# REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE

## Ministério dos Transportes e Comunicações

Economic Growth

Sustainable Future

Mode of Choice

Livable Cities

Access for All

# Timor-Leste Public Transport Facilities
# Final Project Outputs 2026

# Acknowledgements

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# Rationale/Objectives of the Study

Since achieving independence in 2002, Timor-Leste has made significant progress in state building and economic growth. The government's Strategic Development Plan (SDP) 2011-2030 is an instrument envisioning an extensive network of quality and well-maintained roads to connect communities, promote rural development, industry and tourism, and provide access to markets.[1] To transform the vision/goals in the SDP into reality, the government has also formulated the Program of the IX Constitutional Government with key focuses/priorities on land transport to develop and expand a quality public transport system for the Timorese.[2] ADB has been supporting such pursuit of economic growth, inclusive development, and climate resilience through several strategic documents including ADB Country Operations Business Plan 2021–2023 and ADB Country Partnership Strategy 2023-2027.[3]

Against this backdrop, the ADB is funding a multi-faceted study to support the Government of Timor-Leste's planned public transport reforms and improve public transport services and facilities in Timor-Leste by building on the findings and analysis from the 2022 Timor-Leste Public Transport Master Plan (PTMP) Update (hereinafter referred to as the 2022 PTMP).[4] The findings from this ADB Study will strengthen the position of Dili as the principal transport hub in the country and lay the groundwork to develop a sustainable and viable public transport system that can be replicated and adopted for Timor-Leste – through enabling planning, operating, and institutional frameworks and structures – based on international best practice aligning with national and local considerations and conditions. Key goals, objectives, and expected outcomes/outputs of the Study include:

***Goals/Objectives of the Study***

- Provide a high-quality, sustainable public transport system that meets the needs of users for safety, comfort, security, convenience, affordability, accessibility and availability
- Create a transparent and stable regulatory environment that encourages ongoing private sector investment and operations

***Expected Outcomes from the Study***

- **Output 1**: Climate-resilient and optimized public transport network system developed
- **Output 2**: Institutional capacity strengthened
- **Output 3**: Regulatory framework for low-carbon and climate-resilient development strengthened

***Key Outputs of the Study***

- **2024 Public Transport Master Plan** – Produce an independent updated PTMP (hereinafter referred to as the 2024 PTMP) based on the review of the 2022 PTMP including a public transport sector assessment, route analysis and network optimization study, investment plans with phases and cost estimates, options analysis for public transport facilities, suggestions for innovative solutions, as well as roadmap for capacity building and regulatory development.[5]
- **Feasibility Study** – Conduct a feasibility study of ten priority facilities from the 2024 PTMP with key focuses on site assessment, facility schemes/design, cost estimates, financial analysis, economic analysis, climate change, environmental/social safeguards (including gender elements), and procurement.

[1] Source: Government of Timor-Leste. 2011. Timor-Leste Strategic Development Plan, 2011–2030. Dili.
[2] Source: Government of Timor-Leste. 2023. Program of the IX Constitutional Government. Dili.
[3] Sources (i) https://www.adb.org/sites/default/files/institutional-document/635976/cobp-tim-2021-2023.pdf; and (ii) https://www.adb.org/sites/default/files/institutional-document/806246/cps-tim-2023-2027.pdf
[4] The 2022 PTMP is an update of a previous iteration of the 2016 PTMP.
[5] The 2024 PTMP was completed, and it was officially launched in May 2024 by the MOTC.

- **Supporting Public Transport Reform Programs** [6] **–** In parallel, six supporting public transport reform programs are assessed at strategic or pre-feasibility level to inform sequencing and integration with infrastructure investments: (i) Dili Pilot Bus Project – conduct a pre-feasibility study of a pilot bus service requested by MOTC on an east-west corridor in Dili; (ii) Public Transport Fare and Fare Structure Modelling – assess fare scheme and structure for public transport including a phased roadmap for fare system transition; (iii) Traffic Management Study to Improve Public Transport Operations – conduct a comprehensive assessment of traffic and parking operations/management options in Dili to create more effective management procedures and operations for public transport; (iv) Stringent Emission Standards for Public Transport Vehicles – assess potential for instituting more stringent emissions requirements for current public transport services; (v) Hybrid Courier Service Model – identify opportunities for hybrid courier services and furthermore potential physical implications on the terminal designs; and (vi) Microlet Operation Framework – assess potential to formulate operator associations among existing operators to ensure coordinated operations and maintenances of microlet services.

- **Recruitment Assistance for Detailed Engineering Design (DED)** – Provide tender support including preparation of a draft for the DED consultant as well as assistance during the recruitment process.

A log-frame of the linkages between government vision/strategies, project objectives, outcomes and outputs are presented and summarized as below:

**Table ES-1: Log-Frame of Study Goals, Objectives, and Outcomes/Outputs**

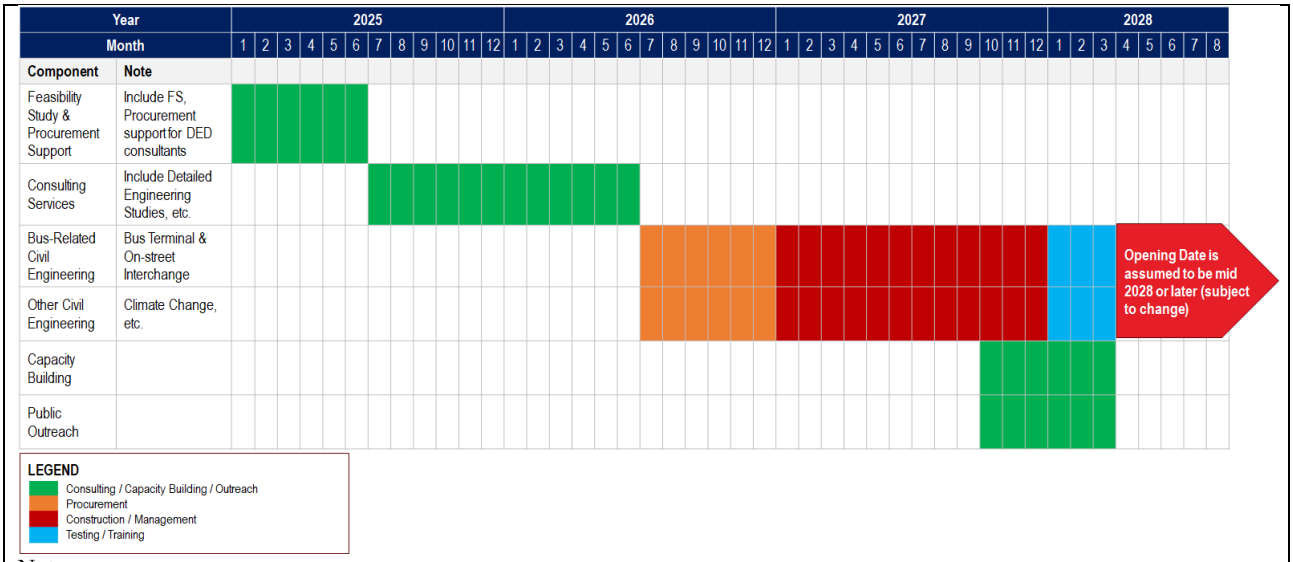
| Item | Key Points in Log-Frame (Focus on Public Transport) |
|---|---|
| **Government Vision & Strategies** | • **Strategic Development Plan (SDP) 2011-2030** – envision an extensive network of quality and well-maintained roads to connect communities, promote rural development, industry and tourism, and provide access to markets.<br>• **Program of the IX Constitutional Government** – develop and expand a quality public transport system for the Timorese (in particular for land transport). |
| **Objectives** | • Provide a **high-quality, sustainable public transport system** that meets the needs of users for safety, comfort, security, convenience, affordability, accessibility and availability<br>• Create a **transparent and stable regulatory environment** that encourages ongoing private sector investment and operations |
| **Outcomes** | • **Output 1:** Climate-resilient and optimized public transport network system developed<br>• **Output 2:** Institutional capacity strengthened<br>• **Output 3:** Regulatory framework for low-carbon and climate-resilient development strengthened |
| **Outputs** | • **2024 Public Transport Master Plan** – the country's public transport master plan including diagnostic assessment, route analysis and network optimization study, vision/strategies, investment plans with phases and cost estimates, facility assessment framework to shortlist public transport facilities, suggestions for innovative solutions, as well as roadmap for capacity building and regulatory development.<br>• **Feasibility Study** – feasibility study of ten priority public transport facilities including site assessment, facility schemes/design, cost estimates, financial analysis, economic analysis, climate change, environmental/social safeguards, and procurement.<br>• **Supporting Public Transport Reform Programs –** six supporting public transport reform programs to inform sequencing and integration with infrastructure investment.<br>• **Recruitment Assistance for DED** – tender support including preparation of a draft for the DED consultant as well as assistance during the recruitment process |

[6] Six supporting public transport reform programs are assessed at strategic or pre-feasibility level to inform sequencing and integration with infrastructure investments, thus further assessment will be required.

# Key Assumptions in This Feasibility Study

The figure below shows the indicative timeline with key milestone activities including feasibility study, detailed engineering design, construction, testing and operation of bus terminals/on-street interchanges. Key assumptions in this timeline and preparation of the feasibility study are as follows:[7]

- **Mid 2025** – Start of DED work (to be completed by mid-2026)
- **Early 2027** – Construction of bus terminals/on-street interchanges (to be completed by end 2027)
- **Early 2028** – Testing / training of relevant personnel before opening of bus facilities
- **Mid 2028** – Opening of bus terminals/on-street interchanges




Notes:
[A] Land acquisition for terminal footprints is not assumed at this stage as the select sites are assumed to be owned by the government.
[B] Key assumptions/timeline are indicative only and the timeline of milestone activities is subject to change in aling with the government's plan. For conservative purpose, cost, revenues, financial and economic assessment are estimated based on 2029 when bus terminal/facilities will be fully open (considering buffer time/potential delays of milestone activities).

**Figure ES-1: Indicative Timeline of Bus Facility Development**

# Public Transport Facility Development Program

A total of ten locations are identified as priority sites for public transport facility improvement across the country. The proposed facility investment program is structured around two facility typologies: (i) bus terminals –function as primary hubs for terminating and interchange services, serving both urban and inter-regional routes; and (ii) on-street interchanges – provide organized boarding and alighting points with passenger amenities in locations where full terminals are neither feasible nor required.

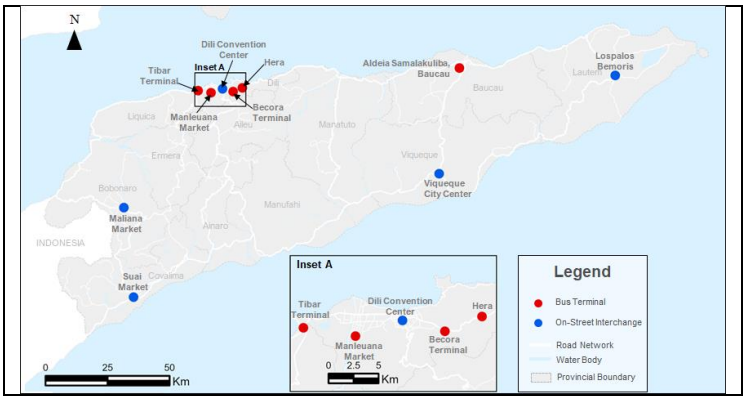



**Figure ES-2: Priority Sites**

[7] Key assumptions/timeline are indicative only and may subject to change based on decisions/priorities of key stakeholders on the timeline of milestone activities. For conservative purpose, cost, revenues, financial and economic assessment are based on 2029 when bus terminal/facilities are expected to be fully open (considering buffer time/potential delays of milestone activities).

