADB's Safeguards Policy Statement (SPS) 2009, and the Government of Timor-Leste environmental requirements and guidelines currently in effect. The objective of such a procedure is to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards.

9. An approved company, registered with the Secretariat State for Environment (SSE) has undertaken this IEE (for the purpose of the ADB due diligence procedure) and will prepare the Project Document (PD), Simplified Environmental Impact Statement (SEIS) and Environmental Management Plan (EMP) for the purpose of the Timor-Leste Environmental Licensing requirements.

10. The IEE covers the 3 Outputs under the project (Output 1: Regulatory environment improved; Output 2: Water supply and sanitation infrastructure improved; and Output 3: Institutional effectiveness improved) and all mitigation measures and monitoring under this IEE has been compiled under a separate Environmental Management Plan (EMP).

11. The environmental assessment was conducted for the Lospalos city water supply and sanitation project, based on (i) the D4 - Preliminary Engineering Design, and (ii) most likely environmentally sensitive components.

12. The IEE report itself describes this process, where it (i) provides project information and environmental requirements; (ii) provides baseline physical, ecological, cultural and socioeconomic description surrounding the project's area; (iii) identifies and assesses potential environmental impacts from the project's implementation; (iv) includes recommendations for measures to avoid, mitigate, and compensate adverse impacts; (v) informs on stakeholder consultations and participation activities during

project preparation; (vi) provides an environmental management plan; and (vi) presents a grievance redress mechanism for the project.

13. This analysis consisted of a stepped approach (characterization of the environment, description of project components, impacts analysis and management and mitigation measures) with close joint work with the ADP technical team in order to reduce the predicted significant impacts from the various proposed project components in the Design, Construction, Operation and Decommissioning Phases of the Project in this city.

14. The evaluation of the specific environmental conditions for Lospalos city was based on a short preliminary visit during the inception phase (on the 18 and 19 February 2020) and after a rather long period of delay due to COVID-19 restrictions, the team carried out a more in-depth site visit to Lospalos (2 to 4 June 2020).

15. A photographic registry was carried out of the surrounding conditions of all proposed project components defined at the time and the team applied ADB REA checklists for the Water and Sanitation Sector (see Appendix 1) to help survey the preliminary environmental conditions and possible impacts of the WSS components in the project area and review project interactions in regards to the most significant component conditionalities i.e. location, biodiversity and climate change. It also supported and guided the team and client on the probable environmental categorization of the WSS rehabilitation project, depending of the difficulties and/or possible impact control regarding stand-alone, specific infrastructure or in regards to areas where project components may encounter environmental sensitivities and bottlenecks for the project.

16. The field characterization was complemented with a desktop review of generally available secondary information on each of the project areas, in particular from the 2016 Initial Environmental Examination (IEE) documents from the Second District Capitals Project and additional bibliography. The characterization intended to provide a description of the Environmental conditions in each of the project areas in Lospalos and has been described in Chapter 5 “Description of the Environment”.

17. The team involved and collaborated with several local and national level institutions that supported the study, in particular during the field study and data collection, namely:

- (i) Lospalos Directorate of Water and Sanitation (Mr. Jose Vilanova Dias and technician staff Mr. Justo Viegas Pinto and Mr. Alexandre Mendes);
- (ii) 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);
- (iii) Department of Environment for Lautem (Mr. Antonio Amaral and Mr. Delcio da Costa Guimaraes);
- (iv) Lautem Cultural Centre (Mr. Bernardo Caldas and Mr. Tibursiu Mauvero Zakarias)
- (v) 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); and
- (vi) Local authorities: Chief of Suco Home (Mr. Luis dos Santos).

18. The environmental assessment of the Lospalos water supply and sanitation project shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

19. Under this scenario, the water supply and sanitation investment project in Lospalos has been concluded as a Category B, in accordance with ADB SPS 2009 and the Government of Timor-Leste Environmental Licensing Legislation (see Chapter 2 for information on project categorization). The project will also present corresponding Project Documents (for official environmental screening purposes) and, a Simplified Environmental Impact Statement (SEIS) and an Environmental Management Plan (EMP), in accordance with the Government of Timor-Leste environmental legislation in effect.

#### **1.4. Details of Proponent and Consultant that prepared the Report**

20. The Ministry of Public Works (MPW) is responsible for planning, implementation, regulation, and monitoring of WSS, and supports the water and sanitation facilities in municipalities, these operated locally together with the SMASA office.

21. The project proponent and representative details are the following:

***Ministry of Public Works (MPW)***

Mr. Salvador Pires, Minister  
MPW Corporate Services Building  
Avenida 20 de Maio, Caicoli, Díli, Timor-Leste

***SMASA Lospalos Regional Office***

Mr. Domingos Soares, Director  
Suco Fuiloro, Lospalos, Lautem, Timor-Leste

22. The Ministry of Public Works (MPW), on behalf of the Government of the Democratic Republic of Timor-Leste, contracted the consortium Águas de Portugal Timor-Leste / Engidro to prepare the “*Detailed Engineering Design of Timor-Leste Water Supply and Sanitation Investment Project of Same, Lospalos and Viqueque*”, financed by the Infrastructure Fund of the Government of Democratic Republic of Timor-Leste. OASIS – Sustainable Projects is the Consultant subcontracted by ADP/Engidro and responsible for preparing the IEE and EMP report.

## 2. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

### 2.1. The ADB Environmental Process

#### 2.1.1. ADB Safeguard Policy Statement

23. The ADB SPS 2009 (ADB, Safeguard Policy Statement, 2009) are operational policies that seek to avoid, minimize, or mitigate adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the development process. They consist of three operational policies on the environment, Indigenous Peoples, and involuntary resettlement.

24. ADB SPS 2009 requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB, to ensure the environmental soundness and sustainability of projects and support the integration of environmental considerations into the project decision-making process, which SMASA Lospalos will be required to comply with these requirements, for this project. Below is a summary of the step-by-step process, while more detailed information can be sought in the ADB SPS 2009.

- (i) **Screening and Categorization.** Projects are screened for their expected environmental impacts, and assigned to a specific category<sup>1</sup>. Categorization must be based on the most environmental sensitive component. However, for project(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the Project Design Team shall examine alternatives to the project's location, design, technology, and components to avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The screening/categorisation process must be properly documented, taking into account the environmental costs and benefits of the various alternatives considered and the "no action" alternative.
- (ii) **Environmental Assessment.** A description of environmental and social baseline information within the project area to provide an understanding of current conditions, thus forming the benchmark for assessment against identified project activities and respective impacts. Environmental impacts and risks are then analysed for all relevant stages of the project cycle, including design and planning stage, construction, operation, decommissioning, and post-closure activities such as rehabilitation or restoration.
- (iii) **Environmental Planning and Management.** After environmental impact assessment, the Project Design Team prepares an environmental management plan (EMP) to be included in the IEE report. The EMP describes and addresses the potential impacts and risks identified by the environmental assessment and the level of detail and complexity of the EMP and the priority of the identified measures and actions is commensurate with the project's impact

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<sup>1</sup> Per ADB SPS 2009 (i) **Category A:** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B:** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and, in most cases, mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI:** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

and risks. The EMP includes the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

- (iv) **Public Information Disclosure:** The Project owner, in this case MPW, shall submit, for disclosure i.e. on ADB or MPW or other website or paper copies in the MPW office, a final draft IEE in a form and language(s) understandable to affected people and other stakeholders so that they, as well as other stakeholders and the public can provide meaningful inputs into the project design and implementation.
- (v) **Consultation and Participation:** MPW, together with the PDC and the ESS, shall carry out meaningful consultation<sup>2</sup> with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation, where the consultation process and its results must be documented and reflected in the environmental assessment report.
- (vi) **Grievance Redress Mechanism:** MPW shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance, scaled to the risks and adverse impacts of the project.
- (vii) **Monitoring and Reporting:** MPW, together with the PMU, shall monitor, measure and document the progress of implementation of the EMP and identify necessary corrective actions and reflect them in a corrective action plan. These events shall be reported to ADB semi-annually in an environmental monitoring report (EMR) that describes progress in EMP implementation and compliance issues and corrective actions, if any, as well as from any non-compliances detected in any site visits, review meetings and/or missions.
- (viii) **Unanticipated Environmental Impacts:** Where unanticipated environmental impacts become apparent during project implementation, MPW and the PMU shall update or prepare a new the environmental assessment and EMP to assess the potential impacts, evaluate the alternatives and outline mitigation measures and resources to address those impacts.
- (ix) **Pollution Prevention and Control Technologies:** During the design, construction, and operation of the project, the MPW and PMU must apply pollution prevention and control technologies and practices consistent with international good practices i.e. internationally recognized standards such as the IFC EHS guidelines. When the Government of Timor-Leste regulations differ from these levels and measures, the PMU shall achieve whichever is more stringent.
- (x) **Occupational Health and Safety:** the MPW and the PMU shall ensure that all workers<sup>3</sup> are provided with a safe and healthy working environment, taking into account

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<sup>2</sup> ADB SPS, 2009: meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

<sup>3</sup> Means ALL workers, including nonemployee workers engaged by the borrower/client through contractors or other

internationally recognised standards such as i.e. IFC HSE, to identify risks inherent to the sector and specific classes of hazards in the project work areas (physical, chemical, biological, and radiological hazards, etc.) and ensure steps are taken to prevent accidents, injury, and disease arising from or during the course of work i.e. follow guidance from World Bank Group's Environmental, Health and Safety Guidelines.

- (xi) **Community Health and Safety:** the MPW and the PMU shall ensure that risks are identified and potential impacts assessed on the safety of affected communities during the design, construction, operation, and decommissioning of the project, and guarantee that preventive measures and plans are established to address them in a manner commensurate with the identified risks and impacts.
- (xii) **Physical Cultural Resources:** the MPW and the PMU are responsible for overseeing the siting and designing of the project so as to avoid significant damage to physical cultural resources. Such resources will be identified and the project's potential impacts on these resources assessed using field-based surveys in the environmental assessment process and especially chance finds procedures shall be included in the EMP.
- (xiii) **Bidding and Contract Documents:** the MPW and the PMU shall ensure the IEE, SEIS and EMP are included in bidding and contract documents and verified by the MPW, ensuring that these include specific provisions requiring contractors to (i) comply with all other regulatory conditions required by the Government of Timor-Leste and ADB<sup>4</sup> and (ii) to submit to MPW/PMU, for review and approval, a site-specific environmental management plan (CEMP).<sup>5</sup> No works can commence prior to approval of the CEMP; a copy of the EMP or approved CEMP must be on site during the construction period at all times and Non-compliance with, or any deviation from, the conditions set out in the EMP or CEMP will constitute a failure in compliance and shall require corrective actions from the contractor.
- (xiv) **Conditions for Award of Contract and Commencement of Work:** MPW shall not award any Works contract until: (i) relevant EMP provisions are incorporated into the Works contract and the CEMP has been prepared by the contractor and subsequently approved by the PMU; and (ii) the IEE is updated to reflect the Project's detailed design and any conditions resulting from the domestic environmental compliance license, and the PMU has subsequently obtained MPW and ADB's clearance of the IEE and corresponding EMP. Works cannot commence without the domestic environmental license having been secured.

## 2.1.2. Project Category under ADB SPS 2009

25. All projects funded by ADB must comply with its Safeguard Policy Statement (SPS) to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards.

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intermediaries, that work directly in the project sites or perform work directly related to the project's core functions.

<sup>4</sup> Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

<sup>5</sup> CEMP to include (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures as per EMP; (iii) monitoring program as per CEMP; and (iv) budget for CEMP implementation.

26. Environmental assessment has been conducted for the Lospalos water supply and sanitation Project based on (i) Detailed Engineering Design, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklist (see Appendix 1) and the field review during the project. The environmental assessment of the Lospalos Water supply and sanitation project shows it is not likely to 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. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

27. Therefore, under the ADB SPS 2009, the Lospalos water supply and sanitation project is classified as Category B for environment and this initial environmental examination (IEE) report has been prepared based on its requirements. However, Environmental Assessment beyond the IEE will have to take into account the result from the screening process under the Timor-Leste legislation.

## **2.2. GOVERNMENT ENVIRONMENTAL RULES AND REGULATIONS**

### **2.2.1. Decree Law No. 26/2012 – Base Law of Environment**

28. Decree Law No. 26/2012, 4th July 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 a healthy, ecologically balanced environment and the use of natural resources is done in a sustainable way, as defined in the Constitution of the Democratic Republic of Timor-Leste. It 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.

29. 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.

### **2.2.2. Decree Law No. 5/2011 – Environmental Licensing**

30. While all projects funded by ADB must comply with their Safeguards to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards, in Timor-Leste, environmental screening and categorization follows similar suit but is also dependent on project component and scale comparison with Decree-Law no. 5/2011 – Environmental Licensing, particularly Annex I – Category A (EIA) or Annex II – Category B (IEE) thresholds.

31. Decree Law No. 5/2011 was published on the 9th of February 2011 and is the regulatory implementation of article 15 of the Base Law for Environment, where it defines the methods of environmental classification/screening, evaluation, decision, licensing and monitoring of development projects, throughout their construction, operation and decommissioning phases.

32. It requires a proponent to screen the proposed project and undertake either Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) of the proposed project and have it reviewed and approved by the Environmental Regulator (ANLA),<sup>6</sup> prior to implementation.

33. The preparation, review, approval and monitoring of EIA and IEE projects are dealt with in the Articles within Chapters IV, VI, VII and X, while environmental screening and categorization is dependent on project component and scale comparison with Annexes 1 and 2, which list down the project activities and thresholds that define a Category A (EIA) or Category B (IEE) requirement or, concurrent with the principles of the ADB SPS 2009, the ANLA determines and duly justifies the category of a proposed project based on the most sensitive environmental component.

34. This means that a project may have components listed in different Sectors of both annexes (depending on the scale of each of them) but the project, overall, assumes the environmentally most significant Category of any of the sectors it falls into.

35. Most importantly, Ministerial Diploma no. 46/2017, determines not only the technical contents for the deliverable documentation but also empowers the Environmental Authority to determine/choose, duly justified, a category A for a proposed project based on the most sensitive environmental component, concurrent with the principles of the ADB and IFC or the determination of a less sensitive category i.e. downgrade A to B, if also duly justified.

36. Table 1 below indicates the possible screening categorization under the DL 05/2011, based on both the Category A and Category B thresholds, for the proposed project components referred in this report.

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<sup>6</sup> The National Authority for Environmental Licensing (ANLA) is responsible for the: (i) review of applications for Environmental Licensing; (ii) Screening approval for Project Categorization; (iii) review, analysis and approval of submitted IEE, EIA and related Reports/Documents; (iv) forward EIA/IEE Reports together with its technical opinions, suggestions and decision proposal to the SEA (currently the Secretary of State for Environment); and (v) monitoring and evaluation of project implementation impacts.

Figure 1: EIA and IEE process under DL5/2011 – Steps and Timing

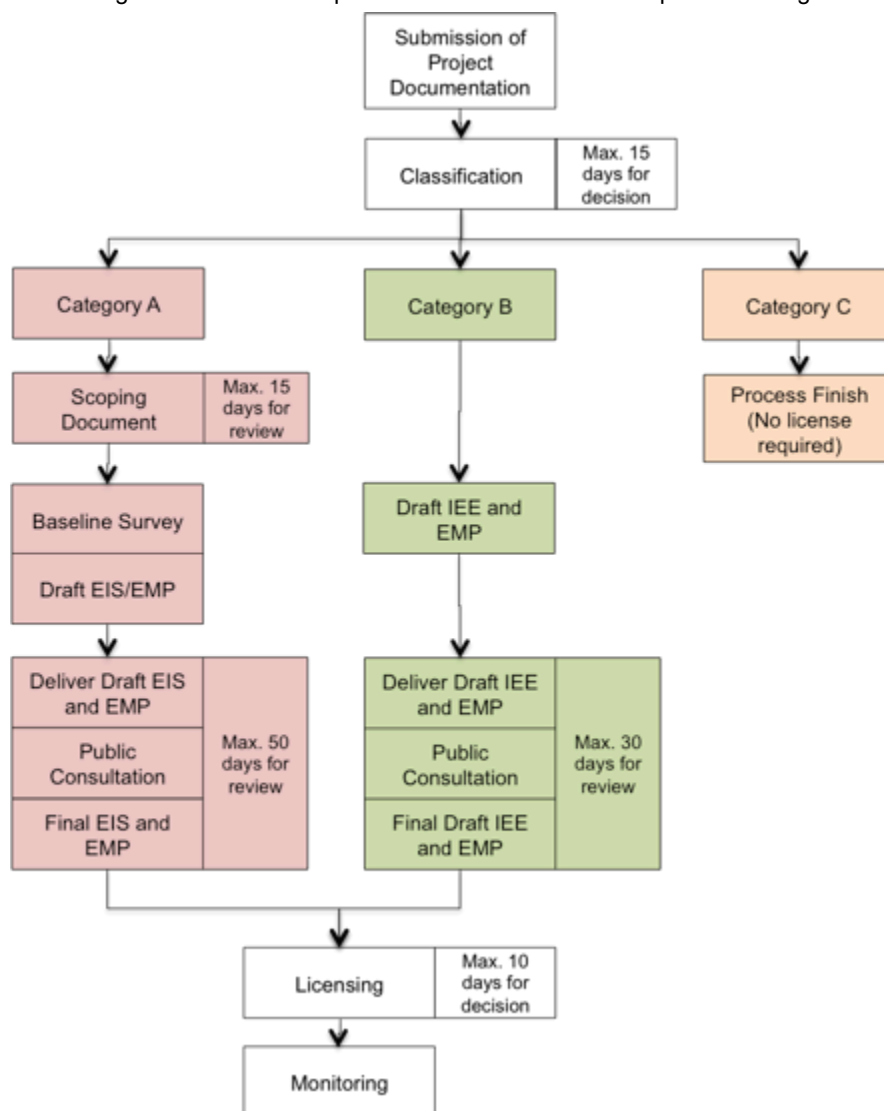


Table 1: Environmental Licensing Categorisation Thresholds under Decree-Law No. 05/2011

	<b>Category A Threshold (EIA required)</b>	<b>Category B Threshold (IEE required)</b>
<b>VII. Sanitation Sector</b>		
3. Wastewater Treatment Plants (WWTP)	≥ 10,000 families/eq.	< 10,000 families/eq.
<b>VIII. Water Sector</b>		
5. Systems of water collection from lakes, rivers, springs and other water sources (excluding the soil or groundwater)	Annual Abstracted Volume > 1 million CBM/year	N/A
6. Abstraction of groundwater with boreholes	≥ 10 L/sec.	< 10 L/sec.
8. Construction of aqueducts and water networks	≥ 3 Km	< 3 Km
<b>XII. Location Factors</b>		
1. Sensitive ecosystems or with value (beaches, mangroves, coral reefs, protected areas, marines areas)	ALL	N/A
2. Unique and valuable landscape	ALL	N/A
3. Archaeological/ Historic site	ALL	N/A
4. Areas Densely populated	Resettlement ≥ 300	N/A

	<b>Category A Threshold (EIA required)</b>	<b>Category B Threshold (IEE required)</b>
	people	
5. Cultural or tribal communities	ALL	N/A
6. Sensitive geographic areas	ALL	N/A

37. The ANLA review time (non-consecutive, non-inclusive of Consultant time of assessment and document drafting and without any delays) for a Category A (EIA) is the sum of: i) Project Document (PD) [15 days] + ii) Scoping Document (SD) [15 days] + 1<sup>st</sup> Draft EIS/EMP, Public Consultation and Final Draft EIS/EMP [50 days] + Decision on License [10 days], totalling 90 working days.

38. For Category B projects (IEE), the process does not include step ii) SD and step iii) Simplified Environmental Impact Statement (SEIS) has a turnaround requirement of 30 days review, bringing the process to a Total of 55 working days.

39. It is important to understand that the Environmental Regulator has the power to double (once) any or all timeframes within the process, if duly justified and always in written form to the project proponent, within the legal timeframes.

40. Also relevant to the Environmental Licensing Procedure are the diplomas that include implementing rules and regulations for certain aspects of DL 05/2011, which are:

- (i) Ministerial Diploma no. 44/2017, of 2nd August - Regulation on Impact and Benefits Agreement;
- (ii) Ministerial Diploma no. 45/2017, of 2nd August - Regulation on the Statute and Rules of procedure for the Evaluation Committee for the Management of the Environmental Assessment Process for Category A projects;
- (iii) Ministerial Diploma no. 46/2017, of 2nd August - Regulation on the Detailed Requirements for Screening (Project Document [PD]), Scoping and the Terms of Reference (TOR), Environmental Impact Statements (EIS), Simplified Environmental Impact Statements (SEIS) and Environmental Management Plan (EMP) for Environmental Assessment; and
- (iv) Ministerial Diploma no. 47/2017, of 2nd August - Regulation on the Public Participation Procedures and Requirements During the Environmental Assessment Process.

### **2.2.3. Project Classification under Decree Law No. 5/2011 – Environmental Licensing**

41. The project's main objective is to guarantee that the overall balance of environmental and social impacts results in positive outcome, taking into special consideration the mitigation commitments in the Environmental Management Plan, the compliance with the RDTL environmental assessment process and especially given the project's special relationship with the institution's technical assistance support.

42. The proponent is certain that the classification of the project components for Lospalos City falls under a Category B given the project components do not fall within any sensitive or protected areas, it is a rehabilitation of the water network i.e. a brownfield project, with pre-existing pipe alignments and zones that have undergone significant land use change since almost 30 years ago, during the first installation and thus lead to the new intervention being less significant and of temporary duration, particularly given the few "greenfield" project components are located in the distribution system extension areas, outside of the PA boundaries..

43. This assumption 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 Capitals Water Supply Project for Manatuto and Pante Macassar 2014 (see Appendix 11).

These two projects are of similar nature to the Lospalos project and the scale of pipeline dimension and length, as well as water sourcing and borehole capacity, is higher than that proposed by the Lospalos project, legitimizing the assumption that the resulting screening exercise and categorization for the Lospalos project results in a Category B, as follows:

Table 2: Estimated Environmental Classification for Lospalos Project Components

Proposed Components	Proposed Capacity	Estimated Classification	Included in XII. Location Factors?
<u>Sanitation</u>			
Public Bathrooms Septic Systems	N/A	N/A	No
Feacal Sludge Treatment Plant	5,592 HH	B	No
<u>Water Distribution</u>			
Rehabilitation (Mains and Distribution)	66,915m	B <sup>(1)</sup>	No
<u>Water Sources (Existing and/or New)</u>			
Papapa System	20 L/sec / 630 720 m <sup>3</sup> /year	B <sup>(1)</sup>	No
Borehole #3,7,8	15 L/sec (each borehole) / 1,296 m <sup>3</sup> /day	B <sup>(1)</sup>	No
Borehole #2,5,9	20 L/sec (each) / 1,728 m <sup>3</sup> /day	B <sup>(1)</sup>	No
Borehole #6 (DNSA)	9 L/sec (777 m <sup>3</sup> /day)	B <sup>(1)</sup>	No

<sup>(1)</sup> As in previous ANLA attributed Category B Licenses to similar-scaled water source volumes and length of distribution network such as MPW projects in Pante Macassar and Manatuto (see Appendix 2 and 3).

44. The proposed system in Lospalos is based on “brownfield” sub-projects i.e. existing water piping and/or springs or boreholes, established by SMASA several decades ago, in order to guarantee that their customers had minimum access to water for consumption. It is assumed that, at the time of their establishment, locational factors were not the priority for government institutions across the board, as opposed to guaranteeing water supply to the people. In addition, the location of the sources available at the time was very limited, resuming to existing springs that the local community leaders gave authorization to extract under “cultural” rule, which is still very active today (see 5.3.2).

45. Currently, the Lospalos water distribution system has evolved around these established spring systems, particularly in regards to Parapata and Paupopo Springs. The importance of these two sources is now augmented by the fact that SMASA requires the water distribution system to expand into the city’s urban expansion areas.

46. Based on the extension of proposed water extraction and the nature of the proposed rehabilitation works for the city, the rehabilitation of the water network to these sources will be a pipe substitution i.e. a brownfield project and thus lead to the current intervention being less significant and of temporary duration.

47. 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 at construction sites and known to civil works contractors.

48. With an almost complete IEE process and Preliminary Detailed Engineering Designs (DEDs), a Project Document has been delivered to the Timor-Leste Environmental Regulator (ANLA) to initiate the Domestic Environmental Licensing process. The tentative plan, based on this delivery and the timeframes under Decree-Law 5/2011, and provided there are no delays from the part of the ANLA, are estimated as follows:

- Delivery of Project Document: 30 December 2020
- ANLA Classification (Estimated): 25 February 2021
- Delivery of Draft Simplified EIS/EMP to ANLA for review (30 w/days): 01 March 2021
- Public Consultation of draft SEIS/EMP: 15 March 2021
- Delivery of reviewed Draft SEIS/EMP to ANLA: 22 March 2021
- Deadline for ANLA comments: 4 May 2021
- Estimated time for SSE to decide on License (10 w/days): 18 May 2021

#### 2.2.4. Other Relevant National Laws, Policies and Guidelines in Timor-Leste

49. Table 3 below summarizes all other national laws, policies and guidelines that are relevant to the Project.

Table 3: Other relevant National Laws, Policies and Guidelines in Timor-Leste

Policy/Law/ Guideline	Relevant Provisions	Applicability
DL No. 6/2020 - Legal Framework for Protection and Conservation of Biodiversity	Defines the legal framework for biodiversity conservation and sustainable use of its components to meet the current needs of protection of biodiversity in Timor-Leste, for special areas inside and outside of the National Protected Areas System (Article 26), especially management measures for a list of special/priority ecosystems (swamps, estuaries, mangroves, corals and coral reefs, marine grasses and sacred Lulik sites. 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). Establishes the considerations to be taken in Environmental Impact Evaluations (Chapter VII), namely identification and description of adverse effects and appropriate measures proposed to prevent, minimize and mitigate the identified impacts.	Relevant to project components in areas adjacent to the Protected areas and stand-alone areas where protected Species may be found i.e. crocodiles in Papapa spring.
DL No. 5/2016 – National System for Protected Areas (PA)	Establishes the necessary legal instruments for the protection of declared sensitive ecological areas in Timor-Leste (Article 11) and their allowed and prohibited activities. Provides for a List of Established 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.	Not relevant to project as none of the components are within a Protected area i.e. Nino Conis Santana National Park.
Law no. 14/2017 –General Framework for Forestry	Defines the fundamental principles and norms regarding 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 reduction and conservation of carbon stocks.	Relevant to project components that traverse or are located within any type of forest in the project area. EMP implementation is the overall measure to mitigate adverse impacts.
Regulation UNTAET no.17/2000 – Prohibition of Logging	Provided for in Law 14/2017, 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. EMP implementation is the overall

<b>Policy/Law/ Guideline</b>	<b>Relevant Provisions</b>	<b>Applicability</b>
operations and Export of Wood		measure to mitigate adverse impacts.
Government Resolution No. 33/2011 – National Adaptation Plan of Action (NAPA) for Climate Change	Adopts transectoral 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, 4, 5, 6, 9, 11 and 13) and for Natural Disasters (no. 3 – avoidance of landslides and 4. Early warning systems i.e. droughts or storms).	Relevant to project in the implementation of adaptation measures for Water Source and Distribution System.
Government Resolution No. 8/2012 – Sanitation Policy	Clarifies the sanitation responsibilities and encouragement on improving the sanitary section, including that each family and institution is responsible for the construction, use and maintaining their own hygienic and sanitary facilities, hand washing facilities and others. Also includes Strategies to follow such as Component 2 - Improved Sanitation: b) and c) management and safe integrated management, treatment and elimination of human excreta; Component 3 – Sanitation Financing: Institutional Sanitation (1) investment in public toilets; (2) financed by the user (per use); Urban Sanitation (1) Direct Investment in Urban Sanitation Infrastructure i.e. FSTP; (2) with user payment for O&M costs; (3) based on integrated Urban Planning. Defines the MOPW responsibilities (Section 3) in strengthening, planning, developing and managing urban sanitation services to a) collect sludge from septic tanks and b) operate centralized / decentralised sewer systems.	Relevant to the Proponent responsibility for implementation of the project in the urban development of the city.
Decree Law No. 33/2008 – Hygiene and Public Order	This law establishes the administrative policy measures for Districts regarding hygiene and public order, defining the relations between Public Administration and Citizens, applicable to urban areas in the Districts and specific locations in districts. Defines the prohibitions in general (Article 5) regarding impact to public infrastructure and land, from 1.a) discharge polluted waters i.e. faecal sludge/sludge; b) Waste in streets; c) drainage obstruction; e) spoils and construction material on sidewalks; and h) noise to community.	Relevant regarding project Work Camps, construction ROW and FSTP treated sludge and distribution of dried bio digested sludge for Agricultural Distribution. EMP implementation is the overall measure to mitigate adverse impacts.
Decree Law No. 4/2004 – Legal Framework for Distribution of Water for Human Consumption	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 and sustainable (Article 4) and with adequate quality (Article 12)	Compliance with Water Quality Standards in effect in Timor-Leste.
Decree Law No. 33/2017 – Legal Framework for Cultural Heritage	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 rules and licensing requirements for general work within these Zones (Article 26).	Relevant regarding project Work Camps, construction ROW. When Heritage sites Protection Zones cannot be avoided, EMP implementation is the overall measure to mitigate adverse impacts.
Decree-Law no. 4/2012 – Labour Code	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 (Article 20) and a fair, safe and healthy working environment (Article 35).	Environmental management plan (EMP) provides measures to mitigate workers' health and safety hazards.
Law no. 6/2017 – Base Law for Planning	Base rules for Territorial Planning in Timor-Leste. Intends for (Article 3) sustainability of urban areas, with improvement of living conditions for citizens. Establishes the different soil uses (Article 8) and the Municipal Territory Plan and the	Relevant to location of all project components, particularly FSTP.

Policy/Law/ Guideline	Relevant Provisions	Applicability
	Land Use Plan (Article 17).	
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 [if applicable] and social or economic impact assessment studies (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	The DL gives local government the functions, 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.	Provides basis for Lautem Municipality, through SMASA-Lospalos, to monitor the environmental performance of the projects.
Decree-Law no. 2/2017 – Urban Solid Waste Management System	Defines the rules that the urban solid waste management system abides by in Timor-Leste, led by the Municipal Authority (Article 2), the typology of Urban Solid Waste (Article 6), as well as the obligations of all users of the system (Article 16), especially the management and collection of waste from construction works (Article 33).	EMP implementation is the overall measure to mitigate adverse impacts and all projects to manage generated solid wastes accordingly.

### 2.2.5. Pollution Control Standards in Timor-Leste

50. In regards to pollution prevention and control technologies and practices, the Government of Timor-Leste has yet to implement their National Standards (for Air, Water, Noise, etc) and therefore, under the legal requirements of the Base Law for Environment, these minimum requirements are safeguarded by the use of World Health Organisation (WHO) guidelines and, where non-existent, the IFC Environmental, Health and Safety Guidelines are usually referred to as international good practice, consistent with ADB SPS 2009 practice. The Key environmental quality standards applied are listed and presented in Appendix 12.

### 3. DESCRIPTION OF THE PROJECT

51. Lautem Municipality and the city of Lospalos in particular is currently attracting an increasing population due to its strategic location on route to the Nino Conis Santana National Park and the Lospalos agricultural plateau. Because of this strategic location, the municipality will tend to grow moderately in the near future.

52. This adaptation requirement highlights the need for the Water Supply and Sanitation Investment Project for Lospalos city, which is encompassed of a number of existing water sources and distribution alignments and this planned expansion will increase water demands and the equivalent wastewater.

53. This chapter is aimed specifically on the sub-project components descriptions of the water sourcing, treatment and storage, supply and consequently, the sanitation sector. The existing features, gaps and proposed water sources, rehabilitation of and/or new construction of conveyance and treatment, distribution, public toilets and faecal sludge treatment plants are all explained in this section, including the technical designs and criteria used.

#### 3.1. Existing condition and need for the Project

54. At present SMASA provides around 3,758.4 cubic meters of water per day to its population through an aggregate transmission and distribution network length of around 44 km. The project is needed because SMASA presently provides an inadequate water supply service to the Lautem residents with significant losses and insufficient cost recovery to the government.

55. The water supply has not been able to meet the growing demand for water from the consumers because the water springs are not producing sufficient flow and the capacity of water storages is very small.

56. There are numerous groups and communities with existing pipelines but the water cannot be supplied due to the poor condition of the pipelines. The existing distribution alignments are 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 why the water system is currently unable to serve the Lospalos population.

57. In addition, according to the SMASA Lospalos, there hasn't been a proper management system established for wastewater and solid waste disposal in the municipality. More importantly, the schools' sanitation facilities are not adequate, mainly due to a lack of maintenance from the responsible parties or operators. The increase in water consumption leads to increased production of wastewater, and therefore, in this project, the sanitation scope will be specifically focused on the faecal sludge production from the household's septic tanks and public toilets and its consequent off-grid treatment.

58. The project will address all of these issues by refurbishing the existing network to repair leaks, increase capacity and pressure, remove illegal connections, and provide a new system of metering to streamline leak detection and aid cost recovery.

59. It is expected to benefit a base year population of Lospalos city of 19,096 (2020) and design year population of 39,873 (2040) by providing a reliable and adequate supply of safe and potable water, by upgrading the existing water supply situation and creating an adequate sanitation management system within a 15 km diameter of service area around the Lospalos city centre. The construction activities such as replacing or rehabilitating old pipes with new ones, increasing the water tank capacity and water treatment, upgrading water sources, creating pilot projects for 4 public toilets, and the installation of a

faecal sludge treatment plant, will be implemented within this project, aiming to meet the growing water demand and sanitation requirements.

### 3.2. Overview of the Project

60. The Lospalos city project area is located in the East area of the Island, at the higher Fuiloro plateau region at 350 masl and 1,297 masl, height of the Mount Legumau, the highest mountain of the Lautem municipality. The city of Lospalos is located to the Southwest of the Lake, within the plateau. The city has a subtropical to a temperate climate heavily influenced by the Wet season (October to June) with an average annual rainfall of about 300 mm.

61. 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 for public buildings and schools within a diameter area of 15 Km around the city, as clarified by the client in April 2020, taking the Lospalos Water Distribution Zones defined in the Second District Capitals Water Supply Project (ADB, 2016) as the guidelines for the project area and scope.

62. The 15 Km diameter project area around Lospalos encompasses the following:

- (i) Suco Fuiloro: almost the entire suco area, as it lies almost totally within the 15Km and includes the entire proposed Water Supply Network, the existing Papapa and Puahopo Springs, with 2 existing and 2 proposed borehole sites, the proposed FSTP location in Parapata and all the identified Public Toilet locations for the sanitation component;
- (ii) Suco Home: half of the suco area, with 3 existing and 2 proposed borehole sites;
- (iii) Suco Leuro, Souro, Lore II, Muapitine, Bauro and Raça: all these sucos are included in or overlap a bit with the 15Km project limit but, to date, no project component or activity is planned to occur within them.

### 3.2.1. Existing Water Components

#### 3.2.1.1. Water Sources

Current Public water supply in Lospalos depends on an existing system (see Figure 3, Map 3.1 in Appendix 3 and Appendix 13), with the following different sources and locations:

- a) Papapa system: the Lospalos water supply system for the community includes two springs, associated lagoon and boreholes, composed of:
  - i) Papapa spring, an emergent spring at the edge of a small lake that directly supplies the Municipal Capital;
  - ii) Paupopo spring, abstracted into the pumping station;
  - iii) Papapa Intake (Lagoon that abstracts the water into the pumping station and currently supplies Lospalos);
  - iv) One Borehole next to the WTP.
- b) Bore wells:
  - i) An inoperable Borehole in Suco Home, dug up in 2018;
  - ii) 2 new boreholes in Suco Home (Northwest system);
  - iii) 2 new boreholes in Suco Fuiloro (Southeast system).

63. Items b.ii) and iii) are located in the prospection areas studied and selected for bore testing and have been drilled under the DED phase of the project and are currently ready for connection and operation as a part of the current system, as additional sources to be included in the system to complement the existing springs.

64. Apart from the new boreholes, the water distribution system as a whole has not had substantial change and as a result, the current Flow Diagram does not differ a lot from the 2015 Master plan (see Figure 4).

65. The left and right banks of the water body are filled with agriculture activities and the water quality usually records high level of turbidity particularly during rainy season, given that it associates with the upstream of Kokoho river. According to DNSA previous water quality testing, the Papapa source has episodes of biological contamination, mostly from upstream husbandry activities and existing larger wild fauna i.e. freshwater crocodiles.

66. The Design team is currently evaluating the long-term productivity/yield of the water sources after placing V-Notch equipment and have done investigations in October 2020, aiming to get definite numbers of the production yield. The total yield of the Papapa System (Papapa and Puahopo springs and Papapa Intake) can go up to approx. 131 L/s. The system is also comprised with another 2 existing boreholes (photos not available) not far from the springs, although they are inoperable due to a failure of the pumping system. Overall, water that is produced from all the existing sources can come up to a total of 140 L/s if both wells are in operation.

Figure 2 Lospalos Water Sources



Figure 3: Lospalos City - Project Scope and Components

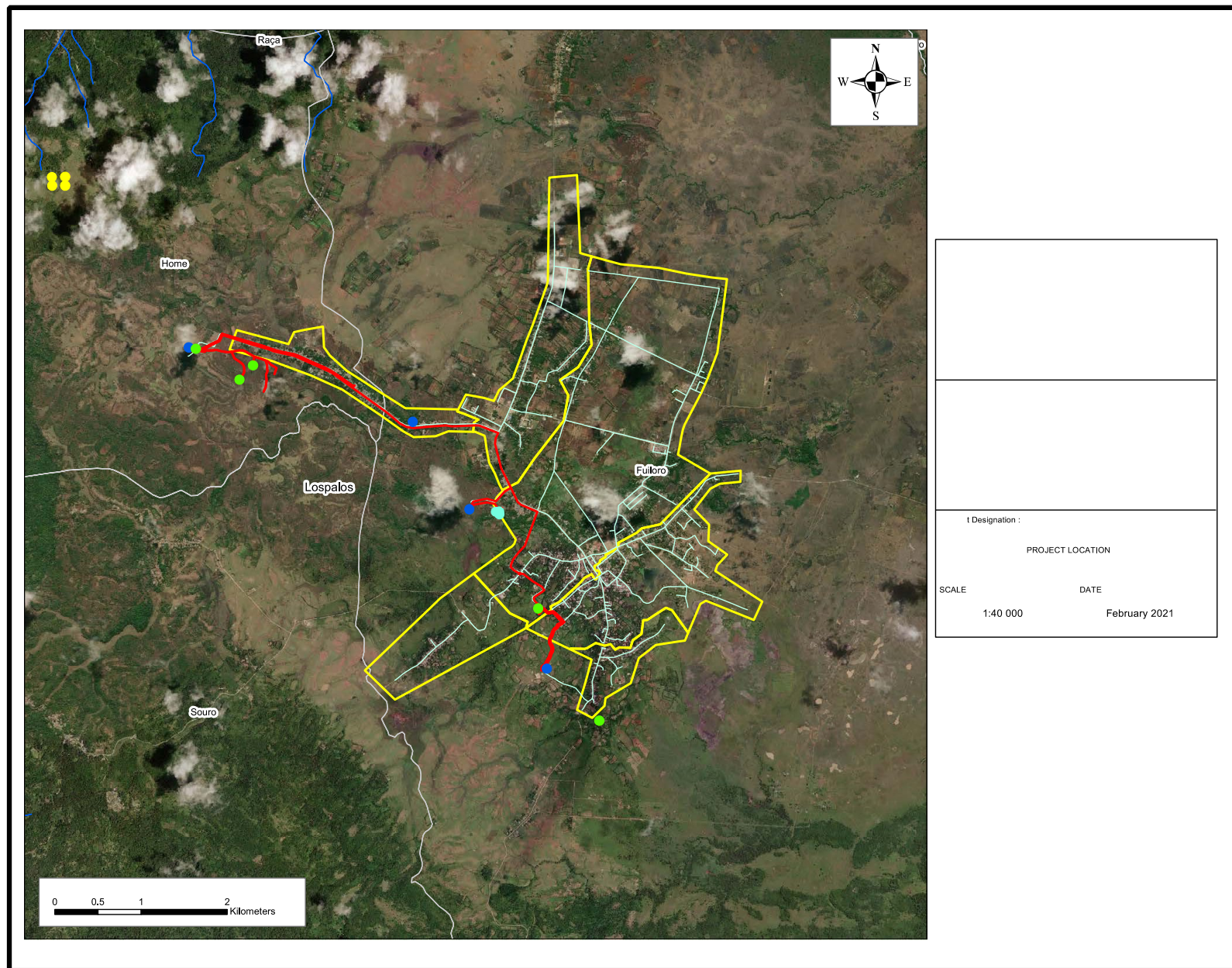
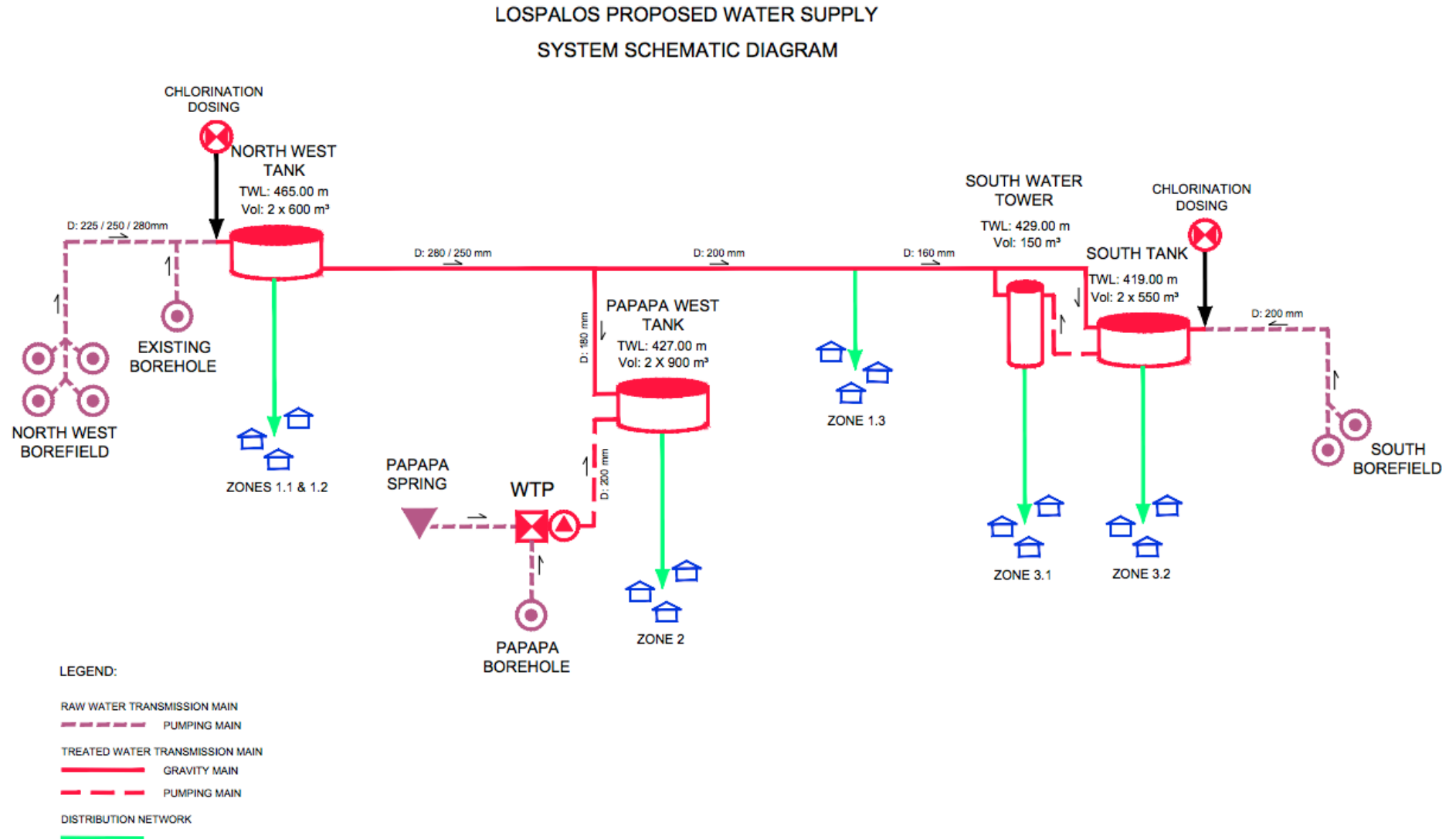


Figure 4: Flow Diagram for Lospalos proposed Water Distribution System (source: AdP-TL/Engidro, 2020)



67. These have provided preliminary water estimation data to be able to estimate supply towards the expected demands for the 2040 Scenario B = 134 lps. The project will propose a mix of abstraction between the existing springs and boreholes and the potential sources to guarantee sustainability of the extraction while guaranteeing water distribution to all SMASA clients.

### 3.2.1.2. Distribution System

68. Most of the transmission and distribution pipes are galvanized steel pipelines of varying age from the period of Indonesian administration, old Portuguese pipes particularly in the old city area, and newer pipes installed by SMASA or by rural projects such as i.e. under the National Program for Suco Development (PNDS) project. According to the 2015 Masterplan, there are also numerous duplicate mains identified. The distribution system requires rationalization and simplification as well as decommissioning and removal of all existing, inoperable pipes.

69. The Papapa spring system supplies the only operating reservoir is a concrete tower constructed in an elevated ground adjacent to the Papapa spring and the WTP, to subsequently supply all distribution zones through transmission and distribution alignments with gravitational system.

70. The distribution zone in Lospalos comprises of 3 different zones with manual rotation in terms of supplying to the customers on an intermittent basis. The service levels are very poor with low coverage, intermittent supply and low pressure. According to the test results and field observations, contamination of the water in the distribution occurs due to low pressure during periods when the supply is not operational. Depending on a single reservoir for distribution is considered ineffective as Lospalos is relatively flat and the city has grown substantially. The pumped system, pump maintenance issues and daytime operation exacerbate the poor service levels.

71. Most of the connections are unmetered with less sharing of piped water supply. The community mostly depends on sharing alternative sources including dug wells and tube wells. The 2015 Masterplan states that only 33% are registered and supplied to the houses in the urban area with low quantity and poor service quality. In general, many of the older pipes, which were intended to be abandoned and replaced by the JICA system, remain functioning and consumer connections have not been transferred to the new distribution pipelines. This resulted in continued utilization of the older distribution pipelines, along with leaking/water loss conditions.

Figure 5: Example of Distribution areas and existing installation



 <p>Private well (Suco Home)</p>	 <p>Water tanks, a project done by the PNDS – Suco Home</p>
 <p>Suco Home (Zone 1.2) pipeline for rehabilitation</p>	

### 3.2.1.3. Water Quality

72. The project has a recent history of water quality test results, some carried out between 2000 and 2005, with only one test per year from 2003 to 2005, while other tests were performed in 2014 for the 4 cities Master plan and other sporadic tests in 2019 and 2020, at various points in the distribution network and at some water sources. The results from the water quality tests can be seen in Appendix 4.

