

Sewerage & Treatment Augmentation for the Bebonuk WWTP

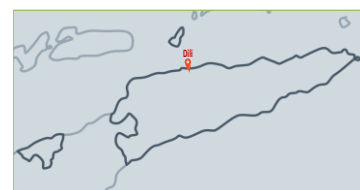


LOCATION SNAPSHOT

Location & description

Project location is Timor-Leste, inside Dili in the Bebonuk area not far from the airport.

MCC/CDT are proposing to sewer part of the Dili city area and build a WWTP to treat the sewage. Our proposed project could provide additional sewerage coverage and augment the proposed WWTP accordingly. CDT are agreeable to this but details currently are few. We are awaiting information from the CDT and a meeting directly with the MCC.



PROJECT CONTEXT AND RATIONALE

Sector & Sub-sector(s)

Sector: **Water, Sanitation/Sewerage and Drainage**

The activity is classified under the following NACE codes:

E) Water supply; sewerage, waste management and remediation activities
38 - Waste collection, treatment and disposal activities; materials recovery
37- Sewerage

Rationale for PPIP intervention and IFI loan

Some of the area for the treatment plant (NW corner triangular block next to Comoro river, south of ocean beach) and some of the area to receive sewerage is shown in **Figure 1**. This project proposes to extend the sewerage coverage over what was originally to be done through the MCC.



Figure 1. Google Earth picture of Bebonuk area near Comoro river and airport

The GoTL's (MOP) master plan estimated that up to 439 km of sewerage networks could be installed to cover about 90% of the Dili population as shown in **Figure 2**.

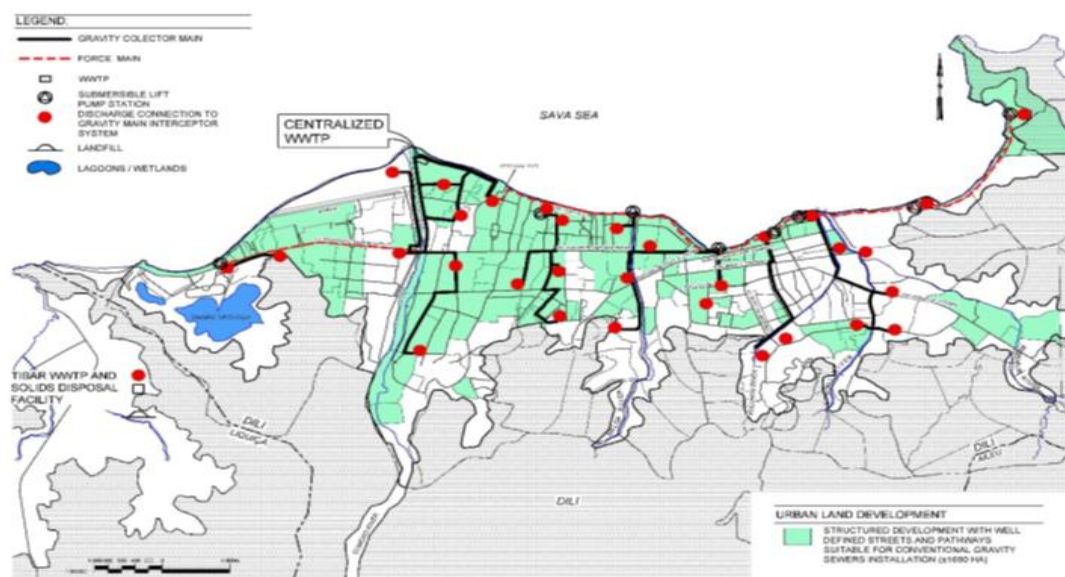


Figure 2. Proposed Dili MP sewage interceptor system

We await the Feasibility Study (COVID delayed) from Tetra Tech to appreciate the extent of the MCC project more fully and where EIB can add value.