In the Dili metropolitan area, the program includes four bus terminals (Becora, Tibar, Manleuana, and Hera) and a central on-street interchange at the Dili Convention Center. Together, these facilities are designed to rationalize urban and inter-regional public transport operations, reduce curbside loading, and strengthen Dili's role as the national transport hub. In regional municipalities, the program includes a new municipal terminal in Baucau and on-street interchanges in Maliana, Suai, Lospalos, and Viqueque. These facilities are intended to improve regional accessibility, support rural–urban connectivity, and facilitate access to markets and services.

# Feasibility Assessment

The feasibility assessment identified a number of technical, social, environmental, hazard-related, financial, and institutional considerations that will need to be addressed during project implementation. None of these issues are considered prohibitive. Overall, the proposed investment program is assessed to be "feasible", provided that appropriate mitigation measures, safeguard instruments, and institutional strengthening actions are implemented. Key findings are as follows:

- From a technical perspective, all ten priority facilities can be delivered within the proposed footprints based on the site assessment, with facility schemes/design developed for each site. Social and land-related impacts are limited, with potential impacts identified primarily in relation to access road improvements at selected sites (such as Manleuana).
- Environmental impacts are expected to be minor and manageable through standard mitigation measures. Climate- and hazard-related risks, particularly flooding, have been identified across multiple sites. These risks have been explicitly incorporated into the preliminary designs through climate-resilient features such as drainage and rainwater harvesting system. The Gender Equality and Social Inclusion Action Plan ensures that facilities and operations respond to the needs of vulnerable users. Potential environmental and land-related impacts are expected to be limited and manageable through appropriate safeguard instruments to be prepared during detailed engineering design.
- From a financial perspective, the study recognizes that public transport infrastructure in Timor-Leste will continue to require government support, particularly during the early years of operation. However, the analysis demonstrates that prudent design, commercial revenue opportunities, and clear institutional arrangements can enhance cost recovery and long-term sustainability. The economic analysis confirms that the project generates substantial net benefits through time savings, safety improvements, reduced congestion, and environmental gains, even under conservative assumptions.
- Institutional capacity constraints represent a cross-cutting risk to implementation. The study therefore proposes phased implementation, transitional management arrangements, and targeted capacity building to align project scope with institutional readiness (with MOTC/DNTT assuming primary responsibilities prior to the establishment of a Land Transport Authority). This pragmatic approach reduces risk while preserving the long-term vision of a modern, integrated public transport system.

# Total Project Cost

The total indicative cost (including 20% contingency) is estimated at about US$40.4 million, including (i) US$18.4 million for bus terminal & on-street interchange (45.4%); (ii) US$12.4 million for pilot bus project (30.9%); (iii) US$0.6 million for public transport fare structure (1.5%); (iv) US$6.6 million for traffic management program (16.3%); (v) US$0.6 million for stringent emission standards for microlet fleet replacement (1.5%); (vi) US$1.2 million for hybrid courier service model (3.0%); and US$0.6 million for microlet operation framework (1.5%).

## Table ES-2: Total Project Cost by Component

| # | Component | Total Cost – Unrounded (US$) [A] | Total Cost (US$) – Rounded to the Nearest Thousand [A, B] | % | Type of Improvements / Assumptions |
|---|---|---|---|---|---|
| 1 | Bus Facilities | 18,383,735 | 18,384,000 | 45.4% | • 5 bus terminals and 5 on-street interchanges with provision of innovative measures, access road/walk improvements, climate change facilities<br>• Cost includes bus terminal cost, consulting service (public outreach), capacity building, and social development program. |
| 2 | Polit Bus Project | 12,412,320 | 12,413,000 | 30.9% | • Proposed 25.6km round trip service with 59 bus stops<br>• 10 buses (9m Euro 5 diesel city bus)<br>• 1 depot to accommodate the fleet with ITS enhancement<br>• Cost includes bus system cost, consulting service, capacity building, and social development program. |
| 3 | Public Transport Fare Model | 600,000 | 600,000 | 1.5% | • Consulting services for developing specifications of fare collection system<br>• Cost includes consulting service (i.e., feasibility study) |
| 4 | Traffic Management | 6,588,960 | 6,589,000 | 16.3% | • Traffic circulation modifications & ITS traffic enhancement<br>• Key intersection improvements (including signals & crossings)<br>• On-street parking meter facilities, and off-street parking facilities<br>• Cost includes traffic/parking facilities cost, consulting service, capacity building, and social development program. |
| 5 | Stringent Emission Standards | 600,000 | 600,000 | 1.5% | • 10% of existing microlet fleet in Dili (~90 vehicles) assumed to be replaced by more environmentally friendly vehicles (i.e., Euro 4/5 class)<br>• Cost includes consulting service (i.e., feasibility study) |
| 6 | Hybrid Courier Service Model | 1,164,000 | 1,164,000 | 3.0% | • Provision of logistics storage facilities including 3 gateway storage hub and 6 regional storage hub<br>• Cost includes storage facilities cost, consulting service (public outreach), capacity building, and social development program. |
| 7 | Microlet Operation Framework | 600,000 | 600,000 | 1.5% | • Consulting services to develop institutional framework<br>• Corporate branding, marketing, public outreach, social development program |
| **Total** | | **40,349,015** | **40,350,000** | | |

Notes:
[A] All cost items are inclusive of 20% contingency.
[B] The total cost in this table may not match with that of financial section (Section 12) due to rounding and that of economic section (Section 13) due to conversion factors used to generate the cost required for economic analysis.

In conclusion, the proposed Timor-Leste Public Transport Project represents a sound and strategic investment that directly addresses the country's most pressing public transport challenges while laying a credible foundation for longer-term, system-wide reform. By prioritizing well-designed, climate-resilient bus terminals and on-street interchanges, the project responds to immediate operational inefficiencies, safety concerns, and accessibility gaps that currently undermine the performance and attractiveness of public transport services across both urban and regional contexts. Furthermore, the feasibility study provides a robust basis for ADB loan preparation, supports informed decision-making by the Government of Timor-Leste, and establishes a coherent framework for sequencing future public transport investments and reforms.

While the feasibility study assesses a comprehensive public transport investment and reform package, it also recognizes that components differ in readiness and complexity. In particular, elements related to supporting public transport reform programs (such as pilot bus, traffic management, fare structure, fleet emissions standards, hybrid courier service, and microlet operation framework) are assessed at a strategic or pre-feasibility level and will require further development. After completion of this study, it is expected that the government will initiate DED preparation for priority facilities based on the results of this feasibility study.

## Table ES-3: Summary of Feasibility Assessment – Ten Priority Bus Facilities

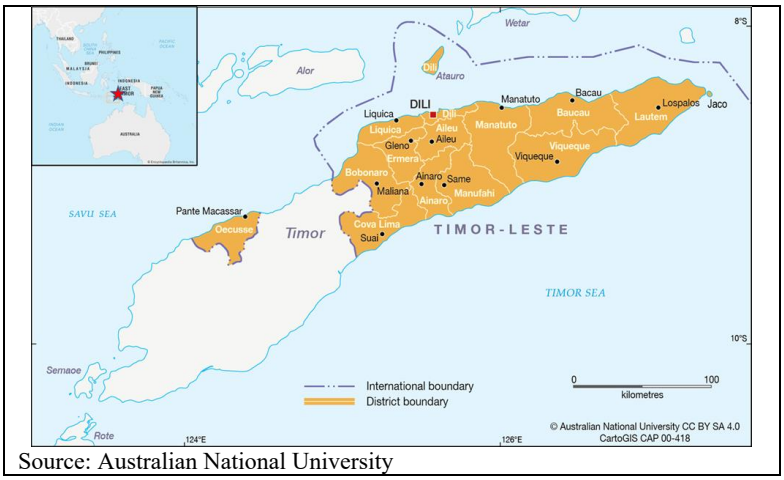
| Facility Type | Bus Terminal | | | | | On-Street Interchange | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Name** | **#2 – Becora** | **#3 – Tibar** | **#4 – Manleuana** | **#5 – Hera** | **#6 – Aldeia Samalakuliba** | **#1 – Dili Convention Center** | **#7 – Maliana Market** | **#8 – Suai Market** | **#9 – Lospalos Bemoris** | **#10 – Viqueque City Center** |
| Location | Dili | Dili | Dili | Dili | Baucau | Dili | Maliana | Suai | Lospalos | Viqueque |
| Technical (Facility Scheme and Design) | No technical constraints identified within the terminal footprint. Internal circulation, bay allocation, and integration with surrounding developments are addressed through the proposed scheme. Limited land acquisition may be required for access road improvements at selected sites (notably Manleuana), which should be addressed through resettlement planning (as warranted). | | | | | No technical constraints identified. On-street interchange feasible within existing street space through the proposed scheme. | | | | |
| Social Considerations | Potential temporary impacts on adjacent commercial activities during construction, manageable through construction staging and stakeholder engagement. | No social impacts identified. | Potential impacts related to access road improvements; impacts are expected to be limited and manageable through appropriate safeguard measures. | No social impacts identified. | No social impacts identified. | No social impacts identified. | | | | |
| Environment Considerations | Initial screening indicates limited environmental impacts. | | | | | | | | | |
| Hazard and Climate Risk | Potential flood risks identified; climate change adaptation facilities provided to mitigate potential hazards. | | | | | | | | | |
| Economic Implications | Overall project EIRR is economically viable due to potential benefits including time savings (for vehicles/people), operation efficiency within site, reductions in safety/accidents, less perceived waiting times, GHG reduction, etc. | | | | | | | | | |
| Financial Implications | The project is operationally and financially viable at the system level, with revenues sufficient to cover OPEX, CAPEX, and REPEX over the project life. The project can be commercially viable provided that appropriate government support is applied, including concessional or sovereign financing, capital grants, operating subsidies, or a combination of these measures. | | | | | | | | | |
| Institutional Arrangements | Implementation under the current institutional framework is feasible under proposed transitional arrangements, with MOTC/DNTT responsible for management and enforcement, supported by targeted capacity building and phased implementation. | | | | | | | | | |

# 1. Introduction & Background

## 1.1 Introduction

Timor-Leste is Southeast Asia's newest country located between Indonesia and Australia. It includes the eastern half of the island of Timor (with an area of about 14,000 km$^2$), an exclave on the northwestern side of the island known as Oecusse (815 km$^2$), Atauro Island to the north (150 km$^2$), and Jaco Island to the east (11 km$^2$).[8] Altogether, the country has a cumulative area of about 15,000 km$^2$ with a total population of about 1.34 million (based on the 2022 Census). Population has grown at an average of 1.8% per year from 2015 to 2022, and the population is projected to reach 1.59 million by 2030.[9,10]

Dili, the capital of Timor-Leste, is located along the northern coast as shown in Figure 1-1. It has some 324,000 residents (based on the 2022 Census) having grown at an average rate of 2.7% per year from 2015 to 2022, much faster than that nationally (at 1.8% annually).[11] Dili is projected to grow to over 833,000 residents by 2030. Other major cities include Ermera (138,000 residents), Baucau (134,000 residents), and Bobonaro (107,000 residents). Based on the 2022 Census, Timor-Leste is predominantly rural with nearly 68% of the population living in rural areas and villages scattered throughout the country.



Source: Australian National University

**Figure 1-1: Map of Timor-Leste**

The most populous city of Dili has a population density of 1,425 residents/km$^2$, while other rural cities have densities of less than 100 residents/km$^2$ (except for Ermera at 179 and Liquica at 152 residents/km$^2$).