73. Conclusions on these results were the following:

- (i) For the period between 2000 and 2003, there is bacteriological contamination (total coliforms and *Escherichia coli* presence) in the distribution system and Papapa intake. There are some samples with high turbidity in the distribution network, but in the Papapa intake the values of turbidity are below the limits. The average of the total hardness in the Papapa intake is above the limit (around 280 mg/l  $\text{CaCO}_3$ , reaching values around 440 mg/l  $\text{CaCO}_3$ ) considering TGL-04, but within the range considering the Decree-law n.31/2020. The values of Manganese are above the guide limit considering the Decree-law n.31/2020, and under the guide limit of TGL-04 (however, there are few samples with manganese measurement);
- (ii) Master plan (2014) tests shows that there is bacteriological contamination (total coliforms and *Escherichia coli* presence) in the distribution system and in the Papapa intake and Puaupua intake. The total hardness is above the limit (around 240 mg/l  $\text{CaCO}_3$ ) considering TGL-04,

- but within the range considering the new legislation (Decree-law n.31/2020). The turbidity is at the limit in Papapa intake (5 NTU);
- (iii) Regarding the water quality tests performed in 2019 and 2020, results confirmed the bacteriological contamination (total coliforms and *Escherichia coli* presence). The turbidity in the Papapa intake was also very high. There are only 2 values, namely the value from March at 173 NTU and for May at 17,8 NT;
  - (iv) The water temperature is normally high reaching temperatures of 32°C in some samples;
  - (v) The other parameters tested are according to the limits from Timor-Leste and of the WHO.

### 3.2.1.4. Gaps in the Water Supply

#### Water Balance: Demand vs Supply.

74. The water supplied to consumers throughout the years has proven to be insufficient due to higher demand and the infrastructures for water abstraction and delivery not being upgraded for a very long-time, hindering optimal operation and distribution, as well as the limited number of natural water sources available.

75. The Detailed Design followed a dimensioning design process that reviewed 2 different scenarios, namely Scenario A in adherence to 2016 Master plan (equivalent to current distribution capacity and customers). However, the project should be able to provide reliable water sources sufficient for the expected expansion requirements for Lospalos city. Therefore, a Scenario B was chosen as the project horizon, as it includes expansion areas and user numbers for the next 20 years, up to 2040.

76. The project identified 7 potential borehole source areas (5 in the Northwest System, in Home Suco and 2 in the Southeast System) and to date have carried out bore exploration for 3 of them, with success in retrieving water.

77. To clear the uncertainty of the production yield of the sources, a hydrogeological study was conducted in October 2020 (in equivalent conditions to the end of the Dry Season) to determine the available yield of proposed boreholes and the existing spring through bore and pump testing. Table 4 presents the water demands versus October 2020 water flow investigation results, which suggest that, under these numbers, and pending a long-term monitoring program, the current proposed sources can produce enough flow for the requirements of the distribution system up to 2040, for the bigger part of the Dry season. These calculations take into consideration a percentage of overflows for social use and the definition of a seasonal variable flow for ecological purposes (suggested at a minimum 30% of the Wet Season Spring flow (November to May) and 10% of Dry Season Spring flow (June to October).

78. These preliminary results show that the Papapa system would have more than enough water flow to supply the current and future demands for Lospalos Municipal Capital, estimated at one and half times the 2040 water demand to cover all the proposed households within the supply zones. However, as per SMASA-Lautem, the water treatment plant at Papapa is planned for a limited production of 20 lps, due to restrictions of physical expansion of the current WTP because the papapa area is sacred and does not accommodate for more infrastructure. These preliminary results must also take into account the downstream social and ecological needs flow for the sources, including agriculture and other activities identified during the IEE characterisation. The Ecological flow considered for Papapa source provides for the variability of rain and flow between dry and wet season and has been determined, at a minimum, of 30% average monthly flow for Wet Season and 10% for Dry Season.

79. Given the papapa system would only account for 20 lps for water distribution (15% of the whole system flow), in this case the environmental flow would be at 47%, well above the suggested flow threshold (30%). However, under the current overall capacity of the system, for Lospalos, at this design

phase, the system capacity stands at 84 lps, thus not achieving the 88.4 lps demand for 2040, but will surpass this requirement when the remaining boreholes are earmarked to be drilled and come online after the construction phase.

80. On that regard, boreholes were drilled and tested in several prospection points from 30<sup>th</sup> September to 10<sup>th</sup> October 2020. 2 pilot wells were indicated and successfully drilled in Aldeia Chenoloru, Suco Home, and an additional 2 boreholes were drilled, one in Aldeia Peicara, and another in Aldeia Kuluhun, in Suco Fuiloro. Of all these boreholes only three have been pressure tested and confirmed production at the yield required (15 to 20 lps), while the remaining await pump testing. The project intends to use the boreholes as top-up and backup sources, especially during the dry season when the papapa source has less flow due to seasonal water variability, which supports the system to avoid any water usage and/or quantity impacts.

Table 4: Water Availability and Origins

<b>LOS PALOS</b>		<b>2020 (October ) Dry Season</b>			<b>2040 (Horizon Year)</b>		
<b>Demands</b>		<b>Lps</b>	<b>m3/day</b>	<b>%</b>	<b>Lps</b>	<b>m3/day</b>	<b>%</b>
2020 Scenario B		42.3	3654.72				
2030 Scenario B		62.7	5417.28				
2040 Scenario B		<b>88.4</b>	7637.76				
<b>Existing sources</b>							
<b>Papapa Lagoon</b>							
	Public Supply	72.0	6220.8	55%	20.0	1728	15%
	Social Demand (w/Agriculture)	49.4	4268.16	37%	49.4	4268.16	37%
	Remaining Flow	10.5	907.2	8%	62.5	5400	47%
<b>Total</b>		<b>131.9</b>	<b>11396.2</b>		<b>131.9</b>	<b>11396.2</b>	
<b>Potential Sources (Boreholes North)</b>		<b>Lps</b>	<b>m3/day</b>	<b>Hours/day</b>	<b>Lps</b>	<b>m3/day</b>	<b>Hours/day</b>
Borehole #2 - Home 1		20	1728		20	1728	16
Borehole #3 - Home 2		15	1296		15	1296	16
Borehole #8 - Home 3			0		15	1296	16
Borehole #7 - Home 4			0		15	1296	16
Borehole #6 - DNSA 2018		9	777.6		9	777.6	16
<b>Potential Sources (Boreholes South)</b>							
Borehole #5		20	1728		20	1728	12
Borehole #9			0		20	1728	12
<b>Potential Borehole Capacity (North&amp;South)</b>		<b>64</b>	<b>5529.6</b>		<b>114</b>	<b>9849.6</b>	<b>12</b>
<b>Total Production Capacity</b>		<b>136.0</b>	<b>11750.4</b>		<b>134.0</b>	<b>11577.6</b>	

81. As the future boreholes are expected to surpass the 88 lps as soon as they come online, the table below shows the only scenario possible for Lospalos to guarantee supply and maintain sustainability up to 2040.

Table 5: Water Sources Scenarios

Lospalos	Scenario 2040	Proposed Water Sources	Papapa Intake, Boreholes #2, #2.1, #3, #3.1 and #7 (in Suco Home at west of the Municipal Capital) and Boreholes #4 and #5 (in Suco Fuiloro)
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82. The existing springs will be analysed for their current productivity and the other concurrent water uses. Regarding new boreholes, the scope of the current project will consider the construction of the infrastructure needed to assure the estimate consumption for the next 10 years.

Figure 6: New Boreholes and pump testing



### 3.2.2. Proposed Water Supply

#### 3.2.2.1. Water Conveyance and Treatment

83. At present, Lospalos only has one possible Scenario, given the conditions of the available sources. This scenario considers that the water supply will be assured by the following water sources: a) Papapa lagoon; b) Existing borehole in the WTP; c) Existing borehole in the Northwest area of the city; d) Four new boreholes in the Northwest area; e) Two new boreholes in the South area of the city.

84. Water from Papapa lagoon will be treated in the existing WTP, which will be rehabilitated to a treatment capacity of 20 lps.

85. Regarding the ground water quality from boreholes, it was assumed that the water is generally good but it's expected to have bacteriological contamination and suffers from high total hardness. In this sense, the water treatment process will include the soften (calgon dosing) and disinfection.

86. The water extracted in the existing borehole in the WTP will be treated in this facility through soften (calgon dosing) and disinfection. For the new boreholes and the existing one in the Northwest area, the water treatment process will be soften (calgon dosing) and disinfection in the Northwest tank. The water extracted from the new boreholes in the South area also will be treated by disinfection in the South Tank.

Table 6: Proposed Water Tanks Storage

Municipal Capital	Tank	MDP + Unaccounted water (m <sup>3</sup> /d)			Storage Needed (m <sup>3</sup> )		New Storage Proposed (m <sup>3</sup> )	
		Scenario A		Scenario B	2020-2030	2030-2040	2020-2030	2030-2040(*)
		2020	2030	2040				
Lospalos (Scenario 1)	North West Tank	958	1 367	2 538	740	1 375	700	700
	Papapa West Tank	1 091	1 669	2 813	904	1 524	1 000	500
	South Tank - Tower Tank	1 136	1 443	1 948	782	1 055	150	-
	South Tank - Ground Tank						800	300
	Total	3 185	4 479	7 299	2 426	3 954	2 650	1 500
Lospalos (Scenario 2)	North West Tank	1 215	1 871	3 258	1 014	1 765	1 000	800
	Papapa West Tank	834	1 165	2 093	631	1 134	700	400
	South Tank - Tower Tank	1 136	1 443	1 948	782	1 055	150	-
	South Tank - Ground Tank						800	300
	Total	3 185	4 479	7 299	2 426	3 954	2 650	1 500

(\*\*) Reserve area for future increase capacity (considering possibility of expansion area)

87. In the Northwest Tank at 465 m elevation the treated water will be stored. From this tank starts a 4.62 km long gravity transmission main up to a bifurcation to Papapa West Tank at 427 m elevation and to South Tank at 419 m elevation. The connection to the Papapa West Tank has 600 m and to South Tank has 2.88 km of total extension.

88. The treated water will be storage at the Northwest Tank at 465 m elevation and from there it will be feed a 4,62 km long gravity transmission main up to a bifurcation to Papapa West tank and to the South Ground Tank. From this bifurcation, the gravity transmission main to Papapa West tank at 427 m elevation has 0.60 km and to the South Ground tank at 419 m elevation has 2.88 km. In this last transmission main trench, about 1.28 km from the bifurcation, the distribution network of the zone 1.3 will be connected directly into.

89. The treated water in WTP will be pumped to the Papapa West Tank. In the South Ground Tank, the treated water will be pumped to the South Tower Tank at 429 m elevation.

90. In Table 6 is the proposed water tank storage calculated according to the water demand projection for 2040 and in Table 7 the list of proposed Water Distribution Zones for Lospalos.

Table 7: Lospalos Tank and Distribution Zone System

Scenario I		
Water Tank	Distribution Zone	Elevation
Northwest Tank (elev. 465 m)	Zone 1.1	From 440m to 405m
	Zone 1.2	From 405m to 390m
Papapa Tank (elev. 427 m)	Zone 2	From 412m to 370m
South Tank (elev. 419 m)	Zone 3	From 405m to 380m
Scenario II		
Water Tank	Distribution Zone	Elevation
North West Tank (elev. 427 m)	Zone 1.1	From 412m to 370m
	Zone 1.2	From 412m to 440m
Papapa Ground Tank (elev. 427 m)	Zone 2.1	From 412m to 370m
	Zone 2.2	From 412m to 440m
South Tank (elev. 419 m)	Zone 3	From 405m to 380m

Figure 7: Lospalos Water Sources Scenario (North System)

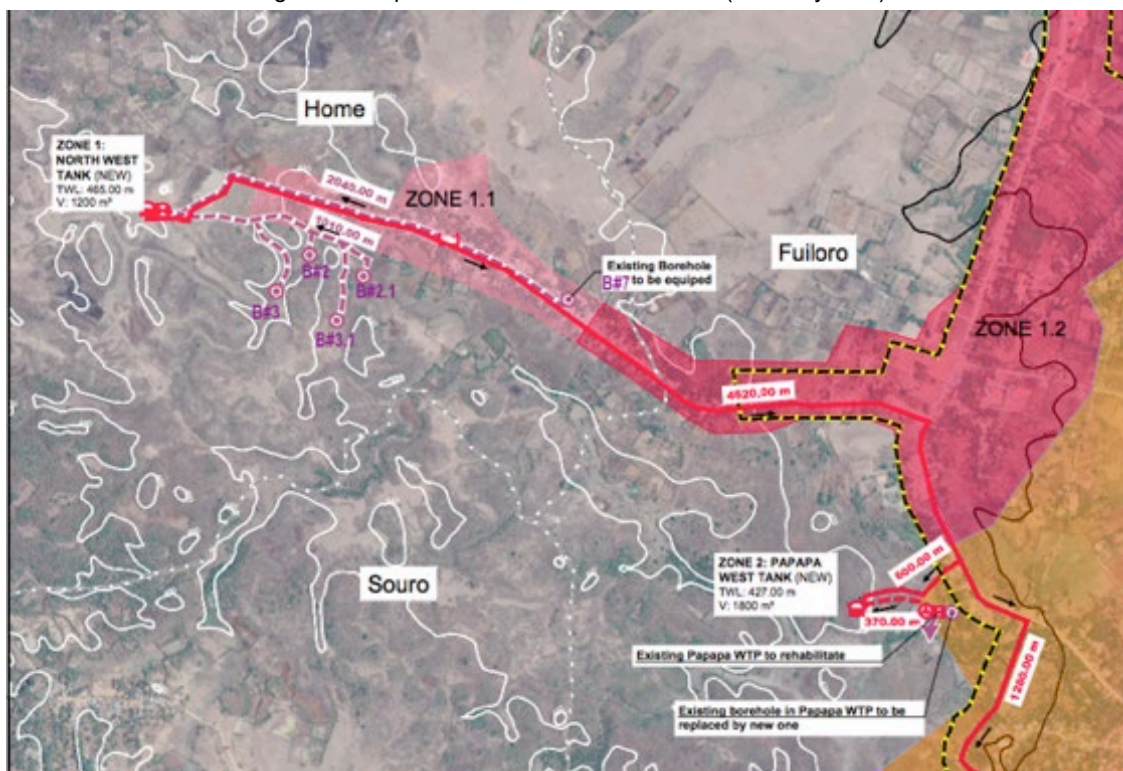
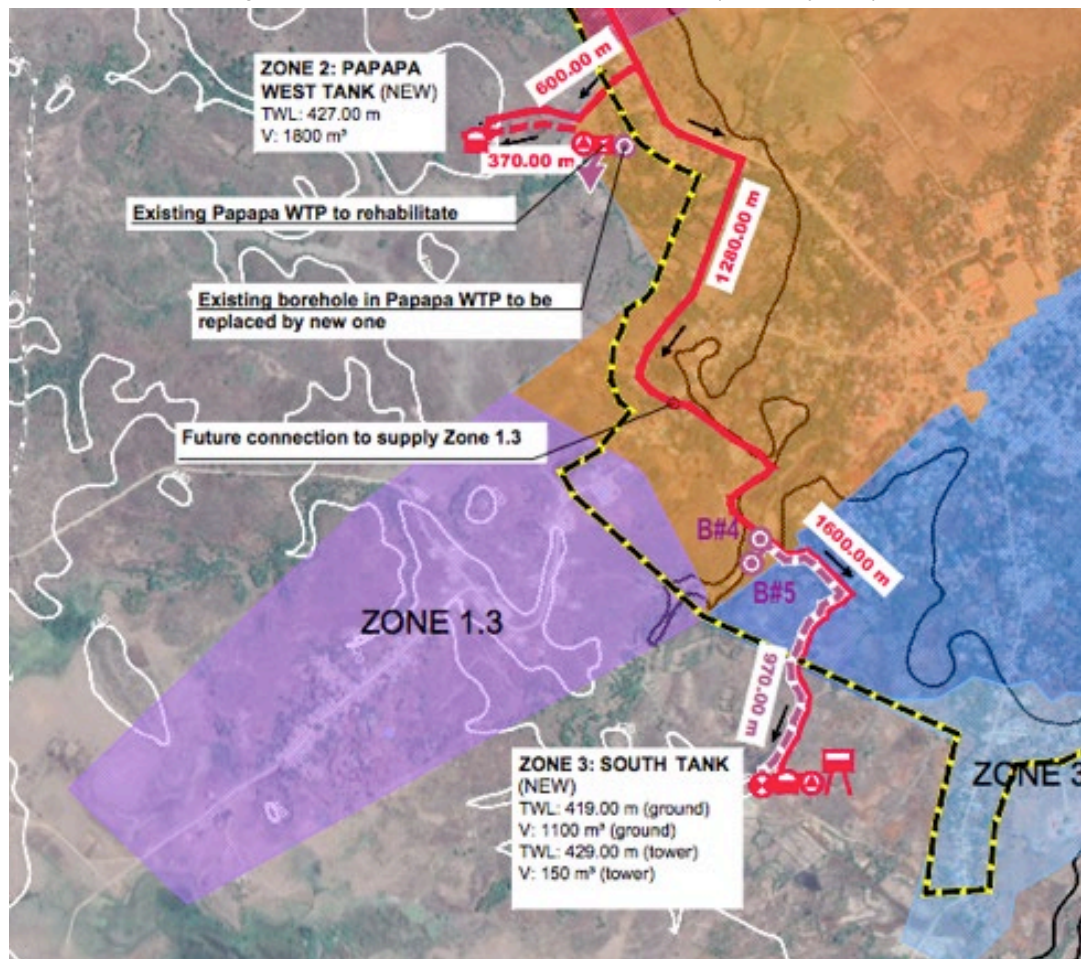


Figure 8: Lospalos Water Sources Scenario II (South System)



### 3.2.2.2. Rehabilitation of the Transmission and Distribution Mains

91. The type of construction for transmission lines and distribution networks has to follow the design criteria, starting from the material selection, trench design type and the operational system.

#### a) Material Selection

92. The following criteria is proposed regarding material selection:

#### Transmission Lines (HPDE and Ductile Iron):

- (i) Transmission lines with nominal pressure below 16 bar and nominal diameters below 315 mm – use of HPDE;
- (ii) Transmission lines with nominal diameters equal or above 300 mm - use of ductile iron;
- (iii) All transmission lines with nominal pressure equal or above 16 bar (regardless of the diameter) – use of ductile iron.

#### Distribution Network (HPDE):

- (i) Distribution network & house service connection – use of HDPE;
- (ii) Laying of Transmission Mains and Distribution Network.

## b) Trench Design

93. It is assumed that pipes will be implanted underground, in general, laid along and within the road Right of Way (RoW) or outside the RoW for the purpose of replacing/rehabilitating existing pipes. Inside the city area, transmission mains will be laid below the distribution network level, as represented in Figure 9, on both sides of the road alignments, in order to allow the construction of the service connections on each side of the road without interference with transmission mains and, also, to make it more difficult for illegal connections, while typical trench details are presented in Figure 10.

94. The distribution networks will be connected to the water tanks. Even in situations where this option implies new network extension, the resulting benefits are significant since the operation of the systems will be facilitated and, therefore the transmission lines system will not be vulnerable to any ruptures in the distribution network.

Figure 9: Laying of Transmission and Distribution Lines Along a Road. Typical Cross Sections

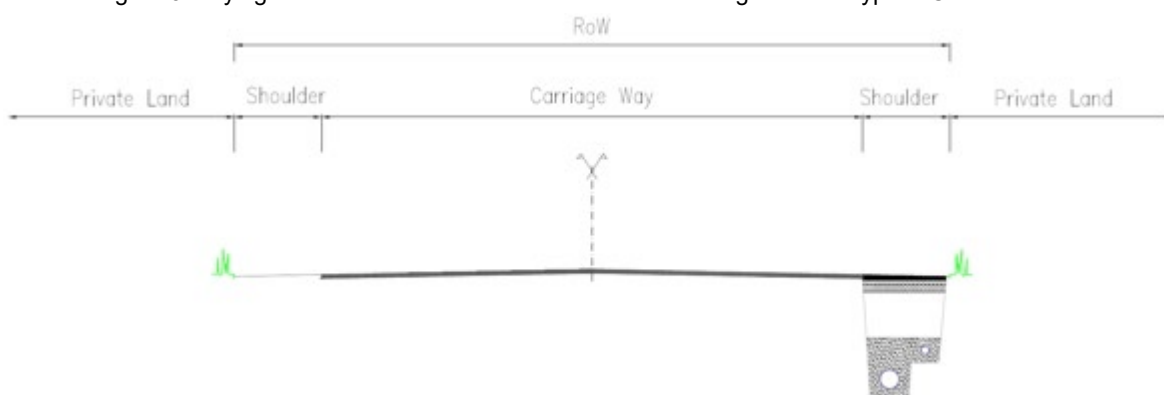
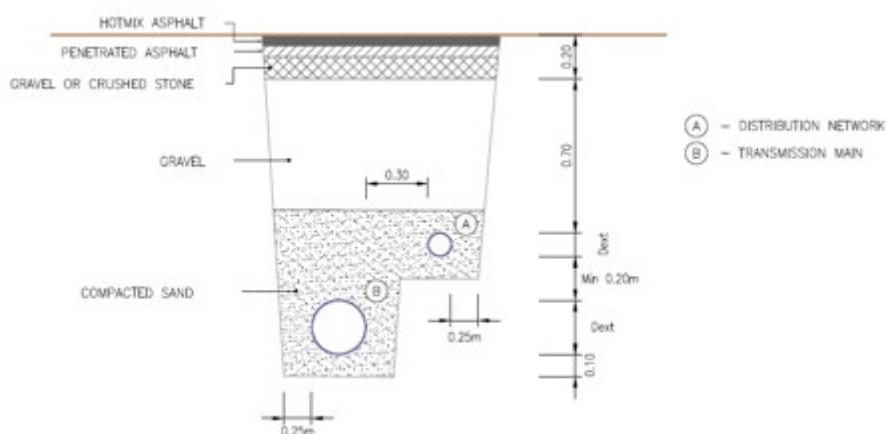


Figure 10: Typical Double Trench Transmission Mains Service



## c) Gravity Transmission Mains Operation

95. To ensure a balanced water supply to the water tanks, when a transmission main supplies more than one water tank, the connection to the tanks will be equipped with automatic control valves, which allows the flow control and will avoid the occurrence of random feeds depending on the value on piezometric head value in the pipe connection on each reservoir.

#### d) Distribution Network Pressure Zones

96. In each distribution zone, the pressure in the network can vary between a minimum of 10 m and a maximum of 60 m. When a water tank supplies a distribution network that has more than one pressure zone, the pressure zones will be set by Break Pressure Tanks (BPTs) or by Pressure Reducing Valves (PRVs).

### 3.2.3. Sanitation System

#### 3.2.3.1. Existing Sanitation in Lospalos

97. According to the 2016 Master plan, the National 2030 target for household sanitation is 100% access to hygienic toilets and improved hygiene behaviour, consistent with the Government Resolution No. 8/2012 - Sanitation policy. However, major deficiencies of current toilets in Lospalos are: open defecation practices; lack of cleanliness; insufficient water supply; poor construction standards and inadequate lighting. School Sanitation is also not “User friendly” (where none of the toilets cater for special infrastructural requirement of children, physically handicapped persons or menstruating girls), and there is inadequacy of funds for operation and maintenance.

98. According to the 2016 Master plan, only 19% households in Lospalos practice open defecation (see Table 8). All the remaining households that do not practice open defecation are contributing with sludge, through their own toilets or shared toilets.

99. It is presumed that nearly most Households in the project area have installed a sanitation system similar to a septic tank but with a permeable bottom that unfortunately serves as a leaching pit with an accumulating sludge top layer [referring to sub-section 3.4.4- Current Status on p-177 of the 2016 Master plan]. Although not ideal, these sanitation facilities are nevertheless producing digested sludge (which needs to be removed once in two years) and infiltrating semi-treated wastewater into the ground and water table.

Table 8: Toilet Access in Lospalos as per 2014 Household Survey

Toilet type		Units	Percentage Access <sup>1</sup>
			Lospalos
1	Open defecation	%	19
2	Unhygienic toilet (owned)	%	32
3	Unhygienic toilet (shared)	%	6
4	Hygienic toilet (owned)	%	35
5	Hygienic toilet (shared)	%	8
Total			100
Current (2014)		Number of Households <sup>2</sup>	
1	Open defecation	HH	514
2	Unhygienic toilet (owned)	HH	844
3	Unhygienic toilet (shared)	HH	147
4	Hygienic toilet (owned)	HH	917
5	Hygienic toilet (shared)	HH	220
Total			2,641

<sup>1</sup> Based on Household Survey

<sup>2</sup> Projected based on population growth with similar percentage access to 2014 Household Survey

#### 3.2.3.2. Proposed Sanitation Projects

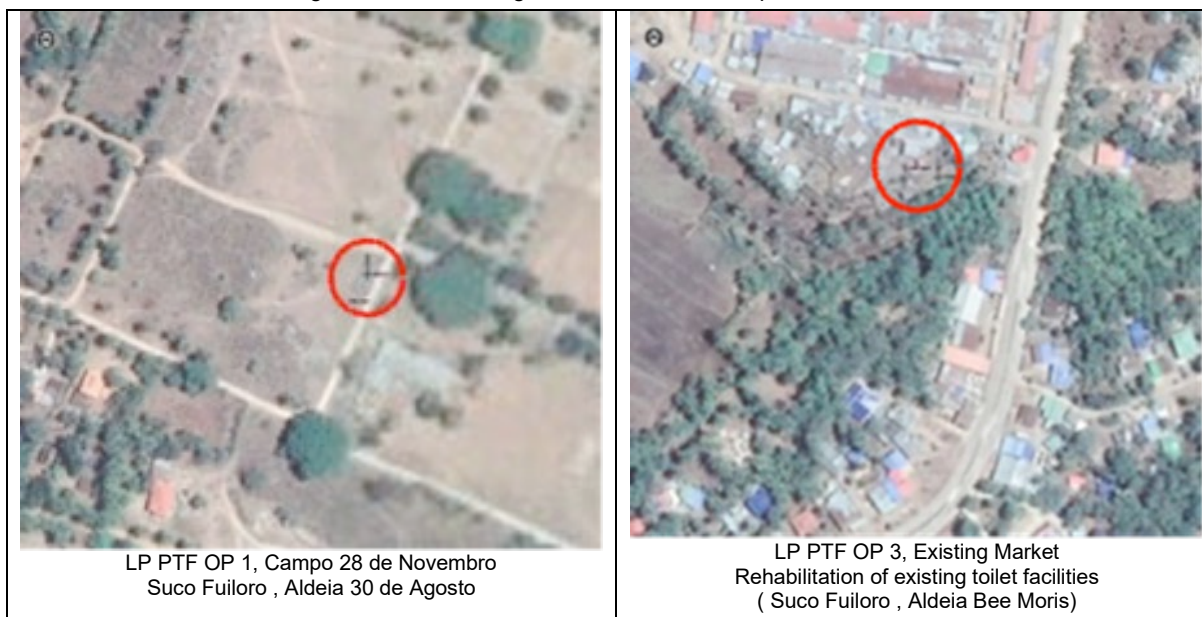
100. The proposed sanitation treatment sector is composed of 4 pilot test sites for public toilets (with septic tank and effluent soak pit system) and the construction of the Faecal Sludge Treatment Plant (FSTP) to receive the sludge from these pilots, as well as all buildings and households located within 15 km of the Lospalos city (See Figure 11 and Figure 12, and Appendix 3, Map 3.1).

101. The public toilets' pilot test locations will be chosen per the location and conditions of current sanitation infrastructure, users, as well as the state of the toilet facilities. It is worth noting that there are concerns across the majority of these public toilet management responsible persons given that current sanitation facilities do not have regular maintenance or access to water supply.

Figure 11: Public Toilets Proposed Location - Lospalos



Figure 12: Aerial Image of Public Toilets Proposed Locations





#### A. Public Toilets.

102. The proposed specifications for the Public Toilets are based on the information below, with gender separation of toilets:

##### Male Toilets:

- Adult: 3 urinal stalls;
- Adult & Children: 3 latrines (each with 1.2 m<sup>2</sup>[approx.]);
- Children: 1 small urinal ;

##### Female Toilets:

- Adults & Children: 5 latrines (each with 1.2 m<sup>2</sup>[approx.]);
- Facilities for menstruating girls.

##### Physically disabled Toilets:

- Adults & Children: A common latrine for physically disabled person shall be provided at the centre of men's and women's section. Area of latrine with a ramp etc. for a handicapped person=3.70 m<sup>2</sup> [approx.].

103. The treatment of the public toilet sludge is being proposed in a two-step process, as described below:

- Primary Treatment - Septic Tank: shall have minimum width of 750 mm, minimum depth of one metre below water level and a minimum liquid capacity of 1 000 litres. Inlet: The pipe shall be fixed inside the tank, with top limb rising above scum level and the bottom limb extending about 300 mm below the top water level. Outlet – It would be fixed like inlet but shall be 50 mm below the invert of the inlet pipe.
- Secondary Treatment - Soak Pit or Dispersion trench or Subsurface absorption system: These infrastructures will be carefully selected and designed according to the available areas, local conditions and receiving environment, based on the number of expected users and adapted to the specific local characteristics where the public toilets will be implemented.



trucks from domestic and non-domestic sources and the estimated daily volume collected in Lospalos can be viewed in Table 10.

Table 10: Total Sludge Volume to be collected daily projections

Village	UNIT	2014	2020	2025	2030	2035	2040
Lospalos	m3/d	1.0	1.3	2.0	2.3	3.0	3.9

105. This service will then require transport from the sources to the FSTP, where accessibility of trucks for sludge collection and routing to the treatment plant are of the most importance, requiring easy access but with a reasonable distance from the proposed FSTP to the nearest household (>400m) and the route should be free from flood areas and/or possible landslide, with a duration of transport no longer than 30 minutes.

106. To define the FSTP ideal/possible location, the following requirements were taken into account:

- Proposed location of FSTP shall be available within 15 km distance;
- Easy road access;
- The land should be relatively flat to facilitate the construction of lagoons without excessive earthworks;
- The lagoons will be constructed using earthen embankments. Site is assumed to be on soil.

107. Given issues of planned city expansion, the proposed FSTP has been chosen to be placed in Parapata, Suco Fuiloro (See Figure 16 and Appendix 3, Map 3.1.), since the location fills in all the above-mentioned requirements, it is adjacent to a “brownfield” project i.e. existing solid waste dumpsite, and it is not earmarked for city expansion, according to information from the Lospalos municipality and SMASA – Lautem.

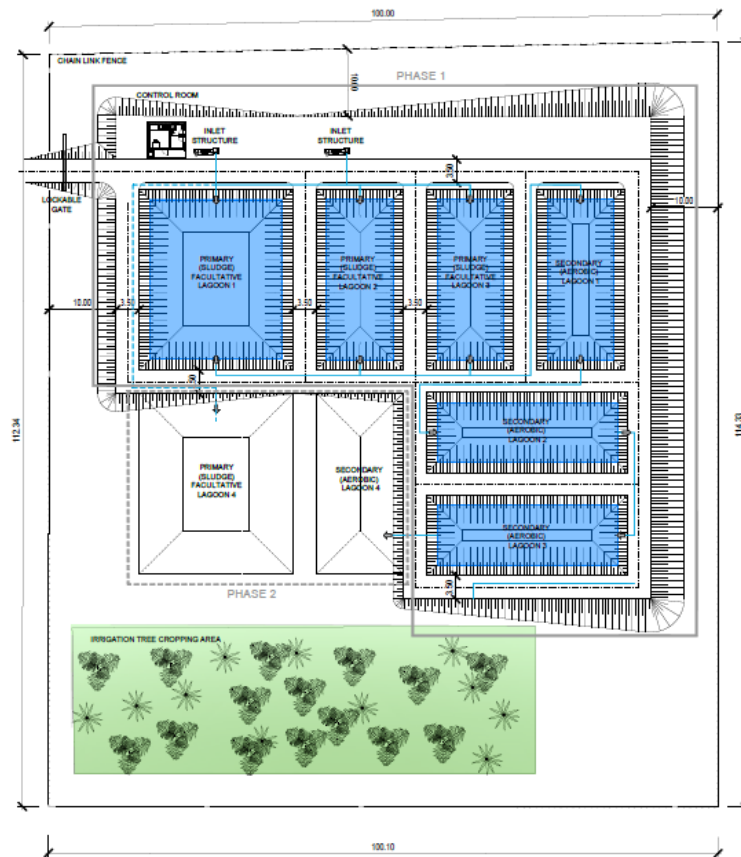
108. In regards to treatment, the FSTP will combine the following technical steps in a modular manner:

Table 11: Faecal Sludge Treatment.

TREATMENT STAGES	TREATMENT MODULES
Sludge Stabilization/ Dewatering	Drying Beds
Liquid Wastewater Treatment	Integrated Settler and Anaerobic Filter
	Horizontal Planted Gravel Filter

109. The Sludge arrives at the FSTP where it is deposited into drying beds to undergo liquid-solid separation and drying. The dried sludge from the drying beds are removed once in 1 or 2 years depending on rate of feeding and directed to a Sludge Pasteurization Unit-Storage of bio-solids. The rest of the liquid percolates or the effluent wastewater is conveyed to separate treatment units, in two stages in the FSTP modules.

Figure 15: FSTP Lospalos proposed installation and segments



110. The primary stages i.e. settler, is mainly for Sedimentation of any solids that have entered the modules along with the percolate where the liquid remains aerobic as not to generate offensive odours. The second stage i.e. Anaerobic Filter is for anaerobic degradation of any dissolved and suspended organic matter.

111. The partially treated wastewater from the secondary treatment unit would be conveyed into a horizontal planted gravel filter. Therefore, the treated wastewater is safely used for irrigation purposes and the bio-solids can be used as soil conditioner for agricultural use.

Figure 16: Proposed FSTP and Public Toilets locations in Suco Fuloro

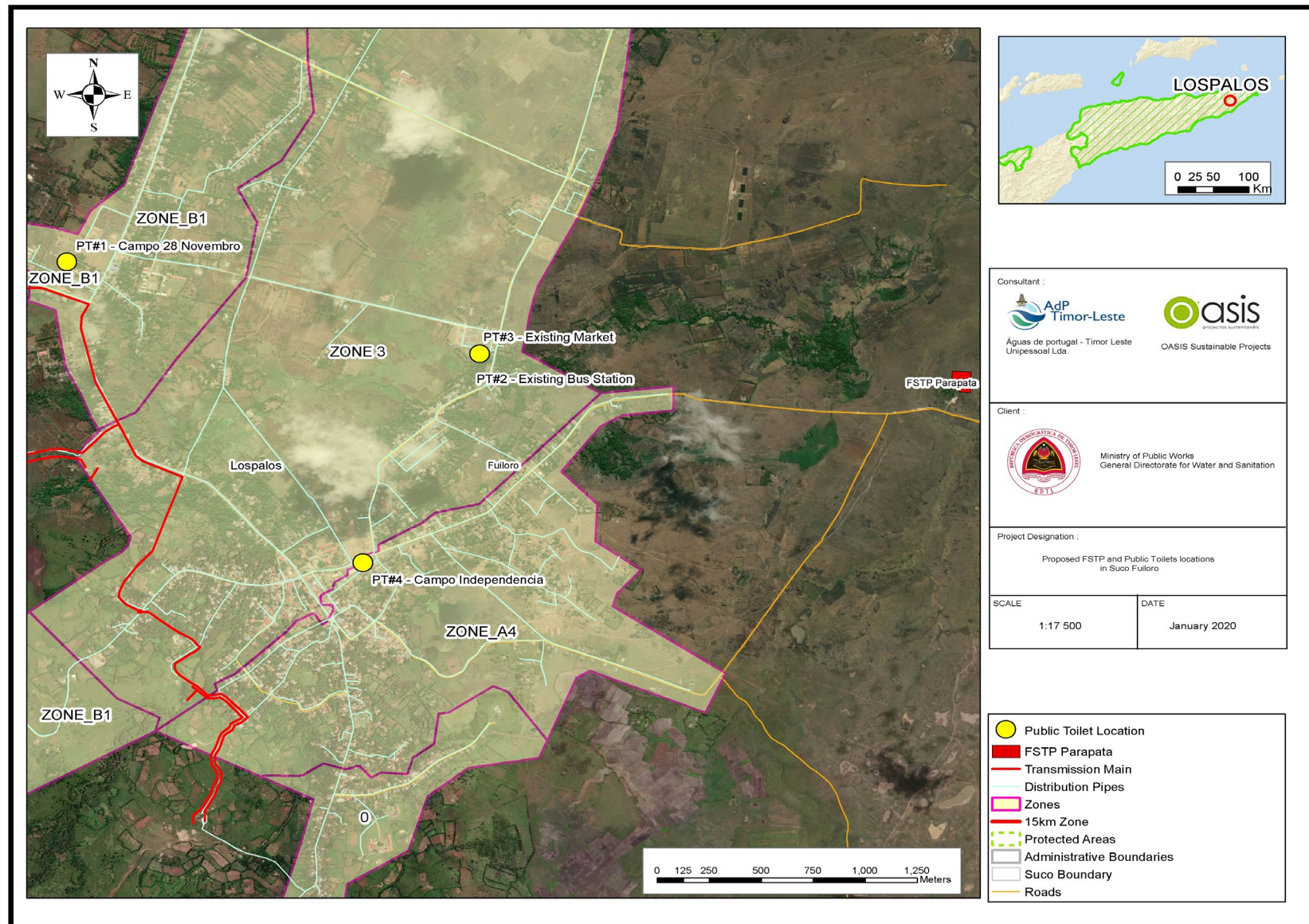
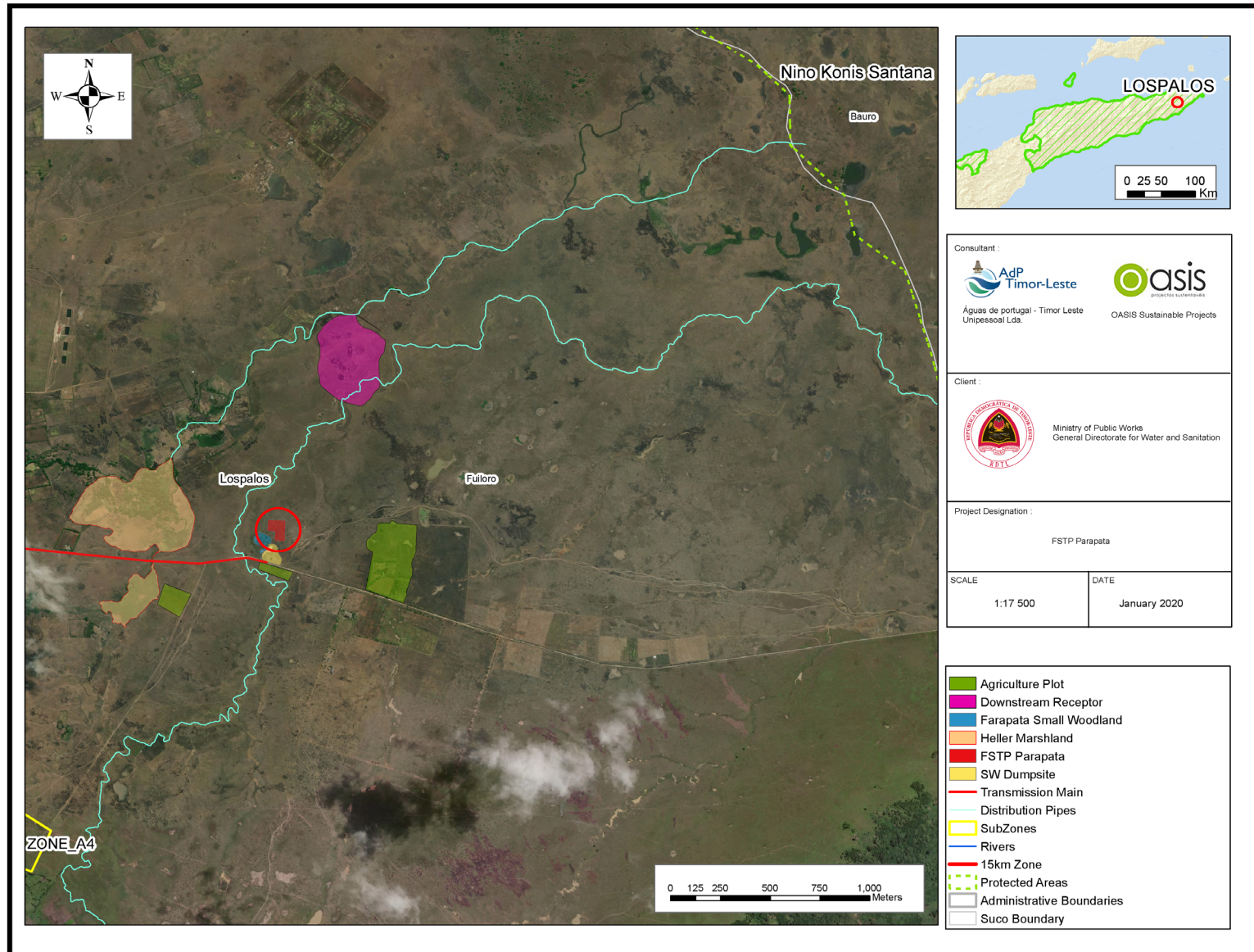


Figure 17: Proposed FSTP and surrounding land use



## 4. ALTERNATIVES ANALYSIS

### 4.1. 'Without-project' or 'do-nothing' Alternative.

112. The citizens of Lospalos city are currently consuming untreated or partially treated water from the existing water supply systems, increasing the possibility of water-borne disease incidence due to poor access to safe and potable water supply, resulting in health hazards in the project area and exposing the surroundings to environmental problems.

113. The existing water supply in the project area is intermittent, not able to meet the increasing demands of the increasing population of Lospalos. Limited water supply will compel SMASA customers to control the use of water for various purposes, including sanitation practices, such as flushing after use of latrine, bathing, washing clothes etc. influencing negatively on the domestic hygiene of the project area. This may pose increase in the risk of the incidence of diseases such as Typhoid, Cholera, Dysentery, or increase stunting and in turn result in the environmental problems.

114. The 'Do-Nothing' alternative reduces substantially the chance of people in the project area to combat diseases such as these because they continue to consume untreated water, increasing the risk of infections that will obviously have an impact on public health, animal health and the health of the ecosystems. It may also be an impediment to the development of Lospalos City, hindering further social and economic development of the municipality and, indirectly, the Government of Timor-Leste's commitment to SDG-6 to increase the percentage of the population with access to sustainable, safe drinking water and basic sanitation.

115. Overall, the proposed project and its components, as the 'with project alternative' will be the best solution to overcome the aforementioned threats that are likely to occur in its absence and a whole city will have convenient access to reliable, adequate, safe, potable water supply and a sanitation system that extends from the domestic area to public spaces and thus, good hygiene and sanitation practices will be promoted and the consequent reduction of possible health and safety risks. It will bring about improved public health and a living environment that will contribute to improved quality of life in the municipality and create an enabling environment for local economic development and improved social services that communities within the project area will benefit from.

### 4.2. Design Alternative.

116. The proposed project has been designed as a totally gravity surface water system with a distribution system comprising a bulk water system and a household distribution system. In this way the whole of the service area will be divided into a number of service areas with dedicated storage reservoirs, divided on the basis of elevation differences and proximity. However, all subsystems can be operated independently as they are also inter-linked, where possible, and water from neighbouring subsystems can be supplied to another adjacent subsystem in case of maintenance and other unforeseen events.

### 4.3. Faecal Sludge Treatment Plant (FSTP) Location Alternative

117. The choice of the FSTP location depends on a series of considerations and conditions that have been identified during the project site visit, as well as during the application of the REA checklists, such as a) distance to communities to avoid impact and loss of amenity; b) reasonable existing access to avoid impacts with new road constructions; c) no sensitive ecological areas; d) preferably public land; and d) close to agricultural land for application of dried sludge treated from the FSTP maintenance activities.

118. 3 sites were identified, all with the land space of 15,000m<sup>2</sup> required for the implementation of the FSTP (see Table 12). Of the 4 locations, Site 2 – Parapata was the chosen location for the FSTP since it filled almost all the criteria and was located close to a pre-existing "brownfield" area i.e. city solid waste

dumpsite, had the best conditions regarding distance to community and the existence of substantial agricultural land adjacent to the site to absorb the proposed dried treated sludge while reasonably close to the city.

Table 12: FSTP Proposed Locations in Lospalos City

FSTP	Coordinates	Actual Area Available (m <sup>2</sup> )	Distance from (m)		Site elevation above MSL (m)	Description	Comments
			Houses	Water Body			
1 – North West, Resouro, Suco Home	Lat: 9° 1'51.64"S Long: 125°40'9.06"E	15000m <sup>2</sup>	120m	3000m	260m	Location characteristics: - "Greenfield" area located on flat grassland, area at border with pristine forest up on the watershed; - access road in poor condition, needs investment to access site - 120m from community settlements	Not recommended
2 – Parapata, Suco Fuiloro	Lat: - 8.513230° Long: 127.0246 19°	15000m <sup>2</sup>	280m	120m	350m	Location characteristics: - located on grassland, - flat area - has the access road, - 0.6 km from community settlements, - Adjacent to agricultural area (sludge reuse); and - has a stream 120 meters away. - Is adjacent to an existing "brownfield" area i.e. Solid Waste Dumpsite	Recommended
3 – South East, Aldeia Trans, Suco Fuiloro	Lat: - 8.483777° Long - 126.9416 17°	15000m <sup>2</sup>	220m	120m	306m	Location characteristics: - located on grassland, area with incline, erosion prone - has access road, national road, relatively good condition, - 120m from community settlements - On Agricultural area (existing plots)	Not recommended

### Components and Site Salient Features

#### A. FSTP No. 1, Aldeia Resouro, Suco Home

(+)

- The topography is relatively flat covered with grassland and no invading species, spacious.
- Surrounded with dispersed agriculture activity i.e. animal husbandry and grazing land.
- No potential of flooding and landslide. Upper watershed.

(-)

- Site is surrounded by pristine forest to the SW, W and NW (sensitive area) and a private burial monument 120m away i.e. lulik/sacred area close to the location.
- The site is not easily accessed, road in poor condition requires rehabilitation.
- Close to dwellings approximately 250 m from the proposed site. The sludge transference will result amenity either odour, and noise from movement of sludge trucks and operational activity.
- Possible private land, therefore compensation will have to be considered.



Northwest view of the Proposed Location



Northeast view of the Proposed Location

**B. FSTP No. 3, South East, Aldeia Trans, Suco Fuiloro**

(+)

- The land has a relative South to North incline in a micro basin.
- Easily accessed with good condition road, although not paved.
- No specific sensitive area i.e. lulik/sacred area identified in the location, except possible of cultural rituals by farmers solely for protecting the animal livestock, however it does not make the area less conspicuous with sensitivity.
- Surrounded with established agriculture plots.