Relevance to Strategic Development Plan & overall planning framework

The Timor Leste Strategic Development Plan (SDP) 2011-2030 commits the government to providing all citizens with access to clean water and improved sanitation by 2030. The two most significant causes of infant and child mortality in Timor-Leste – lower respiratory infection and diarrhoeal disease – are directly related to a lack of water supply and poor sanitation and hygiene.

The SDP states that "Proper sanitation will reduce the spread of communicable diseases transferred in waste and improved water supplies will reduce the amount [sic] of stomach-borne illnesses and infections". The investment in water and sanitation is supported in that "investment in sanitation is an investment in health, education, the environment and poverty reduction. Improved sanitation typically yields about \$9 worth of benefits for every \$1 spent, based on a reduction in direct and indirect health costs, better education, improved water supply and increases in tourism." In the 2010 census it was reported that 66% of Timorese have access to improved drinking water (35% of these have piped water according to the ADB) but only 39% have access to improved sanitation such as a pit latrine with slab, ventilated improved pit latrine or a pour/flush septic tank or pit. Issues with drainage are also cited in the SDP, particularly with stormwater pollution in Dili and district centres. Stated strategy and actions proposed are:

"We will continue to take action to overcome the many challenges involved in improving access to clean water and sanitation across Timor-Leste, including building a major sewerage collection system in Dili, providing a safe piped 24-hour water supply to households in 12 district centres and installing water systems and community latrines in rural areas as part of the Rural Water Supply and Sanitation Program. Our aim is that by 2030, all citizens in Timor-Leste will have access to clean water and improved sanitation."

Relevance to Sustainable Development Goals

The project directly contributes to the following Sustainable Development Goal(s):

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 13: Take urgent action to combat climate change and its impacts

Goal 12: Ensure sustainable consumption and production patterns

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

	(See attached table for a more detailed description of contributions to achievement of SDGs)
Project promoter(s)	<p>The project promoter is:</p> <p>Ministry of Public Works, through BTL.</p> <p>Financing: EIB and another partner – to be determined (MCC/GoTL/ADB/WB/Other?)</p>
General institutional set-up	<p>MPW transformed the Water and Sanitation Directorate to become an autonomous agency. This agency is responsible to assist the process of water and sanitation development in the future to be more effective and efficient. This institutional transformation came in effect when the President of the Republic promulgated the decree-law N° 38 /2020 dated 23 September 2020, for the establishment of a Public Institution named National Authority for Water and Sanitation (ANAS).</p> <p>ANAS, I.P. is aimed at proposing, monitoring and ensuring the implementation of national policy in the field of water resources, in order to guarantee its sustainable and integrated management, as well as the supervision and inspection of the sectors of public water supply, sanitation of urban wastewater and urban solid waste. In particular, ANAS, I.P., is entitled to carry out the following duties:</p> <ul style="list-style-type: none"> a) support the Government in the definition of the water resources management, water supply and sanitation policy; b) prepare proposals for water resources management plans to be submitted to the tutelage; c) support the work of the Coordination Council for Integrated Water Resources Management; d) promote the rational use of water through Water Resources Management Planning; e) propose the creation of areas in the public water domain; f) coordinate, at the national level, the adoption of exceptional measures in extreme drought or flood situations; g) ensure the monitoring, inspection and licensing of the use of water resources in accordance with the law and water resource management plans; h) propose to the Government the approval of regulatory norms related to the water resources sector, water supply and sanitation; i) regulate water supply and urban wastewater sanitation services and the quality of the service provided to users by management entities; j) ensure the monitoring, inspection and licensing of the activity of entities managing water supply and sanitation systems, in accordance with the law; k) control the correct use of water supply and sanitation systems by consumers, etc. <p>Decree-law N° 41 /2020 dated 25 September 2020 created a Public Company called Bee Timor-Leste (BTL) to manage the services related to the national water supply and sanitation network. The corporate object of Bee Timor-Leste, E.P. ("BTL, E.P.") includes, amongst others:</p> <ul style="list-style-type: none"> a) promoting an efficient use of water, ensuring public water supply (through the design, construction, operation and management of water supply systems), b) ensuring public sanitation (through the design, construction, operation and management of wastewater sanitation systems) and c) establishing control and inspection measures for the prevention of illegal connections to the public water supply system and injections into the public water sanitation system. <p>The establishment of these two institutions was considered vital for the development of water and sanitation sector in Timor-Leste and was also one of the requirements for the MCC investment in WTSD in Timor-Leste.</p>