The public transport system in Timor-Leste faces key challenges that constrain/inhibit attractiveness and more widespread use:

- **Growing Population and Demand for Travel** [12] – As noted, the population in Timor-Leste is expected to grow to 1.59 million by 2030 (833,000 in Dili), resulting in higher trip demand, additional vehicles on the road and congestion, as well as more congested public transport operations. ***More people traveling will increase the stress and strain on the existing public transport system, predominantly operated by informal enterprises. More people will drive or use private vehicles, leading to congestion and emissions, if step-changes are not made to improve public transport and make it more attractive as a travel alternative.***

- **Public Transport Attractiveness Constrained by Level of Service and Infrastructure –** Public transport (comprised of buses, microlets, and anggunas) account for about 25% of all trips in Timor-Leste. Attractiveness of public transport as a viable alternative to private vehicles and motorbikes is constrained by unscheduled and unreliable services, overcrowded low-capacity vehicles, short operating hours, and poor riding experience (such as lack of air-conditioning and older, poorly maintained vehicles). Bus infrastructure including bus stops, shelters, and terminals are in relatively poor condition. First/last-mile access to/from the bus stops and terminals has not been prioritized, making walking trips (and interlinkage with other modes such as private vehicles or motorbikes) inconvenient and uncomfortable. There is also a lack access-for-all facilities at terminals and bus stops to ensure safe and inclusive experiences for women and disadvantaged groups. These myriad issues

[8] Source: http://timor-leste.gov.tl/?p=91&lang=en
[9] Source: Ministry of Finance. 2022. Population and Housing Census 2022 – Preliminary Results.
The population trends in the Census 2022 reveal that the population growth has steadily slowed since the last census conducted in 2015 and 2022 (for instance, the average annual growth rate in 2010 and 2015 was 2.4% and 2.1%, respectively).
[10] Source: ADB. 2022. Timor-Leste – Public Transport Master Plan Update.
[11] Source: Ministry of Finance. 2022. Population and Housing Census 2022 – Preliminary Results.
[12] Source: JICA 2016 Dili Urban Master Plan.

combine to create a negative impression of bus services, resulting in uncomfortable and unsafe public transport journeys. ***Concerted efforts to improve bus service, bus infrastructure, as well as the perception of bus services are essential to attracting public transport users.***

- **Weak Regional Connectivity Limits Access to Jobs and Services** – As noted, Timor-Leste is predominantly rural with nearly 68% of the population living in rural areas. Limited inter-city and inter-regional transport options impose challenges for rural residents in accessing community services, healthcare, education, and job opportunities in major cities such as Dili. ***Better access to reliable public transport systems in all regions of the country is essential for inclusive development of the country.***

- **Slow Travel Speeds Impacting Journey Experience by Public Transport** – Average travel speeds range from 10-20 kph (during the morning, mid, and evening peak hours on weekdays) in urban areas of Dili, to below 10 kph in areas such as Colmera.[13] Public transport speeds in urban areas are slower than normal due to congestion and slow-moving roads, as well as frequent stop-and-go (including to load/unload passengers). These relatively slow travel speeds can elongate journeys and make public transport modes less competitive against other modes and inhibit modal shift to public transport. ***Slow travel speeds can elongate journeys and make public transport modes less competitive and attractive.***

- **Climate Change Impact on Current and Future Bus Infrastructure** – Timor-Leste is vulnerable to natural disaster and climate change impacts, which threaten Dili and other cities. The frequency and severity of flooding is increasing, for instance Tropical Cyclone Seroja in 2021 brought flash floods and landslides to all 13 municipalities in Timor-Leste, with nearly 80% of households in Dili being impacted.[14] During these inundation events, most main roads (particularly lowland, coastal areas in Dili) experience flooding, disrupting transport connectivity and causing significant direct/indirect economic losses. ***Current and future bus infrastructure (including bus stops and terminals) will continue to face inundation and climate change related impacts – thus planning and design must integrate the latest urban resilience and sustainable designs to minimize forthcoming impacts on public transport and allow buses to serve as a viable, safe, and convenient mode during these events.***

- **Limited Government Oversight on Efficiency, Safety and Attractiveness of Public Transport -** The Government maintains minimal oversight over intra-city and inter-regional services, as well as fixed microlet services. For instance, the Government approves the right to operate on a route, but does not specify/monitor service levels, service quality, or vehicle standards. Furthermore, the Government does not provide operating subsidies on these routes (except the noted subsidized fuel for microlet operators), encouraging operators to focus on profitable corridors and place less priority on routes providing "coverage" to key population areas or to provide high-quality services. Furthermore, the government does not penalize drivers for unsafe and unattractive conditions, leading to overcrowded vehicles, aggressive/coercive passenger herding (called *konjak*), and long waits at terminals to fill up passengers (known as *keliling*). [15, 16] ***Therefore, the current institutional/ regulatory framework does not incentivize quality of service and penalize unsafe and unlawful driving behavior – thus bus reform is not only an issue of service and infrastructure, but also creating an enabling framework.***

## 1.2 Key Findings of 2024 Public Transport Master Plan

The 2024 Public Transport Master Plan (hereinafter refer to as 2024 PTMP) was formulated to serve as a roadmap to guide the future growth and development of public transport system in Timor-Leste – which was approved by the Ministry of Transport and Communications (MOTC) in June 2024. Key findings of the 2024 PTMP are summarized in this section.

[13] Source: Ministry of Planning and Territory. 2022. Dili Urban Master Plan Update.
[14] Source: Ministry of Planning and Territory. 2022. Dili Urban Master Plan Update (Draft). This study will be referred to as the 2022 Dili Urban Master Plan Update.
[15] Source: The Asia Foundation. 2015. A Political Economy of Public Transportation in Timor-Leste.
[16] Keiling (drivers slowly circling areas outside of a terminal to board more passengers) is illegal but tolerated by traffic police.

### 1.2.1 Vision Statement and Key Pillars

The Vision of the 2024 PTMP is defined as follows supported by the five key pillars to guide the goals of the 2024 PTMP in Table 1-1:

"***Public Transport in Timor-Leste is attractive, accessible, inclusive, and future-ready transport mode that supports economic growth, urban development, and quality of life across the country***."

**Table 1-1: Vision and Five Key Pillars for Timor-Leste's Public Transport System**

| Five Key Pillar | Description |
|---|---|
| **Economic Growth** | The public transport system supports economic growth and the growth of urban Centers. It connects Dili with other strategic Centers and enables the movement of people and goods to support the economy. |
| **Access for All** | The public transport system provides the entire community with better access to jobs and services. Affordable, reliable services meet people's needs, are inclusive of marginalized groups like women and the disabled and improve social mobility. |
| **Livable Cities** | The public transport network and facilities are integrated with urban activity Centers. The system underpins healthy, safe, and connected places that improve livability in urban Centers and beyond. |
| **Mode of Choice** | The public transport network provides seamless and integrated journeys that encourage sustainable travel choices, attracting more users and reducing private vehicle use and congestion. |
| **Sustainable Future** | The public transport system plays a key role in meeting the goals of the Paris Agreement including by encouraging mode shift to reduce the emissions intensity of travel and harnesses new technologies and innovative features to support climate mitigation and resilience. |

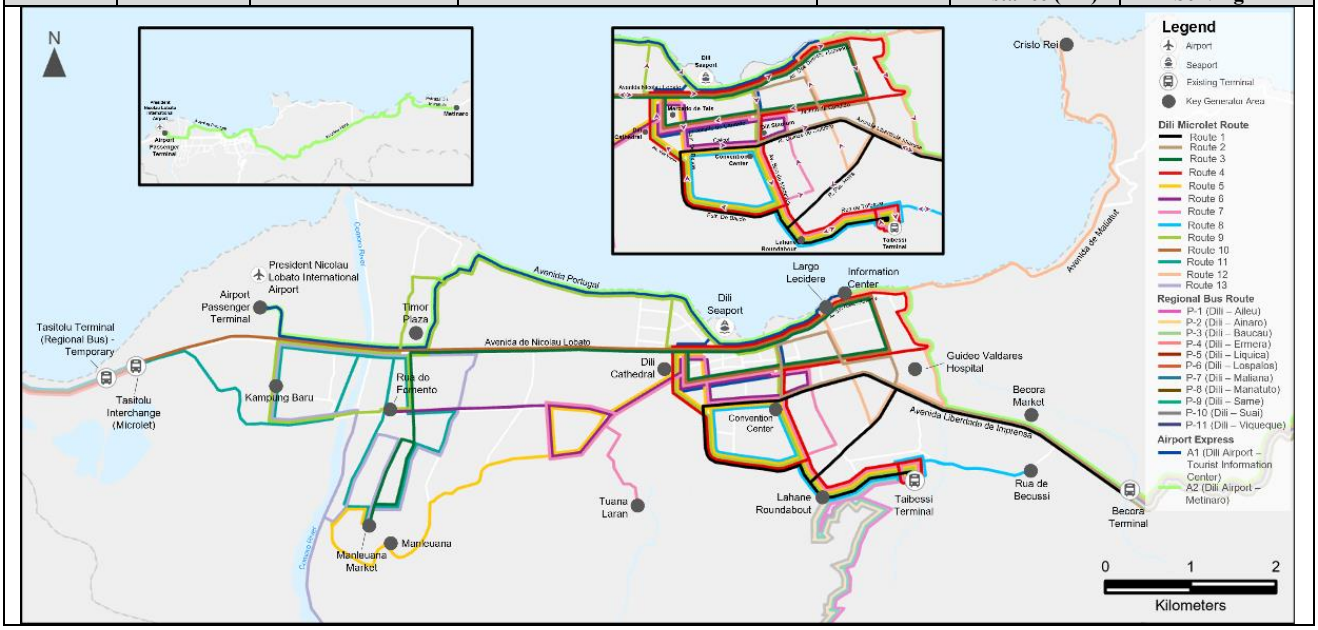
### 1.2.2 Overview of Modified Dili Microlet Routes and Regional Bus Routes

Route rationalization of Dili microlet routes as well as regional bus routes was undertaken in the 2024 PTPM to provide more efficient and convenient services to users. A summary of the modified Dili microlet routes (a total of 13 routes) as well as the two proposed Airport Express routes (between Airport and Tourist Information Center / Metinaro) is shown in Table 1-2. Also, a summary of the regional bus route recommendations (no change to the existing 11-route network) is shown in Table 1-3**.**

**Table 1-2: Modified Dili Microlet Routes and Proposed Airport Express Routes**

| Route # | Origin | Destination | Via | Direction | Round-Trip Distance (km) | Terminals Serving [A] |
|---|---|---|---|---|---|---|
| M-1 | Becora Terminal | Becora Terminal | Ave. Liberdade de Impresa, Estr. De Balide, R. Caicoli | Clockwise | 14.8 | Becora Terminal, Taibessi Terminal |
| M-2 | Becora Terminal | Becora Terminal | Ave. Liberdade de Impresa, Ave. Bpo de Madeiros | Counter-Clockwise | 10.1 | Becora Terminal |
| M-3 | Manleuana Market | Manleuana Market | Ave. de Nicolau Lobato, R. Jacinto de Candido | Clockwise | 16.8 | Manleuana Market |
| M-4 | Taibessi Terminal | Taibessi Terminal | Estr. De Balide, Av. Alm Americo Tomas, R. Jacinto de Candido | Clockwise | 12.6 | Taibessi Terminal |
| M-5 | Taibessi Terminal | Manleuana Market | Rua de Taibessi, Ave. de Manleuana | Clockwise | 21.6 | Taibessi Terminal, Manleuana Market |
| M-6 | Rua do Fomento | Rua do Fomento | Rua Hudi-Laran, R. Caicoli, R. Jacinto de Candido, | Clockwise | 12.2 | No Terminal (serves Rua do Fomento) |
| M-7 | Taibessi Terminal | Tuana Laran | Rua de Taibessi, Rua de Ai Lok Laran | Clockwise | 15.9 | Taibessi Terminal |
| M-8 | Rua de Becussi | Rua de Becussi | Rua de Taibessi, Estr. De Balide | Clockwise | 9.5 | Taibessi Terminal (Thru) |
| M-9 | Kampung Baru | Kampung Baru | Ave. de Nicolau Lobato, Av. de Portugal, Av. Salazar | Clockwise | 22.7 | Taibessi Terminal |
| M-10 | Tasitolu Terminal | Tasitolu Terminal | Ave. de Nicolau Lobato, R. Jacinto de Candido | Clockwise | 19.9 | Tasitolu Terminal |
| M-11 | Tasitolu Terminal | Manleuana Market | Rua de Tali-Laran, Ave. de Nicolau Lobato, Rua de Has Laran | Clockwise | 14.6 | Tasitolu Terminal, Manleuana Market |
| M-12 | Rua de Cristo Rei | Rua de Cristo Rei | Ave. dos Direitos Humanos, Ave. de Matiatut | Clockwise | 15.9 | No Terminal (serves Cristo Rei) |
| M-13 | Kasnafar | Kasnafar | Ave/ Praia dos Conqueiros, Rua de Lesibutak | Clockwise | 20.6 | Manleuana Market |
| | | | | **Total for Dili Microlet** | **207.2** | |
| AE-1 | Airport | Tourist Information Center | Timor Plaza | EB/WB | 19.1 | Airport |
| AE-2 | Airport | Metinaro | Timor Plaza, Tourist Information Center | EB/WB | 71.3 | Airport |
| | | | | **Total for Airport Express** | **90.4** | |