(-)

- Landslide prone. Sedimentary soil structure, with visible natural landslide occurrences in similar soil structures within 500m radius. Distance to the river is 120m.
- Close to dwellings approximately 220 m from the proposed site. The sludge transference will result loss of amenity either odour, and noise from movement of sludge trucks and operational activity.
- Possibility of private land, therefore compensation will have to be considered.



Proposed Location (South view, uphill, agricultural plot)



Proposed location (East view, uphill)


 Proposed Location at Car position. Visible Natural  
landslides and river to the right.

## 5. DESCRIPTION OF THE ENVIRONMENT

### 5.1. Physical Environment

#### 5.1.1. Topography

119. Lospalos city straddles the beginning of the Ramelau mountain range, where it is referred to as the Paitchau range and where Mount Legumau is the highest feature at 1,297m high (EPANZ, 2007). It borders the Fuiloro plateau, located on the northern side of the Paitchau range, draining towards the foot of the Paitchau range, which the center of the area consists of an elevated basin (350 metres above sea level) draining internally to a depression where Lake Iralalaru currently lies. To the north and east of this basin lies a low plateau that drops relatively steeply to the sea, while south of the Paitchau Range lies a shallow valley bound on its seawards side by a low rise.

#### 5.1.2. Climate

120. According to historical data obtain from Lospalos weather station (1954 – 1974), (Seeds of life, 2012), Lospalos is the wettest city in the Eastern part of the country, recording 4 dry months in a year. The region receives a total average rainfall of 1763 mm in a given year, with an average temperature of 25°C (CCCB - TL, 2018), with the occasional occurrence of extreme heavy rainfall over relatively short time periods, such as that recorded in 2001 (EPANZ, 2007), causing severe local flooding which caused widespread damage within the municipality. The maximum temperature recorded in the region is in the range of 27 °C to 31 °C and the minimum temperature vary between 19 °C to 22 °C.

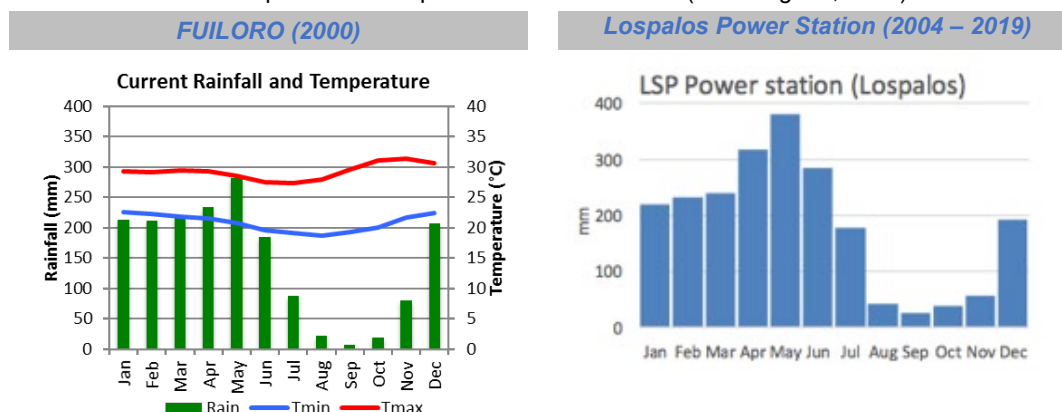
##### 5.1.2.1. Climate Change Projection

121. From 2000 - 2050, there is an estimated 3.3% decrease in average annual rainfall (1763 mm to 1705 mm) and a 4,96% increase in average annual temperature (24.95°C to 26.25°C) in Lospalos. This climate change predicts dryer and hotter periods and less frequent rain events but with higher intensities of rainfall, leading to high-risk probability of flash-floods occurrences.

122. Timor-Leste and its community are vulnerable to climate change, with significant variability of rainfall and temperature due to El Niño/El Niña frequent oscillations. The overall impact could lead to land degradation and soil infertility, and damage of seedlings caused by extreme storms.

123. The projected increase in temperature for Lospalos (increase of approximately 1°C across the project sucos, based on 2050 IPCC4 CSIRO A2A Projection) may come to cause the farmers to i.e. suffer from yields decline of 10% for every 1°C increase in temperature (GovTL, 2010), such as the drought event that occurred in Lospalos between 2001 and 2003 (EPANZ, 2007).

Figure 18: Average Temperature and rainfall patterns throughout 2000 in Suco Fuiloro (ALGIS, 2020) and Average Rainfall pattern for Lospalos from 2004 to 2019 (ADP/Engidro, 2020)



### 5.1.3. Geology

124. The Lospalos city has (EPANZ, 2007) several geological units that lay in a southwest trend parallel to the Paitchau range, namely: a) Crystalline Limestone and Shale (forming the mountain ranges limiting Lake Iralalaru); b) Karstified coralline limestone (forming the overall plateau); and c) karstified bedded limestone (porous) and loose, unconsolidated alluvial clay deposits.

125. The whole area is underlain by Quaternary marine limestone formations which have been up lifted by the rafting north of the Australian tectonic plate and this limestone now outcrops extensively in the Paitchau Range and low plateau north of Bauro. The city of Lospalos (and our Project Area) is located to the Southwest of the Lake, within the plateau.

126. Lospalos sits over the Surobeco Formation, made of a lacustrine limestone, thickly bedded, containing gastropod and algae fossils, locally passing to travertine and chalky limestone. Its age extends from Pleistocene to Recent being deposited in a typical lacustrine environment. It is closely related to the Baucau limestone largely widespread in the eastern half of the country.

127. In Lospalos, the aquifer has a porous nature, due to the degradation of the limestone. This area make part of a large basin, where is today the lake Iralalaro that resulted from a land movement result of a land stretching. The main formation is composed of a so said Soft Porous Coral Limestone, with presence also of other sedimentary rocks such as shale, sandstone, silts and recent deposits in the lake area.

### 5.1.4. Water Resources and Hydrology

128. Timor-Leste is comprised of 191 “hydrologic units” or watersheds, of which a total of 29 were selected as important (JICA, 2017). Within them, in total there are 29 main river systems, of which 12 are situated in the north and 17 in the south.

129. These watersheds produce an estimated 22,300 million m<sup>3</sup> of water per year (mm<sup>3</sup>/yr), with a total internal renewable water resources of 8,215 mm<sup>3</sup>/yr or 6,932 mm<sup>3</sup>/yr per inhabitant, ranking 63 out of 179 countries on renewable water resources availability per capita (WorldBank, 2018). This lower potential derives from a dry tropical climate characterized by long dry seasons. Based on 2004 available data, water withdrawal was 14% of the total country’s renewable water resources, of which 91% was used for irrigation and livestock and 9% for domestic use.

130. Surface water accessibility is more problematic than that of groundwater sources. The meteorological variation results in highly variable river flows and flash floods in the wet season and low or no flows in the dry season. These distinct variations between the northern and southern coastlines result in smaller river catchments with diverse hydrological patterns.

131. Figure 19 shows that the Northern catchments tend to be larger than those located in the south. Most of catchments in the northern coast generate semi-permanent (i.e. seasonal) flows during the wet season after heavy rainfall events. On the other hand, the southern coast benefits from higher rainfall and thus is able to supply larger permanent river systems in the wet season and several rivers with a permanent base flow in the dry season.

### Water Resources in the Project Area

#### **A. Surface and Groundwater**

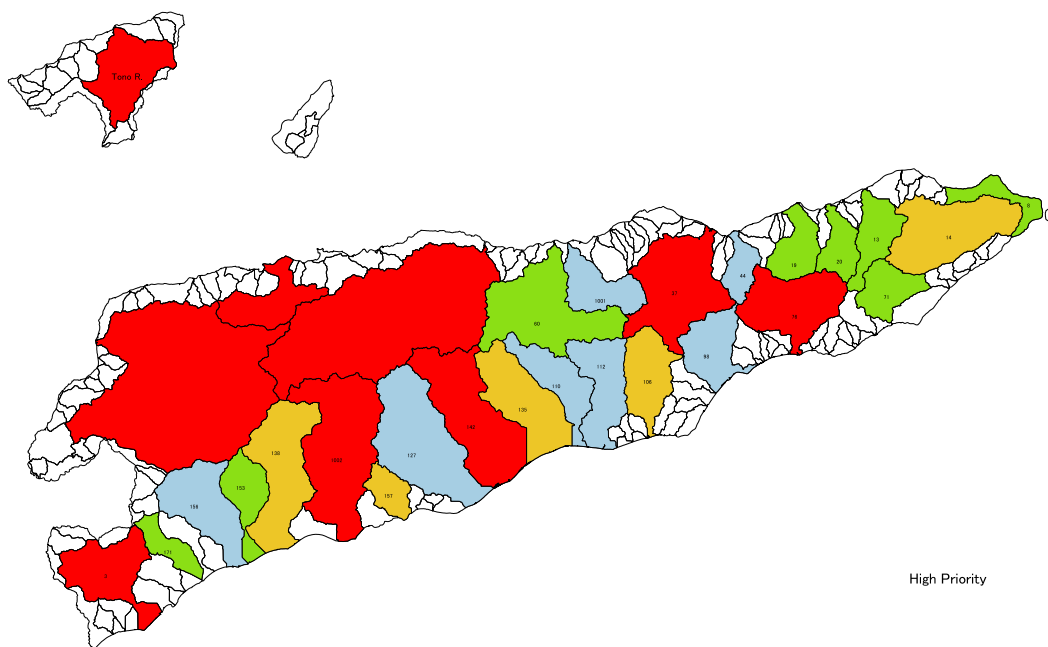
132. The hydrological system in Lospalos falls into the Iralalaro/Vero River Watershed, considered a High Priority, Other Watershed [Yellow] (JICA, 2017). It is composed of a 31 water body system (lakes and streams) (ADB, 2016) and the Iralalaro lake is the regional recipient for the surface water run-off in the upper plateau, where the project area lies. It is drained by the river Ira Siquero, which runs

southwards into the Paitxau range where it drains into a sink hole, only to reappear to the south of the range near sea level.

133. Fuiloro is further upstream of the Lake and the water source situation is complex involving both spring water and groundwater abstraction from a depression to the west of the city, which creates some uncertainty regarding water availability in the area, for the purpose of an effective water distribution system.

As seen in 3.2.1, the Project Area of Lospalos city is also supplied with Spring water from the Papapa Spring.

Figure 19: Important Watersheds in Timor-Leste (JICA 2017)



## B. Water Quality

134. Several water quality studies have been carried since 2000 up to 2019, to several water sources in Lospalos, particularly those used for the Water Distribution system and during the Master plan in 2014 (ADB, 2016). These have been evaluated and assessed in Chapter 4.2. – Water Quality Investigations on the D3 report.

135. Throughout the years, the overall quality of the sources have indicated that, in general, most of the indicators are within the World Health Organisation (WHO) limits for water consumption use of the water, despite several occurrences of higher level turbidity in certain cases, that could be attributed to rainy season or other. However, there is a historical trend of occurrence of water contamination results regarding Total Coliforms and E.Coli which may relate to the common agricultural husbandry activities, as well as the occurrence of mega fauna in the Papapa stream and upstream area of Kokoho and therefore, contaminating the water.

## 5.2. Biological Profile

136. Situated within the Wallacea Biodiversity Hotspot (defined as the islands in the Indonesian archipelago and Timor-Leste between the Sunda and Sahul continental shelves), Timor-Leste hosts a number of globally significant ecosystems and endemic species, originated from Asia and Australasia and spread through the Wallacea region but through long isolation have developed very high levels of endemism (G-RDTL, 2010), many of which are threatened with extinction by IUCN.

137. Additionally, according to NEGA (2010), Timor-Leste is also part of the Coral Triangle, harbouring many important species, such as: "...76% of the world's coral species; six of the world's seven marine turtle species, more than 3,000 reef fish species, whale sharks, manta rays and a diversity of marine mammals, such as 22 dolphin species and a variety of whale species".

138. In general, natural ecosystems in Timor-Leste have been severely depleted in the last century, through intensive deforestation, forest degradation, loss of soil due to 'slash-and-burn' agricultural methods and heavy rains, mangrove destruction, pollution of waters and sedimentation of rivers. Native vegetation is a fundamental element of ecosystems, encompassing most of its biomass and has therefore been equally affected.

### 5.2.1. Flora, Fauna and Protected Areas

#### 5.2.1.1. Protected Areas, National Parks or sensitive ecological areas

139. Timor-Leste has a total of 49 declared Protected Areas (PA), according to Decree-Law no. 05/2016 – Protected Areas Network in Timor-Leste, containing the majority of the country's remaining primary forest cover. The majority of these areas are mountainous and have high species endemism. The first and most established Protected Area in the country is Nino Konis Santana National Park (NKSNP), composed of three main areas, namely, Jaco Island Marine Park, the Lake Iralalaru Park, and the community led marine protected area in vicinity of Com Village. Below is the list of protected areas in Timor-Leste according to the DL 05/2016, NEGA (2010) and GIS documentation and boundaries of the protected areas for the year 2018, from the Ministry of Agriculture and Forestry (MAF).

Table 13: List of Protected Areas in Timor-Leste

No	Name	Area (Ha)	Ref	Remarks
1	Nino Konis Santana National Park	126249.619	GR 08/2007	Area REDUCED to 123600 ha in DL 5/2016
2	Mount Legumau	10035.876	NEGA 2010	Area INCREASED to 35967 ha in DL 5/2016
3	Lake Maurei	200.312	NEGA 2010	Area INCREASED to 500 ha in DL 5/2016
4	Be'e Matan Irabere	0	DL 5/2016	New proposed protected area, area not defined
5	Mount Matebian	10340.534	NEGA 2010	Area INCREASED to 24000 ha in DL 5/2016
6	Mount Mundo Perdido	4168.339	NEGA 2010	Area INCREASED to 25000 ha in DL 5/2016
7	Mount Laretame	896.449	NEGA 2010	Area INCREASED to 16429 ha in DL 5/2016
8	Mount Bulio	6987.437	NEGA 2010	Area INCREASED to 8000 ha in DL 5/2016
9	Mount Burabo	3927.136	NEGA 2010	Area INCREASED to 18500 ha in DL 5/2016
10	Mount Aitana	4236.951	NEGA 2010	Area INCREASED to 17000 ha in DL 5/2016
11	Mount Bibileo	4545.537	NEGA 2010	Area INCREASED to 19000 ha in DL 5/2016
12	Mount Diatuto	9897.168	NEGA 2010	Area INCREASED to 15000 ha in DL 5/2016
13	Mount Kuri	1766.019	NEGA 2010	Area not defined in DL 5/2016
14	Kay Rala Xanana Gusmao National Park	18000	DL 5/2016	New proposed protected area
15	Ribeira de Clere	9926.638	NEGA 2010	Area INCREASED to 30000 ha in DL 5/2016
16	Lake Modomahut	22	DL 5/2016	New proposed protected area
17	Lake Welenas	20	DL 5/2016	New proposed protected area, part of Mt. Cablaque
18	Mount Manucoco	1773.192	NEGA 2010	Area INCREASED to 4000 ha in DL 5/2016
19	Cristo Rei	1810.001	NEGA 2010	Area REDUCED to 1558 ha in DL 5/2016
20	Lake Tasitolu	378.195	NEGA 2010	Area not defined in DL 5/2016

No	Name	Area (Ha)	Ref	Remarks
21	Mount Fatumasin	1412.862	NEGA 2010	Area INCREASED to 4000 ha in DL 5/2016
22	Mount Guguleur	6962.938	NEGA 2010	Area INCREASED to 13159 ha in DL 5/2016
23	Lake Maubara	0	DL 5/2016	New proposed protected area, area not defined
24	Mount Tatamailau	14418.235	NEGA 2010	Area INCREASED to 20000 ha in DL 5/2016
25	Mount Talobu/Laumeta	15000	DL 5/2016	New proposed protected area
26	Mount Loelako	1078.986	NEGA 2010	Area INCREASED to 4700 ha in DL 5/2016
27	Mount Tapo/Saburai	3767.788	NEGA 2010	Area INCREASED to 5000 ha in DL 5/2016
28	Lake Be'e Malae	0	DL 5/2016	New proposed protected area, area not defined
29	Korluli	0	DL 5/2016	New proposed protected area, area not defined
30	Mont Lakus/Sabi	0	DL 5/2016	New proposed protected area, area not defined
31	Mount Taroman	5888.429	NEGA 2010	Area INCREASED to 19155 ha in DL 5/2016
32	Tilomar	4731.239	NEGA 2010	Area INCREASED to 7000 ha in DL 5/2016
33	Mount Cutete	8590.356	NEGA 2010	Area INCREASED to 13300 ha in DL 5/2016
34	Mount Manoleu	10844.206	DL 5/2016	Area INCREASED to 20000 ha in DL 5/2016
35	Area Mangal Citrana	1000	DL 5/2016	New proposed protected area
36	Oebatan	300	DL 5/2016	New proposed protected area
37	Ek Oni	700	DL 5/2016	New proposed protected area
38	Us Metan	200	DL 5/2016	New proposed protected area
39	Makfahik	0	DL 5/2016	New proposed protected area, area not defined
40	Area de Mangal Metinaro	0	DL 5/2016	New proposed protected area, area not defined
41	Area de Mangal Hera	0	DL 5/2016	New proposed protected area, area not defined
42	Lake Hasan Foun & Onu Boot	12	DL 5/2016	New proposed protected area
43	Lake Bikan Tidi	110	DL 5/2016	New proposed protected area
44	Samiksaron	0	DL 5/2016	New proposed protected area, area not defined
45	Batugade	112.59	DL 5/2016	New proposed protected area
46	Atauro Island	10897.131	NEGA 2010	Area REDUCED to 50.85 ha in DL 5/2016
47	Lamsanak	15064.143	NEGA 2010	Not included in DL 5/2016
48	Mount Cablaque	12623.434	NEGA 2010	Not included in DL 5/2016 (Substituted by #14)
49	Behau	27491.337	NEGA 2010	Not included in DL 5/2016

### Protected Areas in and around the Project Area

140. Of the 46 declared Protected Areas (PA) in the country, Lospalos has within it the Nino Conis Santana National Park, designated according to the Government Resolution No. 08/2007 and covering a total land area of 1236 km<sup>2</sup>. It is composed of a terrestrial and marine protected area and, at the same time, is overlapped by Important Bird Area (IBA) TL 17 – Mount Paitchau and Iralalero Lake.

141. These are the only Protected Areas and/or Key Biodiversity Areas within the 15 km diameter project limit for the Water Supply and Sanitation Investment Project, where Suco Fuiloro borders the PAs east and south-eastern border. As can be seen in Figure 3 all the project components are planned to be implemented within Sucos Fuiloro and Home, within the urbanised area of Lospalos, with the closest component to the protected area being the FSTP Parapata (approximately 3,3 Km away from the PA boundary). None of the project components are located within or at any proximity of the Protected Area and the overlapping seen in Figure 200 represents only project border overlapping and not physical overlapping of project components within or close to the PA or KBAs.

142. The team met with Mr. João Antalmo, (National Director for Protected Areas) on the 12<sup>th</sup> September 2020, to procure updated GIS documentation on the National Protected Areas Borders. Whilst at the time these were not available, the team further complemented this consultation with a meeting with the General Director for Forestry, Mr. Raimundo Mau (on the 10th December 2020), where it was confirmed that the 2018 boundaries should be used as the most current PA boundary reference. Updated GIS data were supplied which have made it possible to define the areas of the project that may be in and out of the PA.

143. The environmental features, flora, fauna, etc, regarding this National Park are reflected in the following chapters.

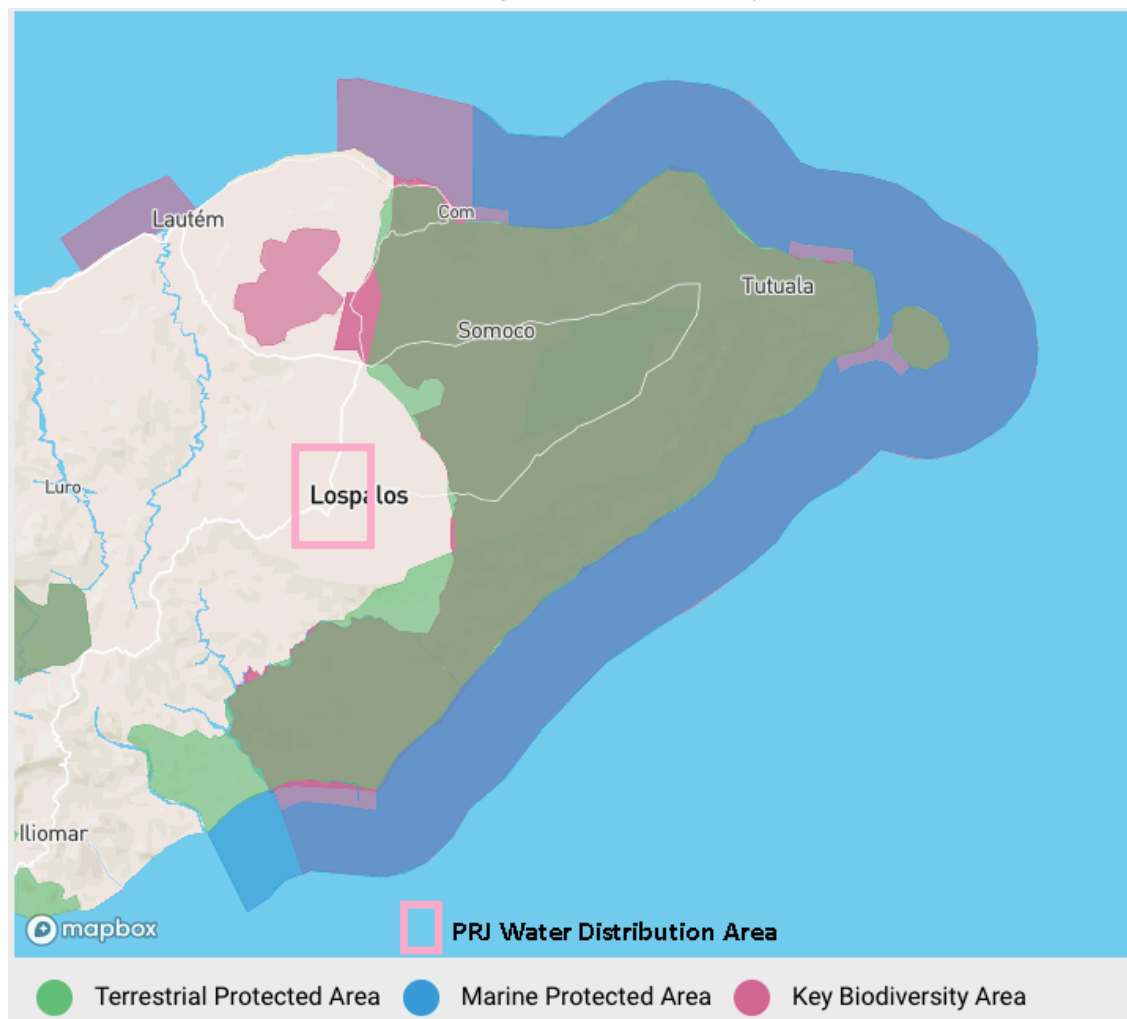
#### **5.2.1.2. Flora and Forests**

144. In general, forest and woodland of several structural types are the predominant original vegetation throughout much of Timor-Leste. Tall evergreen forests grow in areas with high moisture while drier and more extreme climatic conditions lead to the appearance of semi deciduous and tropical dry forests (JICA, 2013).

145. Prior to the country's independence, its forest had been significantly exploited due to the foreign demand of country products, such as sandalwood (*Santallum album*). From 1.5 million hectares of total land in Timor, 57% are classified as forest or woodland (GovTL, 2010). The identified forest woodland has been degraded due to Timber harvesting and illegal logging, and slash-and-burn for agricultural practices.

146. In 2012 the forest area of Timor-Leste was estimated in the draft National Forest Conservation Plan (Nippon Koei, 2013) to be 869 thousand hectares, which represented 58% of the whole country. Dense forest with a crown cover was found on 60 to 70% of the forestland, the remaining balance being sparse forest. Agricultural land was estimated at 26 % of the whole country.

Figure 20: IBAT mapping of Protected Areas and Key Biodiversity Areas near Lospalos Project (Source: [www.IBAT-alliance.org](http://www.IBAT-alliance.org), accessed 06.01.2021)



147. Altogether, the area of sparse forest is almost 1.8 times the size of the area of dense forest. Between districts, in general, forest cover does not markedly differ. Based on these national forest maps, only 1.7% of the total land area of Timor-Leste is still covered by primary forest; significant areas can be seen in Lautem and Covalima municipalities. The last major stretches of old primary forest are mainly located in the Tutuala sub-municipality of Lautem.

148. The Malesian region, where Timor-Leste is located, is a region of high plant biodiversity with an estimated 41,000 plant species, including 70 per cent of species endemic to the region (GovTL, 2015).

149. Based on a preliminary survey of the flora and fauna of Timor-Leste conducted in collaboration with Birdlife International, more than 251 tree species had been identified as native with a great deal of biodiversity in agriculture. The agro-biodiversity database elaborated by MAF, GIZ/AMBERO, UNTL and Permatil lists 200 crop species in 555 varieties that are cultivated and/or used by Timorese farmers. While the database only includes data from 26 pilot villages (sucos) distributed over five districts, actual diversity is likely to be much higher.

## Flora and Forests around and in the Project Area

150. The dominant natural vegetation of the area of Lospalos consists of large forested areas with some of the remaining stands of tropical evergreen and semi evergreen forest and dry forest in Timor-Leste, while natural areas of sedge and grassland cover the floodplain of Lake Iralalero. The ranges and southern coastal areas continue to support primary closed forest and these are now probably the largest areas of natural primary vegetation left on the island of Timor, where the last major stretches of old primary forest are mainly located in the Tutuala sub-district of Lautem (Cowie, 2006).

151. Primary forest around Lospalos and in the Lake Ira Lalaro basin have had some disturbance for the past 50-100 years, with extensive conversion by humans due to timber gathering and gardens/vegetables growing patches, cropland and secondary forest vegetation. Cowie (2006) indicates that number of plant communities in the park are thought to be endangered at a regional and national level and badly in need of conservation and three IUCN listed threatened plant species (*Intsia bijuga* [Pacific Teak]; *Pterocarpus indicus* [Amboyna Rosewood]; *Aglaia spp* [Mahogany]) are known from the Park, whilst twenty two species of plants recorded during the survey for the Hydropower EIA have not previously been recorded from Timor, in literature. There is also the recent establishment of *chromolaena odorata* [Jack in the Bush], a fierce vegetative invader most common in open areas or recent forest openings where it excels in competing for sunlight over other species.

152. The population in the area use the various vegetation types commonly for medicinal and/or construction purposes, where the lake's floodplain provide grass vegetation for Mehara and Maupitine villagers to graze their livestock, for growing rice and tobacco, or distilling palm liquor for private consumption or commercial production. The economically/locally important vegetation types and species recorded in 2015 (ADB, 2016), in the Lospalos area are the following:

Narra (*Pterocarpus indicus*); teak tree (*Tectona grandis*); ai samtucu (*Falcaturia moluccana.P*); eucalyptus (*Eucalyptus globus*); acasia (*Samanea saman*); mahogany (*Swietenia mahagoni*); baletu (*Ficus stipulosa* Miq.Linn.); ipil-ipil (*Leucaena leucocephala*); madre de cacao (*Gliricidia sepium*); coconut (*Cocos nucifera*); mango (*Mangifera indica*); coffee (*Coffea Arabica*); banana (*Musa x paradisiaca*); papaya (*Carica papaya*); guava (*Psidium*); jackfruit (*Artocarpus heterophyllus*); breadfruit (*Artocarpus altilis*); guyabano (*Annona muricata*); atis (*Annona squamosa*).

153. There are no sensitive vegetation areas and/or protected flora species identified to date within the determined 15 Km project area border. Likewise, on the eastern section touching Suco Bauro and Maupitine, a fragment strip of Nino Konis Santana National Park overlaps the project border but no project components lie within, as explained in paragraph 164. This section has similar vegetation as that of the project area but is located just on the edge of the national park and therefore the effect from the project can be classified as little to none to the protected area.

154. Vegetation in the project area, Fuiluro, is a mixed of moist lowland forest and extensive grassland with not so dense vegetation, given the existing urban setting and respective household small-scale agricultural activity.

155. From the field visits and photographic records, only 1 location close to any of the project components was considered sensitive. The Parapata Spring and Stream area, considered *lulik* or sacred by the local community, due to fauna characteristics more than vegetation (see 5.3.2). The species of vegetation identified near the Papapa spring consisted of coconut (*Cocos nucifera*), banana (*Musa sp.*), seedless breadfruit (*Artocarpus altilis*), water lettuce (*Pistia*), corn (*Zea mays*), taro (*Colocasia esculenta*), mango (*Mangifera sp.*), Ipomoea palm (*Areca ipomoea*), banyan tree (*Ficus microcarpa*), etc. The corn plantation is privately owned by locals, for subsistence purposes, as well as the tendering of other consumable plants. As explained in Table 4, due to the production restrictions in the Papapa WTP, the

distribution intake will represent an estimated 15% of the river flow, which leaves a substantial remaining flow for agricultural activities downstream. Additionally, most of the agricultural activities are immediately upstream of the Papapa intake. Therefore, the impact from the abstraction will be reduced in regards to the agricultural setting in the area.

### 5.2.1.3. Fauna

156. The 5th UNCBD Report (GovTL, 2015) indicates that bird life in Timor-Leste is usually better documented than the non-bird fauna of Timor-Leste, although some main species groups such as mammals, reptiles and amphibians have been studied to some degree at some locations within the country. Roughly, half of the bird fauna originates from Asia and Australasia, whereas the mammal, amphibian and reptile faunas are dominated by Asian families and species. New species of bats, frogs, geckos and skinks have been discovered with evidence indicating high levels of endemism.

157. Bird fauna related information is relatively established in Timor-Leste. The country hosts 262 bird species and 39 of them are threatened or restricted range species –8 of which are endemic to Timor-Leste (GovTL, 2010). Realizing the importance of conserving the birds to maintain the ecosystem services that the species are offering, the country has determined Important Bird Area (IBA) with a cumulative land of 1,852 km<sup>2</sup> across the municipalities in Timor (Trainor, 2007). The 5th National Report to the UNCBD (G-RDTL, 2015) states that these Important Bird Areas (IBAs) form the core of a network of sites for all wildlife: the Key Biodiversity Areas (KBAs). They are 16 IBAs, 14 on the mainland and two (2) on offshore islands (Atauro and Jaco islands)), covering roughly 12.5% of Timor-Leste's total land area, supporting populations of both restricted-range birds of the Timor and Wetar Endemic Bird Area (EBA), as well as globally threatened bird species.

158. The NBSAP (G-RDTL, 2015), based on studies conducted by (Trainor, 2007), substantiates this importance, registering at least 262 bird species that are known to be from Timor, from which 169 are considered resident, 76 regular migrants and 17 considered as vagrants. Of all these, three (3) species are identified as endangered, namely the Timor Green Pigeon (*Treron psittacea*, local name (LN): Punai Timor], the Timor Imperial Pigeon (*Ducula cineracea*, LN: Pergam Timor) and the Wetar Ground Dove (*Gallicolumba hoedtii*, LN: Delimukan Wetar). Additionally, one is classified as critically endangered – Yellow-Crested Cockatoo (*Cacatua sulphurea*, LN: Kakatua jambulkuning) and another as vulnerable – Timor Sparrow (*Padda fuscata*, LN: Gelatik Timor).

159. The country also has a rich, highly endemic, oceanic island terrestrial fauna that also consists of 60 mammals, including 24 non-volant (non-flying) mammals (of which two of these are the Timor Shrew *Crocodyra tenuis* and Timor Rat *Rattus timorensis*), but overall dominated by 31 bat species and 40 reptile (15 lizard and 15 snake) species, one of which, the crocodile (*crocodilus porosus*) is very important spiritually in Timor-Leste. Other common species of low conservation significance are the Timor Deer, Common spotted Cuscus, Common Palm Civet, pigs and Long-tailed Macaque. Almost all these land mammals are introduced and all are affected by hunting and habitat loss.

### Fauna around and in the Project Area

160. With the inclusion of the Nino Conis Santana National Park in its municipal borders, the Lautem District boasts a significant percentage of the total fauna species in the country. Previous studies (EPANZ, 2007), particularly in the National Park Area, have identified several species of land mammals, reptiles, avifauna, shrews and 20 native bat species within the National Park, as well as fossil records of giant rats, which may now be extinct (ADB, 2016).

161. As one of the most important biological reserves in the country, the Park registers almost the totality of the common and endangered fauna species listed in this subchapter.

162. The nearest Important Bird Area (IBA) to the project site is TL07 – Mount Paitchau and Lake Iralalero (Birdlife International, 2020), harbouring twenty-four (24) restricted range species such as the Timor Green-pigeon (*Treron psittaceus*), and Yellow-crested Cockatoo (*Cacatua sulphurea*), while the Iralalero lake and its tributaries, as a significant freshwater wetland, also supports 50 species of water birds (Trainor, 2007) and fish species such as i.e. existing anguillid eels and gobies or new species of fish endemic to Timor-Leste such as *craterocephalus laisapi* or *Lentipes* sp, in irasiquiro river (EPANZ, 2007). In general, most of the existing fish species in the area are widespread in south-east Asia and thus not of high regional conservation significance.

163. More locally, there are 3 identified areas that have been identified by local authorities as areas of ecological interest: 1) Papapa stream and springs; 2) Kokoho Marsh; and 3) Heller Marsh. Of the three, only papapa is within the area of direct impact of the project, namely because of the location of the lagoon intake. Papapa is a culturally protected area, mainly due to the presence of saltwater crocodiles in its waters and the project itself has provided for design changes to accommodate for the cultural status of the area.

#### 5.2.1.4. Coastal Resources

164. Timor-Leste has approximately 700 km of coastline, holding many coastal and marine resources including fish, sea grasses, seaweeds, coral reefs, mangrove forests and pristine beaches (very suitable for recreation and with a high tourism value). These coastal habitats vary from region to region around the country, with areas such as lagoons, fringing coral reefs, sea grass beds and steep cliffs with adjacent deep-water drop-offs, mangrove stands, beaches and shallow bays. These coastal habitats are places of varying abundance and diversity of fish stocks, some representing spawning grounds whilst others a transition area between onshore and offshore habitats or seasonal migratory pathways to many mega fauna species.

165. Thus, the coastal zone (and habitats) of Timor-Leste are subject to a high degree of human dependency and impact on the said resources, be it for Tourism or socioeconomic activities i.e. mangrove forests, have been reduced at an alarming rate throughout decades since 1940, due to timber harvesting, fuel wood, and opening up spaces near the mangrove forests for shrimp and fish ponds.

166. Being part of the Coral Triangle (CT) also befits Timor-Leste of a rich Marine fauna, since it is estimated the CT harbours 76 per cent of the world's coral species, six of the world's seven marine turtle species, more than 3,000 reef fish species, whale sharks, manta rays and a diversity of marine mega fauna, such as saltwater crocodiles, 22 dolphin species and a variety of whale species, namely "...76% of the world's coral species; six of the world's seven marine turtle species, more than 3,000 reef fish species, whale sharks, manta rays and a diversity of marine mammals, such as 22 dolphin species and a variety of whale species" (G-RDTL, 2010).

167. This declaration follows reports such as Veron (2000) where Timor-Leste is among those places on the planet with the highest coral species diversity, with over 500 species of coral reported from the sea around Timor-Leste, putting emphasis of the fact that any activity along the coastline, coastal development projects, marine pollution, sedimentation, overfishing and destructive fishing are considered having impact to the corals.

168. This enormous marine resource places Fisheries in Timor-Leste as a primary food source, although it is still considered small-scale and mainly for subsistence purposes, where fishermen use non-motorized boats with gill nets and hook and line to capture reef and surface-dwelling fish. The Fish and Animal Consumption and Availability Survey conducted in 2011 by Regional Fisheries Livelihoods Program in five Timorese municipalities, estimated average fish consumption to be 6.1 kg/person/year all

throughout Timor-Leste, while people living near the coast stood at 17.6 kg/person/year versus those living inland consumed 4/kg/person/year (Población, 2013).

## **Coastal Resources in and around the Project Area**

169. The coastal resources around the Lautem municipality cover the Northern and Southern Coast and boast special importance in marine richness and diversity. However, as they are well outside the 15 Km project scope area and are substantially far from any possible impacts from any of the project activities and/or components, they have not been considered in this characterisation.

## **5.3. Socio-Economic and Cultural Environment**

### **5.3.1. Economic Development**

170. **Agriculture development.** Human interaction within this setting results in several land-uses in the country such as agricultural, forestry, settlements, industrial and dry lands land use.

171. The project is situated in the Lautem Municipality and its population was projected, in 2015 (General Directorate of Statistics, 2015) to be at 65,240 persons for a total area of 1,809 km<sup>2</sup> (EPANZ, 2007), and the population of Fuiluro to be 16,701 persons, representing close to 25% of the Municipality. This Suco population has maintained its scale and number since the Census in 2010, and is the primary receptor of the water supply services from this project, which, in 2015, counted with 2,683 private households.

172. The predominant form of livelihood for households in the project area (Lospalos city) is a mix of urban services but mostly near subsistence swidden agriculture for the production of primary staple crops such as i.e. maize, cassava, etc for farmer households, whilst a larger proportion of livestock activities i.e. buffalo, spread out towards the area from the outskirts of Lospalos city to the Iralalero plain and lake area.

173. This majority of the population is mostly composed of farmers, consisting of 41% of the active population (15 to 64 years old) and water has been an important source for securing their activity so as to have a sustainable income. The project area registered a Poverty rate of 32.2% in 2014.

174. Within the project boundary there are 19 active schools (basic, secondary and technical level) totalling a population of 8082. Whilst Portuguese and Tetum are the official languages, in Lautem more than 60% of the population speaks the local dialect Fataluku, and many do not speak another language. These are the numerically and sociocultural dominant group and are the indigenous population in the Municipality, which, together with the Makassae, form the majority of the population in the Eastern Region of Timor-Leste (EPANZ, 2007).

175. **Transportation.** Public transportation in Lospalos city varies comparing to Dili city with access only to *Bemo* and motorcycle/*ojek* (taxi bike) service for rural and urban destination. For travelling outside Municipality, public vehicle such as bus heading to Dili and vice versa is commonly used by the community.

176. Lautem Municipality also has a rudimentary runway for aircraft landing located in the northern part of Suco Fuiluro. The mentioned site is said to be included for future expansion and re-functioning implementation as in accordance with the urban planning design.

177. **Land use.** An assessment of Land use and cover in 2010 (JICA, 2013) indicated forest as the largest land use/cover category in the country (occupying about 60% of the country) and the second

largest being grassland and shrubs (at 27% of the total land area). The remaining areas consisted of bare land (3.3%), rice and agricultural fields (2.8%) and dry farm (1.5%) while settlement covers 0.2% of the total land area.

178. **Power sources and transmission.** Energy consumption increased since the number of clients also increased. In 2015 there were 10,485 clients and in 2018 increased to 11,752 clients (DNE, 2018).

179. **Tourism facilities.** Nino Conis Santana National Park, including its marine area and especially Jaco Island to the east of Valu beach, Pousada Tutuala, are, to date, the main tourist attractions in the Municipality, with Iralalero lake increasing interest in eco-tourism services. The Lospalos Municipality Administrative is still undergoing some improvements on infrastructure rehabilitation for conservation purposes.

### 5.3.2. Social and Cultural Resources

180. **Population and Communities.** The project is situated in the Lospalos city and its population was projected, in 2015 to be at 65,240 persons and the population of Fuiloro to be 16,701 persons and of Home to be 1,933 persons.

181. **Health Facilities.** In terms of facilities in Lospalos city, there are 13 Health Centres and private clinics with 13 Health professionals (DGE Lautem, 2018).

182. **Education Facilities.** In 2018, Basic Education counts with a total of 85 schools, 723 teachers and 19,641 students. On the other hand, Secondary Education only has 5 schools, 111 teachers and a total of 2,735 students (DGE Lautem, 2018).

183. **Socio-economic Conditions.** Despite being a 95% Catholic country, there is an underlying and very vast animistic culture in all the ethno-linguistic communities of Timor-Leste, maintaining institutional forms associated with the importance of the “Sacred” or *Lulik* beliefs in contemporary social life. Society and households in Timor-Leste engage with in a variety of ways, engaging in exchange relationships and customs that maintain narrative stories and founding myths, ancestral regalia and inherited knowledge, as well as landed property and ritual practices.

184. These extend to the ritual of agriculture management and seasonal monsoons, life cycle ceremonies (birth, marriage and funerals), clan group rituals of solidarity and, more importantly, as a traditional approach to land management.

185. **Physical or Cultural Heritage.** Lospalos society follows a variation albeit still in line with the general indications of those practiced in Timor-Leste, where the sacred or *Lulik* plays a central role in their contemporary social relationship and community, especially in what regards agricultural management and conservation of resources.

186. In regards to Springs and water Sources, the Lia Na'in (or traditional leader) has the core role to lead a procession accompanied and witnessed by the representative of community, local authorities, and other relevant and interested parties throughout the ritual. Offerings are usually provided before commencing the ritual according to the objective that the interested party wants to achieve. The Lia Nain will then start to pray whilst presenting the offerings to God, Ancestors and Sacred Objects. Below is an overview of the ritual processing, materials provided and list of participants during the cultural ceremony that took place in Papapa spring on the 6<sup>th</sup> October 2020.

Table 14: Cultural Ceremony Participatory and Processions at Papapa Spring

Offerings	Ritual Process	Participants
<ul style="list-style-type: none"> <li>- One egg and</li> <li>- Small quantity of rice</li> </ul>	<p>6th Oct. 2020:</p> <ul style="list-style-type: none"> <li>- The spring owner (Figure 221) found the materials i.e. one egg and small quantity of rice and put on the land besides the spring and started talking to look for spiritual acknowledge;</li> <li>- The objective is to get permission from spring spiritual owner (crocodile) to let the activity go well without any interruption. During 30 minutes the Lia nain talked to the spiritual owner;</li> <li>- After finishing there was good response from the spiritual land owner or crocodile and the land owner directly talked to the survey company to start work on pumping test for these three papapa springs (Papapa main, papapa secondary and papapa lagoon)</li> </ul>	<ul style="list-style-type: none"> <li>- Lia Nain (Land owner)</li> <li>- Chief of Aldeia</li> <li>- SMASA – Lautem Municipality</li> <li>- ADP representative</li> <li>- Local community/its representative</li> </ul>

Figure 21: Papapa Spring's land owner



187. Traditional regulations and customs in Timor-Leste also contribute to conserving the natural resources such as forests and crops, a communal protection system known as Tara bandu. It is an agreement within a community to protect a special area or resource for a period of time, usually carried out for the harvest of agricultural produce, cutting of trees or collecting of forest products, and hunting or fishing but is also currently being used to regulate social behaviour or protection of cultural locations.

188. There are several types of symbolic actions used for this practice. In agriculture, objects may be hung near or a piece of rattan tied around the trunk of specific trees or next to a garden to indicate custodianship of the resource. It is also widely believed that people who steal the goods subject to Tara bandu may suffer from an accident, misfortune or illness, while the Tara Bandu itself also provides for mediation of land disputes.

189. Lautem Municipality has numerous of physical or immobile material objects that are registered and conserved by the Secretary of State of Arts and Culture<sup>7</sup> and are widely known by their heritage value. Lospalos in particular includes several objects and sites that are immaterial and sensitive, that are protected not only by the State but also by the community itself. Therefore, during the site visit, the team made sure that the referred features were identified diligently within the distribution zones. Information was also collected with help from the local authorities for the site identification to be more efficient and accurate. All 15 locations are within 10m to 20 m of one of the borders of these assets. See Table 15 below of cultural heritage sites listed by the team and Figure 22. All sites will require approval from the local and national Culture Directorate, regarding protection during the Construction Phase.

Table 15 - List of Cultural Heritage Sites Identified in Lospalos

No.	Name of Site	Type	Coordinates	Distance from Site ROW
1.	Uma Adat Kiik Monument	Socio-cultural, heritage	8°31'17.43" S 126°59'42.18" E	Transmission Parallel to NE boundary (<10m)
2.	SD2 School	Heritage	8°31'21.66" S 126°59'41.41" E	Transmission Parallel to South boundary (<10m)
3.	Edifice of Ministry of Education	Heritage	8°31'28.75" S 126°59'40.77" E	ROW Parallel to NE boundary (<10m)
4.	Sao Paulo Church	Socio-cultural	8°31'20.21" S 126°59'47.19" E	ROW Parallel to SE boundary (<10m)
5.	National Hospital	Heritage	8°31'20.62" S 126°59'50.42" E	ROW Parallel to NW boundary (<10m)
6.	Evangelic Church	Socio-cultural	8°31'20.97" S 126°59'31.63" E	ROW Parallel to SW boundary (<10m)
7.	Centro Cultural & Uma Adat	Heritage	8°31'18.82" S 126°59'55.83" E	ROW Parallel to NW boundary (<10m)
8.	EDTL edifice	Heritage	8°31'27.61" S 126°59'42.54" E	ROW Parallel to NW boundary (<10m)
9.	Cemetery 1 – Rate Perekiki	Socio-cultural	8°30'55.64" S 126°59'15.48" E	ROW Parallel to NE boundary (<10m)
10.	SD1 School	Heritage	8°31'21.07" S 126°59'43.08" E	ROW Parallel to South and West boundaries (<10m)
11.	Mosque	Socio-cultural	8°31'25.04" S	ROW Parallel to

<sup>7</sup> The team had previously requested for data regarding to the cultural heritage sites for all the 4 Municipal Capitals of Water Supply and Sanitation Project to the National Department of Cultural Patrimony, Secretary of State of Arts and Culture. The SEAC provided the Consultant team hardcopies of lists available from current studies in which all of the referred sites are located outside the project area. Thus, site visit was conducted to fortify the said necessity for further assessment of environmental impact and monitoring plan. Minutes of meetings are provided in APPENDIX 1.Appendix 9.

No.	Name of Site	Type	Coordinates	Distance from Site ROW
			126°59'42.96" E	South boundary (<10m)
12.	Emanuel Church & Clinic	Socio-cultural	8°31'28.78" S 126°59'50.76" E	ROW Parallel to North and West boundaries (<10m)
13.	Lospalos Community Radio	Heritage	8°31'27.76" S 126°59'40.83" E	ROW Parallel to SE boundary (<10m)
14.	Monument Klub	Heritage	8°31'21.32"S 126°59'34.36"E	Roundabout crossed by 2 ROWs
15.	Cemetery 2 – Rate Kuluhun	Socio-cultural	8°31'46.18"S 126°59'54.09"E	ROW Parallel to West, North and East boundaries (<10m)
16.	UNTL	Heritage	8°31'59.11"S 126°59'51.60"E	ROW Parallel to North and West boundaries (<10m)
17.	Police PNTL Headquarter Lospalos-	Heritage	8°31'30.84" S 126°59'45.63" E	ROW Parallel to NE boundary (<10m)
18.	Uma Adat Monument	Heritage	8°31'21.45" S 126°59'45.78" E	Roundabout crossed by 2 ROWs
19.	Monument Lafaek	Heritage	8°31'21.96"S 126°59'42.73"E	ROW Parallel to South and East boundaries (<10m)

190. **Current use of lands and resources for traditional purposes by indigenous peoples.** Tara bandu also includes temporary prohibitions on resource extraction such as cutting of trees, including mangroves, and the designation of specific areas as sacred i.e. a water source or spring or a location such as Jaco Island and its surrounding reef, which are considered sacred by the local community. Fines for violations are prescribed and certain selected villagers are responsible for ensuring that village laws are followed.