INVESTMENT PROJECT INFORMATION

Scope of proposed project and type of investment	<p>The proposed project is to expand the MCC project to provide additional sewerage and possibly contribute to an amplification of the Bebonuk WWTP to accommodate the additional sewage flows. The WWTP is to be constructed on 5.5 ha of empty land, located adjacent to the Comoro river all the</p>
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measures to be implemented

way to the Ocean View. Arbiru Beach (commercial area) will not be covered. A water disinfection (0.8% NaOCl) production facility via electrolysis of brine will be installed on the WWTP area as well.

There are two different sewerage scenarios that MCC is considering, viz., conventional and simplified. The simplified sewerage system will be used in the unstructured areas with no road access, whilst the conventional will be in the structure areas, where rising mains can be installed along roadways.

There is a possibility to look at having a part on the WWTP, such as funding more sewerage or other component, because the WWTP will not cover the sewerage production from the entire city of Dili. The areas for sewerage intervention will see an impact of disease reduction, likely Colmera, towards Fatuhada, Bebonuk, and also Comoro upwards. EIB can fund some part of the project.

Possible Activities

- a) It is anticipated that additional sewerage & treatment could involve the some of the elements given below:
 - i. Preliminary designs (including layouts) to be provided for sewerage, pump stations, wastewater treatment and water quality monitoring plant for each hydraulic catchment. Analyses should be provided to determine the optimum designs for the sewerage (conventional and/or combinations of conventional small bore sewerage as required) and the design amplification approach for an expanded WWTP. An expanded WWTP will have to fit the design employed by MCC/CDT. . Initial focus should be on sewerage the most density populated areas and those environmentally sensitive near water bodies or water sources.
 - ii. Attention will also be given to treated wastewater reuse, particularly during the dry seasons, to offset the use of potable water, such as the watering of public grounds or sports fields. This includes to what quality the reuse water is to be treated. Again, the employment of promulgated Timor Leste or EU standards are suggested. This will have to be in agreement the plans for the WWTP by the MCC/CDT but could in theory add to the whole.
 - iii. Preliminary costing and financial analysis to be made of the sewerage/treatment options, inclusive of disposal of waste solids, human relocation, environmental planning, etc. to identify a preferred approach.
 - iv. Designs should cater for future population growth, particularly at the WWTP.
 - v. MCC only intends to fund the network system but not household connection. An estimated 17,000 households will be connected with an estimate budget of \$33 million. This EIB project could extend the sewerage coverage.

Level of maturity

It is very early days for the development of this potential project. However, MCC is well underway with their Feasibility Study (Tetra Tech), although COVID delayed. The PPIP WWS team have already met with CDT and are pursuing a direct meeting with the MCC (through the CDT).

Approach chosen for project implementation

The proposed Institutional set-up for project implementation is as follows (refer to **Figure 2**):

PMU (Project Management Unit)	Implementing Agency: Established by the Promotor (Ministry of Public Works via BTL), comprising possible local representatives and wastewater authorities. The activities would be supported by a Technical Assistance (TA) Consultant to oversee, monitor, and overall management of all components of the project in all phases
TA Consultant:	The TOR and tendering documents for the TA consultant would be prepared by the PPIP. Responsibilities would include tendering for contractors to deliver the sewerage and WWTP amplification works. Works delivery would likely be via design and build (D&B) contracts to be consistent with the works of the MCC/CDT. Other responsibilities would include Institutional Tendering and Evaluation, Design Review, Monitoring and Supervision, Capacity Building and Public Education. All activities are to be in agreement with the MCC/CDT efforts.
Private Contractors (Implementation phase):	<u>Wastewater Management:</u> *WWTP Design & Construction – Separate Contract with PMU *Sewerage Systems – Separate Contract with PMU
Private Contractors (Operation phase):	This would have to be discussed more fully with BTL, MCC/CDT and our funding partner (when identified).