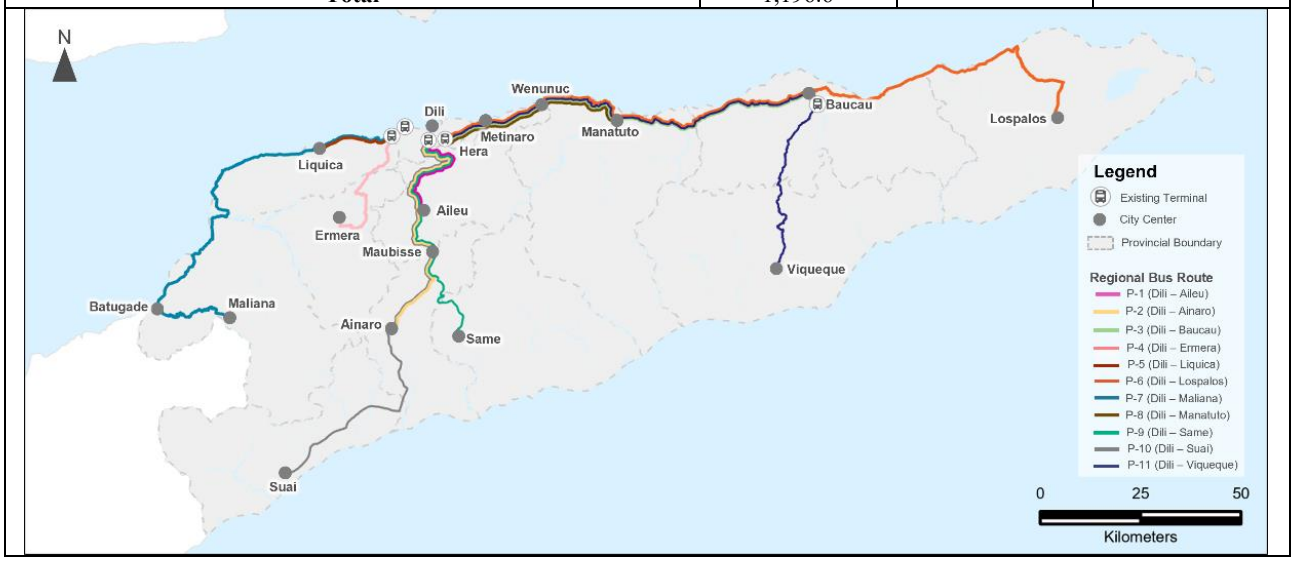
| Route # | Origin | Destination | Via | Direction | Round-Trip Distance (km) | Terminals Serving [A] |
|---|---|---|---|---|---|---|




Notes:
[A] The terminal(s) serving this route may change subject to the MOTC's decision on future terminal locations.

## Table 1-3: Overview of Regional Route Recommendations

| Route # | Origin | Destination | Direction | One-Way Distance (km) | Terminals Serving [A] | Region Covered by Route |
|---|---|---|---|---|---|---|
| P-1 | Dili | Aileu | NB/SB | 44.3 | Taibessi | South |
| P-2 | Dili | Ainaro | NB/SB | 109.3 | Taibessi | South |
| P-3 | Dili | Baucau | EB/WB | 117.7 | Becora | East |
| P-4 | Dili | Ermera | NB/SB | 46.0 | Tasitolu | West |
| P-5 | Dili | Liquica | EB/WB | 23.1 | Tasitolu | West |
| P-6 | Dili | Lospalos | EB/WB | 205.1 | Becora | East |
| P-7 | Dili | Maliana | EB/WB | 132.7 | Tasitolu | West |
| P-8 | Dili | Manatuto | EB/WB | 58.7 | Becora | East |
| P-9 | Dili | Same | NB/SB | 112.1 | Taibessi | South |
| P-10 | Dili | Suai | NB/SB | 171.0 | Taibessi | South |
| P-11 | Dili | Viqueque | EB/WB | 176.6 | Becora | East |
| **Total** | | | | 1,196.6 | | |

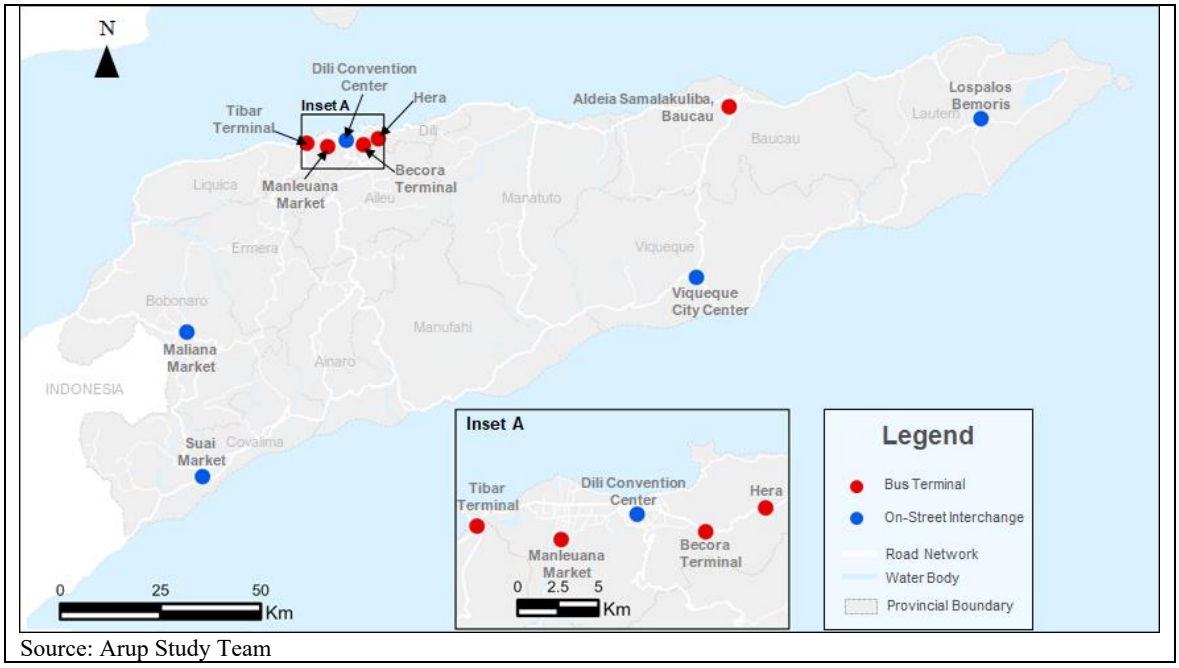



Notes:
[A] The terminal(s) serving this route may change subject to the MOTC's decision on future terminal locations.

### 1.2.3 Selected Facility Sites for Feasibility Study

A two-tier facility assessment was conducted in the 2024 PTMP to objectively assess a longlist of 40+ facility sites across the country and shortlist priority sites for feasibility assessment. The facility assessment framework comprised of various criteria including stakeholder preferences (i.e., MOTC), strategic alignment, operational impacts, environmental and social implications, and engineering considerations. Of the longlist of 40+ facility sites, some 20+ sites were shortlisted – which were further delineated into short (up to 2025), medium (2026-2030), and long-term (2031-2035) phasing plans (in align with the timeframe of the 2024 PTMP).[17]

Based on the results of the 2024 PTMP (priority sites identified in the medium-term investment plan 2026-2030) and following ADB missions conducted in April and October 2024, a total of ten sites are selected by MOTC for this feasibility study including five locations in Dili and five other locations in regional municipalities including Baucau, Maliana, Suai, Losaplos, and Viqueque. Key details of the sites are summarized as below:

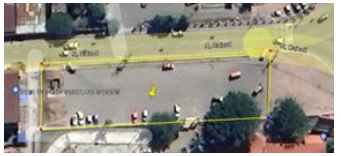


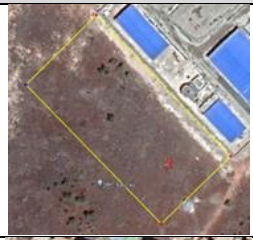

Source: Arup Study Team

**Figure 1-2: Selected Transport Facility Sites for Feasibility Study**

[17] For detailed analysis/results of the facility assessment framework, pleases refer to Section 7.5 in the 2024 PTMP.

## Table 1-4: Selected Facility Sites for Feasibility Study

| # | Site Name | Location | Context | Proposed Facility Type | Existing or New | Indicative Size of Terminal Footprint ($m^2$) | Location Map (Indicative) |
|---|---|---|---|---|---|---|---|
| 1 | Dili Convention Center | Dili City Center | The Dili Convention Center is strategically positioned at the city center, surrounded by key generators, making it an ideal interchange location with an extensive microlet network that covers the entire Dili City. Nestled beside the convention center, this site optimizes its limited available space by utilizing vacant land and capitalizes on its proximity to a local road, rendering it suitable as an on-street interchange. | On-Street Interchange | Existing | ~2,200 |  |
| 2 | Becora Terminal | Dili East | The Becora Terminal is an existing terminal strategically located in the eastern part of Dili serving as the gateway to the municipalities in the east. Major operational issues (i.e., safety, maintenance, no defined bays) and facility issues (i.e., lack of passenger amenities, access-for-all facilities) are identified. The facility is proposed to be redeveloped with enhanced passenger amenities and climate change facilities accommodating microlet and shuttle services between Becora and Hera. | Bus Terminal | Existing | ~3,600 |  |
| 3 | Tibar Terminal | Dili West | The Tibar Terminal serves as the Dili west gateway terminal connecting Dili with municipalities in the west as well as hubs for international trips to/from Indonesia. The proposed location is a vacant open area with the potential to develop into a bus terminal integrated with growth opportunities and development potentials expected in the area. | Bus Terminal | New | ~8,000 |  |
| 4 | Manleuana Market | Dili South | The Manleuana Market lies to the south of Dili and presents an opportunity for an integrated bus terminal with surrounding markets (with the preference of this site over the existing Taibessi Terminal strengthened since improved roads connecting to municipalities in south). Currently road space inside the market is used for loading/unloading activities with provision of minimal passenger facilities. | Bus Terminal | New | ~9,600 |  |
| 5 | Hera Terminal | Dili East | The Hera site is in the eastern end of Dili (about 6km from Becora Terminal). This site was initially proposed as an on-street interchange in the 2024 PTMP. However, based on the findings and discussions during the ADB Mission in April 2024, the MOTC requested to consider Hera as a strategic bus terminal and include it in the feasibility study. Following another ADB Mission in October 2024, ADB/MOTC concluded that an existing government site (currently used for driver testing only) can be repurposed for a bus terminal connecting to municipalities in the east, while the Becora terminal focuses on serving the connectivity needs of Dili and act as a central link between Dili and Hera. This site would accommodate regional buses to/from municipalities in the east as well as shuttle services between Becora and Hera. | Bus Terminal | New | ~10,000 |  |