#### 5.4. Site-Specific Environmental & Social Features

191. Table 16 summarizes site-specific conditions of the component locations/sites/alignments.

Figure 22: Lospalos Cultural sites within Project Area

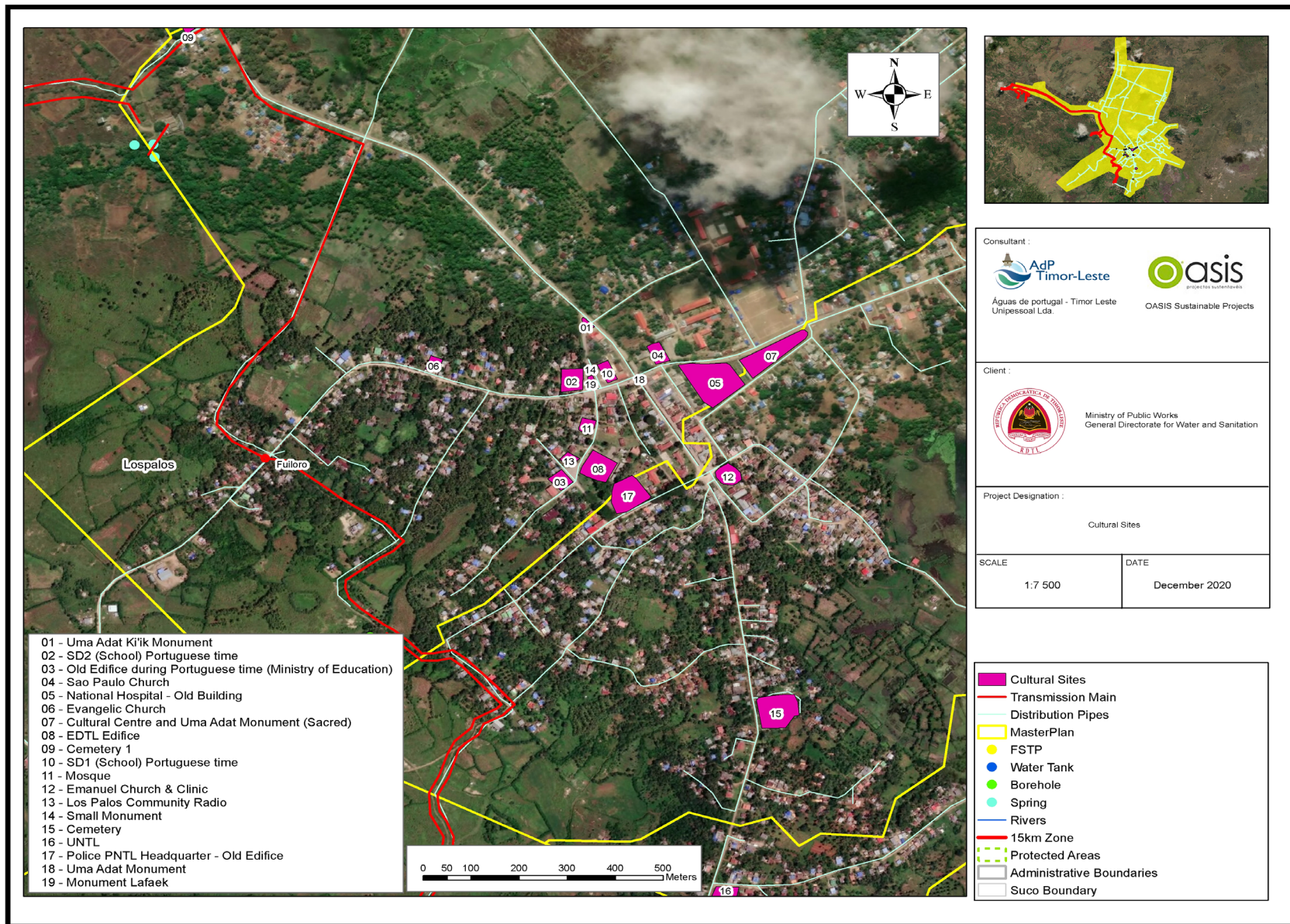
















Table 16: Project Site Environmental and Social Features




Components	Site Salient Features	Site Photographs
<b>1. Intakes</b>		
<b>A. Papapa and Puahopo spring, stream and Intake and WTP</b>		
<ul style="list-style-type: none"> <li>• 1Km downstream from Kokoho Marshland (sacred biodiversity area), the excess flow follows East to adjacent irrigation systems and through to the Lospalos city system and into the Fuloro plain and consequently into Iralalaro Lake system.</li> <li>• Located 30 meters to southwest from the WTP and access road. WTP consisted of Slow Sand Filter but is inoperable due to clogging.</li> <li>• According to SMASA technician, water has a lower debit during dry season and abundant during wet season.</li> <li>• On the East and West side banks lie the community's agriculture plots that benefit from this water source. The community also utilize water for animal husbandry and public washing/laundry purposes.</li> <li>• Puahopo and Papapa springs are considered sacred and WTP is located adjacent to the spring/lagoon system.</li> <li>• The spring has a cultural sacredness, considered <i>lulik</i> or sacred by the local community, due to fauna characteristics i.e. presence of saltwater crocodile, more than vegetation and a yearly cultural ceremony is provided by DNSA and local authorities to guarantee the continuous provision of environmental services, as per the local community.</li> <li>• Characterization of green vegetation surrounding the spring area was of a riparian area with agricultural use, with species such as taro plants (<i>Colocasia esculenta</i>), Timonius timon, were coconut (<i>Cocos nucifera</i>), banana (<i>Musa sp.</i>), seedless breadfruit (<i>Artocarpus altilis</i>), water lettuce (<i>Pistia</i>), corn (<i>Zea mays</i>), taro (<i>Colocasia esculenta</i>), mango (<i>Mangifera sp.</i>), Ipoh palm (<i>Areca ipot</i>), banyan tree (<i>Ficus microcarpa</i>), etc. The corn plantation is privately owned by locals for subsistence purposes, as well as the tendering of other consumable plants.</li> </ul>		 <p>Papapa spring tank structure</p>  <p>Papapa stream ecosystem</p>  <p>Papapa Lagoon Intake (South view)</p>  <p>Papapa WTP (Southeast view)</p>






Components	Site Salient Features	Site Photographs
<b>2. Prospection Points</b>		
A. PP 1 – Kokoho River		
<ul style="list-style-type: none"> <li>• North West of Lospalos city, very narrow road access to the location point.</li> <li>• Close to Kokoho river, connected to Kokoho marshland downstream and Papapa spring.</li> <li>• Less water during dry season. Abundant water during rainy season.</li> <li>• Agriculture activity surrounding the PP such as corn fields.</li> <li>• The prospection point is covered with green grassland, seaweed, bushes (siam weed) and some coconut trees.</li> <li>• Soil composition fully limestone.</li> </ul>	 <p>South View</p>  <p>West view</p>  <p>East view</p>  <p>North view</p>	






Components	Site Salient Features	Site Photographs
		 <p data-bbox="1255 587 1545 613">Kokoho river Southwest view</p>
<p data-bbox="184 646 743 672">B. PP 2 – Home Gully (next to Suco Headquarters)</p> <ul data-bbox="184 675 869 915" style="list-style-type: none"> <li>• North West of Lospalos city, Suco Home.</li> <li>• Inclined terrain (5%).</li> <li>• 30 meters next to the prospection point is a private land with Agriculture activities.</li> <li>• Vegetation such as bushes (predominantly invaders i.e. siam weed) and grassland.</li> <li>• 100 meters to South East is the valley where DNSA recommends for bore testing.</li> </ul>		<div data-bbox="932 672 1398 1019">  <p data-bbox="1045 1023 1163 1049">North view</p> </div> <div data-bbox="1402 672 1869 1019">  <p data-bbox="1650 1023 1759 1049">East view</p> </div> <div data-bbox="1171 1049 1629 1393">  <p data-bbox="1344 1396 1457 1422">West view</p> </div>

Components	Site Salient Features	Site Photographs
C. PP 3 – Indonesian Borehole (next to Suco Headquarters)		
<ul style="list-style-type: none"><li>• North West of Lospalos city, Suco Home.</li><li>• Existing bore field built during the Indonesia occupancy.</li><li>• Agricultural land all around the site and established cornfields 10 meters North from the existing bore field, as well as several coconut trees.</li></ul>		
		
		
D. PP 4 – Resouro road (next to Suco Headquarters)		
<ul style="list-style-type: none"><li>• Located in Suco Home heading North West to Resouru.</li><li>• Fenced agriculture plots activities both left and right side of road.</li><li>• Prospection point in the middle of the access road, with a water accumulation area (muddy road) in front of the prospection point that is in very poor conditions and difficult to traverse.</li></ul>		
		

Components	Site Salient Features	Site Photographs
		 <p data-bbox="1213 548 1587 574">South view (private agriculture plot)</p>
<p data-bbox="184 688 638 711">E. PP 5 – Be'e Moris Area (Suco Fuiloro)</p> <ul data-bbox="184 716 856 987" style="list-style-type: none"> <li>• Access via the community resettlement in Be'e Moris area, North West of Lospalos city.</li> <li>• Access road through community aldeia, small, dimensioned road, high density housing.</li> <li>• Located in the Kokoho river, downstream of Papapa stream and intake.</li> <li>• PP is 5 meters away from the community's house.</li> <li>• Surrounding vegetation is for agriculture purposes i.e. coconut trees, banana trees, teak trees and various more.</li> </ul>		 <p data-bbox="993 1084 1262 1110">Kokoho River (east view)</p>  <p data-bbox="1451 1084 1793 1110">Fruit trees and teak (south view)</p>

Components	Site Salient Features	Site Photographs	
			 <p data-bbox="989 553 1814 581">Access road via the community, 30 m before the prospection point (west view)</p>
<p data-bbox="178 581 783 609">F. PP 6 – Unnamed Area (Suco Fuiloro) (Borehole #4)</p> <ul data-bbox="178 609 877 824" style="list-style-type: none"> <li>• Located in South of Lospalos city, in a valley heading south downhill, 100 meters South to a small stream.</li> <li>• Open area with Vegetation such as grass and shrubs i.e. predominant invader Siam weed.</li> <li>• Private land with harvesting activities and <i>leucaena</i> and small number of coconut trees fencing the area (approximately 30 meters West from the prospection point).</li> </ul>		 <p data-bbox="953 979 1350 1006">Siam weed and grassland (East view)</p>	 <p data-bbox="1409 979 1877 1006">Access road, downhill direction (south view)</p>
<p data-bbox="178 1060 674 1088">G. PP 7 – Savarika II (Suco Fuiloro) Bore #5</p>			

Components	Site Salient Features	Site Photographs	
<ul style="list-style-type: none"><li>• Located in South West of Lospalos city, entering Savarika II street.</li><li>• PP is 20 meters from a small flowing creek.</li><li>• PP in a Floodplain probably due to river overflow or perhaps the emergence of a water spring.</li><li>• Coconut grove and teak to the Southwest and fenced agriculture plot to the Northeast.</li></ul>			
		Creek next to PP (southeast view)	Groundwater emerging into farmland (SE view)
			
		PP (south view)	PP (west view)
		H. PP 8 – Fuel Station (Suco Fuiloro)	
		<ul style="list-style-type: none"><li>• Located in South West Suco Fuiloro, next to the national road towards Suco Souro.</li><li>• Site is a vacant lot but fenced with some agriculture activity (small scale).</li><li>• There is a fuel station under construction, to the Southwest, bordering the PP site.</li></ul>	
PP North View	PP Northwest view		

Components	Site Salient Features	Site Photographs
		 <p data-bbox="1157 591 1646 618">Fuel station ongoing construction (west view)</p>
<p data-bbox="178 618 894 649"><b>3. Proposed FSTP location #2 - Parapata</b></p> <p data-bbox="178 649 894 763">The open dump site is a government property. No sacred or cultural sites or tara bandu in the surrounding site. Sacred site is only found in Heler, according to Horacio Sabio (a farmer), in a different water basin.</p> <ul data-bbox="178 795 894 1161" style="list-style-type: none"> <li>• Located in Parapata, Suco Fuiloro, North of the city solid waste open dumpsite i.e. Brownfield project established since the Indonesia occupancy on Government property.</li> <li>• Next to the road towards Malahara (South of Iralalaro Lake).</li> <li>• Site on flat, open grassland area.</li> <li>• Stream (year round) 120 meters away, flowing year round to NCS National Park (5Km away) and Iralalaro Lake (12Km away).</li> <li>• 0.6 km from closest community dwelling and 1.5Km from city limit.</li> <li>• Adjacent to agricultural areas to the South and Southeast (sludge reuse).</li> </ul>		
		<div data-bbox="909 646 1398 1013">  <p data-bbox="951 1013 1356 1040">Proposed FSTP site (North view)</p> </div> <div data-bbox="1398 646 1892 1013">  <p data-bbox="1503 1013 1829 1040">Northeast view – Fuiloro basin</p> </div> <div data-bbox="909 1049 1398 1386">  <p data-bbox="1014 1398 1241 1425">East view - Farmland</p> </div> <div data-bbox="1398 1049 1892 1386">  <p data-bbox="1398 1398 1860 1425">South view – Dumpsite entrance and Road</p> </div>

Components	Site Salient Features	Site Photographs
		 Solid Waste Dumpsite (NW view, S of FSTP)
		 Stream 120m from FSTP site and Dumpsite
		 Farmland South of Proposed FSTP site

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## 6. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 6.1. Overview of Impacts

192. The Water Supply and Sanitation Investment Project for Lospalos, Same and Viqueque is expected to produce numerous beneficial and negative impacts towards the environmental and social aspects due to various project activities.

193. A characterization study of existing origins and pilot well testing areas was conducted during a site visit (2 to 4 June 2020) aiming to identify specific protected biodiversity, sacred site, water usage, land status, and activities downstream and upstream and the main objective of the Assessment was to evaluate the impacts based on the characterization study and the site visits, as well as the social safeguards impacts evaluation from the Social Specialist and stakeholder and public consultations carried out during the IEE survey.

194. The potential impacts and mitigation measures assessment for each project city were assessed within the respective city IEE, based on each of the project components, namely: 1) water sourcing; 2) treatment and storage; 3) distribution networks; 4) and sanitation sector (public toilets and FSTP), and the analysis followed the project cycle (Design phase, Construction phase, Operational and Maintenance phase, and Decommissioning phase), as well as information gathered from applying the ADB REA (Rapid Environmental Assessment) checklist (see Appendix 1).

195. The assessment was an analysis of the existing situation (information gathering - using existing information) and the identification of the social, economic and biophysical resources, impacts or others that should be maintained, enhanced, prevented and/or mitigated under the project scope, providing for an identification of the biophysical and socio-economic opportunities and constraints, potential environmental “no-go areas”, red flag areas, potential environmental impacts including potential cumulative environmental impacts, potential health risks and water related risks, as well as the identification of “alongside-project” considerations which will be included in the preliminary E&S impact analysis and will seek to identify what pros and cons may exist within each of the proposed project components.

196. An environmental management plan (EMP) has been developed (see Chapter 9) to provide mitigation measures to help control and/or reduce all negative impacts to acceptable levels, presented in the form of an Environmental Management Plan (EMP) matrix, to be used by SAS (for monitoring purposes) and the Contractor (for management) prior, during and post-construction activities.

### 6.2. Impact Analysis

197. An Impact evaluation was carried out for all project components and activities by applying an evaluation matrix (see example in Table 18) and impact assessment rating applied for 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 component's present condition and the scale of impact should the impact persist, at the time of evaluation.

198. “S(+/-)” denotes a positive/negative significant impact whereas “MS(+/-)” represents moderate significance and “IS(+/-)” is insignificant. Priority should be given to significant negative impacts, emphasised in the EMP.

199. These classifications are the result of the product between “Scale of Present Condition” and “Scale of Impact”, based on the criteria in Table 17: Scales for Present Conditions and Impacts, where

present condition has three classifications, treated independently from the scale of impact, according to the present condition of the affected component. On the other hand, the scale of impact accounts for the nature of the impact whether it will have a minor, moderate or strong impact and whether the impact would be temporary or permanent.

Table 17: Scales for Present Conditions and Impacts

Scale of Present Condition	
3	Good = Sensitive Environmental/Social conditions of the location and surrounding area, with little to no impact sources
2	Moderate = Moderate Environmental/Social conditions, and with pre-existing sporadic (temporary or permanent) impact sources not related to the project.
1	Bad = Deteriorated Environmental/Social conditions, and with large numbers of pre-existing (temporary or permanent) impact sources (other than the project).
Scale of Impact	
1	<b>Minor, temporary:</b> Inside Project Boundary - Zero or minor Environmental/Social impact/damage, temporary Outside the Project Boundary - No Environmental/Social impact
2	<b>Moderate, temporary:</b> Inside Project Boundary – Release/Impact with limited Environmental/Social damage/impact, temporary Outside the Project Boundary: Minor Environmental/Social impact/damage, temporary
3	<b>Strong, temporary</b> Inside Project Boundary – Release/Impact with major damage, temporary Outside the Project Boundary - Strong Environmental/Social impact/damage, temporary
4	<b>Minor, permanent</b> Inside Project Boundary – Release/Impact with minor Environmental/Social damage/impact, permanent Outside the Project Boundary: Minor Environmental/Social damage/impact, permanent
5	<b>Moderate, permanent</b> Inside Project Boundary – Release/Impact with limited Environmental/Social damage/impact, temporary Outside the Project Boundary: Moderate Environmental/Social damage/impact, permanent
6	<b>Strong, permanent</b> Inside Project Boundary – Major Environmental/Social impact/damage, permanent Outside the Project Boundary – Major Environmental/Social impact/damage, permanent
Conclusion	
S	Significant Impact
MS	Moderate Significant Impact
IS	Insignificant impact

The product of the scale of present condition and the scale of impact is used to assess whether the impact is significant (S), Moderate Significant (MS) or insignificant (IS). Table 18 - Impact Assessment Rating, presents the matrix for the assessment of impacts based on the values for the scale of importance and the scale of impact.

Table 18 - Impact Assessment Rating

		Scale of Impact					
		1	2	3	4	5	6
presen ↑	1	1	2	3	4	5	6
	2	2	4	6	8	10	12
	3	3	6	9	12	15	18

	Insignificant (+/-)	IS
	Moderately Significant Impact (+/-)	MS
	Significant Impact (+/-)	S

### 6.2.1. OVERALL BENEFICIAL (POSITIVE) IMPACTS

200. Clean, adequate drinking water is a basic human need and developing drinking water supply facilities has numerous beneficial impacts to individuals and communities. Furthermore, when coupled to sanitation improvement, there is a substantial increase in the quality of life within the project area. Some of the major beneficial impacts of the proposed project and suggestions to achieve these benefits are described below and the numbering is related to the EMP.

201. **C3.2.1. Local Employment Generation.** This project will directly generate employment opportunities either skilled or non-skilled work for the local people. Their earnings will consequently affect the local economy, given the employment process will prioritize local people, reducing the need for immigration (S+ = Positive Significant). Recruitment of unskilled workers from affected community within the project area, in coordination with local authorities i.e. Municipality, Suco, etc, and in accordance with Timor-Leste Law, will be the most effective mitigation measure.

202. **C3.2.2. Skill Enhancement.** Employment opportunities will increase the skill of the workforce in terms of technical proficiency. This kind of enhancement will be an investment for individuals to implement in the future, as well as to augment incomes and improve their economic status (S+ = Positive Significant). The contractor must prepare a training program i.e. “on-the-job” for all workers and, equally important, training on the Environmental and Social management plan and its Mitigation Measures, particularly to create the competency, skills and abilities of all the relevant staff to ensure they are aware and apply the provisions of the EMP effectively.

203. **O3.1.1. Improved Health and Hygiene.** This project is aimed at improving water supply and sanitation to the community, improving people’s hygiene and public health and consequently reduce waterborne disease occurrence. A regular maintenance of the project’s components will provide continuous benefits to the local people (S+ = Positive Significant).

204. **O3.1.2. Women Empowerment.** Women play an important role in the family: they manage the household, bear children and expect to live a healthy menstrual cycle. Having good access to improved water and sanitation will result in a significant health improvement, reduce mortality and balance family and at an individual level, it will improve their working performance which will lead to a more advanced economical condition in the household daily life (S+ = Positive Significant).

### 6.2.2. IMPACTS IN DESIGN/PRE-CONSTRUCTION PHASE

205. The pre-construction works involve field survey and investigation, development of design and detailed drawings, carrying out cost estimate etc, as well as the evaluation of water availability and competing uses. A characterization study of existing origins and pilot well testing area was conducted during site visit (1 to 3 July 2020) for the preliminary design, aiming to identify specific protected biodiversity, sacred sites, water usage, land status, and competing activities downstream and upstream.

#### 6.2.2.1. PC1. Water Sources

##### PC1.1. Location and Sensitive Areas

##### 1.1.1. Nuisance to the biodiversity (flora, fauna, water ecosystem)

206. The Papapa/Paupopo Spring and Intake all located in a sensitive area, more cultural than environmental but nonetheless sensitive. The Papapa system has been supplying water for Lospalos for at least 40 years, pre-existing to the project i.e. “brownfield projects”, already have working water distribution infrastructure and surrounding the spring there are dwellings and housing with agricultural activities and a road within a 100m radius. The environmental assessment of these components shows

that it is not likely the project activities have significant adverse environmental impacts that are irreversible, diverse, or unprecedented and unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific and few if any of them are irreversible (MS- = Negative Moderate Significant).

207. Irrespective of this situation, it is important to apply more stringent forms of implementing the 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 Papapa Lagoon Intake and Springs.

208. While there are no official lists of Mitigation Measures to be applied by Projects in Sensitive areas, previous measures in past project should be the closest applicable measures for the construction phase, such as (but not limited to) the following:

- a) The contractor, his employees or subcontractors are prohibited to carry out the following activities:
  - 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.
- b) Trees that will be cleared should be inspected for nesting birds prior to cutting. The nest will be transferred carefully to another tree safe from project activities. Trees with nesting birds near the trees to be cut will be marked and the direction of fall should be inclined away from the trees with nests. If chicks are already present felling must take place, where possible, > 50 m distance from the nest. All activities must be supervised and decided upon by a Forest Guard or representative of the National Directorate for Protected Areas (DNAP).
- c) A detailed layout of vegetation clearing will be presented by the contractor before is carried out. Clearing will be limited in accordance to the project layout/design and the extent will be limited with relevance to the project. The Contractor is prohibited to deface, paint, mark natural and pre-existing vegetation even if of no relevance to the project.

209. All tree species will not be harmed and will be protected throughout the lifespan of the project. If an endangered tree is to be cut, under special circumstances and technically justified, DNAP must approve the felling and guarantee that the planting of the similar tree species at a quantity to be determined will be conducted at pre-defined and approved site.

## **PC1.2. Use of Water Sources (springs and boreholes)**

### 1.2.1. Available Water for all users

210. Consumers in Lospalos have received insufficient water supply due to an increasing urban water demand and degradation of the existing water infrastructures over time, hindering optimal operation and distribution of water from a limited number of natural water sources available. The high incidence of illegal connections in the system also results in a weak and slim water distribution to each consumer (S- = Negative Significant).

211. Preliminary production yield of the sources was carried out in October 2020 (in equivalent conditions to the end of the Dry Season) of proposed boreholes and existing springs through bore and pump testing. The water demands versus October 2020 water flow investigation results, suggest that,

under these numbers, and pending a long-term monitoring program, the current Papapa source may produce enough flow to contribute to the requirements of the distribution system for the bigger part of the Dry season. Given the technical limitations of the WTP treatment capacity, the overflow will be substantial for social use (agriculture and other) and especially an ecological flow (suggested at 30% of Wet Season Spring flow (November to May) and 10% of Dry Season Spring flow (June to October)) which, due to this limitation, is calculated at 47% for ecological purposes, with much more volume in the wet season to cover the requirements for the whole ecosystem.

212. Therefore the increase in supply will be obtained from the refurbishment of the distribution network (which will significantly reduce system losses from leakage), and the installation of a new metering system (which will improve leak detection and cost recovery). This is expected to both improve the supply of water to the consumer and reduce the decline in groundwater from over-abstraction.

213. However, if the Dry season spring flow reduces naturally, to guarantee the distribution system maintains service to Lospalos consumers throughout its lifetime, it is necessary that a Monitoring system is put in place to monitor daily flow in all operational sources and help estimate water production variability and decreases that may require other sources i.e. north and south system boreholes, to come online to support the water distribution, especially in the dry season. These borehole systems must also have a well monitoring program to be able to track aquifer performance.

#### 1.2.2. Water User needs between Environment, Communities and Water Distribution System on water consumption

214. The issue of water benefits in the source area communities has been raised by local authorities and Chefes de Suco, during the public consultation. This, together with a mixed urban/rural setting that has several different water consumptions beyond human consumption alone i.e. agriculture and rice fields, etc, downstream of nearly all the existing and future sources, has brought discussions regarding source sustainability for all users, not only for the targeted urban areas, although no indications were given that water was scarce to the point of depletion (S- = Negative Significant).

215. As seen in Table 4, preliminary numbers identify that the Papapa and Bores #2 and #5 are currently sufficiently productive (60 lps) and able to contribute entirely to the current water demand (42.3 lps) but falling under the 2040 horizon year demand numbers (88.4 lps).

216. With this deficit and the requirement for new boreholes to come online, water resource is one of the major public assets, which is a vital need for human well-being, animals, plants, environments and ecosystems and can be the difference between life and death, and between bounty and poverty. Therefore, proper planning and management of water is crucial.

217. For Lospalos, mitigation measures must be: a) the definition of a sustainable water balance and feasible/fair environmental a flow for shared sources that takes into account the seasonal variability of the project area (Wet Season 30% of mean monthly flow / Dry Season 10% of mean monthly flow).

#### 1.2.3. Social and cultural disruption due to Tara bandu and lulik/sacred areas

218. Several National Laws i.e. Cultural Framework, Base Law for Environment, etc, as well as the requirements of the ADB SPS 2009 ADB are the project guidelines to protect and mitigate impacts to related cultural segments, as a project that involves, exploits, or associates with any type of natural resource use. However, the project also needs to follow customary Law regarding localised cultural customs applied by the community, aiming at the natural preservation, sustainability of the natural elements and social balance.

219. It is important to understand that almost all springs, new and currently in use i.e. Papapa/Paupopo Spring and Stream area, are and have always been involved in and have a spiritual importance to the community, under cultural/animistic protection (S- = Negative Significant).

220. Therefore, it is important to involve the *lia na'in*, i.e. cultural leader, and communities to lead in the preparation of cultural ceremony preparation i.e. "opening" and Tara Bandu for authorization to i.e. yearly ceremonies at Papapa/Paupopo springs or while conducting investigations for existing and proposed water sources, their use, continuance of use and/or cultural/natural protection of the source water resource, to avoid conflicts and distribution interruptions.

221. Project activities during the construction phase will be monitored by personnel assigned by 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.

222. 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.

### **PC 1.3. Protection of the water source for distribution purposes**

#### **1.3.1. SMASA borehole over extraction**

223. There may be the risk of the SMASA boreholes and adjacent private wells drying up due to over extraction for the purpose of the Distribution network boreholes.

##### ***1.3.1.1. SMASA Protection Area***

224. In areas where the project has been successful in testing and sourcing water for the system i.e. Borehole Prospection Areas, dwellers in the immediate area may now be prepared to drill private boreholes in their land now that they know there is available water where before there was none, which may diminish the available water yield for distribution and hinder the Government's investment and considerable budget for the project's water sourcing, treatment and distribution (Ind S- = Indirect Negative Significant).

225. It is important that MPW and SMASA initiate 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.

### **6.2.2.2. PC2. Water Treatment and Storage**

#### **PC 2.1. New Disinfectant and Storage Systems**

226. The storage and treatment of the water predicted activities encompasses generalised impacts, especially those related to the Water Distribution Network i.e. minor civil construction works of Water Reservoirs. However, there are a few design phase impacts and mitigation measures worth noting for this project component.

##### **2.1.1. Waterborne Diseases towards consumers; and 2.2.1. Insufficient treated water due to poor infrastructure and lesser capacity of the water tanks**

227. Insufficient water storage capacity and increasing water demand due to population increase and requirements for 2040 supply levels has pushed this project to upgrade the proposed storage infrastructure in order to avoid interruption of quality water distribution to the current and future registered consumers (MS- = Moderately Negative Significant).

228. In general, the upgrade of the design of new treatment plant and storage facilities that apply a disinfection, chlorination or Calgon dosing system to the Water sources with lower quality and which are not in compliance with WHO standards, becomes the necessary mitigation measure to avoid waterborne disease towards consumers (S- = Negative Significant).

### **6.2.2.3. PC3. Water Distribution Network**

#### **PC 3.1. Identification of Cultural Heritage sites**

##### 3.1.1. Impairment of Cultural heritage properties

229. Cultural heritage refers to sites, structures and remains of archaeological, historical, religious, cultural and aesthetic value. Its identification and examination is helpful in understanding the significance of a site, according to its aesthetic, historic, scientific and social value. Several cultural heritage, touristic and other sensitive sites have been identified and mapped within the Project Area (19 in total) during the field visits in the Inception and Preliminary Design Phase, which are within <20m from and may be impacted by the construction activities, if precautions are not taken (S- = Negative Significant).

230. 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 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. In case a new cultural/historical heritage site is identified during the construction, the Contractor will notify the SMASA-Lospalos and follow the same procedure regarding these sites.

#### **PC 3.2. Project Preparation for Health & Safety and O&M**

##### 3.2.1. Risk to Health and Safety of Workers - General

##### 3.2.1.1. Health & Safety Plan

231. Workers will be exposed to many threats during construction works such a range of accidents in site due to earthwork activities, dehydration, communicable and transmittable diseases, exposure to hazardous substances, poor sanitation, poor handling and/or operation of the equipment.

232. The preparation of the Contractor for the project requirements is extremely important to guarantee that impacts are minimised and community perspective of the construction management is maintained at a "high" (S- = Negative Significant).

233. At contractor choice, there must be a requirement in the Bid Contract that compromises the contractor to develop a Health and Safety Plan, taking into account all occupational health and safety requirements, such as: i) Install cautionary signage; ii) Ensure sufficient visibility and safety instructions in the work areas; iii) Construction site free of drugs and alcohol; iv) Use of personal protection equipment (PPE) by all workers, etc.

234. It is also fundamental that the contractor provides the name, details of qualifications and experience of the person on the contractor's team who will be responsible for the environmental compliance requirements of the EMP.

235. The Health and Safety Plan must be in accordance with National Law, IFC EHS 2007 and ADB SPS 2009 guidelines to ensure the following:

- a. Train all site personnel on environmental health and safety;
- b. Provision of PPE and proper utilization;
- c. Health and safety training and toolbox meeting, including the communicable diseases and operational system of the equipment;
- d. Maintain records of reports and complaints concerning health & safety occurrences
- e. Installation of sick bay in the base campsite including recruitment of medical staff (intermittent, on-call) for primary response prior delivering to the hospital or closest clinic;
- f. Emergency plan and collection of all contacts in Lospalos-city related to accident response;
- g. COVID-19 prevention and response (as per C3.3.7 and Appendix 2 of the EMP).

236. The contractor will provide all handling and safety equipment to all his/her staff to ensure their safety during construction works. The employer shall permit only those employees qualified by training or experience to operate equipment and machinery.

#### *3.2.1.2. HSE Manuals and documentation in Tetum*

237. This project is concentrated on rehabilitation of existing structures only and therefore there are minimal projected negative effects on construction, which will only occur as a result of the proposed activities, since improvement works are generally aimed at improving benefits to surrounding communities.

238. However, workers and Communities will be moderately exposed to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. and this impact may be enhanced if manuals and signage are not properly prepared and understood (S- = Negative Significant).

239. Catalogues, manuals and signage shall be prepared in Timorese with sketches on community health and safety and potential occupational health and safety impacts to help explain and avoid occurrence of said impacts.

#### 3.2.2. Risk to Health and Safety of Community – Traffic Accidents and Communicable Diseases

240. While the volume of vehicles that will <sup>[17]</sup><sub>SEP</sub> be operated from the simultaneous construction fronts at project component sites may not be very large, the condition and characteristics of the roads in Lospalos City i.e. narrow access roads and particularly in market areas, can create traffic jams and hinder the mobility of people, good, and services and people may be exposed to safety hazards from the constricted road space. Communities are also a potential actor in the spreading of communicable diseases (S- = Negative Significant).

241. Apart from the applicable mitigation measures, proper coordination with relevant local authorities, social service institutions and businesses should help mitigate these impacts.

242. Therefore, mitigation measures to be taken are as:

- a. Prepare a Traffic Management Plan;
- b. Proper traffic or road signage and warning signs with good quality of shining barriers to restrict access to the site and minimize road accidents to the local community;
- c. The Contractor to ensure that all vehicles that may be required to pass through villages and transport equipment and materials are operated safely without endangering these communities;
- d. Protect the community by applying the H&S Plan and distancing them from physical, chemical or other hazards associated with sites under construction and decommissioning;

- e. Disseminating information through flyers or others regarding communicable and transmittable diseases (including COVID-19 prevention and response (as per C3.3.7 and Appendix 2 of the EMP)).

#### **6.2.2.4. PC4. Sanitation (Public Toilets & FSTP)**

##### **PC 4.1. Improvement of Water Distribution**

###### 4.1.1. Increase of Groundwater pollution from poor sanitation in Lospalos city

243. With water availability at home comes the increase of and the need to treat the resulting wastewater (S- = Indirect Negative Significant).

244. Lospalos will thus have a two-step wastewater treatment system, consisting of 1) a first stage with a septic tank system at each dwelling; and 2) a second stage treatment through the FSTP supplied by the Government. However, for the wastewater to be treated in an optimum way and to avoid soil and water contamination in the urban area, it is recommended that a widespread communication plan and program is prepared to influence construction license-related Government entities and the public to upgrade existing or construct their new septic tanks in the households according to the standards provided by MPW.

##### **PC 4.2. Location for Proposed FSTP**

###### 4.2.1. Several impacts due to FSTP project nature

245. In terms of location, the requirements to select a proposed FSTP site considered the specific social, environmental and technical aspects, such as: a) Flat terrain; b) Far from the community's residence; c) Land status to be preferred as Government land; d) No landslide and flooding risk in the selected site; e) an existing water medium as the receptor of the final effluent; f) good road access; g) within range of agricultural areas; and h) outside of and/or no impact to sensitive environmental areas. The choice of the best location with the least possible associated impacts is, in itself, the mitigation measure (S- = Negative Significant).

246. These conditions are aimed to avoid several impacts i.e. inundation and erosion, traffic accidents, emergence of odour and noise towards the nearby community. In particular, instead of occupying unnecessary space in a landfill, the treated dried sludge from the FSTP may contribute to agriculture production as compost and the existing good access to the FSTP avoids impacts from the construction of new road access.

###### 4.2.2. Possible location in Private Land

247. At present, albeit all effort put forward by the DED consultants, there is no clear indication on land ownership. Copies of the preliminary locations, with the layouts of the infrastructure to be built (reservoirs, FSTPs, WTPs, etc) have been submitted both to the Department for Land & Property both at Municipal and National Level and MPW also pursued this issue without success.

248. The social component has conducted a land due diligence survey of the affected land and property on the 8<sup>th</sup> December 2020, in order to substantiate future compensations, if required. Members of the community who were present during the visit confirm reported that the area is public land and that it has no claimants or active users (IS- = Negative Insignificant).

249. Local SMASA officials have accompanied DED consultants to each propose site and provided unofficial information about land ownership, majority of which to be government owned. In the instances

that the alleged landowner was private there was a verbal agreement that he/she donate said site for the benefit of the community but there is no evidence of the specific sites or if there was a formal agreement in writing.

250. While almost all the mitigation measures in PC 4.2.1 were met, in terms of location choice, there was a possibility that the chosen location (Site 1) was included in private land. At least three (3) FSTP possible locations were identified and proposed due to their technical and environmental characteristics, but due to the reasons below, Option 2 was the location chosen and decided upon by MPW:

- a) Sites 1 in Aldeia Resouro/Suco Home – overall presented all the requirements except for the sight being in a grazing area at the top of a pristine watershed area (“greenfield”) surrounded by the edge of a forest area, as well as closeness to a community area., while the access road is not established and would need to be rehabilitated, increasing the impacts, therefore not a feasible option; and
- b) Site 2 (the chosen site) in Parapata/Suco Fuiloro – overall presented most of the required conditions, although there is still doubts regarding site’s status, if it is government or Private land. Is close to the pre-existing city solid waste dumpsite (brownfield project) (S- = Negative Significant).
- c) Site 3 in Aldeia Trans/Suco Fuiloro – This site is located on a slopped area with sedimentary and erosion prone soil conditions, traversing Agriculture plots which have yet been defined as Government or private land and therefore is not a feasible option.

251. However, Site one being in Public Land renders it unrequired to include mitigation measures for this project activity.

### **PC 4.3. Sludge Disposal from FSTP**

#### **4.3.1. Soil and Groundwater Pollution**

252. Faecal Sludge Treatment entails that the wastewater at the end of the process must be of a level that it will not impact the receiving environment after treatment, namely surface, groundwater or soil (S- = Negative Significant).

253. Designing an effective sludge treatment is key to achieve this objective and thus, taking into account the constraints in Timor-Leste regarding operation and maintenance or human resource know-how, the project has proposed to implement a system of earthen lagoons for biological treatment of the sludge, with Primary (2+1 facultative lagoons) and Secondary (3 aerobic lagoons) treatment. At the end of this process, the effluent will be directed to a final treatment, namely an irrigation cropping area with a vegetative and permeable soil medium in order to absorb the last remaining nutrients in the effluent and devolve the water up to an acceptable standard into the receiving environment.

### **6.2.3. IMPACTS IN THE CONSTRUCTION PHASE**

254. As mentioned previously, the construction activities will likely produce more negative impacts towards environmental stability and the local community. Other than the pipe laying works (new and/or rehabilitation), the rest of the 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.

255. These are all general impacts of construction in urban areas, but it is important to remember there may be serious impacts that jeopardize private and public properties if the contractor does not implement the proposed mitigation measures. Therefore, methods of mitigation have been developed and suggested, adapted to Lospalos city, in order to prevent negative impacts, and are all established in the EMP.

256. The above-mentioned impacts, albeit in different scales, are common to all four project components i.e. water a) sources; b) treatment and storage; c) distribution; and d) sanitation, in regards to the construction of all these infrastructures. Therefore, in this subchapter (and in the EMP), they are described in general in Section C3. Water Distribution, since this component is the most significant regarding the construction phase, while only the specific impacts to the other components will be described in each of their subchapters.

### **6.2.3.1. C1. Water Sources**

#### **C1.1. Inadequate protection off intake/bore structures during rehabilitation**

##### 1.1.1. Intake/bore overflow to cause erosion

257. The spring intake and boreholes will require minimal protection during their rehabilitation so as to avoid any overflow into unplanned areas, and possible erosion of adjacent areas (MS- = Moderate Negative Significant).

258. It is important that the intake/bore well has adequate land for perimeter fencing and connect to a temporary drainage that shares the overflow with pre-existing neighbours, thus avoiding any unnecessary erosion or impact to adjacent communities.

##### 1.1.2. Socio-Cultural Impact

259. Just as in PC 1.2.3, the spiritual opening of the construction activity is extremely important to avoid conflicts with the local communities, particularly in locations as sacred as the springs (S- = Negative Significant).

260. Thus, it is important to involve the lia na'in, i.e. cultural leader, and communities to lead in the cultural ceremony of i.e. "opening" for the continuance of use and/or cultural/natural protection of the source water resource, to avoid conflicts and distribution interruptions.

### **6.2.3.2. C2. Water Treatment and Storage**

#### **C2.1. Upgrading activities to Water Treatment and Storage**

##### 2.1.1. Worker exposure to disinfection chemicals during installation

261. During construction there may be some risk of contact with the disinfection chemicals, on the part of the workers that are installing and/or storing the first batch of disinfection equipment and materials (S- = Negative Significant).

262. For this activity in particular, it is fundamental that the contractor provides and obligates the use of PPE to handle these substances, such as i.e. mask, gloves, and safety boots and restrict access to a minimal number of authorised persons.

### **6.2.3.3. C3. Water Distribution**

#### **C3.1. Induction of Contractor**

##### 3.1.1. Enhanced impacts because of lack of knowledge of the EMP

263. Clear understanding of the EMP, by the Contractor, is paramount to avoid enhancement of potentially adverse impacts in the project area (S- = Negative Significant).

264. Therefore, after selection of the Contractor, SMASA and the PMU will meet the Contractor's HSE responsible staff prior to contract commencement and on-site to explain and confirm understanding of the EMP conditions. After SMASA and the PMU are confident that the contractor understands and can comply with the EMP, SMASA will give the "go-ahead" for the Contractor to commence work. During construction, the Contractor will work according to the requirements of the project EMP.

#### **C3.2. Construction Activities – Macro Benefits**

265. See 5.2.1. Overall Beneficial Benefits

#### **C3.3. Construction Campsite**

##### 3.3.1. Campsite Location, Community and Landslide Risk

266. Typical construction camps cannot be established on the sides of the roads of the alignments as most of the sites are surrounded by housing, private property or buildings and therefore there isn't sufficient space to accommodate the campsite (MS- = Moderate Negative Significant).

267. Thus, basecamp and work site camps sites are proposed to be established in central locations, preferably in Government land that are flat and landslide and floodplain risk free and shall not be located near settlements, water supply intakes or sites that affect local access to drinking water. All sites must apply mitigation measures to prevent impacts to surrounding community and environment i.e. wastewater, waste, dust, noise, etc. After use, sites shall be cleared and restored to status as they were and, if required due to their surroundings, to near natural or stable conditions with vegetative cover.

268. There is also a need to perform an assessment of compliance of proposed camp with the workers' camp siting and management - mitigation measures for H&S and COVID-19.

##### 3.3.2. Wastewater and soil/water contamination

269. Throughout the duration of the project, the campsite will house many personnel and facilities in the campsite will need to be available for those who do not lodge in the area. A suitable latrine is a primary facility for a construction camp, which also brings wastewater issues (S- = Negative Significant).

270. Good housekeeping practices, maintenance of latrines, and protection from surface runoff provides favourable hygienic conditions for the workers. This will also prevent the accumulation of flies in the area, which are vectors for transferring food-borne illnesses.

271. The latrines must include a proper septic tank design (at a minimum) and should be located in an area at least 30 m from any domestic well, to minimize the risk of contamination or downhill of wells within 30 m distance. It will be elevated to prevent surface water from flooding the sanitation facility especially during rainy season.

### 3.3.2. Water Source for Campsite may compete with Community Sources

272. While some water distribution exists currently in Lospalos, the campsite may require to be established in an area where the distribution system does not exist yet. The communities in Lospalos, under these conditions, may experience shortages in water supply during the dry season and thus sourcing water for the campsite locally from tap water/pipe line/boreholes may create conflict with the adjacent community (MS- = Moderate Negative Significant).

273. The campsite should establish a water tank large enough to provide for the campsite requirements, to be filled with water purchased to SAS- Lospalos from authorised water sources. Also, purchasing sufficient potable water supply in the form of water litre bottles and/or gallon containers will ensure the health safety of the workers and prevent disturbances to the communities in their utilization of public water from taps.

### 3.3.4. Storage of Hazardous chemicals, waste and construction materials may bring spills, fire hazards and H&S problems

274. Improper storage and handling of construction materials may have the potential to impact the surrounding areas (S- = Negative Significant).

275. Properly stored chemicals will minimize human contact, thus providing a healthy environment for the workers. Fuel and lubricants for construction machinery will be stored as delivered in steel drums in the work areas and properly handled to prevent contamination of nearby water bodies. Allocating appropriate containment for hazardous materials will reduce vulnerability to fires and health effects of exposure to chemicals like cement and hydrocarbon-based products.

276. In the event of conflagration, fire protection facilities such as fire extinguishers, water tanks with available buckets and stock of sand to cover fuel spill will be provided. Also, containing flammable materials in a fire-resistant enclosure will prevent the spread of fire and provides additional fire safety measures for the workers and the public.

277. When identified, Asbestos Containing Materials (ACMs) i.e., used pipes must be handled under controlled conditions (with gloves, mouth and eye protection and under moist conditions so as to not break the materials and risk inhalation. The contractor must coordinate with the DNCP on solution for deposition of these materials. The CEMP must include ACM management plan to detail how to identify, remove, and safely dispose of ACMs. When Asbestos Containing Materials (ACMs) are identified:

- (i) First confirm ACM status. Send a carefully extracted and properly wrapped sample to an approved laboratory for testing.
- (ii) Cordon off the area, control access, and provide clear signage of the ACM risk.
- (iii) Provide all staff with correct PPE:
  - Clothing -> personal protective clothing to prevent skin contact / long sleeve + disposable.
  - Respirator -> min P3 respirator, or N95 Dust mask.
  - Goggles, gloves and safety boots.
- (iv) Identify, mark, delineate the ACM that will be removed and do-not mix ACM with non ACMs.
- (v) Avoid cutting or breaking ACMs if possible. If cutting is required wet the ACM surface and add duct tape to reduce the risk of dust generation.
- (vi) Decontaminate equipment prior to and after use.

- (vi) Supervision + Sampling material (if any left), make sure all asbestos material has been removed. Prepare Site Clearance Report.
- (viii) Removed asbestos must be contained, wrapped or sealed, and placed into removal bags or bins and labelled. Use only durable container: double bag polythene, drum or bin.
- (ix) Asbestos waste should not be disposed of with other wastes. In countries where asbestos use is regulated, there will be special or hazardous waste disposal facilities. If special facilities are unavailable, asbestos waste should be sealed in double lined bags and disposed of at a secured waste site and kept separate from other types of waste. Work with the local government to identify a suitable and safe site and ensure that a record is kept of the location. If Asbestos is properly contained, buried, and remains undisturbed it will remain safe and pose no further environmental or health risk.