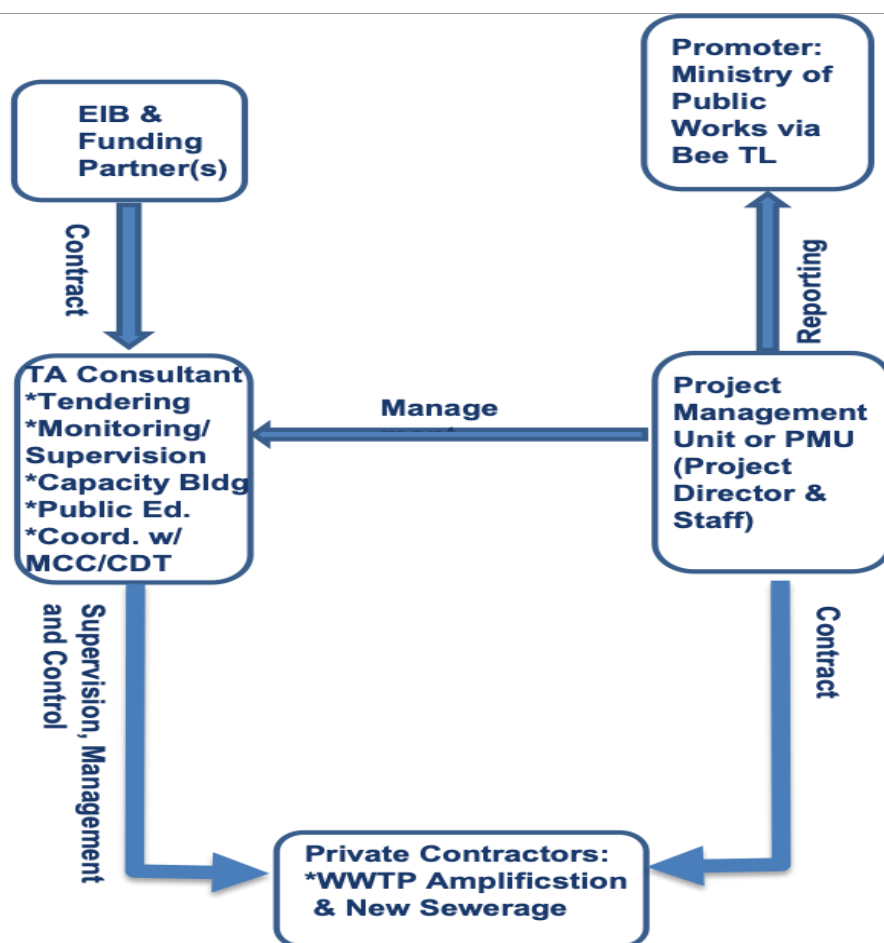


Figure 2. Proposed project delivery mechanisms

<p>Identification of preliminary alternatives for the works</p>	<p>The alternatives appear to be initially where and when to use simplified sewerage and where to use conventional sewerage. It may be that since the EIB does not seem to favour small-bore sewerage, that the areas to be nominated for EIB funding include mostly those that would use traditional sewerage. MCC indicates simplified sewerage is to be used in the less structured areas and conventional in the structured areas. There also may be nuances in the design of the WWTP but little is known at this time.</p>
<p>Total estimated project investment costs</p>	<p>Investment level for EIB is difficult to measure at this point but between Euro7.5m and Euro15m could be required, considering the MCC budget is \$33m (USD). It will be determined by the amount of sewerage that is to be added in addition to the plan of the MCC/CDT. The more sewerage, the larger the amplification to the WWTP.</p>
<p>Approach to finance the project</p>	<p>Considering that the EIB's contribution to a project's cost is limited to 50% of the overall investment, the following financing sources have been identified:</p> <p>To be determined during Feasibility Study (PPIP).</p>