| # | Site Name | Location | Context | Proposed Facility Type | Existing or New | Indicative Size of Terminal Footprint ($m^2$) | Location Map (Indicative) |
|---|---|---|---|---|---|---|---|
| 6 | Aldeia Samalakuliba | Baucau | Baucau is the second biggest municipality in the country and this location is proposed at about 1.5km to the west of city center. There is an opportunity to integrate a public transport terminal with the new market development in this area. The development of a municipal public transport hub would serve regional buses connecting to the eastern municipalities, as well as microlet services connecting into the urban area of Baucau. The existing Baucau Central Terminal site is being redeveloped into a sports venue by the local government and bus terminal functions will be transferred to this new location. | Bus Terminal | New | ~11,600 |  |
| 7 | Maliana | Maliana | Maliana is in the western municipality of Timor-Leste (about 60km from Dili) and shares the border with Indonesia. This location is located next to the local market and also serves as a transit hub for international trips due to its proximity to Indonesia's land border. Maliana receives public transport passengers from six other administrative posts (Atabae, Balibo, Bobonaro, Cailaco, Lolotoe and Maliana). | On-Street Interchange | Existing but no facility provided | ~680 |  |
| 8 | Suai Market | Suai | Suai is located to the southwest of Timor-Leste (about 90km from Dili) and shares the border with Indonesia. This location is located next to the local market and also serves as a transit hub for international trips due to its proximity to Indonesia's land border. Suai receives public transport passengers from seven other administrative posts (Fatululic, Fatumean, Fohorem, Maucatar, Suai, Tilomar and Zumalai). | On-Street Interchange | Existing but no facility provided | ~210 |  |
| 9 | Lospalos Bemoris | Lospalos | Lautem municipality is in the eastern end of Timor-Leset (about 160km from Dili) and serves a destination with various landmarks/tourist spots (such as the largest national park, Nino Konis Santana). Lospalos receives public transport passengers from six other administrative posts (Iliomar, Lautém, Lospalos, Luro, Lore and Tutuala). | On-Street Interchange | Existing but no facility provided | ~680 |  |
| 10 | Viqueque City Center | Viqueque | Viqueque is located to the southeast of Timor-Leste (about 100km from Dili) and serves a destination with various industrial centers for coconut oil, fishing, etc. Viqueque receives public transport passengers from five other administrative posts (Lacluta, Ossu, Uatucarbau, Viqueque and Watulari). | On-Street Interchange | Existing but no facility provided | ~190 |  |

## 1.3 Overarching Issues at Bus Terminal / Facilities

Key issues observed at the existing bus terminals/facilities (i.e., Becora Terminal, Baucau Terminal, Dili Convention Center) are delineated into operational (i.e., operating norms/ practices) and facility/amenity (i.e., physical issues related to the facility or provision of passenger amenities) although some may be cross-cutting:

**Table 1-5: Overarching Issues at Bus Terminal / Facilities**

| Category | Key Issues |
|---|---|
| Operational Issues | • **Safety of Passengers –** Current operation around the terminal (i.e., loading/unloading at the perimeter parking space, clockwise operation with doors on the left) require passengers to walk through circulation areas for boarding/alighting a vehicle and cross active roadways creating potential conflicts with vehicles.<br>• **Unsafe Operations within Terminal –** Vehicles spaces (loading, unloading and layover) are not orderly designed with some vehicles making back-up movements to enter/leave the space.<br>• **Layover / Queuing for Passengers on Circulation Areas Within Market –** No designated space for each mode is provided at existing terminals which may be confusing to passengers and also results in potential conflicts between modes.<br>• **Bus Facilities Used by Mixed Modes –** Non-designated vehicles (such as private vehicles, motorbikes) are allowed to enter the site which add more congestion to the site and results in delays to microlet/regional bus.<br>• **Lack of Maintenance/Cleaning Inside Terminal –** The passenger waiting areas, floor, and the facility are not regularly cleaned with discarded trash and litter observed around the facility (thus leading to unattractive waiting environment) and have limited maintenance based on their deteriorated conditions.<br>• **Vehicles Blocking Bus Stop Hindering Efficient Operation –** In some bus stops, trucks and other non-public transport vehicles were observed parking in the designated loading areas, blocking public transport vehicles from directly accessing the stop. This also forces passengers to access the vehicles from outside the bus stop area (and possibly enter the active roadway). |
| Facility / Amenity Issues | • **Dirt Surfacing and Lack of Pedestrian Crossing Markings –** The facility has unpaved sections (e.g., access roads near the entry gate, potholes within the site) which affect passenger experience and operation efficiency. In addition, the surfacing can be muddy during rain, soiling clothes of pedestrians / users passing by<br>• **Limited Provision of Passenger Amenities –** There is limited provision of passenger amenities creating unattractive waiting environment. Some sites such as Becora have buildings with covered facilities, but these are poorly maintained and not safe/comfortable for passengers.<br>• **No Road Markings for Vehicle Navigation & Pedestrian Crossing –** There is limited provision of road markings to navigate vehicles in an orderly manner and safe crossing environments for pedestrians. This endangers both drivers as well as passengers accessing the site.<br>• **Deteriorating Roads on Access Road –** Access roads leading to/from the terminals are deteriorating with poor maintenance (as many potholders observed) affecting vehicle operation and posing safety issues.<br>• **Minimal Provision of Lighting & Covered Facilities -** While there is limited provision of lighting within the waiting area, lighting is dim in the parking lot where the majority of vehicles load/unload. This can cause visibility and safety issues when passengers cross active circulation areas.<br>• **Lack of Access-for-All Facilities (i.e., Ramps for Disabled People) -** Access-for-all facilities such as tactile paving, ramps, wheelchair facilities are also lacking in particular considerations for disadvantaged social groups such as elderly and disabled people. |

## 1.4 Rationale and Objectives of this Study

Since achieving independence in 2002, Timor-Leste has made significant progress in state building and economic growth. The government's Strategic Development Plan (SDP) 2011-2030 is an instrument envisioning an extensive network of quality and well-maintained roads to connect communities, promote rural development, industry and tourism, and provide access to markets.[18] To transform the vision/goals in the SDP into reality, the government has also formulated the Program of the IX Constitutional Government with key focuses/priorities on land transport to develop and expand a quality public transport system for the Timorese.[19] ADB has been supporting such pursuit of economic growth, inclusive development, and climate resilience through several strategic documents including ADB Country Operations Business Plan 2021–2023 and ADB Country Partnership Strategy 2023-2027.[20]

Against this backdrop, the ADB is funding a multi-faceted study to support the Government of Timor-Leste's planned public transport reforms and improve public transport services and facilities in Timor-Leste by building on the findings and analysis from the 2022 Timor-Leste Public Transport Master Plan (PTMP) Update

[18] Source: Government of Timor-Leste. 2011. Timor-Leste Strategic Development Plan, 2011–2030. Dili.
[19] Source: Government of Timor-Leste. 2023. Program of the IX Constitutional Government. Dili.
[20] Sources (i) https://www.adb.org/sites/default/files/institutional-document/635976/cobp-tim-2021-2023.pdf; and (ii) https://www.adb.org/sites/default/files/institutional-document/806246/cps-tim-2023-2027.pdf

(hereinafter referred to as the 2022 PTMP).[21] The findings from this ADB Study will strengthen the position of Dili as the principal transport hub in the country and lay the groundwork to develop a sustainable and viable public transport system that can be replicated and adopted for Timor-Leste – through enabling planning, operating, and institutional frameworks and structures – based on international best practice aligning with national and local considerations and conditions. Key goals, objectives, and expected outcomes/outputs of the Study include:

***Goals/Objectives of the Study***

- Provide a high-quality, sustainable public transport system that meets the needs of users for safety, comfort, security, convenience, affordability, accessibility and availability
- Create a transparent and stable regulatory environment that encourages ongoing private sector investment and operations

***Expected Outcomes from the Study***

- **Output 1**: Climate-resilient and optimized public transport network system developed
- **Output 2**: Institutional capacity strengthened
- **Output 3**: Regulatory framework for low-carbon and climate-resilient development strengthened

***Key Outputs of the Study***

- **2024 Public Transport Master Plan** – Produce an independent updated PTMP (hereinafter referred to as the 2024 PTMP) based on the review of the 2022 PTMP including a public transport sector assessment, route analysis and network optimization study, investment plans with phases and cost estimates, options analysis for public transport facilities, suggestions for innovative solutions, as well as roadmap for capacity building and regulatory development.[22]
- **Feasibility Study** – Conduct a feasibility study of ten priority facilities from the 2024 PTMP as presented with key focuses on site assessment, facility schemes/design, cost estimates, financial analysis, economic analysis, climate change, environmental/social safeguards (including gender elements), and procurement.
- **Supporting Public Transport Reform Programs** [23] **–** In parallel, six supporting public transport reform programs are assessed at strategic or pre-feasibility level to inform sequencing and integration with infrastructure investments: (i) Dili Pilot Bus Project – Conduct pre-feasibility study of a pilot bus service requested by MOTC on an east-west corridor in Dili; (ii) Public Transport Fare and Fare Structure Modelling – Assess fare scheme and structure for public transport including consideration of fare setting, revenue schemes, institutional arrangements, etc.; (iii) Traffic Management Study to Improve Public Transport Operations – Conduct a comprehensive assessment of traffic and parking operations/management options in Dili to create more effective management procedures and operations for public transport; (iv) Stringent Emission Standards for Public Transport Vehicles – Assess potential for instituting more stringent emissions requirements for current public transport services; (v) Hybrid Courier Service Model – Identify opportunities for hybrid courier services and furthermore potential physical implications on the terminal designs; and (vi) Microlet Operation Framework – Assess potential to formulate operator associations to ensure coordinated operations and maintenances of microlet services.
- **Recruitment Assistance for Detailed Engineering Design (DED)** – Provide tender support including preparation of a draft for the DED consultant as well as assistance during the recruitment process.

[21] The 2022 PTMP is an update of a previous iteration of the 2016 PTMP.
[22] The 2024 PTMP was completed, and it was officially launched in May 2024 by the MOTC.
[23] Preliminary assessment was conducted for these six supporting programs which do not include feasibility study level analysis such as financial/ economic analysis, safeguard assessment, and any other due diligence activities.