As there are no direct guidelines under Timor laws and regulations on ACMs refer to international standards and guidelines:

- US Environmental Protection Agency, Asbestos page: <http://www.epa.gov/asbestos/>
- WHO Occupational Health Publications, Asbestos: [http://www.who.int/occupational\\_health/publications/asbestosrelateddiseases.pdf](http://www.who.int/occupational_health/publications/asbestosrelateddiseases.pdf)
- The East Timor Transition Administration (ETTA), in cooperation with AusAid prepared a guideline on asbestos risk reduction; "Guidelines on Maintenance, Handling and Disposal of Asbestos Materials and Asbestos Waste" - September 2000. This provides: (i) guidelines on the maintenance of asbestos-cement products; (ii) guidelines on the handling of building rubble and other material containing asbestos; and (iii) guidance for the siting and management of asbestos disposal sites.

278. Materials for the works i.e. sand, gravel and cement, fuel and lubricants, will be planned duly to be hauled directly into the work sites and utilized as work progresses, with all haul trucks covered with tarpaulin, especially when hauling aggregates and sand.

### 3.3.5. Non-hazardous Solid Waste Improper handling and storage and vector diseases

279. Implementation of a Solid Waste Management System throughout the duration of the project will improve hygienic conditions of the workers. A clean environment is less vulnerable to disease carrying insects and less likely to be a source of health complication (MS- = Moderate Negative Significant).

280. Minimisation and proper handling and storage of solid waste in the campsite will maintain a pleasant environment for the workers and the local communities. Keeping non-hazardous waste in closed bins will prevent luring in scavengers such as rats, dogs, pigs and wild animals that could displace waste in the campsite.

281. Proper disposal of solid waste to authorized dump sites/landfills, referred and identified by the SMASA-Lospalos or DNCP-Lospalos will ensure that waste is not disposed in random areas of the forest where it may have implications to wildlife and local communities.

282. Also important is the inclusion of mitigation measures for COVID-19, in the form of a COVID-19 response plan, to comply with country-specific COVID-19 risk management regulations and directives including Government rules and guideline.

283. Conduct workplace risk assessment to identify low, medium or high exposure risk to COVID-19. Prepare an action plan for prevention and mitigation of the spreading of COVID-19. At a minimum, 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 and PPE and inform workers of its correct use.

### 3.3.6. Food for construction personnel may compete with food supply for the local communities

284. To ensure that workers do not interfere with local food supply, adequate food supply will be provided by the contractor, sourced from local vendors (S- = Negative Significant).

285. This will also discourage poaching of wild animals and of communities' livestock grazing freely in the forest. In addition, prohibiting poaching will protect local *fauna* and livestock of the communities.

### 3.3.7. COVID-19 transmission risks between workers and community in Camp and Work sites

286. Construction Camps and work sites and access roads will necessarily mean OH&S risks not only to construction workers, but also to people living and working around the sites. These risks not only come from a range of activities including the use of heavy machinery, excavation and trench work, earth moving, and use of chemicals but also the risk of transmissible diseases i.e. sexually transmitted diseases or the more current COVID-19, which may likely increase in the community if there is a significant influx of migrant workers (S- = Negative Significant).

287. It is important that mitigation measures are put in place that help the contractor minimize or prevent these occurrences. Information dissemination is extremely important for the management of the site regarding these diseases but COVID-19 has been the recent focus due to the ease of contamination. To help prevent and mitigate this threat, the Contractor will have to implement a COVID-19 Management Plan (see Appendix 14 for more details) that focuses on (but not limited to) the following major tasks:

- 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.
- 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.
- 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 washbasins and sanitizers available at entry, break area, and washrooms. Regularly clean and disinfect.
- Provide PPE and inform workers of its correct use.
- Health surveillance and insurance.
- 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.

### **C3.4. Construction Materials**

#### 3.4.1. Sand and Stone Extraction and disturbances to environment

288. Although most of the trenching will reapply the excavated soil from pre-existing alignments, there is still a need for a percentage of the trench to in-fill with sand and gravel for the cushioning of the pipe bed and support the top layer asphalt. This extraction activity can disrupt natural land contour, soil erosion, loss of vegetation, scouring of riverbeds, ponding, water logging or water pollution (S- = Negative Significant).

289. The Contractor will request licensing/authorisation for all extraction sites from the necessary authorities (ANPM), under MPW supervision. The extraction activities for these materials must be done to the quantities required by the project only. The MPW weekly supervision will allow regulating the extent and volume of extraction based on the current conditions of the quarries and/or rivers (sand extraction) and allow authorities to monitor and ensure the quality and good condition of the extraction sites, ensuring that extraction activities will not have social or ecological disturbances, and that the quantities of extracted sand and stone conform to the project specifications, which will also reduce the generation of spoils in the construction site.

290. In such instance where additional sand and stone will be required, it should be based on technical reasoning, intended solely for the development of the project components. All non-established extraction sites/borrow pits must be restored maintaining natural contours and vegetation.

### **C3.5. Construction Work Front: all Infrastructure (Inlet / Tank / WTP / Water pipes / FSTP)**

#### 3.5.1. Servicing and Fuelling of Construction Equipment and spills and pollution

291. Hydrocarbon based products are toxic to humans and straying wildlife upon prolonged exposure and exposure to high quantities. It is also a possible source of fire (S- = Negative Significant).

292. Define rules from using unmaintained vehicles and ensuring that all equipment is in good condition prior to operation minimizes the likelihood of leaks and accidental spills. Prohibiting equipment and vehicle with leaks and causing spills prevents the accumulation of toxic contaminants in the forest, and minimize the probability of bush fires, thereby maintaining a safe environment for wildlife and local communities.

293. Maintenance and repair of vehicles such as washing, repairing leaks, changing parts etc. should be done in the central base campsite, confined within a designated area. This area should have a concrete surface or lined with an impermeable surface (ex. plastic) with built drainage to contain wastewater contaminants. The drainage may be built as a subsurface drainage for direct treatment. Otherwise, the drainage should channel wastewater to an infiltration trench system for treatment of wastewater constituents (hydrocarbon and metals) prior to infiltration to the subsoil. A fuel secondary containment must be available in the event of fuel spills and Removable Well Cap for monitoring and sampling purposes.

#### 3.5.2. Excavation, Cutting and Filling and safety hazards to Public and workers

294. Construction sites, especially those with trenching, have a high risk for low height/high impact accidents for workers and the community (S- = Negative Significant).

295. Placing adequate visual signage in excavated, cut and filled areas will reduce safety risk of the workers and the public. Installation of light reflecting road signs will provide safety measures for people

and vehicles accessing the road during the night time. Vivid and readable Warning signs maintained on sites of construction, especially haphazard zones will inform public of danger sites and caution to take precautions. This will reduce the likelihood of construction and road accidents.

### 3.5.3. Stockpiling and Storage of Construction materials and dust, water runoff damage to existing utilities, buildings and drainage blockage

296. Improper storage and handling of construction materials may have the potential to contaminate the surrounding areas (S- = Negative Significant).

297. Periods of high wind events may disperse stockpiles, generating airborne dust particulates, particularly during dry season. Covering stockpiles with impermeable material will minimize the generation of fugitive dust or wastewater runoff in the surrounding areas. Where possible, it should be stored in the campsite, otherwise utilized at once when stored on-site. Easily accessible storage areas will minimize interferences to water runoff into drainage and the movement of vehicles and personnel in the campsite and will allow fast transport of materials.

### 3.5.4. Excavation, Cutting and Filling and Soil Erosion and Land Disturbance

298. Excavation activities have the potential to cause soil instability, erosion and silt runoff especially during wet season, and spoil materials from earthwork activities that are not being managed properly can disturb the construction work and/or traffic, and decrease the aesthetic and economic values of the area. This resulting activity may also impede the access to the community's houses and other buildings (MS- = Moderate Negative Significant).

299. Mitigation measures to be taken should be: a) Proper backfilling trenches; b) Earthworks targeted for dry season as soil erosion vulnerability is high during wet season, thus, stockpiles (sand, cement and aggregates) will not be situated at or near steep areas; c) Exposed soil will be stabilized and re-vegetated to prevent further soil erosion; d) Provide for temporary access and diversion to dwellings and buildings where these are impeded, to avoid traffic accident or others.

### 3.5.5. Construction and Noise Disturbance to surrounding communities and sensitive areas

300. The project will include heavy machinery and vehicles activity during this phase, such as demolition works, movement of trucks and equipment, earthworks, concrete mixing, loading and unloading construction materials. These types of activities may have a potential impact in noise-sensitive areas i.e. residential or buildings such as government, health care or educational facilities. Noise level will be done in adherence to WHO Community noise level guidelines (S- = Negative Significant).

301. The Contractor must implement a Noise Management System with the following Mitigation measures: a) Limit and/or no unnecessary engine idling duration in construction area, as well as use of power horns; b) Reduce speed limit in the work site and all road-worthy project equipment must not circulate above 40 Km/h in residential areas and 50 Km/h in urban areas; c) Construction Monday to Friday (7:00 am to 7:00 pm), Saturday (7:00 am to 1:00 pm if inaudible at residential premises), No construction works during night-time (7pm to 7am), Sundays and Holidays; d) No construction works on a particular time wherein cultural and religious practices are carried out.

### 3.5.6. Construction and Dust (Air quality decrease) to the community

302. No major air quality concerns are projected to occur during the project implementation as the planned works require small scale and not much equipment, confined excavation to be undertaken and it is not projected to result in a significant increase in particulates matter in the area, only dust generation which can affect the respiratory and eye systems (S- = Negative Significant).

303. The Contractor must apply an Air Quality and Dust Management System with mitigation/control measures such as watering and sprinkling of the excavated ground surface, to suppress dust from becoming airborne (at least twice a day or whenever visual inspection/monitoring or GRM complaint require immediate dust suppression), especially required frequently during dry season and when working near residential and built up areas. Covering stockpiles will protect them from wind and will contain light particulates to the surface. Minimising the movement of vehicles to 40 km/h in residential and 50 Km/h maximum in urban area will also reduce the generation of fugitive dust.

### 3.5.7. Construction and Impact on Ecological Resources

304. During the implementation for the rehabilitation project, attention must be given to protect and minimize negative impacts on environmental sensitive areas and ecosystems, or the natural environment. Overall, the project area is in urban area and the trenches and trenchless works will not have direct impacts since the work will be done within the ground adjacent to the road (ROW) or confined to the planned area of construction. Nevertheless, the project only has 1 locations that is deemed sensitive (see PC1.1.1.) and should other areas be encountered during the construction activities, the contractors must ensure to establish a Sensitive Areas Management Plan to make sure no impacts occur in this regard (S- = Negative Significant), namely vegetation and trees removal are avoided and no fauna is destroyed.

305. However, if some of the construction works must forcefully remove roadside trees under the supervision of the NDPA and SAS-Lospalos, the contractor is required to compensate with trees replanting and re-vegetation. It is also important to limit noisy activities within these areas, in order to stabilize the fauna's mobility, and restrict permanent campsite location, clearing, parking, and movement of heavy vehicles and equipment stockpiling.

### 3.5.8. Impacts on Socioeconomic Resources, Infrastructure, Utilities and Cultural Sites

#### 3.5.8.1. Reducing impact on established Businesses activities and others

306. Large numbers of shops, businesses, industries, and other economic activities may be affected by the network improvement works, as most of the components are located in an urban area, with ROWs in roadways, although the work will be carried out on individual short lengths of the network, thus the period of construction in each section area will not last long.

307. No major impacts will be expected on the economy of the city or its citizens given the installation of distribution pipes will be conducted by trenchless methods as much as possible, which require small-scale excavation, conducted the road in right-of-way (RoW), not requiring land from private owners. Additionally, the proposed FSTP is located far from the community's households and commercial buildings.

308. Nevertheless, there can be economic impacts if roads have to be closed for short periods and customers are unable to gain access to shops, or if trenches are constructed near the sides of roads, and customers are impeded by the presence of trenches, excavation, workers and machineries. Resulting losses in income are expected to be small (or inexistent) and short-lived (S- = Negative Significant).

309. Applicable mitigation measures would be planning and making available temporary access ways to all businesses and activities affected and, in extreme cases, determine compensation to the affected business that have justifiably been impacted and demonstrate reduction of income due to the project's direct construction activities.

#### 3.5.8.1. Reducing impact on established Businesses activities and others

310. Cultural sites and infrastructure can be impacted if the constructor does not apply caution to the construction ROW (S- = Negative Significant).

311. Constructor must follow the precautionary measures and rules in the Construction Protection License (see PC 0.5.2) and his/her own Safeguard Plan (see PC3.2.1) for each site, in order to avoid any impact and/or degradation of these sites.

### **C3.6. Construction Work Front: all Infrastructure (Inlet / Tank / WTP / Water pipes / FSTP)**

#### **3.6.1. Site clean-up and rehabilitation of locations**

312. The project should endeavour to return the construction sites to their original state, where possible, in order to guarantee that the constructed infrastructure blends with its surroundings and does not impact communities or the environment (MS- = Moderate Negative Significant).

313. The contractor must remove all his/her materials, facilities, etc, as the completion of the project components occur. Excess rocks and sand as a result of excavation activities are not to be dumped next to surface waters and left prior to departure and proper coordination with local authorities must be done of appropriate sites where mass load are needed. This had to be spread in natural looking manner and left in a stable state.

314. At campsites, besides all equipment, all evidence of the project being there must be retrieved and the latrines and septic tanks must be filled with a soil mixed of dry plant matter soil prior to departure.

#### **6.2.3.4. C4. Sanitation**

All construction activities for this component are reflected in 6.2.3.3. C3. Water Distribution.

### **6.2.4. IMPACTS IN THE OPERATION AND MAINTENANCE PHASE**

315. The operation and maintenance phase is a stage where the constructed facilities are ready to be used and how SMASA, as the responsible agent, is going to manage them properly so that they can function accordingly with the O&M manual as a foundation for all the related procedures. The EMP will guide SMASA with some provided mitigation measures aiming to minimize or inhibit possible impacts from occurring. This too, enables SMASA to resolve the anticipated issues as fast as possible.

316. Various activities in this phase generate both positive and negative impacts originally come from each component of water sources, treatment and storage, distribution up to sanitation which are described below.

#### **6.2.4.1. O1. Water Sources**

##### **O1.1. Protection of the Water Source Quality**

317. The existing condition in the Papapa water source in Lospalos is concluded as not well protected and according to the field observation, the upstream and surrounding area of Papapa system has intensive human activities such as agriculture or housing areas with no proper sanitary infrastructure, as previously cited in Chapter 3.2.3. along with figures of existing private toilet.

318. Given the circumstance that the existing conditions needed to be upgraded with more advance designs and programs to maintain a good quality of potable water for the community's consumption, therefore, it is mandatory for the SMASA operators to be duly consistent on implementing programs as mentioned below as part of mitigating such impacts.

### 1.1.1. Declining of the Water Source Quality

319. As the population number ascends, there will be more houses built adjacent to where the water sources are located (upstream) as the community's main target, especially when the sanitation facilities in each household are built inadequately. The more intense human activities intervention in that specific area, the more polluted the water quality will be. The said impact is likely to be indirect significant (IS-).

#### *1.1.1.1. Implementation of Upstream Watershed Protection Programs*

320. Protecting the upstream zones and area encompassing the water source such as restriction to slash and burn activity, animal husbandry, other typical deforestation activity, irresponsibly disposing household chemicals, etc. Information also needs to be disseminated to the community regarding to watershed protection in order to expand awareness which can thus trigger them for the implementation, promptly as possible. The responsible agent i.e. SMASA and Municipality should be able to encourage the local leaders such as Suco Chiefs, Aldeia Chiefs, and also the community to take part in this program.

#### *1.1.1.2. Improvement Program for all Existing and Future Dwelling Sanitary Infrastructure*

321. Community in the district either in the urban, semi-urban, or rural areas, particularly the low-income family, are proven to scarcely own sanitation infrastructure of septic tanks with any further preliminary treatment process and desludging activity. It is considered very crucial because the untreated sewage that's being generated from the households would flow directly to the water bodies and even to the ground, which can then cause water and soil contamination. The presence of water stored in the ground is easily to be impacted with this sort of condition mentioned above.

322. Improving the existing and future private sanitary facility is also part of the Watershed protection program aiming to conserve the underground water volume and its quality. The such program that can be offered and applied for is to promote the SMASA septic tank design template to the community in a comprehensive way, but also to mainly focus on the community surrounding the water source and other upstream watershed area.

#### *1.1.1.3. Involve the Lia Na'in and Communities for Cultural Ceremony Preparation and Tara Bandu Protection of the Source*

323. The programs mentioned above will not be successfully attained if they are not fortified by the establishment of Tara Bandu (local regulation) and the cooperation and involvement between the local Lia Na'in with the community. The local community and its culture play important contribution on managing the resources, although SMASA will be the one responsible for all the requirements to prepare for the Cultural Ceremony.

## **6.2.4.2. O2. Water Treatment and Proposed Storage**

### **O2.1 Mishandling of Chlorine**

324. Water quality tests to Lospalos Source water have shown that some intakes are commonly contaminated by E. Coli and Total Coliform contamination. To ensure the potable water conveyance to the consumers and due to the design analysis, 2 out of 7 water tanks in total to be reconstructed will be designed with treatment facility i.e. disinfection type by injecting Sodium Hypochlorite into the proposed tanks with stored water.

325. After the construction phase, the SMASA operators will still have to encounter some risky tasks e.g. dealing with operating chemical hazards which subsequently may threaten the workers' health and safety. The impact of chemical exposure is adverse and significant (S-) towards the workers and some mitigation measures should be seriously taken into account, as described below.

### 2.1.1 Health Hazards towards the Operators

326. When it comes to mishandling of hazardous substance, the impact will directly and solely effect on the workers. Chlorine, hypochlorous acid and hypochlorite ion exposures can result in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting.

#### *2.1.1.1. Ensure Proper Storage and Handling Practices for Chemicals*

327. Chemicals either they are imported or not, should be placed properly in an indoor warehouse, avoidance of sun exposure and room temperature control, in order to maintain the chemical composition in its original state, and diverting fire and explosion from occurring.

#### *2.1.1.2. Ensure the Knowledgeable and Skilled Person is in Charge of Chlorine Handling*

328. Operators still need to be provided with training skills with simulation performances and equipment if any, in order to improve their capacity in the working field especially on handling the Chlorine.

#### *2.1.1.3. Ensure use of PPE while Using Chemicals*

329. Workers or operators are obligated to use PPE as part of HSE procedures during working hours. Facemasks, safety boots & jackets, gloves and goggles are examples of equipment that workers must wear to protect themselves from any undesirable accidents.

330. Supervisor needs to do monitoring in each of the water storage location and do registry of workers who are or are not in compliance with the usage of PPE, as a mechanism for the workers working performance and their consistency.

## **6.2.4.3. O3. Proposed Distribution Network**

### **O3.1. Sound Operation of Clean Water Distribution System**

#### 3.1.1. Improved Health and Hygiene

331. This project is aimed to improve water supply and sanitation sectors to the community. This project will result in improvement of local people's hygiene and public health and thereby reduce the waterborne disease. A regular maintenance of the project's components will provide continuous benefits to the local people. The impact is therefore direct in nature, local in extent, high in magnitude and long-term in duration (S+).

#### *3.1.1.1. Proper Operation of the Distribution System*

332. This mitigation measure is aimed on providing an adequate and reliable supply of safe water to its users. Operation includes monitoring the system state, running the system and enforcing policies and procedures.

### **O3.2. Drinking Water Supply System**

333. Monitoring activity conducted by operators is to ensure the water distribution components are operating properly and consequently can guarantee the necessity to the users in terms of quantity and quality of water. Although, there will be certain impacts expected to occur, similar as other water supply projects e.g. pipe leaks and bursts, and changes in the water quality due to natural phenomena, inadvertent negligence or non-incompliance of O&M manual.

334. Nevertheless, this phase will not anticipate any illegal connections in the sources and other locations because mitigation measures are already established in the design phase in terms of water source protection of the rehabilitated intakes and boreholes area, and additionally water pipelines are designed to be laid under the ground, along the road ROW. However, impacts that are constituted in the EMP matrix, particularly regarding the water delivery system, are described below along with their mitigation measures.

### 3.2.1. Delivery of Unsafe Water

335. This refers on the diminishing of the water quality and volume with a rating impact of moderate significant (MS-) because they can be quickly mitigated and somehow the duration will only be temporary without causing any acute effect on the environment and public health.

336. The water quality that is affected depends on the activities upstream contaminating the immediate area of the sources and also pipe leaks along the distribution line.

#### *3.2.1.1. Prepare Operations and Maintenance Plan*

337. The referred manual is prepared by the selected Contractor for this project and should provide detailed information on the related matter. The O&M manual will then be used by the SMASA as a guideline during operating and maintaining the quality of the facilities from impairments.

#### *3.2.1.2. Implement a Water Quality Control Program (WQCP)*

338. The WQCP should be drafted based on the requirements of Decree-Law no. 31/2020 – Water Quality, in order to ensure the system monitors and distributes safe drinking-water to prevent contamination of water sources, to treat water, to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets in Timor-Leste, and to prevent re-contamination during storage, distribution and handling of drinking-water.

#### *3.2.1.3. Monitor Water Quality*

339. The SMASA as the responsible agent should plan its sampling schedule for water quality testing as per Decree-Law no. 31/2020 – Water Quality, specifically under the requirements of Annex II of said regulation, daily at each WTP exit and monthly in all sampling points defined in the WQCP.

### 3.2.2. Detection and Repair of Leaks and Pipe Bursts

340. Pipe bursts are commonly happened in the water distribution systems. Detection of pipe burst events usually comes from direct visual observation or customer report, although this sort of method is not efficient and time-consuming. Leaks and pipe bursts should be solved accurately and quickly to reduce water loss and further damages to the pipes (MS- = moderately negative significant).

#### *3.2.2.1. Ensure Leak Detection and Restoration Time is Minimized to the Extent Possible*

341. To mitigate leaks and pipe bursts, there should be an advance design with time-efficient method for burst detection techniques either equipment-based method or software-based methods. Not to mention that giving trainings to the workers in regards to implement those methods is also essential.

### 3.2.3. Excessive Algal Growth in Tanks

342. The presence of algal in reservoir can affect in deteriorating water quality because it releases toxins that often lead to several disruptions e.g. health concerns, water taste and odour problems. Water that is contaminated with algae can endanger the whole water supply system, since not all water tanks or reservoirs will be installed with treatment facilities. This kind of impact is likely to be moderately significant (MS-).

### *3.2.3.1. Water Tank Maintenance and Cleaning Schedule*

343. Mitigation measures to be taken: a) Close Water Tanks All the Time; b) Clean Reservoirs as per the O&M Schedule.

## **6.2.4.4. O4. Sanitation (Public Toilets & FSTP)**

### **O4.1. Sanitation Facilities (Toilets & Sludge Disposal Site)**

344. Community toilets are to be used by the public, with numerous people coming in and out every day to utilize the facility. The absence of operation and maintenance is a frequent cause of failure of service. This fore-sought general impact also applies to primary treatment on-site septic tanks of each household.

#### 4.1.1. Contamination of Land or Waterways due to Overflow of Septic Tanks and the Uncontrolled Dumping of Sludge

345. Contamination of land and waterways and dumping of Sludge may generate odours and nuisance to the community and the environment such as health problems and soil contamination (S- = Negative Significant) if not properly addressed.

##### *4.1.1.1. Further Septic Tanks Design*

346. The design of the septic tanks' dimensions should be able to ensure maximum retention to avoid overflow of the wastewater. In addition, routine maintenance and health of the system should be associated in one part of the process to have a smooth operational progress and sustain the facilities in good condition, such as scheduling and implementing de-sludging and cleaning activity regularly. Septic tanks will be emptied at the required frequency of minimum every 3 years. Households will also be educated to reduce the likelihood of septic tanks overflows and uncontrolled dumping of sludge.

### **O4.2. Operation of FSTP**

347. Sludge is composed of by-products collected from different household on-site septic tanks to the wastewater treatment process. It contains both compounds of agriculture value and pollutants, which usually consist of heavy metals, organic pollutants and pathogens.

#### 4.2.1. Soil and Groundwater Contamination

348. Uncontrolled nutrient introduction in soils from the mistreatment effluent from the FSTP is a major environmental concern. Transport of the nutrients through the soil may eventually lead to groundwater contamination significant impact (MS- = Moderate Negative Significant).

##### *4.2.1.1. Treated Dried Sludge Distributed for Farming Activities and Effluent to Irrigation Cropping Area*

349. Treatment and disposal of sewage sludge and effluent are major factors in the operation of the specific faecal sludge treatment plant. Treating sludge before final disposal is aimed on reducing its volume and stabilizing the organic materials, nitrogen, phosphorus and potassium. The treated dried sludge will derive from the maintenance cycles of the primary treatment and may be contributed for surrounding agriculture activities, while the effluent will be discharged into a horizontal planted gravel filter for final treatment before absorption into the soil medium. Stabilized sludge does not have an offensive odour and can be handled without causing nuisance or health hazard.

#### *4.2.1.2. FSTP Malfunction*

350. There are also certain environmental risks from the failure of properly operating the FSTP, most notably disposal of untreated faecal material or incompliant wastewater pollutant levels to soil and groundwater, which can damage human health and contaminate both soil and groundwater.

351. It will be important therefore that the SMASA follows O&M manuals and ensures all the components are maintained as per specifications, and establishes a procedure to routinely check the operation and integrity of the FSTP, particularly when beds are (nearly) full and during the rainy season, to implement rapid and effective repairs where necessary.

352. Additionally, and while downstream from the FSTP site no dwellings or activities were identified, there is a need for frequent effluent testing (3 monthly) just before the horizontal planted gravel filter, to guarantee that the facility's effluent complies with the wastewater guidelines in effect in Timor-Leste.

353. In the event of a malfunction and sludge maintenance must be carried out, then the SMASA must coordinate with the Municipality of Lautem and the Municipal Environmental Directorate to follow their instructions regarding a final safe and correct sludge deposition location.

#### 4.2.2. Community and Occupational Health & Safety risks of the FSTP infrastructure

354. Uncontrolled access and proximity of both staff and community may bring increased risks for their health and safety (MS- = Moderate Negative Significant).

##### *4.2.2.1. Health & Safety Manual as Part of the Operation & Maintenance Manual*

355. The contractor will be required to prepare an Operations & Maintenance Manual that includes a Health & Safety Manual and at commissioning, provide a signed commitment from the operator to a) understand and b) comply with IFC Environmental Health and Safety guidelines (2007), as well as provide for and conduct training programs for workers in workplace safety of FSTP operation and safety orientation trainings including regular safety drills for workers. It is also important that the operator provides appropriate and adequate PPE for all operational staff and workers (including regular training and drills on the use of PPE and other emergency equipment).

356. Equally important is the need for the operator to implement fencing and appropriate signage to prevent public access to the FSTP infrastructure, as well as cover as much standing water as possible and regularly treat for mosquitoes during seasons of high incidence of mosquito- borne diseases such as dengue.

#### 4.2.3 Odour Occurrence

357. It is important that the FSTP is performing as designed and constructed so that odour perception around the plant is within acceptable limits. This odour may also occur due to the frequent dumping of truckloads of faecal sludge in and around the FSTP (IS- = Negative Insignificant).

358. However, the FSTP is located in the flat area and with distance from the highway about 150 meters and 140 from the rivers. Additionally, the closest dwelling is 400m away from the site.

359. Nevertheless, good practice will be instituted in the FSTP operation procedures and proper maintenance of the facility must be upheld, including avoidance of pools of dirty stagnant waters and spills in the FSTP area and surroundings i.e. access road.

360. Odour monitoring will be practiced by the FSTP operators and maintain procedures for recording and managing complaints from the public, as well as consult with residents to identify record odour or nuisance issues – preferably date, time and duration of odorous events.

#### **6.2.5. DECOMMISSIONING PHASE**

361. The decommissioning phase is the dismantling of the project's facilities due to the incapacity of the facilities to be operating. The SMASA 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.

## **7. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION**

### **7.1. Consultation and Participation under the IEE process**

362. The IEE procedure for Category B projects, under Decree-Law no. 05/2011, requires the proponent to undergo a full Public Consultation. Likewise, the project follows ADB's Safeguard Policy (ADB, April 2009), which requires borrowers/clients to perform meaningful consultation with affected people.

#### **7.1.1. Lospalos Public Consultation (12<sup>th</sup> October 2020)**

363. The ADB IEE (ADB, 2020) undertook Public Consultation for Lospalos in the Lautem Municipal Cultural Centre on the 19<sup>th</sup> of November 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.

364. The stakeholders presented their concerns, suggestions and recommendation for the project implementation, focussing mainly on issues such as Coverage area of the project, Design of the public Toilets, Water distribution system that does not cover or serve all villages, Misuse by consumers (and direct impact on water availability in the distribution system and Cultural sites and new constructions within project area (see Appendix 5 for Lospalos Public Consultation Notes).

365. In general, during the consultation, no issues of significant social concern or objections about the proposed project were raised and stakeholders were positive about the proposed project and expecting for this project to be implemented as soon as possible, since they are facing crucial issues on water for daily consumption and don't want to repeat uncertain schedule for water delivery into the households in the future.

Figure 23: Lospalos Public Consultation; participation of the Local Leadership and Other Stakeholders



#### 7.1.2. Suco Social Public Consultation (8<sup>th</sup> December 2020)

366. In addition, 2 other Public Consultations were carried out under the social component in Suco Fuiloro and Suco Home (8<sup>th</sup> December 2020). 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. Suco community deliberated on the location and the layout of the future Public Toilets. The list of participants is displayed in Appendix 15.

367. The Suco community members present deliberated on the location and the layout of the future Public Toilets. A layout, with gender segregation, was generally accepted by the community.

368. The community acknowledges the lack of proper water supply and sanitation system. Specifically for the water component it is a time consuming activity to transport water from the source to the household. To make potable, water is then boiled before being used which entails in an additional cost for fuel (mainly wood).

369. It was observed that the community in general is willing to extend their cooperation as the activities are proposed to enhance the infrastructure service levels and their living standards. Thus, they are supportive of a paid water distribution system and the use of Public Toilets. The creation of a water users association that would support SMASA teams is also generally accepted. The community welcomes the opportunity to be part of the project either in the construction phase or in the operation and maintenance stage, reinforcing the role of SMASA employees.

370. The results of these Public Consultations further confirmed the expectations and worries stated in the previous general 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.

Figure 24: Suco Fuloro Social Public Consultation



Figure 25: Suco Home Public Social Consultation



## 7.2. Consultation in upcoming Project Phases

### 7.2.1. Consultation during the SEIS/EMP Domestic process

371. As required by the national environmental licensing law, the PDC, together with the MPW and PMU, will conduct a Public consultation regarding the SEIS/EMP of the project, with the objective to receive final comments and questions regarding the project's environmental safeguards, from the

communities and their local leaderships. A tentative agenda for said meeting is below: (i) general overview of the projects; (ii) project benefits, positive impacts and outcomes; (iii) potential environmental impacts from the project; (iv) proposed measures to mitigate them; (v) existence & implementation of the SEIS Environmental Management Plan (EMP) that includes environmental mitigation and monitoring; (vi) the construction phase and the obligation of the Constructor Environmental Management Plan (CEMP); (vii) existence and observance of a grievance redress mechanism during project implementation; and (viii) compliance with Timor-Leste and ADB environmental safeguard policies.

### **7.2.2. Consultation during Construction**

372. Prior to the start of construction, the contractor, MPW and the PSC will conduct information dissemination sessions and request support of the local community leaders to encourage the participation of the people to discuss the various environmental issues. At each Aldeia, focus group meetings will be conducted (lead by MPW and the constructor) to discuss and plan construction work 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.

373. Constant communication will be established with the residents and communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. The Municipality, together with MPW and PSC will organize public meetings and will appraise the communities about the progress on the implementation of the EMP. 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.

### **7.3. Information Disclosure**

374. For disclosure and information purposes, a copy of the IEE/SEIS/EMP with the Executive summary translated into Tetum (local language) will be distributed to SMASA and one copy to each of the Chiefs of Aldeia, for local public access to information, creating wider public awareness. As MPW does not have an active website, additional copies will be made available to the public, on request.

375. An Electronic version of the IEE/SEIS/EMP in English and Executive Summary in Tetum will be placed in a website indicated by the MPW (ADB, Consultant or other) and the stakeholders will be made aware of the grievance register and redress mechanism.

376. Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plans. Prior to construction start, MPW will issue a Notification on the start date of implementation.

377. A board showing the details of the project will be displayed at the construction site for general public information.

## 8. GRIEVANCE REDRESS MECHANISM

378. The Grievance Redress Mechanism's main objective is to provide a transparent mechanism for the stakeholders and public to voice their social and environmental concerns or issues linked to the project, arising during the pre-construction, construction and development of the Project, with the objective of ensuring that concerns and potential conflicts can be satisfactorily addressed.

379. 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 (See Appendix 2) by the Contractor as described below on the Grievance Procedure.

380. 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.

381. 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.

382. Every grievance shall be registered by the Contractor through a carefully documented process. The MPW will also be involved in the clients' complaints and establish a good network with the chefe de 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.

### 8.1. Grievance Procedure

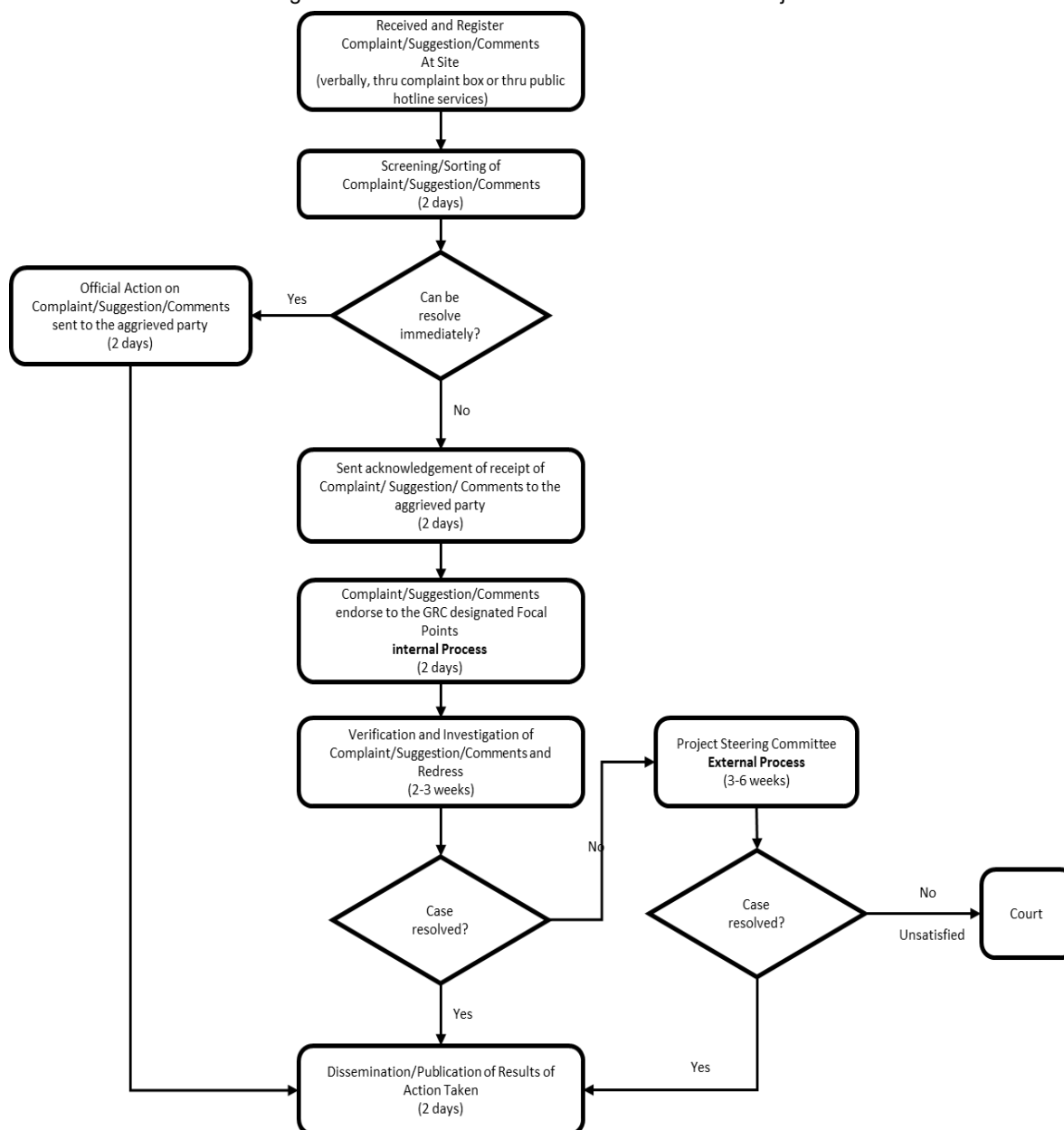
383. Grievance regarding the process can be redressed at two levels, which are during the construction, and during Operation of the project, following the process in Figure 226.

384. 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.

385. 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.

386. The contractor representative will inform the MPW representative of the occurrence and review the nature of the complaint with MPW to make sure it is environment related. MPW 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 26 : Grievance Redress Procedure for the Project



387. If the grievance requires local mediation, MPW 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. MPW must follow up on the corrective measure, within the agreed timeframe.

388. If the Contractor has not taken any satisfactory corrective action within the defined timeframe, MPW will take action in accordance to environmental legal and contractual clauses in effect.

389. If the Grievance cannot be solved at the project level, by MPW, the case will be referred to the court of law to adjudicate the matter.

390. Complainants can also file a direct complaint to MPW, under their official Department for Client Support (Address: MPW, Caicoli, Dili; Telephone: 331 71 57), who will follow up directly with the project complaint registry at the construction level.

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

## 9. ENVIRONMENTAL MANAGEMENT PLAN

392. The Environmental management plan (EMP) ensures all the project activities are in compliance with technical designs, environmental legislation (GovTL, 2010) and guidelines applicable in Timor-Leste and within the ADB SPS 2009. The activities shall be undertaken responsibly without decrementing or jeopardizing the environment and social aspects. Objectives of the EMP are:

- (i) To provide a feasible and practical working tool to enable the measurement and monitoring of environmental performance on-site;
- (ii) To guide and control the implementation of findings and recommendations of the environmental assessment conducted for the project;
- (iii) Detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- (iv) To ensure that safety recommendations are complied with.

393. The EMP is based on the type, extent and duration of the identified environmental impacts for Lautem Municipal Capital, and has been prepared following best practice and by reference to the ADB Safeguard Policy Statement (2009). It includes detailed requirements for:

- a) Mitigation and monitoring measures;
- b) Institutional arrangements and project responsibilities;
- c) EMP budget for implementation;
- d) Capacity building and training requirements;
- e) Public consultation and information disclosure;
- f) GRM including timescale and responsibilities.

394. A detailed EMP is provided for the project in a separate document, where the detailed mitigation measures are included per each of the activities and Project Phases.

395. The overall responsibility for EMP implementation and compliance with loan assurances lies with the Implementing Agency, the Ministry of Public Works (MPW). The MPW will establish a Project Management Unit (PMU) based in Dili, responsible for general project implementation with the support of a Project Supervision Consultant (PSC).

396. The costs for the EMP implementation are summarised in Table 19 and are regarding the construction period (4 years) and an initial 2 year operation phase (under the contractor support), of a 14 year total operation phase up to the year 2040:

Table 19: EMP Estimated Cost

	Particulars	Stages	Unit	Total Number	Rate (\$)	Cost (\$)	Cost covered by:
<b>A</b>	<b>Mitigation Measures</b>						
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
	<b>Subtotal (A)</b>					<b>\$72,000</b>	
<b>B</b>	<b>Environmental Monitoring</b>						

	Particulars	Stages	Unit	Total Number	Rate (\$)	Cost (\$)	Cost covered by:
<b>Measures</b>							
1	Water Quality (upstream and downstream of Papapa Spring and FSTP Parapata)	Construction	(as in DL31/2020)	16	\$700	\$11,200	Contractor
2	Noise (if complaint at sensitive/residential location)	Construction	dBA	4	\$1,500	\$6,000	Contractor
3	Water Quality (FSTP discharge before Gravel Filter)	Operation	(as in IFC Guidelines)	8	\$500	\$4,000	Contractor
<b>Subtotal (B)</b>						<b>\$21,200</b>	
<b>C Capacity Building and Training</b>							
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	Contractor
3	Grievance Redress Mechanism	Before and during Construction	Training Session	2	\$2,000	\$4,000	Contractor
4	Environmental Protection	Before Construction	Training Session	1	\$1,000	\$1,000	Contractor
5	Environmental Monitoring	Before Construction	Training Session	1	\$1,000	\$1,000	Contractor
6	FSTP Operation and Maintenance	Before and during Operation (2 years Contractor)	Training and on-the-job Sessions	3	\$12,600	\$37,800	Contractor
<b>Subtotal (C)</b>						<b>\$61,800</b>	
<b>TOTAL (A+B+C)</b>						<b>\$155,000</b>	

397. A summary of the key functions for project implementation and therefore environmental safeguards is presented in Table 20:

Table 20 – EMP general roles and responsibilities

Role	Abbreviation	Location	Summary of Functions
MPW and Project Management Unit	MPW/PMU	Dili and Lospalos	Responsible for general project implementation and reporting; clearance of environmental due diligence documents; approval of the CEMP.
Project Supervision Consultants	PSC	Dili and Lospalos	Project final design and implementation, support and capacity development Engineering supervision for all construction and reporting; environmental safeguards trainings; training to be provided by the PSC to contractors on EMP requirements; updating of environmental safeguards due diligence documentation under implementation; review of the CEMP for approval by the PMU; review of monthly contractor monitoring reports; supporting the PMU with the environmental safeguards inputs for the quarterly progress reports to ADB, as well as for the semi-annual environmental monitoring reports to ADB.
Project Design Consultants	PDC	Dili and Lospalos	Prepare and finalize PD, SEIS and EMP Reports based on the IEEs and EMPs, for domestic Licensing purpose.
Contractor and respective Environmental, Health and Safety Officer	Contractor / HSE officer	Lospalos	Preparation of the CEMP for approval of the PMU; Mitigation measures implementation and reporting, capacity building and training as per Table 19; monthly reporting to the PSC/PMU; implementation of environmental safeguards corrective action measures.
Local and National Authorities	ANLA / Chefes Suco	Dili and Lospalos	Review, comment, approve and monitor the SEIS and EMP compliance and implementation;

Role	Abbreviation	Location	Summary of Functions
	and Aldeia		Supervise Contractor employment mechanism, community awareness programs and Grievance Redress Mechanism.
Asian Development Bank	ADB		Review and clear IEE/EMP, Bid documents, and SEMRs and any resulting corrective action plans. Review missions. Due diligence documents disclosure on the ADB website.

## 10. CONCLUSION AND RECOMMENDATIONS

398. This IEE study was carried out at the planning stage of the project, where primary and secondary data have been used to assess the potential environmental impacts in a comprehensive manner. This report provides a picture of all potential environmental impacts associated with the Project and recommended suitable mitigation and monitoring measures.

399. Assessment of the project characteristic and details with the existing conditions revealed that, although the project traverses a relative number of residences along its route, the proposed works will be very temporary and of short duration, as well as the impacts.

400. The EMP (already prepared as a separate document so as to be able to go as part of the bidding documents, subject to a final round of updating once the domestic environmental license has been secured, and any other final DED changes), if implemented as directed, will mitigate impacts on the natural environment and affected people to an acceptable level. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, quarry or burrowing sites, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

401. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). Noise, dust/emissions or indeed impacts on the natural hydrology or ecology are not anticipated and all the predicted impacts that have been identified can be mitigated and managed to minor levels.

402. During operation, the potential delivery of unsafe water can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as prescribed in the National Drinking Water Quality Standards Directives.

403. The mitigation measures, integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to Contractors. Hence, will not be difficult to implement.

404. The key parties for mitigation measure implementation are the construction contractors and the MPW. The implementation of the EMP will be closely monitored and reported on by the relevant stakeholders in the project.

**APPENDIXES**

## Appendix 1. Rapid Environmental Assessment Checklist and Preliminary Climate Risk Screening Checklist

### Rapid Environmental Assessment (REA) CHECKLIST - WATER SUPPLY

#### Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

<b>Country/Project Title:</b>	Timor-Leste / Water Supply and Sanitation Investment Project
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<b>Sector Division</b>	LOSPALOS
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SCREENING QUESTIONS	Yes	No	REMARKS
<b>A. Project Siting</b> Is the project area...			
▪ Densely populated?	<input type="checkbox"/>	X	Lospalos is sparsely populated with population density of 42.4 persons per square kilometre
▪ Heavy with development activities?	<input type="checkbox"/>	X	No
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	✓	<input type="checkbox"/>	The TA team identified close to 11 important monuments/buildings, 2 Areas of worship i.e. churches and cemeteries and 6 Monuments within the Distribution Area, that lie close to the proposed rehabilitation alignments within the urban city.  Additionally, the Papapa and Paupopo, currently under use for the Distribution system, are considered as sacred, requiring a yearly traditional ceremony for the use of the springs.
• Protected Area	✓	<input type="checkbox"/>	Some parts of the project 15 Km Diameter border overlaps slightly the Nino Konis Santana National Park border (GR 8/2007). However, the proposed water distribution system components, the network and water sources (existing and new) are planned to remain at the center of the 15Km and thus at a reasonable and safe distance from the Park boundaries.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> <li>Wetland</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A small pond adjacent to the Papapa Spring holds small wetland features and some fauna i.e. crocodile, tendered by the local community. In addition, flood plain areas in both side of the road are also identified in Lulira area, southeast of the distribution system.
<ul style="list-style-type: none"> <li>Mangrove</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project location is within the upper range of the Iralalalo Plateau, not at the coast
<ul style="list-style-type: none"> <li>Estuarine</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project location is within the upper range of the Iralalalo Plateau, not at the coast
<ul style="list-style-type: none"> <li>Buffer zone of protected area</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	TBC with National Directorate for Protected Areas. Besides the Regulation that creates the Nino Konis Santana National Park (GR 8/2007) there hasn't been published (to date) any specific Buffer Zone limits beyond the Park Border.
<ul style="list-style-type: none"> <li>Special area for protecting biodiversity</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Several interesting Biodiversity areas were identified in the Lospalos Area during the Characterisation Visit i.e Kokoho and Heller Marshlands. However, none are within the influence areas of the Project Components.
<ul style="list-style-type: none"> <li>Bay</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<b>B. Potential Environmental Impacts</b> Will the Project cause...			
<ul style="list-style-type: none"> <li>pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The network in Lospalos is currently supplied by limited surface water and ground water. The Water at the source already has some microbiological contamination before project proposed treatment.
<ul style="list-style-type: none"> <li>impairment of historical/cultural monuments/areas and loss/damage to these sites?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<p>The TA team identified close to 10 important monuments/buildings, 8 Areas of worship i.e. churches and cemeteries and 4 Monuments within the Distribution Area, that lie close to the proposed rehabilitation alignments within the urban city.</p> <p>Additionally, the Papapa and Paupopo, currently under use for the Distribution system, are considered as sacred, requiring a yearly traditional ceremony for the use of the springs.</p> <p>The future EMP will include measures to mitigate the impacts during the construction phase to comply with the protection measures defined in the Cultural Policy/regulations of Timor-Leste.</p>
<ul style="list-style-type: none"> <li>hazard of land subsidence caused by excessive ground water pumping?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	Land subsidence are not related to the existing boreholes. The aquifer in Lospalos is composed of thick disaggregated limestone. The occurrence of land subsidence is related to aquifers of fine-grained sediments. For this reason, this phenomenon is not expected to occur.
<ul style="list-style-type: none"> <li>social conflicts arising from displacement of communities ?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No displacement of communities is predicted for this project.