IMPLEMENTATION ARRANGEMENTS

<p>Provisional schedule for</p>	<p>The provisional schedule for project implementation could be 36 to 48 months as laying of sewerage is slow and problematic in built up areas. It is expected that the detailed design for the sewerage and</p>
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project implementation	WWTP amplification would take 6 to 9 months, 6 to 9 months for tender preparation and international tendering, 3 to 6 months for procurement and to 24 months for construction.																
Estimated time and resources for PFS and FS	<p>The estimated time and resources required per study are as follows:</p> <table border="1"> <thead> <tr> <th>Phase</th> <th>Time (months)</th> <th>Level of Effort (person days – KE)</th> <th>Level of Effort (person days - NKEs)</th> </tr> </thead> <tbody> <tr> <td>Pre-Feasibility study</td> <td>8 to 10</td> <td>50</td> <td>250</td> </tr> <tr> <td>Feasibility study</td> <td>6 to 10</td> <td>175</td> <td>825</td> </tr> <tr> <td>Total</td> <td>14 to 20</td> <td>225</td> <td>1075</td> </tr> </tbody> </table>	Phase	Time (months)	Level of Effort (person days – KE)	Level of Effort (person days - NKEs)	Pre-Feasibility study	8 to 10	50	250	Feasibility study	6 to 10	175	825	Total	14 to 20	225	1075
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Main barriers to develop the project	<p>The main barriers to develop and implement the project identified at this stage are:</p> <ul style="list-style-type: none"> Financing sources, including tariff setting, fee collection, billing practices, (to be identified during pre-feasibility and Feasibility studies). Institutional set-up (although the MCC project would have this pretty much sorted), including setting up structures and establish responsibility for Wastewater Treatment Plants and Sewage Pump Stations. To be outlined in PFS study and executed during Project implementation. 																
Estimation of required TA activities to implement the planned investment	<p>The TA activities required to implement the investment include:</p> <ul style="list-style-type: none"> Coordination and liaison with the MCC/CDT works. International tendering for contractors to deliver the sewerage and WWTP amplification works. Works delivery would likely be via design and build (D&B) contracts. Provision of a supervisory engineer(s), one for the WWTP and one for the sewerage. Activities would include review of designs and monitoring of progress. Public Education as to what is being provided and why as well as liaison with all stakeholders. 																