A log-frame of the linkages between government vision/strategies, project objectives, outcomes and outputs are presented and summarized in Table 1-6:

**Table 1-6: Log-Frame of Study Goals, Objectives, and Outcomes/Outputs**

| Item | Key Points in Log-Frame (Focus on Public Transport) |
|---|---|
| **Government Vision & Strategies** | • **Strategic Development Plan (SDP) 2011-2030** – envision an extensive network of quality and well-maintained roads to connect communities, promote rural development, industry and tourism, and provide access to markets.<br>• **Program of the IX Constitutional Government** – develop and expand a quality public transport system for the Timorese (in particular for land transport). |
| **Objectives** | • Provide a **high-quality, sustainable public transport system** that meets the needs of users for safety, comfort, security, convenience, affordability, accessibility and availability<br>• Create a **transparent and stable regulatory environment** that encourages ongoing private sector investment and operations |
| **Outcomes** | • **Output 1:** Climate-resilient and optimized public transport network system developed<br>• **Output 2:** Institutional capacity strengthened<br>• **Output 3:** Regulatory framework for low-carbon and climate-resilient development strengthened |
| **Outputs** | • **2024 Public Transport Master Plan** – the country's public transport master plan including diagnostic assessment, route analysis and network optimization study, vision/strategies, investment plans with phases and cost estimates, facility assessment framework to shortlist public transport facilities, suggestions for innovative solutions, as well as roadmap for capacity building and regulatory development.<br>• **Feasibility Study** – feasibility study of ten priority public transport facilities including site assessment, facility schemes/design, cost estimates, financial analysis, economic analysis, climate change, environmental/social safeguards, and procurement.<br>• **Supporting Public Transport Reform Programs –** six supporting public transport reform programs to inform sequencing and integration with infrastructure investment.<br>• **Recruitment Assistance for DED** – tender support including preparation of a draft for the DED consultant as well as assistance during the recruitment process |

In addition, the linkage of the feasibility study and six supporting public transport reform programs to the aforementioned key pillars of the public transport system in Timor-Leste are shown as below:

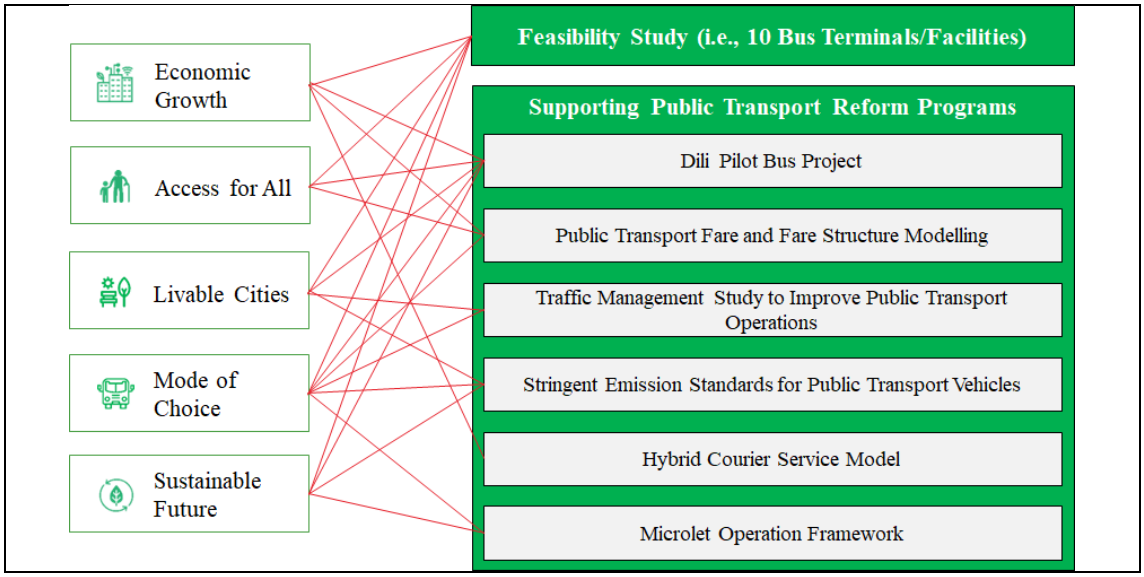



**Figure 1-3: Linkage of Feasibility Study and Supporting Public Transport Reform Programs to Key Pillars in Public Transport Vision**

***Definition of Bus Terminal and On-Street Interchange***

The purpose of this report is to conduct a feasibility study of transport facilities (i.e., bus terminals, on-street interchange) that are selected and prioritized in the 2024 PTMP. In total, ten bus facilities (including five bus terminals and five on-street interchanges) are identified as priority initiatives in terms of technical/strategic

importance and government preferences following two ADB missions conducted in April and October 2024. The definition of bus terminal and on-street interchange is highlighted in the table below:

**Table 1-7: Definition of Bus Terminal and On-Street Interchange**

| Facility Typology | On-Street Interchange | Bus Terminal |
|---|---|---|
| Facility Type & Characteristics |  |  |
| | • Serves microlets only (or in the case of smaller municipalities, a small number of daily regional buses as well).<br>• Located at key points within city/ municipality for convenient transfers.<br>• Includes basic passenger amenities like sheltered waiting areas, seating, route maps, and real time arrival information.<br>• Possesses integrated pedestrian connectivity to surrounding urban areas and provisions for persons with disabilities.<br>• May incorporate active travel infrastructure (e.g., bicycle racks) to improve last mile connectivity. | • Serves microlets and/or major regional routes.<br>• Located in residential & commercial areas/ centers for enhanced access.<br>• Includes additional amenities (beyond ones at on-street interchange) like restrooms, food and beverage options, and bicycle parking.<br>• Supports integration with other modes of transport (e.g., taxis & private shuttles)<br>• Provides customer support (e.g., ticketing)<br>• May include depot provisions – i.e., administration, maintenance, fueling, cleaning and storage for public transport vehicles, however these would be separate from passenger areas. |
| **Demand Scale** | Moderate passenger volume, primarily serving local areas. | Moderate to high passenger volume, serving urban centers and major employment centers. |
| **Footprint Scale** | Smaller-size footprint, generally occupying a single block or less. | Medium-size footprint, occupying a block or more, depending on available space and need. |
| **Suitability** | Implement at key locations within city/municipality, where bus/microlet routes intersect or where interchange is required between services. | Implement in areas with high public transport ridership, where multiple routes converge and there is a need to connect local neighborhoods to selected regional bus services. |

Source: 2024 PTMP

As noted above, development of bus terminals will bring significant impacts and implications with robust buildings (i.e., operation and administration offices) and passenger amenities (such as covered waiting areas, ticket booth, retail/kiosk, etc.). In contrast, on-street interchanges are enhanced bus stops and have less impacts and influences on the surrounding environment.

The results of this study will inform investment decisions by the Government of Timor-Leste and support ADB's decision on loan approvals to ensure financially viable and sustainable operation of public transport facilities and support strategic procurement planning and procurement plan including recruitment assistance for the detailed engineering design consultant.

## 1.5 Structure of the Report

This report is structured as follows:

- **Section 1: Introduction and Background** – highlights the background, goals/objectives of the study, key findings from the 2024 PTMP, and structure of this report.

- **Section 2: Facility Design Principles and Key Assumptions** – presents key design principle and assumptions in estimating the size of facilities, design of bus terminals and on-street interchanges, as well as key assumptions in preparation of this feasibility study including project timeline.

- **Section 3: Site Assessment & Facility Schemes/Design** – presents an engineering and architectural study focusing on site analysis, public transport services/demand, existing conditions of the site, site constraints, as well as facility improvement schemes/design including potential measures to strengthen climate resilience.

- **Section 4: Environmental Safeguards** – highlights an overview of environmental safeguards and environmental setting by site and potential environmental impacts by project phase.

- **Section 5: Gender Equality and Social Inclusion Assessment** – provides an overview of the Gender Equality and Social Inclusion (GESI) Assessment for the project including key issues/challenges, potential impacts on different social groups, opportunities for enhancement, and Gender Equality and Social Inclusion Action Plan.

- **Section 6: Institutional and Governance Arrangements** – presents key entities and relevance to public transport and a proposed responsibility matrix for public transport system, as well as operational framework for bus terminals (including standard forms of agreement).

- **Section 7: Bus Facility Options Analysis** – presents an options analysis to address observed issues and explore other potential solutions (besides developing new bus facilities) to support informed investment decisions.

- **Section 8: Risk Assessment** – provides an overview of potential risks to implement the project including technical risk (based on site assessment and facility design/scheme study), financial uncertainties, safeguard risks (including environment and social), legal and institutional risks, and other unforeseen events.

- **Section 9: Phasing Plan** – presents a phasing of the priority ten bus facilities in two phases to ensure successful implementation of the project.

- **Section 10: Supporting Public Transport Reform Programs** – entails six supporting public transport reform programs, with key findings summarized from technical working papers.

- **Section 11: Indicative Costs & Revenues** – presents indicative order-of-magnitude capital costs and O&M costs for bus terminals and on-street interchanges, and other supporting programs, as well as indicative revenues estimated for annual and a 30-year project cycle.

- **Section 12: Financial Viability Assessment** – examines the capital expenditure (CAPEX), operational expenditure (OPEX), replacement capital expenditure (REPEX), system revenue, financing costs and commercial costs of the proposed Timor-Leste public transport system to test the system's operational, financial and commercial viability and funding requirements.

- **Section 13: Economic Assessment** – presents key findings/results and economic assessment including economic evaluation approach, economic costs and benefits, and results of economic analysis.

- **Section 14: Conclusion** – summarizes key findings in this feasibility study report and outlines next steps based on the results of this study.

## 1.6 Abbreviations

| Abbreviation | Definition |
|---|---|
| ADB | Asian Development Bank |
| ADN | National Development Authority (or Agência de Desenvolvimento Nacional) |
| BAU | Business as Usual |
| BEB | Battery Electric Bus |
| BOT | Built-Operate-Transfer |
| CAFI | Council for the Administration of the Infrastructure Fund |
| CAPEX | Capital Expenditure |
| CBD | Central Business District |
| CCD | Dili Convention Center |
| CCTV | Closed-Circuit Television |
| CDB | Conventional Diesel Bus |
| CEPTED | Crime Prevention Through Environmental Design |
| DMA | Dili Metropolitan Area |
| DBFO | Design, Build, Finance, Operate & Maintenance |
| DED | Detailed Engineering Design |
| DGTP | General Directorate of Land and Property |
| DNSR | National Directorate of Road Safety |
| DNTT | National Directorate of Land Transport of Timor-Leste |
| DRBFC | National Directorate for Roads Bridges and Flood Control |
| EIRR | Economic Internal Rate of Return |
| FGD | Focus Group Discussion |
| GDP | Gross Domestic Product |
| GESI | Gender Equality and Social Inclusion |
| GHG | Greenhouse Gas |
| ICE | Internal Combustion Engine |
| IEE | Initial Environmental Examination |
| IT | Information Technology |
| ITS | Intelligent Transportation System |
| JICA | Japan International Cooperation Agency |
| KII | Key Informant Interview |
| LNG | Liquefied Natural Gas |
| LEED | Leadership in Energy and Environmental Design |
| LTA | Land Transport Authority, Timor-Leste |
| MCA | Multi Criteria Analysis |
| MOF | Ministry of Finance, Timor-Leste |
| MOI | Ministry of Interior |
| MOJ | Ministry of Justice |
| MOP | Ministry of Planning and Territory |
| MOTC | Ministry of Transport and Communications, Timor-Leste |
| MPS | Major Projects Secretariat |
| MPT | Ministry of Planning and Territory, Timor-Leste |
| MPW | Ministry of Public Works, Timor-Leste |
| NCDC | National Capital District Commission |
| NPC | National Procurement Commission, Timor-Leste |
| NPV | Net Present Value |
| OPEX | Operating Expenditure |
| PMU | Project Management Unit |
| PNTL | National Police of Timor-Leste |
| PPP | Public Private Partnership |
| PTA | Public Transport Authority |
| PTMP | Public Transport Master Plan |
| REPEX | Replacement Capital Expenditure |
| TA | Technical Assistance |
| TCRP | Transit Cooperative Research Program |
| TOR | Terms of Reference |
| UNTL | National University of Timor-Leste |
| VOC | Vehicle Operating Cost |

# 2. Facility Design Principles and Key Assumptions

## 2.1 Background

This section presents key design principle and assumptions in estimating the size of facilities as well as the design of bus terminals and on-street interchanges.

## 2.2 Bus Facility Enhancement Toolkit

National / local standards and codes for public transport terminals and facilities currently do not exist in Timor-Leste.[24] The Study Team developed the Bus Facility Enhancement Toolkit as below based on the review of international best practices and case studies – this toolkit provides a design guideline / framework with specific design requirements for creating an inclusive, accessible, and sustainable public transport system and infrastructure aligned to the vision for public transport.