SCREENING QUESTIONS	Yes	No	REMARKS
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	✓	<input type="checkbox"/>	There are concerns of drying up existing private wells due to extraction from the 5 new pilot-boreholes and this must be confirmed during borehole tests. It should be noted that the private boreholes in these conditions are located in urban areas included into the future supply system.
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	✓	<input type="checkbox"/>	Raw water is planned to be treated prior to distribution, both for pathogens and calcium carbonate. Resulting quality of treated water will comply with the Timorese Legislation and WHO standards for drinking water, improving the already contaminated water sources.
▪ delivery of unsafe water to distribution system?	<input type="checkbox"/>	X	The rehabilitated network will provide treated water through the substitution of old for new pipes, preferably under the city urban road Right of Ways (ROWs) to prevent illegal connections and consequent leakages and contamination.
▪ inadequate protection of intake works or wells, leading to pollution of water supply?	<input type="checkbox"/>	X	The intake will be secured and only accessible to authorized persons. It will also be regularly monitored to ensure only treated water is distributed
▪ over pumping of ground water, leading to salinization and ground subsidence?	<input type="checkbox"/>	<input type="checkbox"/>	TBC - The existing water extraction rates are small to the also small-scale of the project. However, given there are concerns of drying up existing private wells due to extraction and this must be confirmed during existing and new borehole tests to understand if there is this particular risk. The location of the future wells is not compatible with the increasing of salinization (either by the advance of saline intrusion or by the existence of salt diapirs). Since water will be injected into the system, there is no expectation of salt re-concentration on the surface.
▪ excessive algal growth in storage reservoir?	✓	<input type="checkbox"/>	Not anticipated as the storage reservoirs are planned to be fully enclosed structures and the treated water will only be stored for a short period of time.
▪ increase in production of sewage beyond capabilities of community facilities?	<input type="checkbox"/>	X	The Project is indeed expected to increase the water consumption and, consequently the wastewater output. However, the Project scope includes pilot projects for 4 Public WC septic tank treatment within the city and the design of a decentralized Waste Water/Septage Treatment Plant with designed septic treatment capacity for the households and buildings within the 15Km radius project area.
▪ inadequate disposal of sludge from water treatment plants?	✓	<input type="checkbox"/>	Lospalos water treatment is planned for Softening (Calgon dosing) and Disinfection. No Sludge is predicted to be produced.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?	<input type="checkbox"/>	X	Not applicable
▪ impairments associated with transmission lines and access roads?	✓	<input type="checkbox"/>	Anticipated during construction activities but impacts are temporary and short in duration. The future EMP will include measures to mitigate the impacts.

SCREENING QUESTIONS	Yes	No	REMARKS
▪ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	<input type="checkbox"/>	X	Not applicable. The MPW storage facilities will be designed to guarantee enough space for the correct handling of the water treatment chemicals.
▪ health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?	<input type="checkbox"/>	X	Not applicable. The MPW storage facilities will be designed to guarantee enough space for the correct handling of the water treatment chemicals. Personal protective equipment will be provided to workers and training will be provided to ensure workers are aware of the potential hazards.
▪ dislocation or involuntary resettlement of people	✓	<input type="checkbox"/>	No Involuntary resettlement is planned. However, some private residential and agricultural land areas and surface property will be affected and compensation will be required.
▪ social conflicts between construction workers from other areas and community workers?	✓	<input type="checkbox"/>	Yes. Priority/proportion in employment should be given to local residents if/when qualification requirements are reached for each work position, is in compliance with SEPFOPE regulations.
▪ noise and dust from construction activities?	✓	<input type="checkbox"/>	Anticipated during construction activities but impacts are temporary and short in duration. The future EMP will include measures to mitigate the impacts.
▪ increased road traffic due to interference of construction activities?	✓	<input type="checkbox"/>	Anticipated during construction activities but impacts are anticipated as small scale, temporary and short in duration, given Lospalos does not have significant traffic flow in the project area. The future EMP will include measures to mitigate the impacts and the construction contractors will be required to coordinate with the local traffic police.
▪ continuing soil erosion/silt runoff from construction operations?	✓	<input type="checkbox"/>	Not anticipated, as topography of Lospalos is relatively horizontal. However, the EMP still includes measures to mitigate the impacts. Construction contractors will be required to include soil management guidelines and procedures where required.
▪ delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	<input type="checkbox"/>	X	Not anticipated. Chlorine Monitoring is included in the proposed methodology for Water Monitoring during the Operation Phase.
▪ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	<input type="checkbox"/>	X	Not anticipated.
▪ accidental leakage of chlorine gas?	<input type="checkbox"/>	X	Not anticipated.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> <li>excessive abstraction of water affecting downstream water users?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Possible affects on the downstream water users due to excessive abstraction. There are concerns of drying up the existing private wells due to extraction and this must be confirmed during existing and new borehole tests to understand if there is this particular risk. It should be noted that the private boreholes in these conditions are located in urban areas included into the future supply system.</p> <p>The project attempts to establish new boreholes to increase water supply for consumption and to avoid water deprivation in the downstream.</p>
<ul style="list-style-type: none"> <li>competing uses of water?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Several community areas with less access to water distribution tend to abstract water from alternative sources i.e rivers, private boreholes, and several small water springs.</p> <p>Other correlated factor is the declining quality condition of the pipes (i.e leakages and corrosive) and illegal connections. Therefore, the project attempts to increase water consumption in order to avoid the mentioned impact.</p> <p>TBC in the field visit. There are concerns of drying up existing private wells due to extraction and this must be confirmed during existing and new borehole tests to understand if there is this particular risk. It should be noted that the private boreholes in these conditions are located in urban areas included into the future supply system.</p>
<ul style="list-style-type: none"> <li>increased sewage flow due to increased water supply</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The Project is expected to increase the water consumption and, consequently the wastewater output. The FSTP is planned to address and accommodate for the totality of the projected wastewater, although the guarantee of transport of the wastewater from city's septic tanks to the FSTP is not under the responsibility of the current project.</p>
<ul style="list-style-type: none"> <li>increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The Project is expected to increase the water consumption and, consequently the septage output, including from kitchens. The FSTP is planned to address and accommodate for the totality of the projected wastewater.</p>

### Checklist for Preliminary Climate Risk Screening

**Country/Project Title:** Timor-Leste / Water Supply and Sanitation Investment Project

**Sector:** LOSPALOS

**Subsector:** Water Distribution Network

**Division/Department:** Ministry of Public Works (MPW)

Screening Questions		Score	Remarks <sup>8</sup>
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	<i>The topography of the site is quite flat and landslide risk free and so location and routing is not considered to be a substantial problem, as the infrastructure will be almost all with limited or no influence on the foundations.</i>
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	<i>The project will require water-level metering monitoring regarding flow, as well as review of quantities variations to correlate with seasonal meteorological variations and estimate source productivity and possible climate change problems</i>
Materials and Maintenance	<b>Would weather, current and likely future climate conditions</b> (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters <b>likely affect the selection of project inputs over the life of project outputs</b> (e.g. construction material)?	1	<i>Given the area has 2 seasons with frequent extreme conditions and is predominantly drought prone, there may be a requirement to look into more temperature resistant piping infrastructure and fill-in materials to guarantee the quality integrity of the distributed water quality.</i>
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	<i>Not applicable</i>
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	<i>Annual values of rainfall are quite dispersive in the project area. This fact combined to the poor resilience of the aquifer increases uncertainty regarding the water availability. The impact may be stronger in the sources located in high transmissive geological formations with low storage capacity, i.e. systems with poor resilience and thus impact on the water availability in the surface and ground sources.</i>

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1

<sup>8</sup> If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Very Likely	2
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Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): Medium

### Rapid Environmental Assessment (REA) CHECKLIST - SANITATION

<b>Instructions:</b>	
<input type="checkbox"/>	This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
<input type="checkbox"/>	This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
<input type="checkbox"/>	This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
<input type="checkbox"/>	Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

<b>Country/Project Title:</b>	Timor-Leste / Water Supply and Sanitation Investment Project
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<b>Sector Division</b>	LOSPALOS
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SCREENING QUESTIONS	Yes	No	REMARKS
<b>B. Project Siting</b> Is the project area...			
▪ Densely populated?	<input type="checkbox"/>	X	Lospalos is sparsely populated with population density of 42.4 persons per square kilometre
▪ Heavy with development activities?	<input type="checkbox"/>	X	
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	<input type="checkbox"/>	X	The FSTP Parapata is 400m away from the Heller Sacred Marshland, the only Cultural Heritage site (locally defined) in the Southeast of the Project Area. This area is located in a different stream system, outside of the FSTP influence.
• Protected Area	<input type="checkbox"/>	X	Some parts of the project 15 Km Diameter border overlaps slightly the Nino Konis Santana National Park border (GR 8/2007). However, the proposed septic treatment for the 4 Public Toilet Infrastructures, and the location of the Parapata decentralized wastewater treatment plant (DWWTP), will remain within the 15Km. The FSTP will be at 3500m distance from the Park boundaries.
• Wetland	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The FSTP Parapata is located in a different stream system, 400m away from the Heller Sacred Marshland, one of the few relevant cultural wetlands within the Project Area.  However, it is located in a stream system that drains 10 Km from the FSTP location to the Iralalaro Lake, inside the Nino Conis Santana

SCREENING QUESTIONS	Yes	No	REMARKS
			National Park.
• Mangrove	<input type="checkbox"/>	X	Not applicable. Project location is within the upper range of the Iralalalo Plateau, not at the coast.
• Estuarine	<input type="checkbox"/>	X	Not applicable. Project location is within the upper range of the Iralalalo Plateau, not at the coast.
• Buffer zone of protected area	<input type="checkbox"/>	<input type="checkbox"/>	TBC with National Directorate for Protected Areas. Besides the Regulation that creates the Nino Konis Santana National Park (GR 8/2007) there hasn't been published (to date) any specific Buffer Zone limits beyond the Park Border.
• Special area for protecting biodiversity	<input type="checkbox"/>	X	None of the project components lie within or are adjacent to these areas that they would be directly be impacted by the project.
• Bay	<input type="checkbox"/>	X	Not applicable. Project location is within the upper range of the Iralalalo Plateau, not at the coast.
<b>A. Potential Environmental Impacts</b> Will the Project cause...			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?	<input type="checkbox"/>	X	None of these sites are located in the surrounding area to the proposed FSTP site.
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	<input type="checkbox"/>	X	No blocking/interference with other utilities are expected, given Public Sanitation Installations will have proper septic treatment infrastructure and planned for regular emptying and maintenance.  FSTP site is in a predominantly agricultural area with only 2 houses within a 600m distance radius. No interference is predicted.
▪ dislocation or involuntary resettlement of people	<input type="checkbox"/>	X	Public Sanitation Installations are planned to be in Government Land, as well as location of DWWTP. TBC Officially with Lospalos and or National Land and Property Services.
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	<input type="checkbox"/>	X	FSTP Parapata will have Solid/Liquid Separation (sludge drying bed) and Post Sludge Percolate Treatment (Anaerobic Baffled Reactor Tank and Filter [secondary treatment], Planted Gravel Filter [Tertiary Treatment] and UV Treatment or Polishing Pond. Dried Sludge and/or Residual percolate may be used for Agriculture in the area.  FSTP effluent discharges shall meet the norms laid out by the Government of Timor-Leste (WHO/IFC) and can also utilized for agriculture purpose.
▪ overflows and flooding of neighboring properties with raw sewage?	<input type="checkbox"/>	X	FSTP will be designed considering the population growth up to the project time horizon of 2040, to accommodate septage treatment for the long term. No impact is envisaged. It should be noted that this station will only receive effluent transported by tanker trucks and therefore it is not possible flooding due to the inflow of sewage. In addition, the following measures are planned:  • During operation of the sludge/liquid separation bed, an extra margin up to the top of the earth bank would be kept to prevent

SCREENING QUESTIONS	Yes	No	REMARKS
			<p>overflow after a large rain storm.</p> <ul style="list-style-type: none"> <li>Furthermore, a shallow earth bank will be constructed along the perimeter of the total area to protect from the plant storm water.</li> <li>The earth bank is to be planted with grass and small trees to demarcate the area. The soil for construction of the earth bank comes from excavation of the ponds.</li> <li>Regular checking of the adequacy of the facility, particularly when beds are (nearly) full and during the rainy season.</li> <li>Timely heightening of the bund surrounding the facility and / or increasing the bed capacity.</li> </ul>
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	<input type="checkbox"/>	X	The proposed system is based on Domestic wastewater FSTP. No industrial WW planned to be directed to this treatment system.
▪ noise and vibration due to blasting and other civil works?	✓	<input type="checkbox"/>	No blasting activities envisaged. Temporary nuisance/disturbance due to construction activities will be minimized with appropriate mitigation measures.
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?	<input type="checkbox"/>	X	The proposed system is based on Domestic wastewater from septic tanks, collected and transported by truck to the FSTP, not by a sewer collection system. No industrial WW planned to be directed to this treatment system.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?	<input type="checkbox"/>	X	The proposed system is based on Domestic wastewater from septic tanks, collected and transported by truck to the DWWTP. Any impact from the collection is planned to be temporary.
▪ social conflicts between construction workers from other areas and community workers?	✓	<input type="checkbox"/>	Priority in employment should be given to local residents if/when qualification requirements are reached for each work position.
▪ road blocking and temporary flooding due to land excavation during the rainy season?	✓	<input type="checkbox"/>	Road blocking and Traffic re-routing may be required during construction stage of the FSTP. However, surrounding area is agricultural and with little to no daily traffic.
▪ noise and dust from construction activities?	✓	<input type="checkbox"/>	While the impact in the Septic tanks in the Public Toilet locations will be very reduced, the FSTP construction site may have these impacts in a larger scale and the EMP should define that all the construction activities should comply with the WHO noise standards, currently applicable for Timor-Leste. Sprinkling of water should be done along the construction area for dust suppression.
▪ traffic disturbances due to construction material transport and wastes?	✓	<input type="checkbox"/>	While the location of the DWWTP is to be remote and out of the urban area, traffic management with re-routing of traffic during construction period will be required to avoid conflict of public transport with construction material / waste transport.
▪ temporary silt runoff due to construction?	✓	<input type="checkbox"/>	<p>During construction phase, the excavation will be planned in such a way that it is avoided during heavy rains.</p> <p>During construction of FSTP especially during rainy season, this aspect will be kept in mind. The work would be undertaken in small pockets to avoid any silt runoff. Furthermore earth strengthening measures would also be undertaken.</p>

SCREENING QUESTIONS	Yes	No	REMARKS																																																									
			All excavated spoil is expected to be reused in the construction of the FSTP and its protective measures. Any excess should be well managed through levelling or tipped into low lying areas or borrow areas which are no longer useful.																																																									
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	✓	<input type="checkbox"/>	<p>Regular maintenances of the FSTP have to be carried out to avoid over flow and related impact of public health due to pollution. The design may be required to provide additional bunkering for overflow collection and re-pumping back into the system, as well as emergency shutdown procedures to avoid the possibility for groundwater pollution due to malfunction of FSTP system.</p> <ul style="list-style-type: none"><li>• Treatment units would be raised sufficiently to keep them clear of the highest predicted flooding level.</li><li>• There are two concerns for ground water protection, these are the potential pathogen movement in the groundwater and the infiltration of soluble nutrients. Due to their size, the pathogens will adhere to the soil particles and not move very far. With a minimum safe distance of 100 m for ordinary soil, there will be no pathogens in the groundwater outside this distance.</li><li>• The soluble nutrients, such as nitrate from urine, will move with the groundwater, but will be diluted to a level where there is no health risk. It is assumed that most of the nitrate has already infiltrated at the site of origin, that is near the households from the infiltration of liquid waste the septic tanks and pit latrines.</li><li>• Close monitoring of the facility to ensure it functions as planned, this involves monitoring of ground and surface waters in the surroundings of the FSTP.</li></ul>																																																									
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	✓	<input type="checkbox"/>	<p>Currently Lospalos does not have an established Solid Waste Landfill/dumpsite (only an uncontrolled dumpsite next to the proposed FSTP site). Given the sensitivity of the National Park area downstream, the sludge treatment will be as complete as possible and dewatering of the sludge will be priority for further safe reuse of dry sludge in agricultural activities.</p> <p>Adequate measure of sludge disposal and prohibit discharge of untreated sludge from septic tanks need to be taken.</p> <p>In no way will septage be allowed to be discharged from FSTP without complete &amp; proposed treatment. Treated effluent will meet the WHO Standards as well as DL 236/98 (Portugal) as given below:-</p> <table><tr><th></th><th colspan="2">BOD (mg/L)</th><th rowspan="2">NH<sub>4</sub>-N (mg/L)</th><th rowspan="2">Helminth eggs (No./filter)</th><th rowspan="2">FC ( N<sup>o</sup>./100 ml)</th></tr><tr><th></th><th>Total</th><th>Filtered</th></tr><tr><td colspan="6"><b>A. LIQUID EFFLUENT ( WHO Standards)</b></td></tr><tr><td colspan="6"><b>A.1 - Discharge into receiving waters:</b></td></tr><tr><td>Seasonal stream estuary</td><td>100-200</td><td>30-60</td><td>Oct-30</td><td>≤2-5</td><td>≤10<sup>4</sup></td></tr><tr><td>Perennial river or sea</td><td>200-300</td><td>60-90</td><td>20-50</td><td>≤10</td><td>≤10<sup>5</sup></td></tr><tr><td colspan="6"><b>A.2 - Reuse</b></td></tr><tr><td>Restricted irrigation</td><td colspan="2">n.c.</td><td>1)</td><td>≤1</td><td>≤10<sup>5</sup></td></tr><tr><td>Unrestricted irrigation</td><td colspan="2">n.c.</td><td>1)</td><td>≤1</td><td>≤10<sup>3</sup></td></tr><tr><td colspan="6"><b>B: TREATED PLANT SLUDGE ( WHO Standards)</b></td></tr></table>		BOD (mg/L)		NH <sub>4</sub> -N (mg/L)	Helminth eggs (No./filter)	FC ( N <sup>o</sup> ./100 ml)		Total	Filtered	<b>A. LIQUID EFFLUENT ( WHO Standards)</b>						<b>A.1 - Discharge into receiving waters:</b>						Seasonal stream estuary	100-200	30-60	Oct-30	≤2-5	≤10 <sup>4</sup>	Perennial river or sea	200-300	60-90	20-50	≤10	≤10 <sup>5</sup>	<b>A.2 - Reuse</b>						Restricted irrigation	n.c.		1)	≤1	≤10 <sup>5</sup>	Unrestricted irrigation	n.c.		1)	≤1	≤10 <sup>3</sup>	<b>B: TREATED PLANT SLUDGE ( WHO Standards)</b>					
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Quality of surface fresh water for the production of water for human consumption (Attachment I)	200-300	60-90	20-50	n.c	2*10 <sup>5</sup>	2*10 <sup>4</sup>																																																															
A.2 - Reuse ( DL 236/98)																																																																					
Quality of water for irrigation (Attachment XVI)	n.c.	60	50 (2)	n.c	n.c	100																																																															
1) ≤ 3 mg/L in waters that feed ponds or reservoirs 2) nitrates (NO3)																																																																					
▪ contamination of surface and ground waters due to sludge disposal on land?	✓	□	<p>Sludge reuse for agricultural activities will follow strict guidelines and information on best-use/restrictions of use will be given to potential re-users of the dried sludge.</p> <p>Inadequate sludge disposal on land can contaminate ground water and surface water and measures of adequate sludge disposal would be taken to avoid any environmental impact.</p> <p>For reuse of the dried faecal sludge from the facility, the operation will secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years, the infection risk of Ascariasis is minimal.</p>																																																																		
▪ health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in sewage flow and	✓	□	<p>No significant impacts are expected from the septic tank systems in the 4 proposed Public WCs maintenance as their scale is much smaller and less dangerous that a fully reticulated sewer collection system.</p>																																																																		

SCREENING QUESTIONS	Yes	No	REMARKS
exposure to pathogens in sewage and sludge			However, especially for the FSTP site operation, personal protective equipment and training will be provided to workers to ensure they are protected and aware of the potential hazards.

### Checklist for Preliminary Climate Risk Screening

**Country/Project Title:** Timor-Leste / Water Supply and Sanitation Investment Project

**Sector:** Lospalos

**Subsector:** Sanitation

**Division/Department:** Ministry of Public Works (MPW)

Screening Questions		Score	Remarks <sup>9</sup>
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	<b>0</b>	<p>The topography of the project site is quite flat and landslide risk free and restricted to the urban area so location and routing is not considered to be a substantial problem.</p> <p>Regarding the FSTP (faecal Sludge Treatment Plant), the best potential location for the Lospalos FSTP (faecal Sludge Treatment Plant) (Parapata site, on the side of the existing Solid Waste Dumpsite), is deprived of hazardous conditions in the immediate surrounding area and is outside the flood plain risk area.</p> <p>The access road from the public road to the treatment plant site should be paved, without steep gradients. It should preferably have sufficient width to allow two tankers to pass. Where this is not possible, frequent passing places should be provided.</p> <p>In addition, capacity of the proposed facility can be increased by shortening the time of each cycle for removal of semi-dried faecal sludge from the ponds to the drying beds, while still providing the secure storage time for a safe Ascaris egg-free waste product.</p> <p>The planning of the operation of the faecal sludge treatment facility would take the weather into account when estimating the reasonable maximum capacity with regards to the number of cycles per year for emptying the sludge/liquid separation bed.</p> <p>The emptying should then be completed by the end of the two dry seasons; the cold period (typical July to October) and the hot period</p>
	Would the project design (e.g. the clearance for bridges) need to consider any	<b>1</b>	Adjacent to the proposed FSTP ( faecal Sludge Treatment Plant) site, local

<sup>9</sup> If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Screening Questions		Score	Remarks <sup>9</sup>
	hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		<p>information has identified that the only access road (city-WWTP-city) and nearby bridge is within the flood plain range and is recurrently underwater during wet season extreme flood events. May require reliable knowledge on peak river flow and water level and a new, higher bridge to avoid flood occurrences and interruption of faecal sludge collection services.</p> <p>In case the bridge continually remains submerged in water, this would definitely adversely impact regular transportation of septage to FSTP. An alternative route which is open during wet season from November to May needs to be explored.</p> <p>Another point that needs to be observed at site whether the bridges along planned access routes should provide sufficient height to allow tankers to pass or not.</p>
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	Construction material will be selected keeping in mind the climactic conditions existing in the area.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	<p>The proposed FSTP location is above floodplain levels but strong rain occurrences may require temporary delays for scheduled maintenance if the current access bridge to the site is not redesigned and built above flood-plain levels.</p> <p>The civil construction design would be undertaken so that structures can be maintained well without incurring unduly high expenditure.</p>
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	<p>Infrastructure maintenance and contingency measures must be in place for i.e. extreme rainfall and possible overflowing of DWWTP. Possible options may be additional Bunding Areas with recirculation after extreme event occurrence. Under evaluation by the technical team.</p> <p>FSTP is going to produce dry solids in the form of compost which can be utilised by farmers having agricultural fields in the vicinity of FSTP. For reuse of the dried faecal sludge from the faecal sludge treatment facility, the operation must secure elimination of Ascaris eggs, for example by using a one year cycle for moving sludge from pond to the two drying beds (for odd and even year) giving a total three years retention time before final removal of the dry faecal material. After three years the infection risk of Ascariasis is minimal.</p> <p>Yes the storage for the compost needs to be adequately provided keeping in mind the very long rainy season of approx. 06</p>

Screening Questions		Score	Remarks <sup>9</sup>
			months. FSTP is going to produce liquid effluent which would meet the WHO standards for it to be used for agriculture purpose. Excessive rainfall effect on the design of FSTP has to be taken into account t as it would not only dilute the influent septage but would also lead provision of higher volumetric capacities of the treatment units.

Options for answers and corresponding score are provided below:


Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.



Result of Initial Screening (Low, Medium, High): 3 - Medium

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## Appendix 2. SAMPLE GRIEVANCE REDRESS FORM



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

# COMPLAINT REGISTRY FORM

**DATE:** \_\_\_\_/\_\_\_\_/\_\_\_\_ (dd/mm/yy) **CRF: 001**

**Capital (please check) :** ☐ Lospalos ☐ Viqueque ☐ Same

**Complainant Profile**

<b>Name</b>	<b>:</b>		<b>Age</b>	<b>:</b>	
<b>Gender</b>	<b>:</b>	<input type="checkbox"/> Male	<b>Civil Status</b>	<b>:</b>	<input type="checkbox"/> Single
		<input type="checkbox"/> Female			<input type="checkbox"/> Married
					<input type="checkbox"/> Widow/er
<b>Address</b>		<u>Aldeia</u>			
		<u>Suco</u>			
		<u>Administrative Post</u>			

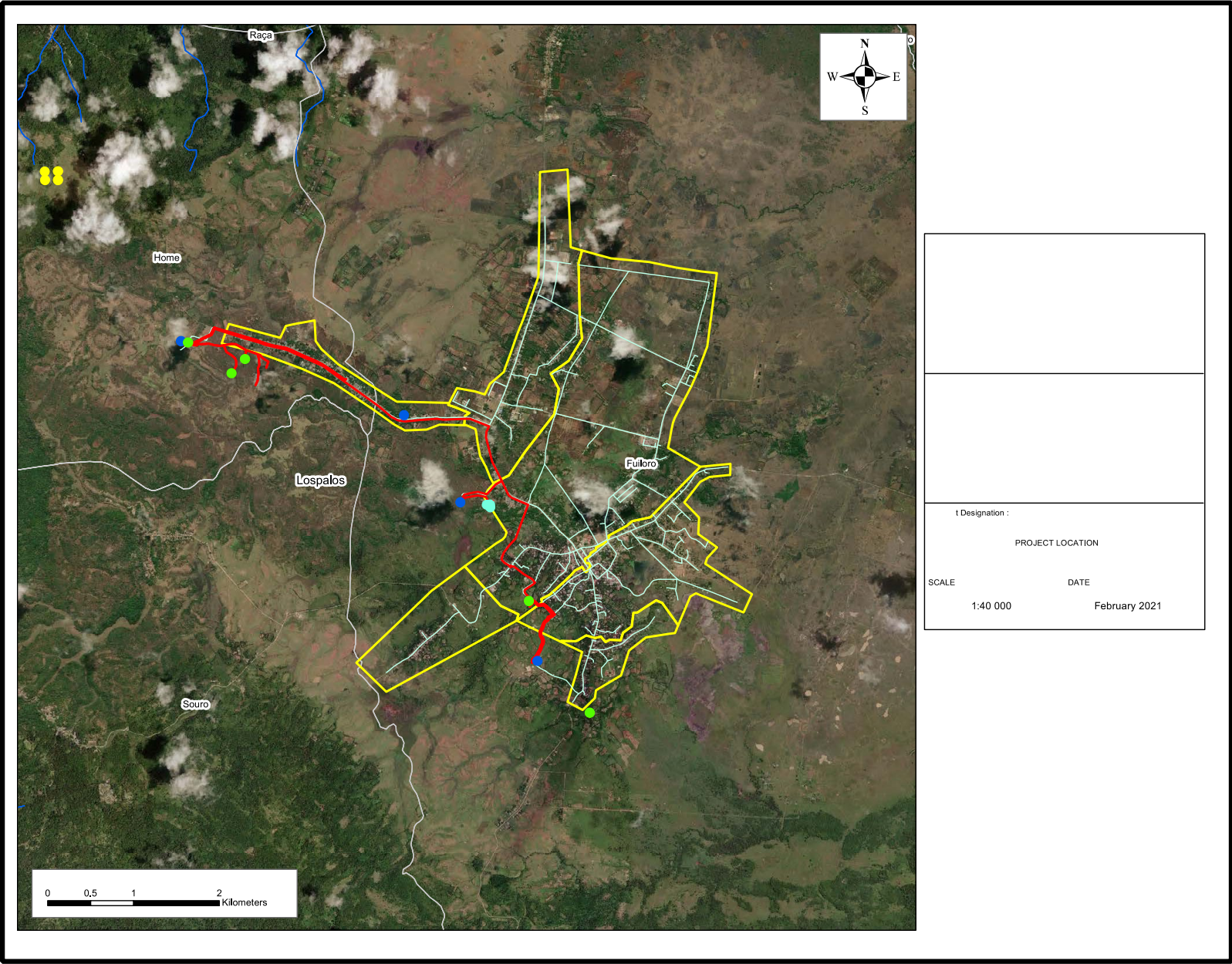
**Complaint Details**

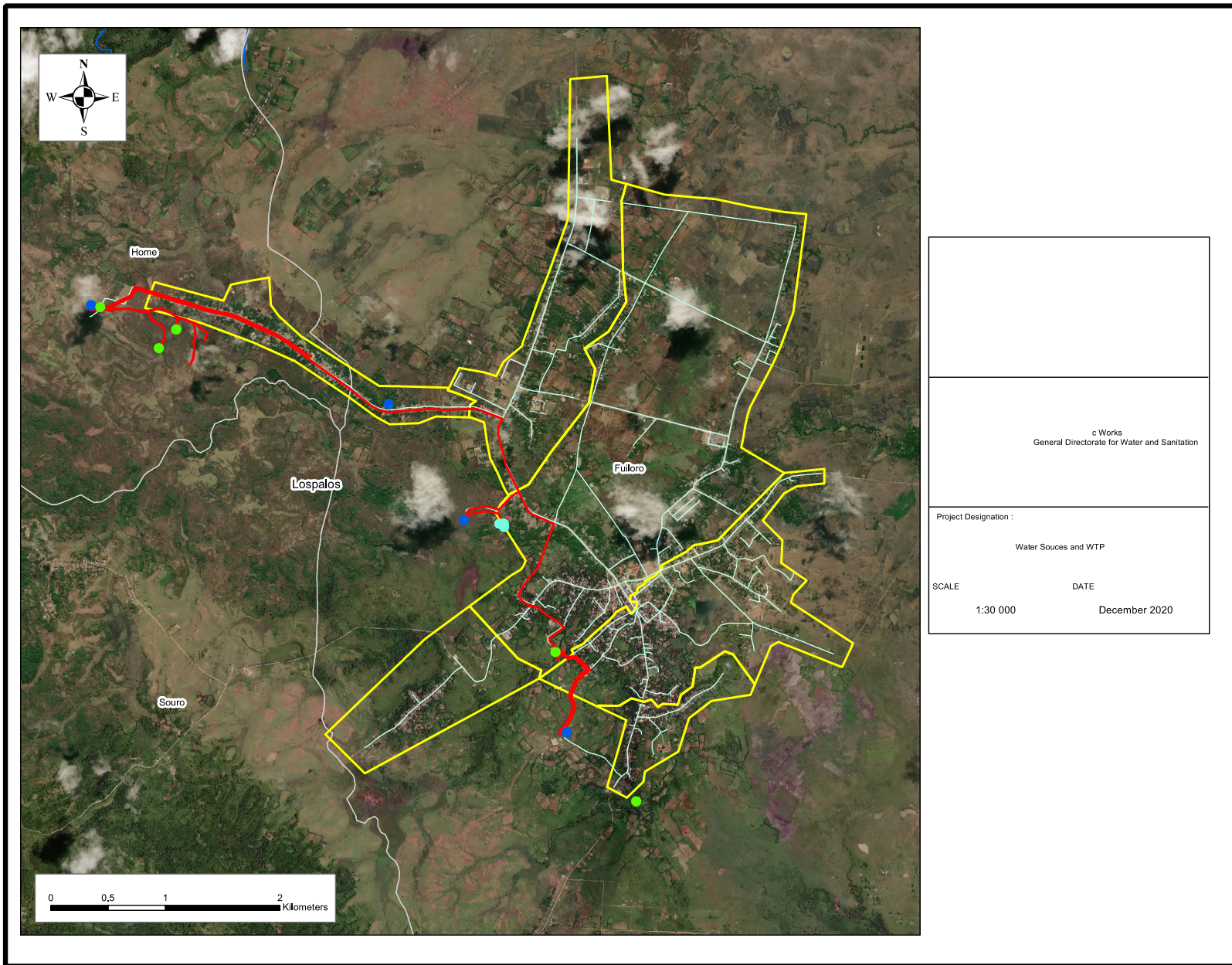
<b>Attending Officer:</b>	
Name/Designation	Complainant Signature

### **Appendix 3. MAPS FOR WSSIP – LOSPALOS CITY**

#### **3.1 Location of the Project Components**

#### **3.2 Water Sources and WTP**





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## Appendix 4. WATER QUALITY TEST REPORT (JICA & MASTERPLAN)

**District: Lautem**

**Town: Los Palos**

Tested by: Alvaro Godinho, technician, WSS laboratory and T.ISHIHARA, JICA Study Team

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkali.	Hdns.	Ca-Hdns	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	R.Cl <sub>2</sub>	T.Coli	G.Bac
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	5	0	0
LP-1	Papapa, intake	23/mar/00	24/mar/00	7.1	26.1	518	251	0.2	1.7	258	264	NT	0.1	0.6	0.012	ND	0.10	0.1	NT	NT	±	+
LP-2	KOR BATT, Spring	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-3	Kauto, Old pump house	23/mar/00	24/mar/00	6.8	26.0	523	253	0.3	1.4	NT	NT	NT	ND	NT	NT	NT	0.16	NT	NT	NT	+	+++
LP-4	Perekiki	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-5	Kartini-1	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-6	Sawarika	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-7	Motarlori	23/mar/00	24/mar/00	7.0	26.5	522	253	0.2	1.0	NT	NT	NT	ND	NT	NT	NT	0.17	NT	1	NT	+++	+++
LP-8	Natura, shallow well	No Sample		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-9	Central 2	23/mar/00	24/mar/00	7.1	26.8	534	259	0.3	1.0	NT	NT	273	ND	NT	NT	NT	0.21	NT	2	NT	++	++
LP-10	Central 3	23/mar/00	24/mar/00	7.0	27.5	537	260	0.3	1.5	290	297	NT	ND	0.9	0.010	ND	0.25	0.1	NT	NT	NT	NT

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit,

--: 0-3

±: 3-10

+: 10-20

++: 20-30

+++: more than 30

**District: Lautem****Town: Los Palos**

Tested by: Alvaro Godinho, technician, WSS laboratory

No.	Sampling Point	Date		pH	Temp.	R.Cl <sub>2</sub>	Cond.	TDS	Salinity	Turbidity	NH <sub>3</sub> -N	Fluoride	Alkalinity	Hardness	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Mn	T.Coli	G. Bacteria
		sample	test		(°C)	(mg/L)	( μ S/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
WHO Guideline Value				6.5-8.5	NS	0.5	NS	1000	NS	5	NS	1.5	NS	200	10	1	0.3	0.5	0	0
1	Papapa, intake	08/mai/00	09/mai/00	7.1	26.0	NT	532	258	0.3	2.12	0.4	0.12	289.0	NT	0.80	0.007	0.02	0.0	±	+
2	Central 2	08/mai/00	09/mai/00	7.1	NT	NT	526	255	0.3	12.3	0.30	0.2	286.0	NT	0.60	0.003	0.02	0.3	++	++
3	Central 3	08/mai/00	09/mai/00	7.0	26.0	NT	518	251	0.2	10.9	0.3	0.10	NT	NT	0.50	0.003	0.00	0.3		
4	Motarlari	08/mai/00	09/mai/00	7.0	26.0	NT	516	250	0.2	1.48	0.5	0.12	288.0	NT	0.40	0.002	0.02	0.1	+++	+++
5	Kauto, Old pump house	08/mai/00	09/mai/00	6.8	26.0	NT	517	250	0.2	2.03	0.2	0.19	NT	NT	0.40	0.002	0.02	NT	+	+++

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

-: 0-3

±: 3-10

+: 10-20

++: 20-30

+++: more than 30

**Suggestions**

Boil water before drinking

**District: Lautem**  
**Town: Los Palos**

Sample by Eurico Da Costa, WSS Lospalos, Tested by Alvaro Godinho, Mario soares WSS Laboratory

Sample by Loro sa'e (000), WOE Leopards, tested by WAO's Oceans, WAO's Oceans, WAO's Oceans																				
No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkali.	Hdns.	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	NS	200	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	30/out/00	01/nov/00	7.5	28.7	539	261	0.3	1.4	280	268	ND	0.9	0.011	ND	0.12	ND	1.0	170	0
LP-2	KOR BATT, Spring	30/out/00	01/nov/00	7.4	26.8	546	264	0.3	0.4	281	222	1.0	1.3	0.006	ND	0.15	ND	ND	10	0
LP-3	Kauto, Old pump house	30/out/00	01/nov/00	7.4	30.0	544	264	0.3	1.6	NT	NT	ND	NT	0.009	NT	0.11	NT	NT	225	0
LP-4	Perekiki	30/out/00	01/nov/00	7.5	27.0	545	264	0.3	3.5	280	282	ND	0.9	0.005	ND	ND	0.3	1.0	100	0
LP-5	Kartini-1	30/out/00	01/nov/00	7.4	27.6	547	265	0.3	4.4	NT	NT	0.6	NT	ND	NT	0.07	NT	NT	145	0
LP-6	Sawarika	30/out/00	01/nov/00	7.3	30.3	554	269	0.3	1.5	281	285	1.1	1.0	0.003	ND	0.18	ND	ND	130	0
LP-7	Motarlori	30/out/00	01/nov/00	7.4	27.8	545	264	0.3	2.3	NT	NT	ND	0.8	0.004	ND	ND	ND	1.0	115	5
LP-8	Natura, shallow well	30/out/00	01/nov/00	7.6	25.7	440	212	0.2	1.6	NT	219	1.4	0.4	0.007	ND	ND	ND	ND	TNC	130
LP-9	Central 2	31/out/00	01/nov/00	7.5	25.9	541	262	0.3	6.5	280	283	ND	0.9	0.009	0.03	0.08	ND	2.0	85	35
LP-10	Central 3	31/out/00	01/nov/00	7.5	26.6	541	262	0.3	4.3	NT	NT	0.3	NT	0.008	NT	0.12	NT	NT	220	5

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

TNC: too numerous to count

**Suggestions**

Boiling Water Before Drinking



**District : Lautem**  
**Town : Lospalos**

Sample by Eurico Da Costa ,WSS Lospalos tested by Alvaro Godinho, Mario Soares WSS Laboratory

No.	Sampling Point	Date		pH	Temp.	Cond.	TDS	Salinity	Turbid.	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	CFU	CFU
Timor Loro sa'e Guidelines				6.5-8.5	NS	NS	1000	NS	5.0	0	0
LP-1	Papapa, intake	14/mar/01	15/mar/01	8.3	20.6	526	255	0.3	3.0	TNC	6
LP-2	KOR BATT, Spring	14/mar/01	15/mar/01	8.5	6.7	169	81	0.1	3.8	TNC	0
LP-3	Kauto, Old pump house	14/mar/01	15/mar/01	8.2	20.7	564	276	0.3	3.7	5	0
LP-4	Perekiki	14/mar/01	15/mar/01	8.3	20.3	512	248	0.2	5.7	280	2
LP-5	Kartini-1	14/mar/01	15/mar/01	8.2	20.2	402	194	0.2	4.7	60	0
LP-6	Sawarika	14/mar/01	15/mar/01	8.2	21.2	518	251	0.2	4.5	60	0
LP-7	Motarlori	14/mar/01	15/mar/01	8.3	20.4	517	250	0.2	2.2	225	0
LP-8	Natura, Shalow Well	14/mar/01	15/mar/01	8.1	18.2	450	217	0.2	0.9	345	0
LP-9	Central 2	14/mar/01	15/mar/01	8.2	21.3	519	252	0.2	1.0	195	4
LP-10	Central 3	14/mar/01	15/mar/01	8.2	21.9	482	233	0.2	1.9	190	0

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

TNC: Too Numerous To Count

Suggestions

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date :18-April-2001

Sampled by : Eurico da Costa DWSS Lospalos

Testing Date :19-April-2001

Tested by : Alvaro Godinho .Mario Soares WSS Laboratory

Received by : X. Wang

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Ca.Hardness	Hardness	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	0	0
LP-1	Papapa, intake		09:30	8.3	21.7	512	248	0.2	2.7	230	275	60	70
LP-2	KOR BATT, Spring		09:32	8.2	7.5	303	146	0.1	7.1	NT	NT	50	18
LP-3	Kauto, Old pump house		09:35	8.3	22.0	512	248	0.2	3.3	NT	NT	0	0
LP-4	Perekiki		09:47	8.0	16.1	394	190	0.2	3.7	NT	NT	TNC	TNC
LP-5	Kartini-1		09:48	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-6	Sawarika		09:49	8.3	23.7	315	248	0.2	8.4	NT	NT	73	0
LP-7	Motarlori		10:02	8.3	22.1	512	248	0.2	2.3	NT	NT	100	6
LP-8	Natura, Shalow Well		10:04	8.0	11.2	835	40	ND	76.5	NT	NT	80	6
LP-9	Central 2		10:14	7.8	11.2	79	37	ND	27.8	NT	NT	123	82
LP-10	Central 3		15:15	8.2	18.9	497	240	0.2	15.8	NT	NT	140	0

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit; TNC: Too Numerous To Count

Suggestions

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date :22-May-2001

Sampled by : Eurico da Costa DWSS Lospalos

Testing Date :25-May-2001

Tested by : Mario Soares WSS Laboratory

Received by : Alvaro Godinho

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Ca.Hardness	Hardness	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	0	0
LP-1	Papapa, intake		11:17	8.3	16.7	334	161	0.2	0.8	NT	176	-	++
LP-2	KOR BATT, Spring		11:19	8.2	15.0	340	163	0.2	0.6	NT	NT	±	+
LP-3	Kauto, Old pump house		11:22	8.3	15.1	334	161	0.2	0.7	NT	NT	-	+++
LP-4	Perekiki		11:24	8.2	15.1	338	163	0.2	0.6	NT	NT	-	±
LP-5	Kartini-1		11:26	8.3	14.4	320	154	0.2	0.9	NT	NT	-	+++
LP-6	Sawarika		11:31	8.4	14.3	317	153	0.2	3.5	NT	NT	-	±
LP-7	Motarlori		11:32	8.4	14.2	293	141	0.1	1.1	NT	NT	-	+
LP-8	Natura, Shalow Well		11:37	8.2	14.7	340	164	0.2	0.7	NT	NT	-	+++
LP-9	Central 2		11:39	8.1	24.6	339	163	0.2	1.1	NT	NT	-	+++
LP-10	Central 3		11:45	8.2	24.8	299	144	0.1	1.0	NT	NT	-	+

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit

TNC: Too Numerous To Count

For Paper Slip

( - ) : 0 - 3

( ± ) : 3 - 10

( + ) : 10 - 20

( ++ ) : 20 - 30

( +++ ) : more than 30

**Suggestions**

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 19/ June/2001

Sampled by : Eurico da Costa DWSS Lospalos

Testing Date : 19 /june/2001

Tested by : Miguel Quintao & Mario Soares WSS Laboaratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkalinity	Hardness	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	0	0
LP-1	Papapa, intake		11:41	8.3	27.1	525	254	0.3	2.0	NT	1604	++	+++
LP-2	KOR BATT, Spring		11:44	8.2	27.0	528	256	0.3	1.8	NT	NT	++	+++
LP-3	Kauto, Old pump house		11:46	8.2	26.8	529	256	0.3	1.8	NT	NT	++	+++
LP-4	Perekiki		11:48	8.2	26.6	527	255	0.3	1.8	NT	NT	+++	+++
LP-5	Kartini-1		11:51	8.2	26.4	529	256	0.3	1.8	NT	NT	++	+++
LP-6	Sawarika		11:54	8.2	26.3	526	255	0.3	1.7	NT	NT	++	+++
LP-7	Motarlori		11:56	8.2	26.2	528	256	0.3	1.4	NT	NT	+++	+++
LP-8	Natura, Shalow Well		11:58	8.3	25.9	524	254	0.3	1.7	NT	1514	++	+++
LP-9	Central 2		11:59	8.3	25.5	526	255	0.3	1.8	NT	NT	++	+++
LP-10	Central 3		12:01	8.3	25.5	525	254	0.3	1.8	NT	NT	+++	+++

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit

TNC: Too Numerous To Count

Weather Report :

Sunny / Cloudy / Rain

**Suggestions**

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date :16-07-2001

Sampled by : Eurico da Costa,DWSS Lospalos

Testing Date :17-07-2001

Tested by : Mario Soares WSS Laboratory

Received by : Mario Soares

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkalinity	Hardness	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	0	0
LP-1	Papapa, intake	15:05	15:17	8.1	26.5	530	257	0.3	2.9	NT	NT	15	4
LP-2	KOR BATT, Spring	15:09	15:19	8.1	26.5	511	247	0.2	2.7	NT	NT	95	0
LP-3	Kauto, Old pump house	15:18	15:23	8.1	26.1	515	249	0.2	2.7	NT	NT	NT	NT
LP-4	Perekiki	18:45	15:26	8.1	25.9	503	244	0.2	3.5	NT	NT	NT	NT
LP-5	Kartini-1	18:55	15:30	8.2	26.0	507	245	0.2	3.2	NT	NT	NT	NT
LP-6	Sawarika	10:55	15:35	8.0	26.0	549	266	0.3	1.5	NT	NT	NT	NT
LP-7	Motarlori	15:30	15:37	8.1	25.9	513	249	0.2	1.4	NT	NT	NT	NT
LP-8	Natura, Shalow Well	10:40	15:42	8.1	25.1	448	216	0.2	0.7	NT	NT	NT	NT
LP-9	Central 2	09:04	15:46	8.1	26.1	514	249	0.2	1.5	NT	NT	NT	NT
LP-10	Central 3	16:30	15:47	8.1	26.1	513	248	0.2	2.3	NT	NT	NT	NT

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

TNC: Too Numerous To Count

Weather Report :

Sunny

Cloudy

Rain

**Suggestions**

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15 - 08 - 2001

Sampled by : Eurico Da Costa DWSS Lospalos

Testing Date : 17 - 08 - 2001

Tested by : Miguel Quintao WSS Laboratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Alkalinity	Hardness	T.Coliform	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	0	0
LP-1	Papapa, intake	14:03	14:57	8.3	28.0	527	255	0.3	0.8	234	208	TNC	10
LP-2	KOR BATT, Spring	14:08	14:59	8.2	27.2	525	254	0.3	0.8	232	258	TNC	45
LP-3	Kauto, Old pump house	14:27	15:02	8.2	26.8	524	254	0.3	0.8	NT	NT	TNC	45
LP-4	Perekiki	18:31	15:04	8.1	26.8	525	254	0.3	0.9	NT	NT	TNC	25
LP-5	Kartini-1	18:36	15:07	8.2	26.6	525	284	0.3	0.8	NT	NT	TNC	5
LP-6	Sawarika	09:10	15:10	8.2	26.5	566	274	0.3	0.9	NT	NT	TNC	20
LP-7	Motarlori	08:10	15:12	8.2	26.5	526	255	0.3	0.8	NT	NT	TNC	10
LP-8	Natura, Shalow Well	08:16	15:15	8.1	26.3	523	253	0.3	1.0	NT	NT	TNC	5
LP-9	Central 2	11:13	15:17	8.1	26.7	552	267	0.3	0.8	NT	NT	TNC	5
LP-10	Central 3	08:56	15:19	8.2	26.4	524	254	0.3	0.9	NT	NT	TNC	45