SAFEGUARDS AND ELIGIBILITY

Environmental and Social issues, recommended ESIA needs	<p>A screening of environmental and social aspects will be performed at the pre-feasibility stage; the environmental and social safeguards that may become relevant are listed below:</p> <table border="1"> <thead> <tr> <th>Assessment and management of environmental and social impacts and risks</th> <th>Y</th> <th>Involuntary resettlement</th> <th>Y</th> </tr> </thead> <tbody> <tr> <td>Pollution prevention and abatement</td> <td>Y</td> <td>Rights and interests of vulnerable groups</td> <td>Y</td> </tr> <tr> <td>Biodiversity and ecosystems</td> <td>Y</td> <td>Labour standards</td> <td>Y</td> </tr> <tr> <td>Climate-related standards</td> <td>Y</td> <td>Occupational and public health, safety and security</td> <td>Y</td> </tr> <tr> <td>Cultural heritage</td> <td>N</td> <td>Stakeholder engagement</td> <td>Y</td> </tr> </tbody> </table>	Assessment and management of environmental and social impacts and risks	Y	Involuntary resettlement	Y	Pollution prevention and abatement	Y	Rights and interests of vulnerable groups	Y	Biodiversity and ecosystems	Y	Labour standards	Y	Climate-related standards	Y	Occupational and public health, safety and security	Y	Cultural heritage	N	Stakeholder engagement	Y
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Cultural heritage	N	Stakeholder engagement	Y																		
Eligibility: Alignment with Paris Agreement	<p>The proposed investment falls within the following sector(s) supported by the EIB Group under the Paris alignment framework:</p> <p>Water, wastewater, and flood management</p> <ul style="list-style-type: none"> New or rehabilitation of water treatment, water distribution, wastewater treatment, wastewater collection, nonrevenue water reduction; flood management and protection, coastal protection, sludge digestion. 																				
Eligibility: Alignment with EU Taxonomy	<p>A summary of the technical screening criteria for “substantial contribution” and “do-no-significant-harm” (DNSH) in relation to the six environmental objectives of the EU Taxonomy is shown below.</p> <p>The following project activities are/will be aligned with the EU Taxonomy:</p> <table border="1"> <thead> <tr> <th>Environmental objective</th> <th>Activity: <u>Construction, extension and operation of wastewater collection and treatment</u> - Construction, extension and operation of centralised wastewater systems including collection (sewer network) and treatment. The economic activities in this category could be</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Environmental objective	Activity: <u>Construction, extension and operation of wastewater collection and treatment</u> - Construction, extension and operation of centralised wastewater systems including collection (sewer network) and treatment. The economic activities in this category could be																		
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	associated with several NACE codes, in particular E37.00 (Sewerage) and F42.99 (construction of other civil engineering projects) in accordance with the statistical classification of economic activities established by Regulation (EC) No 1893/2006.
Climate change mitigation	<p>Substantial Contribution:</p> <p>1. The net energy consumption of the wastewater treatment plant equals to or is lower than: (a) 35 kWh per population equivalent (p.e.) per annum for treatment plant capacity below 10 000 p.e.; (b) 25 kWh per population equivalent (p.e.) per annum for treatment plant capacity between 10 000 and 100 000 p.e.; (c) 20 kWh per population equivalent (p.e.) per annum for treatment plant capacity above 100 000 p.e.</p> <p>It is likely that either (b) or (c) size would be appropriate. Net energy consumption of the operation of the wastewater treatment plant may take into account measures decreasing energy consumption relating to source control (reduction of storm water or pollutant load inputs), and, as appropriate, energy generation within the system (such as hydraulic, solar, thermal and wind energy).</p> <p>2. For the construction and extension of a wastewater treatment plant or a wastewater treatment plant with a collection system, which are substituting more GHG-intensive treatment systems (such as septic tanks, anaerobic lagoons), an assessment of the direct GHG emissions is performed²⁰⁸. The results are disclosed to investors and clients on demand. <u>Preliminary Review:</u> This GHG assessment is planned for the PFS. Many of the existing domiciles are currently connected to "almost septic tanks": literally dug holes.</p> <p>Central collection and treatment will be quite different to on-site sanitation or no sanitation.</p>
Climate change adaptation	DNSH: Climate risk and vulnerability assessment performed. The PPIP anticipates this for the PFS and FS stages.
Water and marine resources	<p>DNSH: Environmental degradation risks related to preserving water quality and avoiding water stress are identified and addressed with the aim of achieving good water status and good ecological potential (EU Water Framework Directive), and a water use and protection management plan is developed for the potentially affected water bodies in consultation with relevant stakeholders. However, no assessment is needed if such risks are considered in an EIA in accordance with the EU EIA Directive and Water Framework Directive.</p> <p>Where the wastewater is treated to a level suitable for reuse in agricultural irrigation, the required risk management actions to avoid adverse environmental impacts have been defined and implemented.¹</p>
Circular economy	DNSH: N/A
Pollution prevention & control	<p>DNSH: Discharges to receiving waters meet the requirements laid down in Council Directive 91/271/EEC² or as required by national provisions stating maximum permissible pollutant levels from discharges to receiving waters.</p> <p>Appropriate measures have been implemented to avoid and mitigate excessive storm water overflows from the wastewater collection system, which may include nature-based solutions, separate storm water collection systems, retention tanks and treatment of the first flush.</p> <p>Sewage sludge is used in accordance with Council Directive 86/278/EEC³ or as required by national law relating to the spreading of sludge on the soil or any other application of sludge on and in the soil.</p>
Biodiversity and ecosystems	DNSH: EIA has been completed in accordance with EIB Environmental and Social Standards and with national regulations and standards. For