### 2.2.1 Vision & Bus Facility Design Principles

The 2024 PTMP formulated the overarching vision for the public transport system as follows:

***"Public transport in Timor-Leste is an attractive, accessible, inclusive, and future-ready transport mode that supports economic growth, urban development, and quality of life across the country."***

In developing schemes/preliminary design for terminal/transit hubs, key operating and design principles (tied to the above vision) were formulated as follows with envisioned facilities/amenities for each facility type illustrated in Table 2-1 to create an attractive, inclusive, and future-ready public transport facilities that are attractive to all users:

- **Orderly / Organized** – Public transport is operated, maintained, and managed in an orderly and organized manner with seamless interchange between modes to ensure efficient passenger and vehicle movements.
- **Convenient / Comfortable** – Passenger facilities/amenities support convenient access to the site as well as a comfortable waiting environment, attracting more users and reducing private vehicle use.
- **Inclusive** – Universal access principles are integrated into designs of public transport facilities ensuring equality and social inclusion of the entire community and users of all mobility ability.
- **Secure** – Public transport facilities/designs improve security for all user groups to minimize dangers / harassment to bolster a sense of security.
- **Safe** – A safe access environment is created within and outside of public transport hubs with a suite of pedestrian-scale treatments supporting safe access for all users as well as safe vehicle operations within the site and minimized vehicle-pedestrian interactions/conflicts.
- **Climate Resilient** – Provision of climate resilience measures at public transport facilities minimize potential hazards and risks to users throughout their journey as well as future proof assets from climate change impacts and other hazard risks.

### 2.2.2 Bus Facility Enhancement Toolkit

The table provides a clear and structured framework for determining which design elements should be prioritized in the development of public transport passenger facilities, tailored to the unique characteristics and needs of each typology. Note that this framework represents a conceptual design framework and inclusion of key elements at each site will be further refined during this feasibility study.

[24] The 2022 Road Geometric Design Standards published by the Ministry of Public Works govern the provision of national directorate of roads, bridges, and flood control. Section 13.3 of this document includes some provision of bus laybys and parking bays along the road and have set minimum length and width of layover areas.

## Table 2-1: Bus Facility Enhancement Toolkit

| Focus Area | # | Elements | Description | On-Street Interchange  | Bus Terminal  |
|---|---|---|---|---|---|
| Orderly / Organized | 1-1 | Separation of People and Vehicles | Separate passenger and vehicle areas | ✓ | ✓ |
| | 1-2 | Separation by Vehicle Types | Separate areas for buses, PUV, private vehicles, and other vehicles | ✓ | ✓ |
| | 1-3 | Separation by Functions | Separate loading/unloading, layover, and circulation areas | ✓ | ✓ |
| | 1-4 | One-Way Operation | One-way internal circulation (excluding backup maneuvers) | ✓ | ✓ |
| | 1-5 | Paved Surfacing | Concrete paved loading/unloading, layover, and circulation areas | ✓ | ✓ |
| | 1-6 | Operation / Administration Office | Formal fully-equipped offices for operators and administrators | | ✓ |
| | 1-7 | Signage | Directional and safety markings / signage | | ✓ |
| | 1-8 | Facility Lighting | Well-lit vehicle areas | ✓ | ✓ |
| | 1-9 | Signalization [B] | Traffic signals at key junctions and mid-block areas outside of terminal | ✓ | ✓ |
| | 1-10 | Street Redesign [B] | Improved external access such as road/junction improvements, widening, etc. | ✓ | ✓ |
| | 1-11 | Curb Management [B] | Restricted parking, etc. outside of terminal | ✓ | ✓ |
| Convenient / Comfortable | 2-1 | Pick-Up & Drop-Off Curb [C] | Pick-up and drop-off curb for private vehicles | | ✓ |
| | 2-2 | Interchange Zone [C] | Bus stop for loading/unloading and motorbike pick-up / drop-off | | ✓ |
| | 2-3 | Covered Passenger Areas | Provision of covered passenger waiting and circulation areas | ✓ | ✓ |
| | 2-4 | Benches | Provision of benches in passenger waiting areas (especially for women, elderly, and PWD) | ✓ | ✓ |
| | 2-5 | Retail / Kiosk | Provision of retail and kiosk spaces for local businesses | | ✓ |
| | 2-6 | Ticket & Information Center | Provision of ticketing & information center | | ✓ |
| | 2-7 | Toilet | Provision of toilets | | ✓ |
| | 2-8 | Wayfinding Signage [C] | Provision of wayfinding signage | ✓ | ✓ |
| | 2-9 | Convenient Walk Network [C] | Enhanced walk catchment network and linkages (such as expanded sidewalks) | ✓ | ✓ |
| Inclusive | 3-1 | Accessibility Ramps [C] | Provision of accessibility ramps at crosswalks | ✓ | ✓ |
| | 3-2 | Wheelchair Access [C] | Provision of wheelchair inclines | ✓ | ✓ |
| | 3-3 | Tactile Pavement [C] | Provision of tactile pavement | ✓ | ✓ |
| | 3-4 | Sensitive Design | Adoption of Crime Prevention Through Environmental Design (CEPTED)[A] | ✓ | ✓ |
| Secure | 4-1 | CCTV | Provision of CCTV for enhanced security | | ✓ |
| | 4-2 | Pedestrian-Scale Lighting [C] | Well-lit facilities and walk areas to reduce harassment, etc. | ✓ | ✓ |
| | 4-3 | Guard Post | Provision of guard rooms | | ✓ |
| Safe | 5-1 | Protected Sidewalk [C] | Curbed sidewalks, railings, etc. | ✓ | ✓ |
| | 5-2 | Crosswalks [C] | Provision of crosswalks | ✓ | ✓ |
| | 5-3 | Pedestrian Signals [B] | Pedestrian push buttons and countdown signs | ✓ | ✓ |
| Climate Resilient | 6-1 | Landscaping (trees, etc.) | Landscaping areas such as trees to provide green environment for users/visitors | ✓ | ✓ |
| | 6-2 | Climate Resilient Design | Future proofing of facilities from climate change impact | | ✓ |

Note:
[A] CEPTED is a design approach to manipulate the built environment to create a safer waiting area. This includes designing to eliminate blind spots, increasing visibility of waiting areas, etc. to deter crime and harassment, and minimize fear of crime.
[B] These elements can be considered for external access improvements outside of terminal / on-street interchange
[C] These elements can be considered for both facility improvements within terminal and external access improvements

## 2.3 Public Transport Facility Sizing Assumptions

### 2.3.1 Facility Sizing Assumptions

Scaling the sizing requirements for each facility is based on a combination of variable bay sizing and type of passenger amenities define by facility typology. For example, the number of bays is closely tied to peak hour trips by route and vehicle circulating area is increased relative to the number of bays. Similarly, concrete curb and gutters are scaled based on the total curb length required to support the total number of bays. Passenger amenities, such as the waiting area and roof are scaled based on the number of potential passengers resulting from the peak hour vehicles serving the facility. Key assumptions to estimate the size of bus terminals / on-street interchange are summarized as follows:

**Table 2-2: Facility Sizing Assumptions**

| Element | Value | Unit | Assumption |
|---|---|---|---|
| **Concrete Bus Bay + Bus Circulating Area** | | | |
| Microlet Bay | 15 | m² | Based on microlet size |
| Microlet Bay with Circulating Area | 22.5 | m² | Assumed buffer space with 1.5 multiplier factor |
| Regional Bay | 30 | m² | Based on regional bus size |
| Regional Bay with Circulating Area | 45 | m² | Based on circulating area factor |
| **Concrete Curb and Gutters** | | | |
| Passenger bay | 36 | m/bay | Estimate for initial costing purposes – subject to final design |
| Layover bay | 72 | m/bay | Estimate for initial costing purposes – subject to final design |
| **Drop Off Area (Off-Street)** | | | |
| Minimum drop off area | 126 | m² | Estimate for initial costing purposes (3 pick/up drop off bays and queuing area) – subject to final design |
| Additional area for every 3 additional bays | 13 | m² | Assumption for initial costing purposes: one additional pick/up drop off bay per three passenger bays assume full microlet with 20% of passengers being dropped off by private vehicle with 10 sec drop off rate per passenger. |
| **Waiting and Queuing Area** | | | |
| Area per person | 1.2 | m² | Transit Capacity and Quality of Service Manual, 2014 |
| Area per passenger bay | 16 | m² | Bus Terminal Planning and Design Guidelines for India, 2014 (2m x 8 m) |
| Growth factor | 25% | % | Preserve space upon the total waiting area |
| **Terminal Facility Roof** | | | |
| Facility Roof Factor | 25% | % | 25% more space added to the roof based on the build/waiting areas (to undercover elements combined) |
| **Wayfinding and Signage** | | | |
| Bus Terminal | 10 | number | Assume 4 possible entry/exit directions of interchange (two each - 8 wayfinding) + 2 inside passenger waiting area |
| On-Street Interchange | 2 | number | Assume 2 wayfinding info per location |
| **Ticket & Fare Collection Point** | | | |
| Bus Terminal | 16 | m² | Assume 4m x 4m space for ticket/fare collection |
| **Tactile Paving** | | | |
| Long length of passenger bays | 13 | m | N/A (Conservative estimate for costing purposes taken as long length of largest bay) |
| **Other** | | | |
| Operator Office | 25 | m² | Assume 5m x 5m space for operator office |
| Administration Office | 25 | m² | Assume 5m x 5m space for administration office |
| Booth (Regional) | 9 | m² | Assume 3m x 3m space for multi-function booth at regional on-street interchange. |
| Security Office | 4 | m² | Assume 2m x 2m space for security office |
| External works | 100 | m² | Assume 50m2 of pedestrian improvements either side of facility entrance |
| Retention Pond | 3% | % | Assume 3% of the site area based on similar bus projects in the region |
| Solar Pannel Roof (Terminal) | 50% | % | Assume 50% of passenger waiting areas (on building roof) |
| Solar Pannel Roof (On-Street Interchange) | 11 | m² | Assume solar panel on roof of a bus shelter (area of bus shelter roof is 6m x 1.8m) |

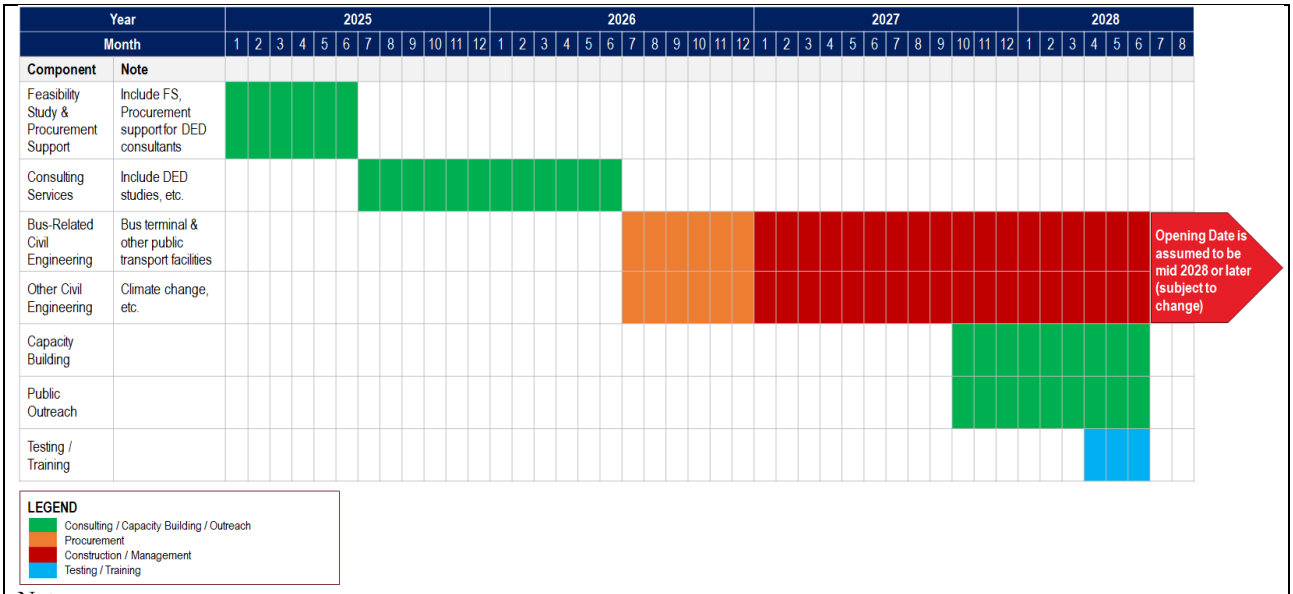
Source: 2024 PTMP and Facility Design Guidelines

## 2.4 Other Key Assumptions

### 2.4.1 Indicative Timeline of Key Milestone Activities

The figure below shows the indicative timeline with key milestone activities including feasibility study, detailed engineering design, construction, testing and operation of bus terminals/on-street interchanges. Key assumptions in this timeline and preparation of the feasibility study are as follows:[25]

- **Mid 2025** – Start of DED work (to be completed by mid-2026)
- **Early 2027** – Construction of public transport facilities (to be completed by mid-2028)
- **Early 2028** – Testing / training of relevant personnel before opening of bus facilities
- **Mid 2028** – Opening of public transport facilities (partially)




Notes:

1. Land acquisition for terminal footprints is not assumed at this stage as the select sites are assumed to be owned by the government.
2. Key assumptions/timeline are indicative only and the timeline of milestone activities is subject to change in aling with the government's plan. For conservative purpose, cost, revenues, financial and economic assessment are estimated based on 2029 when bus terminal/facilities will be fully open (considering buffer time/potential delays of milestone activities).