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit;

TNC: Too Numerous To Count

Weather Report :

Sunny

Cloudy

Rain

**Suggestions**

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15/ 10/ 2001

Testing Date : 17/10/2001

Received by : Miguel Quintao

Sample by :Eurico da Costa DWSS Lautem

Testing by : Miguel Quintao WSS Lab

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	0	0
LP-1	Papapa, intake	14:30	15:18	8.1	25.1	393	190	0.2	1.2	266	1964	TNC	2
LP-2	KOR BATT, Spring	14:35	15:19	8.1	24.5	457	221	0.2	1.7	NT	NT	TNC	112
LP-3	Kauto, Old pump house	14:45	15:20	8.0	24.5	437	211	0.2	1.0	NT	NT	TNC	2
LP-4	Perekiki	18:35	16:58	8.0	24.6	429	207	0.2	1.2	NT	NT	56	0
LP-5	Kartini-1	18:40	16:00	8.0	24.9	427	206	0.2	1.2	NT	NT	26	0
LP-6	Sawarika	09:30	16:01	8.0	25.2	416	201	0.2	0.9	NT	NT	16	0
LP-7	Motarlori	08:03	16:10	8.0	25.4	423	204	0.2	0.8	NT	NT	42	0
LP-8	Natura, Shalow Well	15:30	16:11	7.9	25.6	431	208	0.2	1.0	260	2182	52	0
LP-9	Central 2	10:21	16:12	8.0	25.9	427	206	0.2	1.0	NT	NT	120	0
LP-10	Central 3	10:25	16:20	8.2	26.8	494	239	0.2	1.1	NT	NT	72	0

**Legend:**

ND: not detectable

NT: not tested

NS: not set

CFU: colony formed unit, TNC: Too Numerous To Count

Weather Report :

Sunny

Cloudy

Rain

**Suggestions**

Boiling Water Before Drinking

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 12 / December / 2001

Sample by : Eurico da Costa DWSS Lospalos

Testing Date : 13 / December / 2001

Testing by : Miguel Quintao and Mario Soares WSS Laboratory

Received by : Mario Soares

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	15:00	14:43	7.9	27.0	508	246	0.2	1.1	440	305	0.9	0.5	0.016	0.03	0.8	NT	2	TNC	490
LP-2	KOR BATT, Spring	15:05	14:44	8.0	27.0	411	199	0.2	15.1	330	250	0.6	0.3	0.013	0.25	0.16	NT	6	TNC	542
LP-3	Kautb, Old pump house	15:20	14:45	8.0	27.0	412	199	0.2	14.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	182	2
LP-4	Perekiki	15:25	14:55	7.9	27.0	398	192	0.2	19.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	466
LP-5	Kartini-1	15:30	14:56	8.0	27.0	397	192	0.2	16.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	484
LP-6	Sawarika	16:00	14:57	8.0	27.0	380	183	0.2	17.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	476
LP-7	Motarlori	15:31	15:05	8.0	27.0	398	192	0.2	16.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	488
LP-8	Natura, Shalow Well	14:40	15:06	8.1	27.0	398	192	0.2	18.6	195	240	0.9	0.4	0.027	0.29	0.15	NT	NT	TNC	426
LP-9	Central 2	14:45	15:07	8.0	27.0	399	193	0.2	18.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	510
LP-10	Central 3	14:00	15:16	8.0	27.0	399	192	0.2	17.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC

**Legend:**

ND: not detectable      NT: not tested      NS: not set      FU: colony formed urNC: Too Numerous To Count

Weather Report :      Sunny      Cloudy      Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15/February /2002

Sample by : Eurico da Costa DWSS Lautem

Testing Date : 18/ February /2002

Testing by : Miguel Quintao WSS Laboratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l )	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	14:30	11:05	8.2	25.1	563	224	0.2	1.5	430	300	0.9	0.3	0.006	0.01	0.1	NT	ND	TNC	174
LP-2	KOR BATT, Spring	14:32	11:06	7.9	25.2	485	234	0.2	1.1	245	280	0.3	0.5	0.016	ND	ND	NT	1	94	0
LP-3	Kauto, Old pump house	14:25	11:07	8.1	21.1	487	236	0.2	1.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	82
LP-4	Perekiki	18:30	11:16	8.2	19.4	485	234	0.2	1.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	166
LP-5	Kartini-1	18:36	11:17	8.0	21.8	488	236	0.2	1.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	164
LP-6	Sawarika	10:25	11:19	8.1	22.3	491	238	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	138
LP-7	Motarlori	08:15	11:30	8.2	21.3	487	236	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	178
LP-8	Natura, Shalow Well	16:30	11:31	8.2	25.6	443	214	0.2	0.6	210	315	0.4	0.6	0.005	0.02	ND	NT	ND	TNC	68
LP-9	Central 2	11:00	11:32	8.0	22.6	489	237	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	98
LP-10	Central 3	11:20	11:42	8.2	22.6	475	230	0.2	1.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	0

**Legend:**

ND: not detectable      NT: not tested      NS: not set      :U: colony formed u C: Too Numerous To Count

Weather Report :

Sunny      Cloudy Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15/February /2002

Sample by : Eurico da Costa DWSS Lautem

Testing Date : 18/ February /2002

Testing by : Miguel Quintao WSS Laboratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	14:30	11:05	8.2	25.1	563	224	0.2	1.5	430	300	0.9	0.3	0.006	0.01	0.1	NT	ND	TNC	174
LP-2	KOR BATT, Spring	14:32	11:06	7.9	25.2	485	234	0.2	1.1	245	280	0.3	0.5	0.016	ND	ND	NT	1	94	0
LP-3	Kautb, Old pump house	14:25	11:07	8.1	21.1	487	236	0.2	1.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	82
LP-4	Perekiki	18:30	11:16	8.2	19.4	485	234	0.2	1.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	166
LP-5	Kartini-1	18:36	11:17	8.0	21.8	488	236	0.2	1.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	164
LP-6	Sawarika	10:25	11:19	8.1	22.3	491	238	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	138
LP-7	Motarlori	08:15	11:30	8.2	21.3	487	236	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	178
LP-8	Natura, Shalow Well	16:30	11:31	8.2	25.6	443	214	0.2	0.6	210	315	0.4	0.6	0.005	0.02	ND	NT	ND	TNC	68
LP-9	Central 2	11:00	11:32	8.0	22.6	489	237	0.2	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	98
LP-10	Central 3	11:20	11:42	8.2	22.6	475	230	0.2	1.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	0

**Legend:**

ND: not detectable      NT: not tested      NS: not set      :U: colony formed u C: Too Numerous To Col

Weather Report :

Sunny      Cloudy Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 20 - 04 - 2002

Testing Date : 22 - 04 - 2002

Received by : Mario Soares

Sample by : Eurico Da Costa DWSS Lautem

Testing by : Miguel Quintao WSS Laboratory

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	16:10	16:03	8.4	28.9	324	156	0.2	1.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	220	0
LP-2	KOR BATT, Spring	16:15	16:04	7.9	28.2	386	186	0.2	0.8	300	176	NT	NT	NT	NT	NT	NT	NT	765	0
LP-3	Kaub, Old pump house	16:30	16:05	7.9	28.3	397	191	0.2	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	830	2
LP-4	Perekiki	19:30	16:11	7.9	28.0	265	127	0.1	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	0
LP-5	Kartini-1	19:39	16:12	7.8	28.3	378	187	0.2	0.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	1245	14
LP-6	Sawarika	16:45	16:13	7.8	28.1	388	187	0.2	1.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	4
LP-7	Motarlori	18:20	16:16	7.8	28.0	398	192	0.2	0.8	210	225	NT	NT	NT	NT	NT	NT	NT	TNC	8
LP-8	Natura, Shalow Well	15:30	16:17	7.7	26.8	292	140	0.1	5.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	1060	4
LP-9	Central 2	10:10	16:18	7.7	27.5	388	187	0.2	2.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	4
LP-10	Central 3	10:25	16:25	7.6	27.8	362	175	0.2	2.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	186	0

**Legend:**

ND: not detectable      NT: not tested      NS: not set      =U: colony formed urTNC: Too Numerous To Count

Weather Report :      Sunny      Cloudy      Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 01/07/2002

Sample by : Eurico da Costa DWSS Lospalos

Testing Date : 02/07/2002

Testing by : Mario Soares and Miguel Quintao WSS Laboratory

Received by : Mario Soares

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor		Hours And		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	18:15	09:32	8.5	24.8	460	222	0.2	0.9	165	180	NT	NT	NT	NT	NT	NT	NT	TNC	68
LP-2	KOR BATT, Spring	18:17	09:33	8.5	24.4	490	237	0.2	0.6	295	280	NT	NT	NT	NT	NT	NT	NT	18	0
LP-3	Kaulo, Old pump house	18:00	09:40	8.3	24.1		238	0.2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	10	2
LP-4	Perekiki	18:23	09:41	8.1	24.1	492	224	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	12
LP-5	Kartini-1	18:23	09:46	8.2	24.1	498	241	0.2	0.6	NT	NT	NT	NT	NT	NT	NT	NT	NT	30	2
LP-6	Sawarika	18:50	09:47	8.2	24.1	507	245	0.2	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	56	0
LP-7	Motarlori	18:45	09:55	8.4	24.1	495	239	0.2	0.5	270	275	NT	NT	NT	NT	NT	NT	NT	9	3
LP-8	Natura, Shalow Well	18:30	09:56	8.2	24.1	394	190	0.2	0.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	28	22
LP-9	Central 2	18:40	10:05	8.3	24.1	496	240	0.2	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	15	16
LP-10	Central 3	18:21	10:06	8.2	23.9	496	240	0.2	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	20	12

**Legend:**

ND: not detectable    NT: not tested    NS: not set    CFU: colony formed unit    TNC: Too Numerous To Count

Weather Report :    Sunny    Cloudy    Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15 - 03 - 2003

Sample by : Eurico da costa Dwss Lospalos

Testing Date : 16 - 03 - 2003

Testing by : Miguel Quintao Wss Laboratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp. (°C)	Cond. (µS/cm)	TDS (mg/L)	Salinity (‰)	Turbid. (NTU)	Hard (mg/l)	Alkal (mg/l)	NH <sub>3</sub> -N (mg/L)	NO <sub>3</sub> -N (mg/L)	NO <sub>2</sub> -N (mg/L)	Fe (mg/L)	Fluoride (mg/L)	Mn (mg/L)	SO <sub>4</sub> <sup>2-</sup> (mg/L)	T.Coli CFU	E.Coli CFU
		sample	test																	
East Timor		Hours	And	6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	09:10	10:36	8.6	29.3	292	140	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	4
LP-2	KOR BATT, Spring	09:15	10:37	8.5	29.3	257	123	0.1	0.4	250	120	NT	NT	NT	NT	NT	NT	NT	TNC	30
LP-3	Kauto, Old pump house	09:00	10:44	8.2	29.1	285	131	0.1	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	14
LP-4	Perekiki	10:19	10:45	8.5	29.0	249	121	0.1	0.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	48
LP-5	Kartini-1	10:25	10:46	8.4	29.1	290	139	0.1	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	54
LP-6	Sawarika	11:15	10:55	8.5	29.0	275	132	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	60
LP-7	Motarlori	10:40	10:54	8.5	29.0	270	131	0.1	0.1	150	165	NT	NT	NT	NT	NT	NT	NT	TNC	54
LP-8	Natura, Shallow Well	11:14	10:55	8.5	29.3	290	141	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	34
LP-9	Central 2	12:00	10:57	8.5	29.3	250	121	0.1	0.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	28
LP-10	Central 3	12:15	10:58	8.6	29.1	270	135	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	150	2

**Legend:**

ND: not detectable    NT: not tested    NS: not set    CFU: colony forming units    TNC: Too Numerous To Count

Weather Report :                      Sunny Cloudy Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 15 - 03 - 2003

Sample by : Eurico da costa Dwss Lospalos

Testing Date : 16 - 03 - 2003

Testing by : Miguel Quintao Wss Laboratory

Received by : Miguel Quintao

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		sample	test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	( mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor		Hours And		6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	09:10	10:36	8.6	29.3	292	140	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	4
LP-2	KOR BATT , Spring	09:15	10:37	8.5	29.3	257	123	0.1	0.4	250	120	NT	NT	NT	NT	NT	NT	NT	TNC	30
LP-3	Kauto, Old pump house	09:00	10:44	8.2	29.1	285	131	0.1	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	14
LP-4	Perekiki	10:19	10:45	8.5	29.0	249	121	0.1	0.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	48
LP-5	Kartini-1	10:25	10:46	8.4	29.1	290	139	0.1	0.2	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	54
LP-6	Sawarika	11:15	10:55	8.5	29.0	275	132	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	60
LP-7	Motarlori	10:40	10:54	8.5	29.0	270	131	0.1	0.1	150	165	NT	NT	NT	NT	NT	NT	NT	TNC	54
LP-8	Natura, Shallow Well	11:14	10:55	8.5	29.3	290	141	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	34
LP-9	Central 2	12:00	10:57	8.5	29.3	250	121	0.1	0.3	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	28
LP-10	Central 3	12:15	10:58	8.6	29.1	270	135	0.1	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	150	2

**Legend:**

ND: not detectable    NT: not tested    NS: not set    CFU: colony forming unit    TNC: Too Numerous To Count

Weather Report :                      Sunny Cloudy Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 01/ ; 14/03/2019

Sample by : Eurico da Costa DWSS Lospalos

Testing Date : 02/ 15/03/2019

Testing by : Mai;Sidonio X. de Jesus

& Estela

Received by : M: Mario Soares

No	Sampling Point		pH	Temp.	Cond.	TDS	Salinity	Turbid.	Hard	Alkal	NH <sub>3</sub> -N	NO <sub>3</sub> -N	NO <sub>2</sub> -N	Fe	Fluoride	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		test		(°C)	(µS/cm)	(mg/L)	(‰)	(NTU)	(mg/l)	(mg/l)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	CFU	CFU
East Timor Guidelines		Hours And Minutes	6.5-8.5	NS	NS	1000	NS	5.0	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Papapa, intake	09:05	8.2	24.4	220	110.6	0.1	173.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-2	Puahopu intake, Spring	07:00	7.9	24.1	559	283	0.3	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	28
LP-3	Kaub, Old pump house	09:03	8.2	24.2	198.2	99.9	0.1	176.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-4	Uma Seguransa Papapa	09:10	7.9	24.2	558	282	0.3	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	36
LP-5	Eks Edifiso SMASA Kuluhun	08:38	7.8	24.2	506	256	0.2	2.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-6	Edifiso SMASA Lautem	10:32	7.6	24.5	550	277	0.3	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-7	Central 3/Manuel da Costa	08:51	7.9	24.0	528	268	0.3	2.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC

**Legend:**

ND: not detectable

NT: not tested

NS: not set

=U: colony formed or TNC: Too Numerous To Count

Weather Report :

Sunny Cloudy Rain

Inspected by :

**Suggestions**

1. Bacteriological Is Problem
2. Boiling Water Before Drinking

Mario Soares Laboratory Manager

**District : Lautem**  
**Town : Lospalos**

Sampling Date : 23/05/2019

Sampled by : SMASA LAUTEM

Testing Date : 24/05/2019

Tested by : Estela Saldanha

No	Sampling Point	Time		pH	Temp.	Cond.	TDS	Sal	Turb.	Ca.Hard.	T.Hard	Alk.	NH <sub>3</sub> -N	NO3-N	NO <sub>2</sub> -N	Fe	Flu	Mn	SO <sub>4</sub> <sup>2-</sup>	T.Coli	E.Coli
		Sample	Test		( °C )	( μS/cm )	( mg/L )	( ‰ )	( NTU )	( mg/l )	( mg/l )	( mg/L )	( mg/L )	( mg/L )	( mg/L )	( mg/L )	( mg/L )	( mg/L )	( mg/L )	CFU	CFU
East Timor Guidelines		Hours And Minutes		6.5-8.5	NS	NS	1000	NS	5.0	NS	200	NS	1.5	10	1	0.3	1.5	0.5	250	0	0
LP-1	Puohopou Intake Sp	15:08	NT	8.2	19.9	512	287.0	0.3	0.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-2	Papapa Intake	15:12	NT	8.1	19.6	466	260.0	0.3	16.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-3	Uma Seguransa Papapa	15:25	NT	8.2	20.3	528	291.0	0.3	2.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	4	TNC
LP-4	Ex. Edifisio SAS	09:40	NT	8.2	20.5	501	275.0	0.3	0.8	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	12	TNC
LP-5	Sr. Vitor	09:50	NT	8.4	21.1	511	276.0	0.3	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	28	TNC
LP-6	Clinica Imanuel A	16:08	NT	8.5	21.5	526	282.0	0.3	0.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	5	TNC
LP-7	Clinica Imanuel B	16:12	NT	8.5	21.5	458	240.0	0.2	5.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
LP-8	Sr.Gil da Costa	16:20	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-9	Eurico da Costa	16:25	NT	8.5	23.2	525	278.0	0.3	0.7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC
LP-10	Edifisio SAS	16:27	NT	8.5	23.3	578	295	0.3	1.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	TNC	TNC

**Legend:**

**ND:** not detectable; **NT:** not tested; **NS:** not set; **CFU:** colony formed unit; **TNC:** Too numerous to count; **FAC:** free available chlorine

Weather Report : Sunny Cloudy Rain

Inspected by :

**Suggestions**

1. Turbidity a'as
2. Persiza hadia sistema distribuisaun tamba iha contaminasaun !
3. Nono be'e molok atu hemu !

Chief of DNSA Laboratory

Source - District Capitals Water Supply and Sanitation Master Plan - Baucau, Lospalos, Same and Viqueque

Appendix C

Water quality test results

Cycle 1 tests May 2014

		Town	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS	LOS PALOS
		Date	9-May-14	9-May-14	9-May-14	9-May-14	9-May-14	9-May-14	9-May-14	13/jun/14	13/jun/14
		Location	PAPAPA INTAKE	HOTEL ROBERTO CARLOS	RSS WELL	DISTRICT ADM. OFFICE	BEHIND CHURCH	ALDEIA NATURA/ SAS OFFICE	EX. KODIM LAMA	PUAHOPO	PAPAPA INTAKE
References and parameters	Units	WHO/TL Guideline	Sample Reference 4210	Sample Reference 4211	Sample Reference 4212	Sample Reference 4213	Sample Reference 4214	Sample Reference 4215	Sample Reference 4216	Sample Reference 4330	Sample Reference 4331
<b>Physical tests</b>											
pH	-	6.5 - 8.5	7.7	7.6	7.5	7.7	7.7	7.7	7.5	7.8	NT
E. Conductivity	µs/cm	NS	566	626	520	616	590	610	601	608	NT
TSS	mg/L	NS	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	NT
TDS	mg/L	1000	283	313	260	308	295	305	301	304	NT
Salinity	%	NS	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	NT
Temperature	oC	NS	28.4	28.0	27.1	28.6	28.1	32.0	28.2	20.4	NT
Turbidity	NTU	5	5.0	0.1	0.4	0.2	5.1	0.4	0.5	0.7	NT
<b>Chemical tests</b>											
NH3-N	mg/L	1.5	0.5	0.3	0.4	0.4	0.4	0.5	0.5	NT	NT
NO3-N	mg/L	10 (as NO3-N)	0.3	ND	0.1	0.1	0.2	0.1	0.1	NT	NT
NO2-N	mg/L	1 (as NO2-N)	0.007	0.004	0.005	0.003	0.005	0.005	0.006	NT	NT
Iron (Fe)	mg/L	0.3	0.04	0.03	0.03	0.1	0.03	0.1	ND	NT	NT
Manganese (Mn)	mg/L	0.5	ND	ND	ND	ND	ND	ND	ND	NT	NT
Fluoride	mg/L	1.5	0.10	0.15	0.06	0.1	0.2	0.2	0.1	NT	NT
Free chlorine	mg/L	0.5	ND	ND	ND	ND	ND	ND	ND	NT	NT
Ca hardness	mg/L	NS	235	210	200	225	230	175	240	NT	NT
Arsenic	mg/L	0.01	ND	ND	ND	ND	ND	ND	ND	NT	NT
T. Hardness	mg/L	200	240	225	230	245	245	245	240	NT	NT
Total alkalinity	mg/L	NS	225	215	220	240	240	240	230	NT	NT
Sulphate (SO4 2-)	mg/L	250	2	8	2	5	1	5	2	NT	NT
<b>Bacteriological test</b>											
Total coliform	CFU/100 mL	0	TNC	0	TNC	0	TNC	6	2	TNC	TNC
E. Coli	CFU/100 mL	0	TNC	0	TNC	1	TNC	6	8	2	2

Legend:

ND: not detectable; NT: not tested; NS: not set; CFU: colony formed unit; TNC: Too numerous to count; FAC: free available chlorine

Non compliant

Serious non compliance/health risk



## **Appendix 5. LOSPALOS PUBLIC CONSULTATION MEETING NOTES (5<sup>TH</sup> OCTOBER 2020)**

### **Public Consultation Notes**

#### **“Water Supply and Sanitation Investment Project”**

### **1. Summary of Public Consultation Agenda**

#### **Meeting Details**

Detail : 5<sup>th</sup> October 2020

Time : 2.00 PM to 6.00PM

Location : Lospalos Culture Centre, Suco Fuluro, Municipio Lautem

The public consultation was led by the Administrator of Lautem Municipality, accompanied by the National Director for Basic Sanitation, and lastly attendees coming from local authorities, representatives from the PNDS, Ministry of Public Works and ADB, with a total of 90 participants (Attendance Sheet provided in the subsequent Appendix).

The agenda was comprised of several sessions, as described below:

- a. Registry and video presentation
- b. Introduction: opening remarks from Aguas de Portugal Project Manager, National Director for Basic Sanitation and Lautem Municipality Administrator, and at the same time officially opened the meeting
- c. Technical presentation from the Consultant team, composed of:
  - i. General Vision of the Urban Water Cycle (Presented by Gaudencia, AdP Technical Engineer)
  - ii. General Vision of the Work for the Project (Presented by Gaudencia, AdP Technical Engineer)
  - iii. Water Component (Presented by Agostinho, AdP Technical Engineer)
  - iv. Sanitation Component (Presented by Agostinho, AdP Technical Engineer)
  - v. Environmental Component (Presented by Maria Helena, OASIS National Environmental Technician)
  - vi. Social Component (Presented by Mario Santos, AdP Project Manager)
- d. Coffee Break
- e. Discussion session (Q&A)
- f. Conclusion and Closure

Questions and recommendations during the Discussion session which were raised by the participants are summarised below.

### **2. Questions, Recommendation, Reclamations, Responds and Discussion (Q&A session)**

#### **2.1 Elio da Silva – Lapuru Aldeia Chief (Suco Fuluro)**

##### ➤ Questions & Suggestion: Master Plan

Mr. Elio stated that the presentation is really beneficial to the local community because it can help them to understand the project benefit. From Master Plan it is clearly seen that the WATSAN project only cover some aldeias, why it is happen?

He is also suggest that we should not change the design inside the master plan, as it has been gone through several verifications.

#### **2.2 Helio da Silva – Titilario Aldeia Chief (Suco Fuluro)**

##### ➤ Questions and Concern: Master Plan & Coordination

He appreciates the presentation and said it really helpful. He is questioned the master plan as it doesn't include some aldeias. Why some aldeias does not include in Master Plan? He is also concern about time management and coordination for the next meeting.

### 2.3 Delfin de Jesus – Planning Director of Lautem Municipality

- Concerns, Recommendation and Comments – Water demands, Cultural Site, Public Toilets  
Appreciated the presentation and the project plan that have been presented by the project proponent, one of the main concerns from the community according to our opinion in regards water demands and we have been talk about that with some engineers. He also said that the soil test related to two constructions are already finalized, thus there are water demands that comes from those constructions as well. On the other hand, he also stated that there will have 5 project constructions in Lautem Municipality. Therefore the project proponents also need to consider it regarding technical issues.  
He also concerns about the design as Lautem Municipality already planned to rehabilitate *Uma Lulik* – Sacred House and construct 3 public gardens with outdoor water fountain included. On the other hand, one of the main concerns from him in regards the design of Public Toilets. As mentioned in presentation it does not include the design for people with disabilities. He said that it can raise concern from the NGO and also from community. Therefore, he recommended to consider also the designs.  
He recommends that public toilets should also installed in some specific location as it presents higher demands of toilet.

### 2.4 Luis do Santos – Home Suco Chief

- Questions, concerns & Recommendation – Cost estimation & Public Toilets  
As local leader he appreciated and supports the Watsan project to continue and implement in near time. In regards about the contract of the project, does the project has a cost estimation? How about the development of the project, is it for short, medium or long term?  
He recommends to the project proponents to define the cost estimation for Home Suco with its expenditure mechanism and publish it to the local leader and also community to know about it. He also said that if possible, project owner can consider to install toilets for Suco's Building as at the moment they don't have any toilet yet.

### 2.5 Elio Pereira – Aldeia Chief, Suco Home

- Question & Recommendation – Project Impacts & Public Toilets  
Mr. Pereira asks about the impact to the existing boreholes when the construction begins. If it has an impact what should we do? He also stated about water tank dimension, Can you explained more about water tank dimension for Home Suco? He also recommends to construct public toilet in their Suco.

### 2.6 João Piedade – National Director for Basic Sanitation

- Government (Proponent) Comments – Coverage Area & Master Plan  
Mr. João stated that the situation in 2015 is not the same in 2020, therefore there are a lot of community that ask and questioning to enlarge the coverage area of the project. He also add that, there are some areas that considered as an urban area, however the project is not cover till that area. For example Titilari, the project is not cover that place. He hoped that the project owner can take into consideration some of the requirements that comes from the community.  
At the same time Mr. João also introduced Ms. Joanina from AdP to the community in general as she is always work in close cooperation with Local Authority and Community.  
He also considered comment that comes from planning Director of Lautem Municipality (sub-section 1.3) about the construction of public gardens with outdoor water fountain included and said that when we have resources than we can do that, however he asks to the local authority and community to support the implementation of the project.

He outlined that the objective of the public consultation is to collect all the concerns, recommendation, constructive ideas from all the stakeholders, local authorities and community so that the project proponents can take it into consideration before the construction begin.

Regarding concerns from sub-section 1.4 about the short, medium and long term, he argue that it has already finished when published the final report of Master Plan. At the moment we already begin Detail engineering design to find out the source of the potential springs in order to add the water volume and its flow.

Appreciated local authorities and communities because they can work together in order to develop their mother land. He recommends to informed AdP Consultant representation Mr. Jose Serafin (Former DNSA staff) if they have or get some issues related to the project.

➤ Consultant's Clarification to Respond sub-section 2.5:

**Aguas de Portugal - Mario Santos :** As it has been explained during the presentation regarding sustainability of the water boreholes, we have an equipment that help us to do the test in order to guarantee water sustainability in Home Suco' s and others suco's as well. That equipment's also will allow us to understand whether new boreholes that we planned to do will affect the springs or not.

➤ Consultant's Clarification to Respond sub-section 2.5:

**Águas de Portugal - Julio:** Regarding water tank, it will consist of concrete wall in which will installed in four different areas with one tower respectively. In Suco Home will install one concrete tank with capacity for 700 cubic meters. These tanks also will provide with treatment facilities and security guards.

He also outlined the restricted area for the participants. He said that when all the water tanks and tower are already installed than those areas will prohibited to community in general and also animals to approach in order to avoid any possible damage to the installation site. The installation area for water tanks will cover approximately 4892 square meters.

----- END OF NOTES -----

## Appendix 6. SELECTED PHOTOGRAPHS OF THE PUBLIC CONSULTATION FOR LOSPALOS CITY



Participation of the Local Community and Other Stakeholders During the Consultation



Lautem Municipality Administrator, as the Chairman for Public Consultation Meeting, accompanied by AdP Project Manager, DNSB Director and SMASA - Lautem Director



Environmental Component Presentation by Maria Helena (OASIS National Environmental Technician)



Q&A from Local Administration Leaders i.e. Suco Home



Q&A from Local Administration Institution i.e. Lautem Municipality Planning Directorate



SMASA Lautem Director responding to questions from participants

**Appendix 7. ATTENDANCE SHEET OF THE STAKEHOLDERS DURING PUBLIC  
CONSULTATION**



MINISTÉRIO DAS OBRAS PÚBLICAS  
DIRECÇÃO GERAL AGUA E SANEAMENTO (DGAS)

Rua: Avenida 20 de Maio - Calcoi, Caixa postal No 17, Tel. 3317157, 3317156 - Dili

"Consulta Pública ba Desenvolvimento Projeto Abastecimento Be'e Mos no Saneamento Iha Capital Municipio"

Dia: 05 de Outubro de 2020

LISTA PREZENZA

MUNICIPIO LOSPALOS

NO	NARAN	SEXO		INSTITUISAUN/POZISAUN	SUCCO/ALDEIA	NO CONTACTO	ASSINATURA
		F	M				
1	ORSCORAL GUTERRES		✓	PNTL	FUIDREU	78106047	
2	Regina da Jesus Ribeiro	✓		M.J. - DTASC	hospala	77305081	
3	Alfredo da Costa, S.DP	✓		PNTL Esq. Laga Lone II	Lone II	95958853	
4	ABOITINHO NOBRETEO DE DIMO	✓		SMATA / FPA	Ruicora	77345230	
5	João Henriques	✓		Kunidade	Heme	77379719	
6	FRANCISCO DOS SANTOS	✓		KOMUNIDADE	HORE	— 11 —	
7	João da Costa	✓		Kefe Aldeia	Fuillor/Lorokha	77398527	

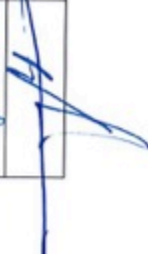



8	Nataniel dos Santos	✓	SMASA	lospalos	-	
9	Bernardo da S. da C.	✓	SMASA	lospalos		
10	Jose Vilanova Pires	✓	SMASA Lhu	lospalos	94326901	
11	Acacio M. Pereira	✓	SMASA Lhu	lospalos	77057093	
12	Reynold P. Menezes	✓	ADP	D. li	72300000	
13	Faustino da C. Silva	✓	Chefe Alcala	Fuiforo	77535796	
14	Leonida Vero da Costa	✓	Stagada SMASA	lospalos		
15	Zeferina Maria Mendes Moura	✓	Stagada SMASA	lospalos		
16	Elcio da Silva Sacramento	✓	Chefe Alca	TITUTAI	77117166	
17	Luís Viegas, Prieto	✓	Eng. SMASA	lpe	77350630	
18	Delhim de Jesus	✓	MAT- laudem	lospalos	77310817	
19	Miguel Boas	✓	Pastesipantes	Home	-	
20	XISTO-F. PINTO	✓	-	HOM	76689218	
21	Fernando da Costa	✓	SMASA	laudem	7726609	
22	João de Piedade	✓	DITAS-riop	Bili	77327413	

23	OSCAR BIAH MAREBAS	✓	detalhado	Terreirão		
24	Teodoro Pereira	✓	SMACA LAUREN	Enthome		
25	Gr. Loures	✓	QMSB. Nacional	lopatos		
26	Luís dos Santos	✓	Xefe Seco	14 onça	70 40000	
27	Alencar de Pereira	✓	SMASA	30 de Agosto	-	
28	Agusta Maria	✓	SMASA	30 de Agosto	-	
29	João Xavier	✓	X.G. Houe	Houe	7666109	
30	Luís Xavier	✓	X.G.	Houe	77381559	
31	Agostinho Pires	✓	Veterano	fuilao		
32	Juvenio P. Mulero	✓	PTAS Hane	Hane	777116301	
33	Daniel Sampaio	✓	Comunidade	Itana		
34	Feliciano B. Oliveira	✓	Comunidade	Houe	-	
35	Honório Monteiro	✓	Xefe Aldeia	Houe	26121920	
36	Ezequiel Loualtes	✓	parf. Sifanto	Houe	76572222	
37	VIMARIO PINTS	✓	SAS	FULLNO	79717823	
38	Gilberto Fernandes	✓	Comunidade	Houe	75418486	

39	CARTELIO JUNIOR		✓	Remunidade	Home	—	—	Colf
40	DEOLINDO BARBOSA		✓	—	—	—	—	Brayda
41	JUIETO DOS SANTOS	P	✗	—	—	—	—	João
42	ERMINIA DACOSTA	P		—	—	—	—	Eug
43	MAROTIN MORELLO		✓	—	—	—	—	João
44	ANITO DA COSTA		✓	—	—	—	—	Alm
45	CLARISSA DE JESUS	P		—	—	—	—	Clara
46	JUIO FERNANDES		✓	Is EOM	—	—	—	João
47	CARLOS FERRAZ		✓	—	—	—	—	João
48	FRANCISCO FERNANDES		✓	—	—	—	—	
49	GIZ AMARAL		✓	—	—	—	—	
50	ELIARIO D.C		✓	—	—	—	—	
51	ELISINHA XIMENES		✓	—	—	—	—	
52	LUSIANA JANUARIO		✓	—	—	—	—	João
53	ORFANCI DACRUZ		✓	—	—	—	—	João
54	CRISTINA DACOSTA		✓	—	—	—	—	João

55	ROZILDA DASILVA	✓		comunidade	Home	-	Rec
56	izelia pereira	✓		comunidade	Home	-	Fig
57	ERCILIA FERNANDES	✓		-11-	Home	-	Eco
58	AGRIPINA BUINETA	✓		-11-	Home	-	Rec
59	<del>Cambeita</del> daceste		✓	-11-	-	-	Rec
60	Quilvia Fernandes	✓	✓	-11-	Home	-	Rec
61	Sersio da Silva	✓	✓	-11-	-	-	Rec
62	Leonar Almeida	✓	✓	-11-	-	-	Rec
63	Florencia Branco	✓	✓	-11-	-	-	Rec
64	Emmelinda dasilva	✓	✓	-11-	-	-	Rec
65	FLORENTINA JANUARI	✓	✓	-11-	-	-	Rec
66	ROSIMTA PEREIRA	✓	✓	-11-	-	-	Rec
67	JUVIITA DO SANTOS	✓	✓	-11-	-	-	Rec
68	LINDA DA COSTA	✓	✓	-11-	-	-	Rec
69	FELISIDADE LOPES	✓	✓	-11-	-	-	Rec
70	Tate dos Santos	✓	✓	-11-	-	-	Rec

71	COSENCO AMARAL	✓	Chuncho	Itua	-	<i>Lucy</i>
72	DORICO DE COSTA	✓	-	-	-	<i>Don</i>
73	Martinho Pereira	✓	Comunidade	Central Fuiro	75153042	<i>Lucy</i>
74	Herdeiro Belmonde	✓	SAS	Lospala	75357511	<i>Chit</i>
75	Alexandre Mendes	✓	SAS	Lospala	7301356	<i>Chit</i>
76	Joaquim da Costa	✓	Bm.	LEDETOHO		<i>Chit</i>
77	Alza Soares Gonzaga	✓	rega top PAP	Administrador	78806273	<i>Chit</i>
78	Alda da Costa	✓	SAS	administrador	78101370	<i>Chit</i>
79	Auriliadora de Jesus	✓	SAS	-	76335247	<i>Chit</i>
80	Domingas Quintas Cruz	✓	SAS	-	76811225	<i>Chit</i>
81	Therese Jones T	✓	SAS	Lospala	77844847	<i>Chit</i>
82	Amoroso da Costa	✓	lia na in	Hone	75832816	<i>Chit</i>
83	Bonifacio de Jesus M. Soares	✓	Comunidade	Fuilo	77135868	<i>Chit</i>
84	Aldean P. A Lopes	✓	PATL	Fuilo	76411352	<i>Chit</i>
85	Frederico L. Pereira	✓	PATL	Soalo	75609674	<i>Chit</i>
86	Faustino Soares	✓	PATL	Fuilo	76353725	<i>Chit</i>

87	Zeferino dos S. Sequeira	✓	Am. laureau	77311656	
88	Corneia f-m	✓	Oficial GAF	77326745	
89	Oscarimans	✓	P.N.T.L		
90	Augusto José Pereira	✓	P.N.T.L	76227596	
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## Appendix 8. SPOIL MANAGEMENT PLAN

### SPOIL MANAGEMENT PLAN

#### A. Spoil Management Plan

The SMP is to describe how the contractor will manage the generated spoil and reuse related to design and construction activities. This is an integral part of EM.

##### 1. Objectives of SMP:

- To minimize spoil generation
- To maximize beneficial reuse of spoil from construction activities in accordance with spoil management hierarchy
- To minimize environmental impacts on resident and other receivers
- Minimize and/or avoid any further site contamination of land, water and soil

##### 2. Structure of SMP:

Section 1: Introduction of SMP

Section 2: Legal and other requirements

Section 3: Roles and responsibilities

Section 4: Identification and assessment of spoil aspects and impacts

Section 5: Spoil volumes, characteristics and minimization

Section 6: Spoil reuses opportunities, identification and assessment

Section 7: On site spoil management approach

Section 8: Spoil transportation methodology

Section 9: Monitoring, Reporting, Review, and Improvements

##### 3. Aspects and Potential Impacts:

Aspects	Potential Impacts
Air Quality	Airborne dust generation due to wind
Sedimentation	Sediment laden site runoff from spoil stockpiles and spillage of spoil from truck on roads
Surface and Groundwater	Contamination of water quality
Noise	Temporary duration associated with spoil handling, haulage and storage
Traffic	Associated with spoil haulage
Land Use	Spoil being transported to a receivable site that doesn't have a permission for disposal

#### B. Spoil Volumes, Characteristics and Minimization

1. **Spoil Volume Calculations.** Estimate the volumes of spoils produced from each of the construction sites.
2. **Characterization of Spoil.** Based on the type of spoil (sand, stone, mix materials, reusable materials).
3. **Adopt Spoil Reduce, Reuse Opportunities.** An overview of the assessment methodology to be used:
  - a. Consideration of likely spoil characteristics

- b. Identification of possible reuse sites
- c. Screening of possible reuse opportunities

**4. Identification of Possible Safe Disposal Sites for Spoil.** Those spoils which can't be reuse shall be properly disposed in designated areas; such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

### **C. Storage and Stock Piling**

- 1. Stockpiling.** Spoils shall be stockpiled at locations at least 300 m away from water courses and covered.
- 2. Transportation and Haulage Route.** Based on the above, the contractor will have to prepare a transport and route plan, and submit it to the consultant for review and approval.

**Appendix 9. MEETING NOTES – NATIONAL DEPARTMENT OF CULTURAL  
PATRIMONY, SECRETARY OF STATE FOR ART AND CULTURE (SEAC) ON  
THE 7<sup>TH</sup> & 22<sup>ND</sup> SEPTEMBER 2020**

**Meeting Notes**

**“Water Supply and Sanitation Investment Project”**

Venue	Secretary of State for Arts and Culture Main Office, Pantai Kelapa
Date	September 7, 2020
Time	9.45 – 11.00
Interviewer	5. Maria Helena A. de Jesus
Sources/Participants	<ol style="list-style-type: none"> <li>1. Irene dos Reis Goncalves (Chief Department of Archeology)</li> <li>2. Ilisio do Carmo (Personnel staff)</li> <li>3. Eustorgio da Silva (Personnel staff, Archeologist)</li> <li>4. Joaquina Lopes (Personnel staff)</li> <li>5. Leandro Aristides (Personnel staff, Archeologist)</li> <li>6. Chris (Personnel staff, Engineer)</li> <li>7. Carlos (Personnel staff, Engineer)</li> </ol>
<p>Ms. Maria Helena (National Environmental Technician) on behalf of OASIS conveyed the objective of the meeting; to request cultural heritage sites data in all 4 Municipals in a form of shapefilez/kmz files in adherence to a request letter sent from the Ministry of Public Works (MPW) with a reference number 172/C50605/Gab.DGAS/MOP/VII/2020. This aiming to identify whether or not the sites are located adjacent to the project components and how they will impact on the related sites. Ms. Maria Helena also stated that the Environmental team from OASIS has identified several cultural, touristic and historical sites during the field visit in 4 Municipals. Hence, adjusting the data prepared from the National Directorate of Cultural Patrimony would be very beneficial in order to complete the information for subsequent mapping and analysis of environmental and social impacts.</p> <p>Mrs. Irene Goncalves, Mr. Ilisio do Carmo and Mr. Leandro Aristides expressed gratitude and explained briefly on each of the personnel's roles who participated on the meeting. They are willing to share what the team requested, although some of the data are still confidential and cannot be publicized in order to avoid any interested parties in taking advantage of the assets. They highlighted the importance of their involvement in various projects and reminded us to invite the delegated person from the mentioned department to have a joint site visit whenever if necessary. The objective of the statement is to gain additional insights as inputs particularly for the Department of Archeology. Thus, the Chief Department and colleagues would like to know the location and total of the sites that the OASIS team had identified.</p> <p>Ms. Maria Helena intervened that the site visits that the OASIS team had conducted was to characterize the environmental condition in the project area and had collaborated with local authority and Municipal Cultural center to gain the needed information. At the current moment, the OASIS team only needs the said description of the data, photographs, and kmz or shapefiles of the cultural heritage sites within the 15 km radius of the project area. The OASIS team for WATSAN project considers the existence of Secretary of State for Arts and Culture and will need the presence of their participation during the Public Consultation in all 4 Municipalities which will be conducted very soon within this September post submitting the IEE documents to ANLA. And the OASIS team is ready to do a presentation in regards to the related project's sensitive and cultural sites cumulated during the last site visit, if needed.</p> <p>Mrs. Irene, Mr. Ilisio, Mr. Leandro and Ms. Maria Helena agreed and confirmed that OASIS team will do a presentation on Thursday, September 9 at 3 o'clock in the afternoon.</p>	


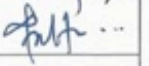



Venue	Secretary of State for Arts and Culture, Pantai Kelapa
Date	September 22, 2020
Time	9.00 – 10.00
Interviewer	6. Maria Helena A. de Jesus
Sources/Participants	<ol style="list-style-type: none"> <li>1. Irene Goncalves dos Reis (Chief of Department of Archeology)</li> <li>2. Maria Isabel Alves do Rego (Architecture)</li> <li>3. Eugenio de J. Sarmento (Chief of Department of Architectonic)</li> <li>4. Octaviano Mota (Engineer)</li> </ol>

	5. Lisandro Manuel (Engineer) 6. Jose P. de S. Garcia (Staff) 7. Romeu Soares da Silva (Staff) 8. Elisio do Carmo (Staff/Technician)
<p>The objective of the meeting is to provide information of the cultural, touristic, sacred, and other heritage sites identified by the OASIS team in a form of power point presentation, which included photographic documentation, coordinate locations list, and mapping presentation. This meeting is to comply the National Department of Cultural Patrimony agreement with the OASIS team which was represented by the National Environmental Technician, Maria Helena, during a meeting conducted on the 7<sup>th</sup> of September 2020 and in relevance with MPW request letter No. 172/C50605/Gab.DGAS/MOP/VII/2020 aiming to receive data of location and description of the patrimony cultural in the associated 4 Municipalities.</p> <p>The meeting was attended by 8 participants coming from the Secretary of Arts and Culture and was commenced with a presentation from Maria Helena regarding to the Cultural Patrimony sites that was defined or identified by the OASIS team during a site visit for the Preliminary Design phase.</p> <p>Post the presentation is the discussion session composed of questions and recommendations from the Secretary of Arts and Culture party and answers were provided by Maria Helena. The discussion session is described below:</p> <ol style="list-style-type: none"> <li>1. <b>Q:</b> During the replacement of the pipe, what is the type of the pipe would your consultant recommend on implanting? (Octaviano Mota)  <b>A:</b> For transmission lines, the selected material would be HPDE and Ductile Iron. Meanwhile, the distribution network will be using HDPE</li> <li>2. <b>Q:</b> In this project that you are referring to, will it give a direct or indirect impact towards the cultural objects? And how do you plan to mitigate? (Elisio do Carmo)  <b>A:</b> The impact would mostly be direct coming from various construction activities, although the duration will be temporary. The mitigation would be in compliance with the Decree Law No. 33/2017 by not interfering the 50 m radius of each object located adjacent to the distribution alignments or any other project components.</li> <li>3. Request from Chief of Department, <b>Mrs. Irene</b>: Sharing the kmz files of distribution lines in order for them to inform us for additional information of the cultural patrimony object or other historical sites.</li> <li>4. Suggestion from <b>Mr. Jose Garcia</b>: If possible, the cultural sites that have been identified should also be described with their historical background  Respond: It is not part of our scope of work</li> <li>5. Comment from <b>Mr. Octaviano Mota</b>: The magnitude of the impacts towards the cultural objects won't be strong comparing to the Drainage (DDIUP) project for Dili</li> </ol>	

# Appendix 10. Attendance Sheet – SEAC




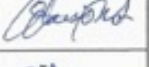
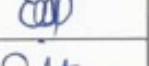
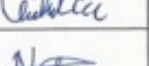


## ATTENDANCE SHEET MEETING AT THE STATE SECRETARY OF ARTS AND CULTURE, TIMOR-LESTE FOR “CONSULTING SERVICES FOR DETAILED ENGINEERING DESIGN OF TIMOR – LESTE FOUR MUNICIPAL CAPITALS WATER SUPPLY & SANITATION PROJECT”

Tuesday, 22<sup>nd</sup> of September 2020  
Dili, Timor-Leste

No.	Naran	Instituisaun	Pozisaun	No. Kontaktu	Asinatura
1	Irene Gonçalves dos Reis	SEAC / DNPC	regi Depart. AE	77399133	
2	Maria Isabel Alves do Rego	SEAC / <del>DNPC</del>	Arquiteta	77132215	
3	Eugenio de J. Sarmiento	SEAC	chef departamento	-	
4					
5	Octaviano Nola	SEAC / DGAE	Engineer	77674555	
6	Lisandro Manuel	SEAC / DGAC	Engineer	77382208	
7	Jose P. de S. Garcia	SEAC / DNPC	Staff	77572617	
8	Romeu Soares da Silva	SEAC / DNPC	staff	75332636	R
9	Elisio do Carmo	SEAC / DNPC	staff	77316772	SA

**ATTENDANCE SHEET**  
**MEETING AT THE STATE SECRETARY OF ARTS AND CULTURE, TIMOR-LESTE**  
**FOR**  
**"CONSULTING SERVICES FOR DETAILED ENGINEERING DESIGN OF TIMOR – LESTE FOUR MUNICIPAL CAPITALS**  
**WATER SUPPLY & SANITATION PROJECT"**

Monday, 7<sup>th</sup> of September 2020  
Dili, Timor-Leste

No.	Naran	Instituisaun	Pozisaun	No. Kontaktu	Asinatura
1	Irene Gonçalves dos Reis	SEAC / DNPC	chef Depart. AE	77399935	
2	Landrao A. de B. Aze	SEAC / DNPC	Staff	75662685	
3					
4	Joaquim Lopes	SEAC / DNPC	staff	77269730	
5	Estanislau Mota	SEAC / DNPC	Engineer	-	
6	Eustorgio da S.P. Lopes	SEAC / DNPC	Staff	-	
7	Cristoforo C.C. Carvalho	SEAC /		-	
8	Natalia de Jesus A. Ximenes	SEAC / DNPC	Staff	-	
9	Elisio do Carmo	SEAC / DNPC	Staff	-	

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**Appendix 11. ENVIRONMENTAL LICENSES FROM THE DISTRICT CAPITALS  
WATER SUPPLY PROJECT IN PANTE MACASSAR AND MANATUTO CITIES**



**REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE**  
**National Directorate for Environment, State Secretariat for Environment,**  
**Ministry for Commerce, Industry and Environment**

**ENVIRONMENTAL LICENSE**  
**Issued under Decree Law on Environmental Licensing No. 05/2011**

In accordance with decision dated on 07<sup>th</sup> August 2014 by the *State Secretary for Environment* Mr. Numinando Soares Martins "Buras" Approved the Simplified Environmental Impact Statement. Hence, pursuant to the Chapter VI of Decree Law on *Environmental Licensing 05/2011* (Decree Law 05/2011), and Issued Environmental License for the activity referred to the Schedule below which subject to the conditions contained in the **Annex**.