¹ As set out in Annex II of Regulation (EU) 2020/741 of the European Parliament and of the Council of 25 May 2020 on minimum requirements for water reuse (OJ L 177, 5.6.2020, p. 32).

² Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment (OJ L 135, 30.5.1991, p. 40).

³ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 4.7.1986, p. 6).

	<p>sites/operations in/near biodiversity-sensitive areas (including protected areas) an appropriate assessment has been conducted and necessary mitigation measures implemented.</p>
<p>Eligibility: Clean Oceans Initiative</p>	<p>The proposed investment is eligible for the Clean Oceans Initiative under the following sector(s):</p> <ul style="list-style-type: none"> • Urban storm water management systems – projects/components that contribute to preventing waste/plastics discharge in waterways through control of storm water. • Wastewater treatment plants – reduction of plastics discharge (also micro-plastics) and other pollutants to rivers and oceans. <p>The following proposed activities will contribute to reducing the amount of plastic waste discharged into water bodies:</p> <ul style="list-style-type: none"> • Improvement of wastewater collection and treatment to keep plastics out of rivers, oceans and coastal areas. • Increase the areas served by sewerage and wastewater treatment plants.

Relevant Sustainable Development Goals (SDGs) and indicators

Goals and targets	Indicators
Goal 1. End poverty in all its forms everywhere	
1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.4.1 Proportion of population living in households with access to basic services
Goal 3. Ensure healthy lives and promote well-being for all at all ages	
3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	3.3.3 Malaria incidence per 1,000 population
	3.3.4 Hepatitis B incidence per 100,000 population
The project will provide: Reliant and regular treatment of wastewater for a good part of Dili. This will lessen water-borne diseases as well as pathogenic sources often in untreated wastewater.	
Goal 6. Ensure availability and sustainable management of water and sanitation for all	
6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	6.2.1 Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of wastewater safely treated 6.3.2 Proportion of bodies of water with good ambient water quality
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time
This project will firstly treat wastewater from part of Dili. This will reduce nutrient pollution of surface waters as well as groundwaters. The surface pooling of untreated wastewater/septage or untreated wastewater in storm drainage systems, often the playground for children, will be significantly reduced and with it the transmission of water borne diseases and the promotion of insect vectors such as mosquitoes. The proposed upgrade/rehabilitation of the water treatment plants proposed will deliver a disinfected water to the people of these three communities.	

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
The project plans to extend the sewerage coverage beyond the 17,000 proposed by MCC, thereby increasing the proportion of population living in adequate housing.	
Goal 13. Take urgent action to combat climate change and its impacts	
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	
13.2.3 Total greenhouse gas emissions per year	
This project can definitely contribute towards reducing GHG emissions, depending on the technologies involved. Electrical consumption can also be ameliorated with photovoltaic panels or biogas generation of electricity. The current proposal seems to flare the biogas. The use of biogas for electrical generation usually is considered if the PE is at least 50,000 and it would be greater at this WWTP.	
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	14.1.1 Index of coastal eutrophication and floating plastic debris density
This WWTP will be adjacent to Comoro river that drains into the Sawu Sea. Proper screening will help reduce the amount of plastics that enter the environment.	