***Schedule***

<b>Proponent of Project:</b>	National Directorate of Water Supply Services
<b>Date Submitted Application:</b>	29 <sup>th</sup> of March 2014
<b>Application Number:</b>	20/ AIA-DNMA /XI/ 2013
<b>Environmental License Number:</b>	06 / C:B-5 / SSE-MCIE / VIII / 2014
<b>Activity Scale:</b>	Distance 15.09 km(Transmission pipe 15090m and distribution pipe 68741m; maximum depth 1m)
<b>District and Sub-district:</b>	Manatuto
<b>Category of Project:</b>	Category B
<b>Project:</b>	Upgrading and Rehabilitation of Existing Water supply
<b>Date of Notification:</b>	07 <sup>th</sup> of August 2014

***Notes***

1. This Environmental License is non-transferrable in accordance with Articles 22 (4) of Decree Law 05/2011.
2. Proposed changes to the project affecting environmental impacts or the project area/size, or relocation, are subject to technical review and approval in accordance with Chapter VIII of Decree Law 05/2011.
3. Appeal rights are governed by *Decree Law 32/2008 on Administrative Procedure*.
4. The Proponent is solely responsible for ensuring all other necessary renewal license, permit, authorisations or recommendations are obtained from relevant government authorities.

5. The Proponent is responsible for ensuring that all subcontractors or others carrying out works associated with this Environmental License comply with the SEIS, EMP and terms of this Environmental License.
6. All future communications, documents and reports prepared by or on behalf of the Proponent in relation to the Project and submitted to the National Directorate for Environment ('DNMA') shall be in both Tetum and English, and in both electronic and hard copy.

***Annex - Conditions of Environmental License***

*The conditions contained in this Annex are to protect the environment and to mitigate the environmental impacts of the Project.*

**General Conditions**

1. *Project in accordance with initial environmental examination documents, and future environmental licenses*
  - 1.1 The District Capital Water Supply Project must be conducted in accordance with the Final Report of Simplified Environmental Impact Statement (SEIS) prepared by Project Implementation Unit Consultant dated 20<sup>th</sup> of March 2014 and the incorporated Environmental Management Plan (EMP), except as modified or amended by this Environmental License.
  - 1.2 The Expansion, Rehabilitation and operation and maintenance of Manatuto Water Supply Systems must be conducted in accordance with Asia Development Bank Safety Environmental Principle.
  - 1.3 The Nature, Size, Location and Importance of the Project, described on page 12 – 15 (5.1-5.2) of the SEIS, strictly states the Project Site Boundary for all development and construction activities related to The District Capital Water Supply Project.
  - 1.4 To successfully implement the EMP the SEIS has given adequate instructions for the Project Implementation Unit (PIU) to monitor and report environmental compliance all through the project implementation period.
  - 1.5 As planned in the SEIS this Water Supply Project is given the Environmental License granted for two (2) years starting from the Date of the Notification mentioned in *Licensing*
  - 1.6 Any proposed changes, alterations or additions to the Project that the Proponent wishes to undertake that are not consistent with the SEIS and EMP and this Environmental License will require an additional Environmental License or amendment of this Environmental License, in accordance with relevant provisions of *Decree Law 05/2011*.
  - 1.7 DNMA may review and alter any conditions in this Environmental License, including by requiring alterations to the Environmental Management Plan, to respond to any proposed changes to any component of the Project through any application made by the Proponent to DNMA relating to the Project, if DNMA deems it necessary to do so to protect the environment.

### Additional requirements and modifications

#### *2. Construction phase*

- 2.1 When the activity starts, community near the area of the project must be included to offer them jobs in which could help minimize the social impacts.
- 2.2 The proponent must coordinate with other institution that related to this activity before implementing the project.
- 2.3 For air quality related to dust, inspection should be done to ensure that residents living along the construction route are not affected. Hence spreading water will help minimize dust emission close to the residential areas;
- 2.4 The proponent must assure that water bodies nearby are safe from siltation and contamination that includes fuel and lubricants used in the rehabilitation of the water supply project;
- 2.5 The proponent must enforce the disposal of surplus material at environmentally safe disposal/ fill sites and that spoil stockpiles are managed properly;
- 2.6 Soils from the excavation must not be disposed of near the water bodies, paddy field, Farmland and community's residential area along the road rehabilitation route;
- 2.7 Sites where rocks and sands are excavated should be 20 meters away from the river bank;
- 2.8 Avoiding excavation of soil and stone in the sensitive environmental areas (protected area/ Forest, potential landslides field, high elevation hills, etc);
- 2.9 When the project is complete, excavated areas must be rehabilitated, materials dumping, Facilities for staff and logistic installed must be demolished and managed it properly;
- 2.10 Actively monitor the water bodies that are close to the construction site during the Rehabilitation process;
- 2.11 The community from the residential areas, horticulture, paddy fields, And other types of farmlands and agricultural plantation whom are affected must be Given compensation in a fair and just manner;
- 2.12 Avoiding in necessary eviction. If any target household need to be remove, please Negotiate in fair manner and applying *prior consent principle*
- 2.13 During the rehabilitation activity, noise from the excavator must be controlled, need to Install appropriate warning signal for safety traffic, for the safety of worker and road Users;
- 2.14 Trucks carrying construction materials (sand, stones, cement etc) must be covered by Tarpaulin to prevent materials from falling off of the trucks;
- 2.15 Alternative roads must be built to ensure that public transportations are not delayed during the rehabilitation;

- 2.16 Rehabilitate eroded areas that caused by the construction activity;
- 2.17 During daytime construction site should be sprayed with water every three hours each day along the Rehabilitation project route;
- 2.18 Prepare disposal site for solid and liquid waste from the construction activity, excavator and trucks; except dangerous waste (oil ,lubricant and so on)
- 2.19 Worker and staff compound close by community village must be develop in coordination with local leaders and the residence. Worker and staff need to respect local people, ritual, symbols of believe and cultures;
- 2.20 Need to apply local content principle for the involvement of local people in working Opportunity and possible local material procurement;
- 2.21 Identified appropriate location for material (sand, stone, wood, water and other material) collection;
- 2.22 Due to the instability of soil, high elevation of the areas and impact of climate change (more rain or less rain could cause erosion), there is need to have bio engineering expert in providing knowledge and techniques to community for re-vegetation and reforestation;
- 2.23 The Proponent must ensure that the waste is disposed of at disposal area;
- 2.24 After the project is finally done, the company is responsible to clean up all the waste and piles from the construction activity along the project route.

National Directorate of environment will be supervision and oriented company refer to the Environment License and Environment Management Plan.

Dili, 07<sup>th</sup> of August 2014

Approved by:



**Numinando Soares Martins "BURAS"**  
Secretary of State for Environment



**REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE**  
**National Directorate for Environment, State Secretariat for Environment,**  
**Ministry for Commerce, Industry and Environment**

**ENVIRONMENTAL LICENSE**  
**Issued under Decree Law on Environmental Licensing No. 05/2011**

In accordance with decision dated on 07<sup>th</sup> August 2014 by the State Secretary for Environment Mr. Numinando Soares Martins "Buras" Approved the Simplified Environmental Impact Statement. Hence, pursuant to the Chapter VI of Decree Law on *Environmental Licensing 05/2011* (Decree Law 05/2011), and Issued Environmental License for the activity referred to the Schedule below which subject to the conditions contained in the Annex.

**Schedule**

<b>Proponent of Project:</b>	<b>National Directorate of Water Supply Services</b>
<b>Date Submitted Application:</b>	<b>20<sup>th</sup> of March 2014</b>
<b>Application Number:</b>	<b>20/ AIA-DNMA /XI/ 2013</b>
<b>Environmental License Number:</b>	<b>06 / C:B-S / SSE-MCIE / VIII / 2014</b>
<b>Activity Scale:</b>	<b>Distance 6.7 km(Transmission pipe 6768m and distribution pipe 39615m; maximum depth 1m)</b>
<b>District and Sub-district:</b>	<b>Pante Macasar, Oecusse</b>
<b>Category of Project:</b>	<b>Category B</b>
<b>Project:</b>	<b>Upgrading and Rehabilitation of Existing Water supply</b>
<b>Date of Notification:</b>	<b>07<sup>th</sup> of August 2014</b>

**Notes**

1. This Environmental License is non-transferrable in accordance with Articles 22 (4) of Decree Law 05/2011.
2. Proposed changes to the project affecting environmental impacts or the project area/size, or relocation, are subject to technical review and approval in accordance with Chapter VIII of Decree Law 05/2011.
3. Appeal rights are governed by *Decree Law 32/2008 on Administrative Procedure*.
4. The Proponent is solely responsible for ensuring all other necessary renewal license, permit, authorisations or recommendations are obtained from relevant government authorities.
5. The Proponent is responsible for ensuring that all subcontractors or others carrying out works associated with this Environmental License comply with the SEIS, EMP and terms of this Environmental License.

- 6 All future communications, documents and reports prepared by or on behalf of the Proponent in relation to the Project and submitted to the National Directorate for Environment ('DNMA') shall be in both Tetum and English, and in both electronic and hard copy.

***Annex - Conditions of Environmental License***

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**General Conditions**

1. *Project in accordance with initial environmental examination documents, and future environmental licenses*
  - 1.1. The District Capital Water Supply Project must be conducted in accordance with the Final Report of Simplified Environmental Impact Statement (SEIS) prepared by Project Implementation Unit Consultant dated 20<sup>th</sup> of March 2014 and the incorporated Environmental Management Plan (EMP), except as modified or amended by this Environmental License.
  - 1.2. The Expansion, Rehabilitation and operation and maintenance of Manatuto Water Supply Systems must be conducted in accordance with Asia Development Bank Safety Environmental Principle.
  - 1.3. The Nature, Size, Location and Importance of the Project, described on page 13 – 19 (5.1-5.2) of the SEIS, strictly states the Project Site Boundary for all development and construction activities related to The District Capital Water Supply Project.
  - 1.4. To successfully implement the EMP the SEIS has given adequate instructions for the Project Implementation Unit (PIU) to monitor and report environmental compliance all through the project implementation period.
  - 1.5. As planned in the SEIS this Water Supply Project is given the Environmental License granted for two (2) years starting from the Date of the Notification mentioned in *Licensing*.
  - 1.6. Any proposed changes, alterations or additions to the Project that the Proponent wishes to undertake that are not consistent with the SEIS and EMP and this Environmental License will require an additional Environmental License or amendment of this Environmental License, in accordance with relevant provisions of *Decree Law 05/2011*.
  - 1.7. DNMA may review and alter any conditions in this Environmental License, including by requiring alterations to the Environmental Management Plan, to respond to any proposed changes to any component of the Project through any application made by the Proponent to DNMA relating to the Project, if DNMA deems it necessary to do so to protect the environment.

### Additional requirements and modifications

#### **2. Construction phase**

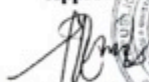
- 2.1 When the activity starts, community near the area of the project must be included to offer them jobs in which could help minimize the social impacts;
- 2.2 For air quality related to dust, inspection should be done to ensure that residents living along the construction route are not affected. Hence spreading water will help minimize dust emission close to the residential areas;
- 2.3 The proponent must coordinate with other institution that related to this activity before implementing the project;
- 2.4 The proponent must assure that water bodies nearby are safe from siltation and contamination that includes fuel and lubricants used in the rehabilitation of the water supply project;
- 2.5 The proponent must enforce the disposal of surplus material at environmentally safe disposal/ fill sites and that spoil stockpiles are managed properly;
- 2.6 Soils from the excavation must not be disposed of near the water bodies, paddy field, Farmland and community's residential area along the road rehabilitation route;
- 2.7 Sites where rocks and sands are excavated should be 20 meters away from the river bank;
- 2.8 Avoiding excavation of soil and stone in the sensitive environmental areas (protected area/ Forest, potential landslides field, high elevation hills, etc);
- 2.9 When the project is complete, excavated areas must be rehabilitated, materials dumping, Facilities for staff and logistic installed must be demolished and managed it properly;
- 2.10 Actively monitor the water bodies that are close to the construction site during the Rehabilitation process;
- 2.11 The community from the residential areas, horticulture, paddy fields, And other types of farmlands and agricultural plantation whom are affected must be Given compensation in a fair and just manner;
- 2.12 Avoiding in necessary eviction. If any target household need to be remove, please Negotiate in fair manner and applying prior consent principle
- 2.13 During the rehabilitation activity, noise from the excavator must be controlled, need to Install appropriate warning signal for safety traffic, for the safety of worker and road Users;
- 2.14 Trucks carrying construction materials (sand, stones, cement etc) must be covered by Tarpaulin to prevent materials from falling off of the trucks;
- 2.15 Alternative roads must be built to ensure that public transportations are not delayed during the rehabilitation;

- 2.16 Rehabilitate eroded areas that caused by the construction activity;
- 2.17 During daytime construction site should be sprayed with water every three hours each day along the Rehabilitation project route;
- 2.18 Prepare disposal site for solid and liquid waste from the construction activity, excavator and trucks; except dangerous waste (oil ,lubricant and so on)
- 2.19 Worker and staff compound close by community village must be develop in coordination with local leaders and the residence. Worker and staff need to respect local people, ritual, symbols of believe and cultures;
- 2.20 Need to apply local content principle for the involvement of local people in working Opportunity and possible local material procurement;
- 2.21 Indentified appropriate location for material (sand, stone, wood, water and other material) collection;
- 2.22 The Proponent must ensure that the waste is disposed of at disposal area;
- 2.23 Due to the instability of soil, high elevation of the areas and impact of climate change (more rain or less rain could cause erosion), there is need to have bio engineering expert in providing knowledge and techniques to community for re-vegetation and reforestation;
- 2.24 After the project is finally done, the company is responsible to clean up all the waste and piles from the construction activity along the project route.

National Directorate of environment will be supervision and oriented company refer to the Environment License and Environment Management Plan.

Dili, 07<sup>th</sup> of August 2014

Approved by:



**Numinando Soares Martins "BURAS"**  
Secretary of State for Environment



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## Appendix 12. APPLICABLE ENVIRONMENTAL QUALITY STANDARDS

### (1) Ambient Air Quality Standards

Source: WHO Air Quality Guidelines (2000) and Global Update (2005)

Parameter	Averaging Period <sup>a</sup>	WHO Air Quality Guidelines ( $\mu\text{g}/\text{m}^3$ )		Standards to be followed by Project ( $\mu\text{g}/\text{m}^3$ )
		Global Update 2005 <sup>b</sup>	Second Edition 2000 <sup>c</sup>	
PM <sub>10</sub>	Annual	20		20
	24-Hour	50		50
PM <sub>25</sub>	Annual	10		10
	24-Hour	25		25
SO <sub>2</sub>	24-Hour	20		20
	10-minute	500		500
NO <sub>2</sub>	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

<sup>a</sup> Due to short term duration of civil works, the shortest period will be more practical to use.

<sup>b</sup> Source: World Bank Group. IFC. 2007. Environmental, Health and Safety General Guidelines.

<sup>c</sup> Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

### (2) Ambient Noise Standards

Source: World Bank Group. IFC. 2007. Environmental, Health and Safety General Guidelines.

Receptor / Source	Standards to be Used for Project WHO Guideline Values for Noise Measured Out of Doors <sup>a</sup> (one hour LA <sub>q</sub> in dBA)	
	07:00 – 22:00	22:00 – 07:00
Industrial Area <sup>a</sup>	70	70
Commercial Area <sup>a</sup>	70	70
Educational Area <sup>a</sup>	55	45
Rural Residential Area	55	45
Urban Residential Area	55	45
Mixed Residential Area	55	45
Quiet Area	55	45

### (3) Water Quality Standards

Source: Decree-Law no. 31/2020 – Control of Water Quality for Human Consumption.

Timor-Leste has developed new legislation in drinking water quality and The Guidelines for Drinking Water Quality in Timor-Leste have been 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 a certain range of microbiological indicators, chemical substances and physical properties of water quality, to ensure the drinking water does not pose any significant health risk to consumers and is aesthetically acceptable.

Parameters	Units	Timor-Leste (DL 31/2020 – Control of Water Quality for Human Consumption)	WHO Guidelines <sup>(1) (2)</sup>
<b>Bacteriological tests</b>			
Total Coliform	CFU/100 ml	0	0
Escherichia coli (E.coli)	CFU/100 ml	0	0
<b>Physical and chemical tests</b>			
Aluminum	mg/l Al	0.2	0.2

Parameters	Units	Timor-Leste (DL 31/2020 – Control of Water Quality for Human Consumption)	WHO Guidelines <sup>(1) (2)</sup>
Arsenic	mg/l As	0.01	0.01
Ammonia	mg/l <sup>(3)</sup>	0.5	1.5
Calcium	mg/l Ca	100	100-300
Chlorides	mg/l CL	250	250
Chlorine	mg/l Cl	0.2-0.6	5
Conductivity	µS/cm	2500	
Colour	mg/l Platinum-Cobalt Scale	20	15
Fluoride	mg/l F	1.5	1.5
Hardness	mg/L CaCO <sub>3</sub>	110-500	200-500
Iron	mg/l Fe	0.3	0.3
Langelier Index		-0.5 – 0.5	-
Magnesium	mg/l Mg	50	-
Manganese	mg/l Mn	0.05	0.1
Nitrate	mg/l <sup>(4)</sup>	11	50
Nitrite	mg/l <sup>(5)</sup>	0.15	3
pH	Sorensen	6.5-8.5	6.5-8.5
Sulphate	mg/l SO <sub>4</sub> <sup>2-</sup>	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

<sup>(1)</sup> 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.

<sup>(2)</sup> Guidelines for drinking-water quality: fourth edition incorporating the first addendum, World Health Organization, 2017

<sup>(3)</sup> Ammoniacal nitrogen (mg NH<sub>4</sub>/l) for WHO and Decreto-lei n° 152/2017 and mg/l NH<sub>4</sub>-N for Timor-Leste legislation

<sup>(4)</sup> Nitrate (mg NO<sub>3</sub>/l) for WHO and Decreto-lei n° 152/2017 and mg/l NO<sub>3</sub>-N for Timor-Leste legislation

<sup>(5)</sup> Nitrite (mg NO<sub>2</sub>/l) for WHO and Decreto-lei n° 152/2017 and mg/l NO<sub>2</sub>-N for Timor-Leste legislation

#### (4) Wastewater Standards

Source: WHO Guidelines for Wastewater Irrigation (1989).

Wastewater, excreta and grey water use in agriculture is more and more 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, by applying the dried treated FSTP sludge to the agricultural sector in the area, following the WHO 1989 Guidelines for Wastewater Irrigation and its thresholds for the effluent discharge and treated dried sludge use in agriculture:

ITEM	BOD (mg/L)		NH <sub>4</sub> -N (mg/L)	Helminth eggs (No. /filter)	FC (No. /100 ml)
	Total	Filtered			
A. Liquid effluent - Discharge into receiving waters:					
Seasonal stream estuary	100-200	30-60	10-30	≤2-5	≤10 <sup>4</sup>
Perennial river or sea	200-300	60-90	20-50	≤10	≤10 <sup>5</sup>
B. Reuse					
Restricted irrigation	n.c.		1)	≤1	≤10 <sup>5</sup>

ITEM	BOD (mg/L)	NH <sub>4</sub> -N	Helminth eggs	FC
Unrestricted irrigation	n.c.	1)	≤1	≤10 <sup>3</sup>
<b>C. Treated Plant Sludge</b>				
Use in agriculture	n.c.	n.c.	≤3-8 g TS <sup>2)</sup>	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				

However, the FSTP effluent will be discharged into an Irrigation Cropping Area and will require frequent testing before discharge for the purpose of groundwater and soil pollution prevention. The standards for such will be in accordance with the 1.3. Wastewater and Ambiente Water Quality of the World Bank Group. IFC. 2007. Environmental, Health and Safety General Guidelines.

Table 1.3.1 Indicative Values for Treated Sanitary Sewage Discharges <sup>a</sup>		
Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD	mg/l	30
COD	mg/l	125
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN <sup>b</sup> / 100 ml	400 <sup>a</sup>
Notes: <sup>a</sup> Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. <sup>b</sup> MPN = Most Probable Number		

## (5) COVID-19 Requirements

Source: Government-Decree no. 21/2020, of the 30<sup>th</sup> December, on the execution measures for the State of Emergency Declaration by Presidential Decree no. 70/2020, of 30<sup>th</sup> December

The COVID-19 world pandemic has challenged Governments and private sector to adapt their operations to difficult health situations and obligated more organization from these entities in order to do their part in this unusual world situation.

The project must follow the requirements of the Government of Timor-Leste, as they evolve, which currently are in the form of Government-Decree no. 21/2020, of the 30<sup>th</sup> December, on the execution measures for the State of Emergency Declaration by Presidential Decree no. 70/2020, of 30<sup>th</sup> December, which are summarised below:

**Execution measures of the state of emergency, renewed by the President of the Republic's Decree 73/2020, of December 30<sup>th</sup>** to respond to the COVID-19 pandemic, which covers the entire national territory and is in force between January 3<sup>rd</sup>, 2021, 00.00 a.m. and February 1<sup>st</sup>, 2021, 11.59 p.m.

This Government Decree recommends that all individuals, who are not subject to compulsory isolation and who do not exercise any professional activity or are exempt from the duty to be present at workplace, should remain in their homes, limiting their exits to the minimum necessary.

With regard to the distancing rules on public roads, this Government Decree requires that all individuals, who are not subject to a mandatory isolation regime, when walking on public roads must do so unaccompanied, wearing masks, observing the distance of, at least, one meter from other passers-by and avoid the formation of crowds. All individuals shall also maintain a distance of, at least, one meter when they are waiting for the opportunity to enter commercial, provision of services or public administration services facilities, as well as at the places of entry and exit of passengers on public transport.

It is forbidden to hold meetings and demonstrations, as well as any social, cultural or sporting events involving the agglomeration of more than ten people. This prohibition does not apply to individual sporting activities, which do not involve the agglomeration of people.

It is also prohibited to hold any religious events, including worship celebrations involving the agglomeration of more than ten people. Funerals are conditional on the adoption of organizational measures that prevent the transmission of the SARS-Cov-2 virus and should not imply the simultaneous presence of more than ten people.

Public passenger transport is allowed, however vehicles must be sanitized daily, before starting the activity, and drivers, crews and passengers are required to wear mouth and nose protection masks. Passengers shall avoid, among themselves and to the extent possible, any form of physical contact.

Markets and all commercial, industrial, crafts or service provision establishments are permitted. All individuals wishing to enter these establishments or premises must wear a mask, wash their hands before entering the premises and respect the distance of, at least, one meter from other individuals. Those responsible for market and establishments shall provide the necessary conditions for compliance with those rules and shall refuse entry to those who do not comply with the previous provisions. The above rules also apply to premises where public services operate.

Street vendors must keep a distance of, at least, one meter from their customers and other street vendors, and shall permanently wear a mouth and nose protection mask, as well as ensure hand hygiene.

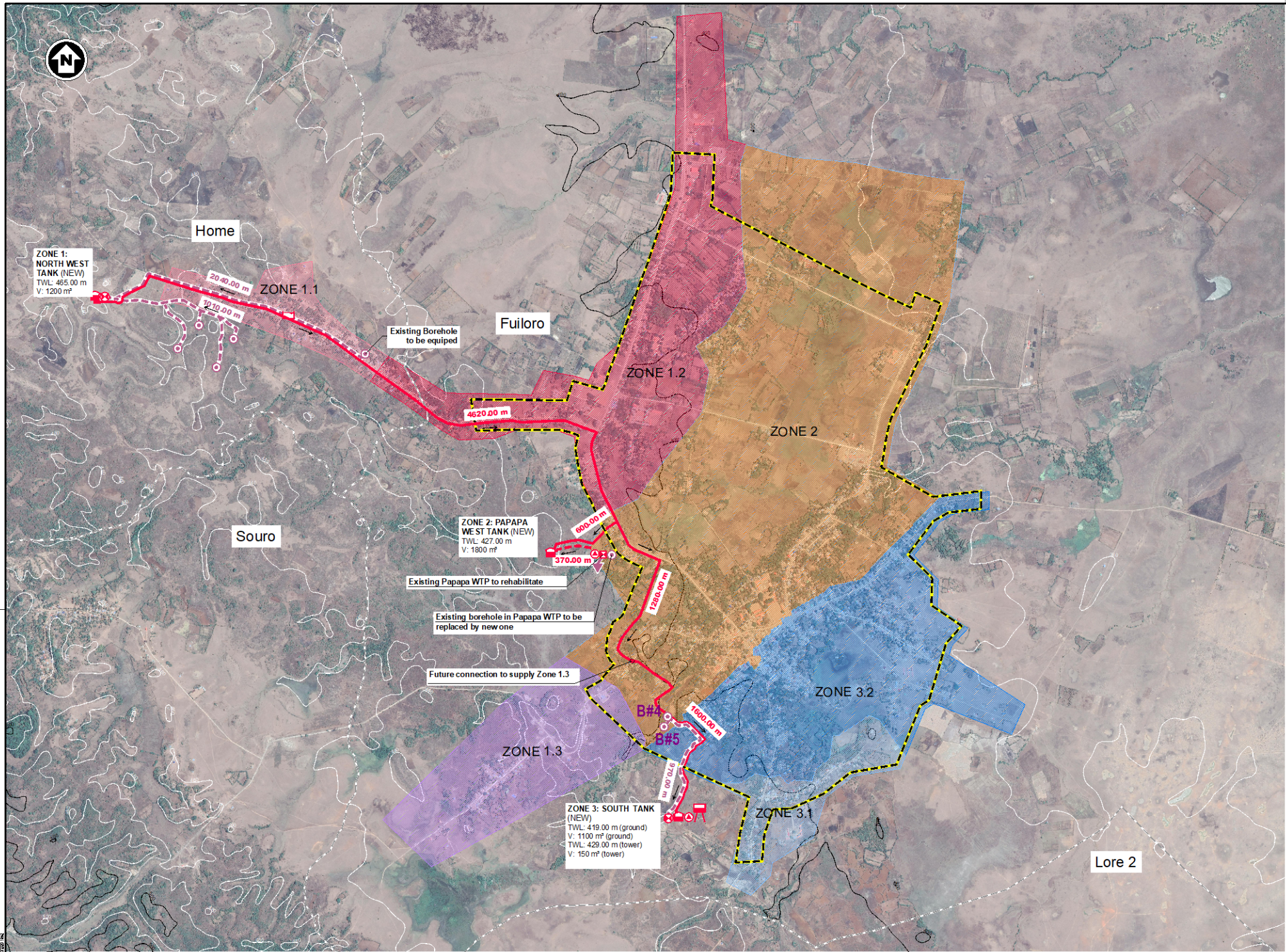
This diploma does not impose any prohibition on the teaching and non-teaching activities of educational establishments, the latter not including those which have a playful, recreational or ceremonial nature. The necessary and appropriate prophylaxis standards for the prevention and control of the COVID-19 epidemic are approved by a joint ministerial diploma from the members of the Government responsible for the health, education and higher education areas.

Security forces officers should sensitize all individuals to the need to comply with the provisions of this Government Decree. The security forces officers will identify the individuals who disrespect the issued orders and will report the incident to the Public Prosecutor's Office, and the offenders may incur in criminal liability, under the Penal Code.

The obligation that all individuals wishing to enter or leave the national territory must be subject to sanitary control is maintained. It also remains mandatory for prophylactic isolation (quarantine), with a minimum duration of fourteen days, and COVID-19 testing, to citizens wishing to enter the country, who have symptoms of COVID-19, or who have had contact with individuals infected with SARS-CoV-2. Expenses related to prophylactic isolation are borne by each individual when it is carried out in a private health facility, residence or isolation centre.

Land border crossing for traditional or customary purposes and for access to regulated markets is still prohibited, and the respective sanctions are also maintained. The entry of foreigners into national territory, across land borders, remains subject to prior authorization. The Minister of the Interior, through a ministerial diploma, may order the temporary closure of border posts or the reduction of their public service hours.

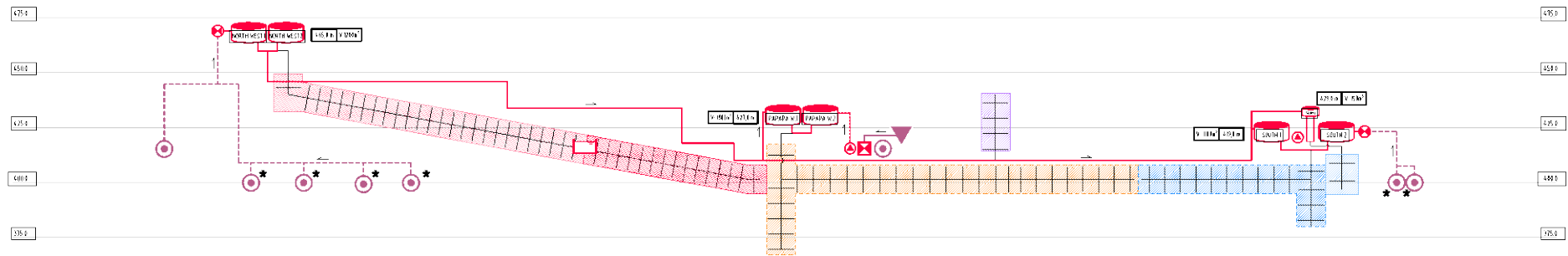
**Appendix 13.       LOSPALOS – PROPOSED WATER SUPPLY SYSTEM –  
GENERAL PLAN**



SYMBOLOLOGY	
PROPOSED SYSTEM	
SPRING	
BOREHOLE	
WTP	
CHLORINATION STATION	
PUMPING STATION	
WATER TANK	
WATER TOWER	
BREAK PRESSURE TANK	
BREAK PRESSURE VALVE	
SUPPLY ZONE	
TRANSMISSION MAINS	
RAW WATER - GRAVITY MAINS	
RAW WATER - PUMPING MAINS	
TREATED WATER - GRAVITY MAINS	
TREATED WATER - PUMPING MAINS	
TREATED WATER - GRAVITY / PUMPING MAINS	
TREATED WATER - REVERSIBLE MAINS (GRAVITY AND PUMPING)	
MASTERPLAN COVERED AREAS	
SUCO LIMITS	

\* Number of boreholes depending on water source investigations results

LAYOUT



DIAGRAM

REMARK: SCALE 1:15 000 AT A1; SCALE 1:30 000 AT A3.

1	FINAL VERSION	10/2020
2	FINAL VERSION	10/2020
REV.	DESCRIPTION	SIGNATURE DATE
CONSULTANT		
 ÁGUAS DE PORTUGAL - TIMOR-LESTE UNIPessoal Lda.		
CLIENT		
Ministry of Public Works General Directorate for Water and Sanitation		
GENERAL DIRECTORATE FOR WATER AND SANITATION		
VERIFICATION (DATE)	APPROVAL (DATE)	VERIFICATION (DATE)
DESIGN		
Consulting Services for Detailed Engineering Design of Timor-Leste Four Municipal Capitals Water Supply & Sanitation Project		
STAGE		
D4 - Preliminary Design Report		
ENGINEERING SPECIALTY	DATE	SCALE
General Design	10/2020	1:15 000
PROJECT	DRAWING	VERIFICATION
TITLE		
LOSPALOS Water Supply System - Proposed System - General Plan and Schematic Diagram		
PROJECT	FILE	REVISION
E1391	E1391_DP_02	LP.02 1/1 1

## Appendix 14. COVID-19 PROTECTION AND MITIGATION MEASURES

1 Construction Site Working Conditions Mitigation Measures for COVID-19	
1. Form a joint team to plan and organize return to work	<ul style="list-style-type: none"> <li>• Develop or convene a joint occupational safety and health committee with members representing the employer and workers.</li> <li>• Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures.</li> <li>• Develop and communicate a work plan on safe working for COVID-19. Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time.</li> </ul>
2. Risk assessment to decide when to work, who works and how	<ul style="list-style-type: none"> <li>• Undertake a risk assessment to determine the preventive and control measures.</li> <li>• Ensure preventative measures are in place before resuming or beginning construction work.</li> </ul>
3. Adopt engineering, organizational and administrative measures	<ul style="list-style-type: none"> <li>• Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice.</li> <li>• Ventilate enclosed workplaces including work camps and communal spaces.</li> <li>• Avoid concentration of workers - limit the capacity of common areas such as work camp dining rooms and changing rooms to allow the minimum separation of 2 m and organize one-way systems. This includes sleeping areas which must be a minimum of 2 m between beds.</li> <li>• Put in place training and information on COVID-19 and measures required for its management.</li> <li>• The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time.</li> <li>• Stagger break and lunch schedules to minimize the number of people in close proximity to one another.</li> </ul>
4. Regularly clean and disinfect	<ul style="list-style-type: none"> <li>• Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps.</li> <li>• All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant.</li> <li>• Discourage the sharing of items such as cups, glasses, plates, tools.</li> </ul>
5. Promote personal hygiene	<ul style="list-style-type: none"> <li>• Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces.</li> <li>• Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth.</li> <li>• Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm.</li> <li>• Dispose of tissues in a lined and covered waste bin and wash hands afterwards.</li> </ul>
6. Provide PPE and inform workers of its correct use	<ul style="list-style-type: none"> <li>• Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision.</li> <li>• Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing.</li> </ul>
7. Health surveillance and insurance	<ul style="list-style-type: none"> <li>• Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms.</li> <li>• Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that:             <ul style="list-style-type: none"> <li>• Workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started.</li> <li>• If symptoms persist after 7 days the person must isolate until the symptoms stop.</li> <li>• People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days</li> </ul> </li> </ul>

1 Construction Site Working Conditions Mitigation Measures for COVID-19	
8. Consider other hazards, including psychosocial	<ul style="list-style-type: none"> <li>• Promote a safe and healthy working environment free from violence and harassment.</li> <li>• Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work- life balance.</li> <li>• Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19.</li> </ul>
9. Review emergency preparedness plans	<ul style="list-style-type: none"> <li>• Develop an emergency plan adapted to COVID-19 and regularly review it.</li> </ul>
10. Review and update preventive and control measures as the situation evolves	<ul style="list-style-type: none"> <li>• Periodically monitor prevention and control measures to determine whether they have been adequate to avoid or minimize risk, and identify and implement corrective actions for continuous improvement.</li> <li>• Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health.</li> </ul>
<b>Source:</b> Adapted from: ILO, WHO, Canada Construction Association, and UK Government.	

<b>2. Worker Camp Siting and Management Mitigation Measures for H&amp;S and COVID-19</b>	
1. Siting	<ul style="list-style-type: none"> <li>• Not in area liable to flooding, landslide or other natural disaster</li> <li>• Not in area affected by construction dust, noise, sewage or other pollution</li> <li>• Not in a residential area.</li> </ul>
2. Minimum housing standards	<ul style="list-style-type: none"> <li>• A separate bed for each worker</li> <li>• Beds should not be arranged in tiers of more than two;</li> <li>• Separate accommodation of the sexes or to accommodate couples</li> <li>• Adequate natural light during the daytime and adequate artificial light</li> <li>• Adequate ventilation to ensure sufficient movement of air</li> <li>• Adequate supply of safe potable water</li> <li>• Adequate sanitary facilities (see below);</li> <li>• Adequate drainage</li> <li>• Adequate furniture for each worker to secure his or her belongings, such as a locker.</li> <li>• Common dining rooms, canteens or mess rooms, located away from the sleeping areas</li> <li>• Appropriately situated and furnished laundry facilities</li> <li>• Reasonable access to plug sockets for charging telephones and other devices</li> <li>• Rest and recreation rooms and health facilities, where not available in the community.</li> </ul>
3. Minimum accommodation sizes	<ul style="list-style-type: none"> <li>• Sleeping space</li> <li>• Inside dimensions over 198 cm by 80 cm; sleeping room:</li> <li>• headroom of over 203 cm allowing full free movement</li> <li>• Beds minimum 2 m apart for COVID-19 risk management</li> </ul>
4. Sanitation Facilities	<ul style="list-style-type: none"> <li>• One toilet, one tap / basin, one toilet for every 6 people</li> <li>• Convenient location to accommodation</li> <li>• Provision of soap</li> <li>• Separate facilities for men and women</li> <li>• Ventilation to open air</li> <li>• Fresh cold running water</li> <li>• Clean and hygienic</li> <li>• Septic tank / sewage treatment facility, or pit latrines located at least</li> <li>• 200 m from surface waters, and in areas of suitable soil profiles and above the groundwater levels</li> </ul>
5. H&S within worker accommodation	<ul style="list-style-type: none"> <li>• Separate area for sick workers to prevent transmission of disease</li> <li>• Smoke detector in sleeping area</li> <li>• Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets</li> <li>• Worker training in fire prevention and procedures</li> <li>• Fire exit sign, adequate means of escape and clearly maintained exit</li> <li>• Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block.</li> <li>• Electrical cables to be in safe condition, elevated and not in areas liable to flood</li> </ul>
6. Inspection	<ul style="list-style-type: none"> <li>• 2 weekly inspect to inspect for cleanliness, state of repair of building, accommodation and fire equipment.</li> <li>• Record inspection results and retain for review</li> </ul>

**Appendix 15.       LOSPALOS SOCIAL PUBLIC CONSULTATIONS LIST OF  
PARTICIPANTS (SUICO HOME AND FUILORO)**



**MINISTÉRIO DAS OBRAS PÚBLICAS**  
**DIRECÇÃO GERAL AGUA E SANEAMENTO (DGAS)**  
 Rua, Avenida 20 de Maio - Calicó, Caixa postal No 17, Tel. 3317157, 3317158 - Dili

**"Consulta Pública ba Desenvolvimento Projeto Abastecimento Bé'e Mos no Saneamento Iha Capital Município"**  
 Dia: 08 de Dezembro de 2020  
**LISTA PREZENZA**  
**Suco Fuloro - Município Lospalos**

NO	NARAN	SEXO		INSTITUISAUN/POZISAUN	SUCCALDEA	NO CONTACTO	ASSINATURA
		F	M				
1	Josefina D. Celestina	✓			30 de agosto	76049283	<i>[Signature]</i>
2	Betrita da concença	✓			LosPala		<i>[Signature]</i>
3	Pozita da sivo	✓			—		<i>[Signature]</i>
4	Pozida da Vitoria	✓			—		<i>[Signature]</i>
5	Brigida Pinto	✓			30 de agosto		<i>[Signature]</i>
6	Dancia dias	✓			30 de agosto		<i>[Signature]</i>

7	Anina de Jesus			<del>lausela</del>	lausela	-	Angela
8	Juana beira			<del>lausela</del> 30 de Agosto	lausela	-	Juana
9	Carlota dos Santos			<del>30 de Agosto</del> 30 de Agosto	30 de Agosto	76741511	Carlota
10	Iria Marques Cabral			<del>30 de Agosto</del> 30 de Agosto	-	76007351	Iria
11	Harina Maria Soares Garcia			30 de Agosto	Des	75214897	Harina
12	Zenoveia Lira			30 de Agosto	Kulu-hun	76287069	Zenoveia
13	Tulmira dos Santos de Jesus			30 de Agosto	Kulu-hun	75760982	Tulmira
14	Dezia Freitas dos Santos Nina			30 de Agosto	Kulu-hun	75750986	Dezia
15	Aurilia Mascarenhas Ribeiro			30 de Agosto	Associao	-	Aurilia
16	Euzita DECARVALLO			30 de Agosto	30 de Agosto	76378851	Euzita
17	Marta Soares			30 de Agosto	30 de Agosto	75135210	Marta
18	Francisco das Quintas			30 de Agosto	30 de Agosto	-	Francisco
19	Adriano Paulo Xavier			30 de Agosto	Lerc-Loho	75293057	Adriano
20	Sabrina Dias			30 de Agosto	Lerc-Loho	-	Sabrina
21							

22	Helena dos Santos da Costa	F		APOIO SUCCO	Fuitoro/5m-H1G	70550447 76703121	10/10/83
23	Paimira F. DOS SANTOS	F			Fuitoro/	75351525	RND
24	Juiana Da Silva	F			Fuitoro	76782582	20/11/81
25	Sergio moriano kimeres	M			-11-11-	76814164	20/11/81
26	Gerson Bení Lopes	M			-11-11-	75037585	Campanha
27	Isster alc Jesus	F			-11-11-	7725569	ENF
28	Rosita Soares	F			-11-11-	75556629	RND
29							
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MINISTÉRIO DAS OBRAS PÚBLICAS  
DIRECÇÃO GERAL AGUA E SANEAMENTO (DGAS)  
Rua: Avenida 20 de Maio - Calcoi, Caixa postal No 17, Tel. 3317157, 3317156 - Dili

"Consulta Pública ha Desenvolvimento Projeto Abastecimento Be'e Mos no Saneamento iha Capital Municipio"  
Dia: 08 de Dezembro de 2020  
LISTA PREZENZA  
Suco Home - Municipio Lospalos

NO	NARAN	SEXO		INSTITUISAUN/POZISAUN	SUCCO/ALDEIA	NO CONTACTO	ASSINATURA
		F	M				
1	Lein da Pontes		✓	Xefe suco	Lein da Pontes	78490345	LG.
2	Carmelo Fernandes	✓		Kamurda	Larivata	78320550	LG.
3	Gilberto Fernandes		✓	-	Larivata	75418486	LG.
4	ERCILIA: Fernandes	✓		de Legada	Larivata		LG.
5	Anicó de Jesus		✓	de Legada	Reitor	75349993	LG.
6	Alarico da Costa		✓	de Legada	Larivata		LG.

			Aldeia	Posicao		
7	Cambeiro de Costa	M	Reisou	Agriçoa	—	CT.
8	Augusto	V	— 15	Juventude	— 11	Andy
9	Pedro	M	Larinachá	Juventude	— 11	<del>Andy</del>
10	Manuel da Costa	if	— 11	Professor	— 11	HP
11	João Xavier	M	— 11	Xefe Aldeia	36661079	Paulo
12	OSCAR CELESTINO DUC.	M	— 11	VETERANOS		Almeida
13	DONINGUS D. COSTA	M	— 11	CONCILIO		Almeida
14	Miguel Fernandes	M	— 11	— 11		Mds
15	Miguel Pinto	M	— 11	— 11		o
16	ACAPITO FLORES	M	— 11	— 11		o
17	Simo Da Costa	M	— 11	— 11		o
18	Raimundo da Costa	M	— 11	Comunidade		o
19	Justino Fernandes	M	Larinachá	— 11		o
20	Eufrasio - PINTO	M	Larinachá	Comunidade		o
21	Zeca Fernandes	M	Larinachá	Professor		o

			Mdeia	Logisum	
22	Americo dos Santos	M	Janiucha	Comunidade	
23	Matheus Dias	M	Lilaputya	—	
24	Cesaltina Pereira	F	Lainnacha	<del>—</del>	
25	Adelina Alves	F	—	—	
26	Ana Rosa da Silva	F	—	—	
27	Jurrita estores	F	—	—	
28	Alvina vianna	F	—	—	
29	Hermínia Fernandes	F	—	—	
30	Marfelia Pereira	F	—	—	
31	Amalia dos Dors	F	Tchenulou	Komunidade	
32	Randy Ximenes	F	—	—	
33	Sidonia T. S. Belo	F	Reisoru	—	
34	E. de gama	M	Reisoru	—	
35	Eleusa Fernandes	F	—	—	
36	Miguelina da Cruz	F	Reisoru	—	
37	Jana Kauer	F	Lainnacha	—	

				Mdeia	Possuam		
38	Celine da costa	F	Larinacha	Estudante		Cod	
39	Julina Da costa	F	Larinacha	Estudante		HO	
40	Rozina cristovão	F	Larinacha	comunidade		<del>HO</del>	
41	Sabina sabana sr	F	Larinacha	comunidade		S48	
42	Rucelia do santos	F	Larinacha	comunidade		<del>HO</del>	
43	Mariana Fernandes	F	Larinacha	comunidade		mpug	
44	Justina Fernandes	F	Larinacha	comunidade		mpug	
45	Juiana da costa	F	Larinacha	comunidade		mpug	
46	Alda dos santos	F	Larinacha	comunidade		mpug	
47	JOANINHA DE	F	LAPUHO	—		<del>mpug</del>	
48	RECINA PEREIRA	F	LARINACA	—		HO	
49	ROZILDA DA SILVA	F	LARINACA	—		ROS	
50	Rajina dos santos	F	Lilapulo	Professora		mpug	
51	Natercia Isalua da c. Muteirs	F	Larinacha	Professora		mpug	
52	Martins fernandes	M	—	Comunidade		mpug	
53	Leonete Prabele	M	Larinacha	Comunidade		mpug	

54	Alarico Fernandes	M	Comunidade	Larinacha		
55	INES FAUSTINA	F	DELEGADA	LILAPUHA		
56	EMILIO GONCALVES	M	delegado	KOMUPUHA		
57	Matias Pereira	M	Laisora	Comunidade		
58	João Sousa Da Costa	F	Comunidade	-11-		
59	Stavina Fernandes	M	Larinaca	-11-		
60	Sulvia mantecura	M	Larinaca	-11-		
61	Ava Fernandes	F	Larinaca	-11-		
62	Agripina Fernandes	F	Larinaca	-11-		
63	Mariana Fernandes	F	Larinaca	-11-		
64	Rafaelina Fernandes	F	Larinaca	-11-		
65	Vitoria Fernandes	F	Larinaca	-11-		
66	Merliana Fernandes	F	Larinaca	-11-		
67	Lucitana Fernandes	F	Larinaca	-11-		
68	Vitoria Dacosta	F	Reisora	-11-		
69	Branca nebes	F	Larinaca	-11-		