**Figure 2-1: Indicative Timeline of Bus Facility Development**

### 2.4.2 Key Assumptions in Preparation of This Feasibility Study

The feasibility study of bus terminals/facilities is prepared based on the following assumptions (as warranted):

- Future demand of microlet (Dili) and reginal buses was projected up to 2035 in the 2024 PTMP. Key findings on route-level demand are further distributed into assumed demand for individual facility sites to estimate fare revenues.
- Existing microlet vehicles are assumed to be operating in this scenario. In other words, no replacement of the microlet with modern buses is assumed for this feasibility study assessment.
- Additional surveys were conducted to understand traffic and pedestrian volumes/activities outside the selected facility sites which will be used to come up with access road/sidewalks improvements. Key details and survey results are summarized in Appendix C.

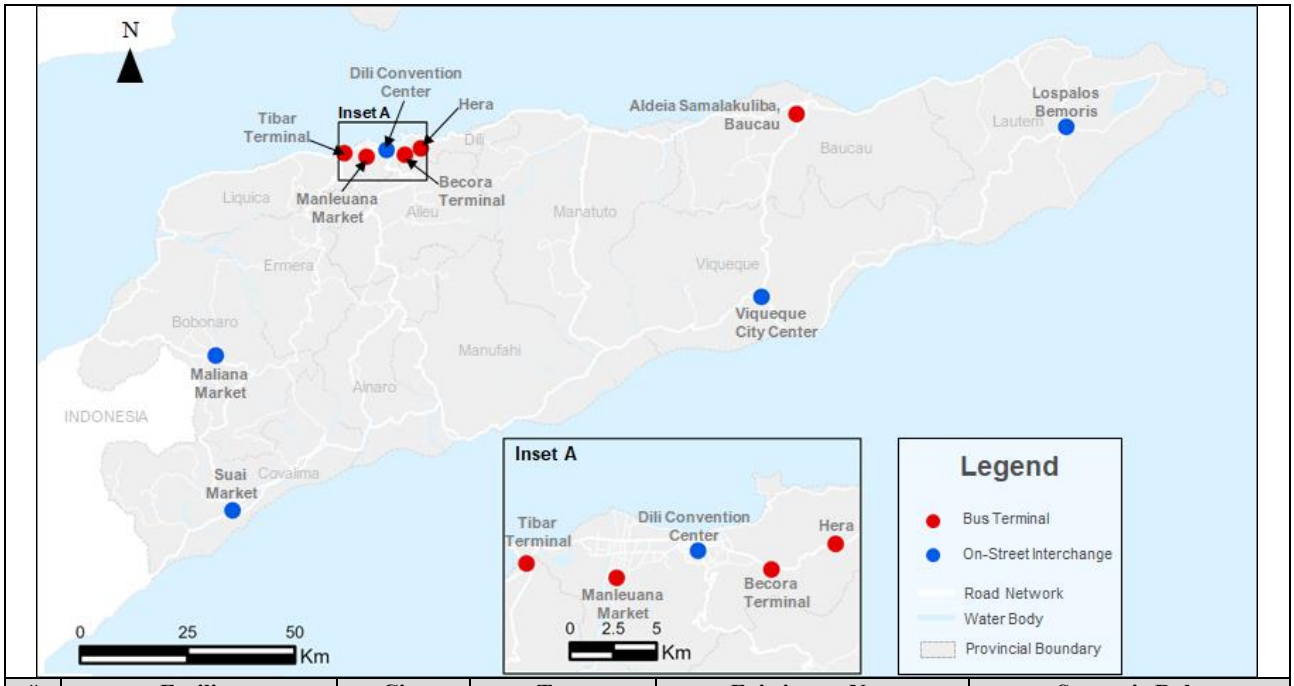
[25] Key assumptions/timeline are indicative only and may subject to change based on decisions/priorities of key stakeholders on the timeline of milestone activities. For conservative purpose, cost, revenues, financial and economic assessment are based on 2030 when bus terminal/facilities are expected to be fully open (considering buffer time/potential delays of milestone activities).

# 3. Site Assessment & Facility Schemes/Design

## 3.1 Background

This section presents an engineering and architectural study focusing on site analysis, public transport services/demand, existing conditions of the site, as well as facility improvement schemes/design including potential measures to strengthen climate resilience. The overview of the selected sites is presented in Table 3-1.

**Table 3-1: Overview of Selected Transport Facility Sites**




| # | Facility | City | Type | Existing or New | Strategic Role |
|---|---|---|---|---|---|
| 1 | Dili Convention Center | Dili | On-Street Interchange | Existing | Interchange hub in Dili city center |
| 2 | Becora Terminal | Dili | Bus Terminal | Existing | Dili east gateway for intracity trips |
| 3 | Tibar Terminal | Dili | Bus Terminal | New | Dili west gateway and international access point |
| 4 | Manleuana Terminal | Dili | Bus Terminal | New | Dili south gateway |
| 5 | Hera Terminal | Dili | Bus Terminal | New | Dili east gateway for regional / intercity trips |
| 6 | Aldeia Samalakuliba Terminal | Baucau | Bus Terminal | New | Key interchange hub for regional trips in 2nd biggest city |
| 7 | Maliana Market | Maliana | On-Street Interchange | Existing but no facility provided | Western destination in the country |
| 8 | Suai Market | Suai | On-Street Interchange | Existing but no facility provided | Southeastern destination in the country |
| 9 | Lospalos Bemoris | Lospalos | On-Street Interchange | Existing but no facility provided | Eastern destination in the country |
| 10 | Viqueque City Center | Viqueque | On-Street Interchange | Existing but no facility provided | Southeastern destination in the country |

Based on the bus facility enhancement toolkit, operational and facility issues are identified at site level (with key findings summarized in Appendix A). Furthermore, engineering data such as civil, structural, utilities, geotechnical, etc. are collected through various channels (including request for information via government agencies and site investigations) and are compiled in Appendix B.

## 3.2 Facility#1: Dili Convention Center

### 3.2.1 Overview of Location and Strategic Importance

Dili Convention Center is an existing on-street bus stop located in the center of Dili and serve as a key interchange hub to travel/transfer across the city of Dili. The area size (including parking spaces for private vehicles) is about 2,200m$^2$ and surrounded by R. Caicoli in north (two-way roads, one lane per direction) and Dili Convention Center in south (with sidewalk access provided on east/west side of the site). A roundabout (two lanes) lies to the northeast of the site which constitutes a major corridor spanning the city (from Ave. de Nicalau Lobato to Ave. Liverdade de Imprensa leading to Becora Terminal).

Figure 3-1: Site Location – Dili Convention Center

Key generators around the site include Dili Convention Center (civic public center), schools, commercial buildings, hotel, government offices (the government office of DNTT located across R. Caicoli), landmark, Dili Municipal Stadium (within 500m) and schools, hospitals, and park (within 1km).

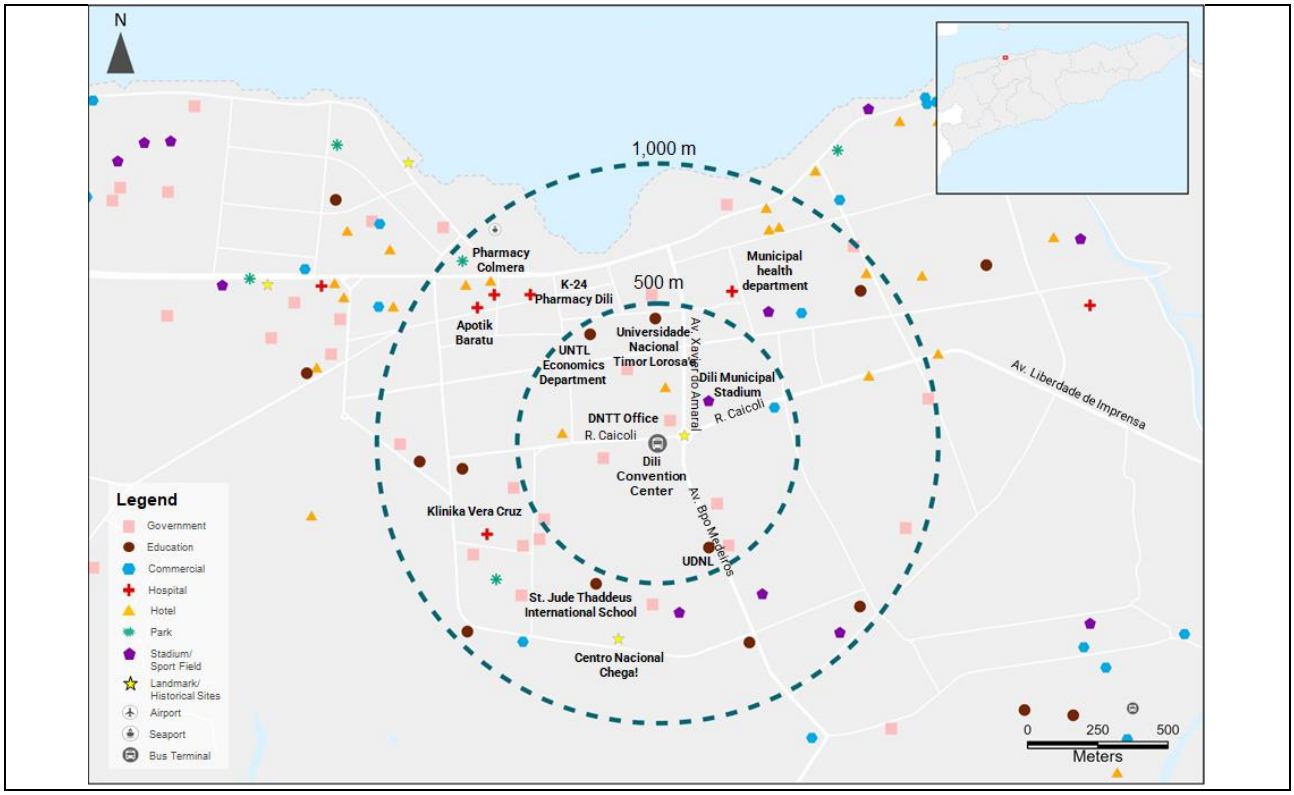



Figure 3-2: Key Generator – Dili Convention Center

### 3.2.2 Public Transport Services and Demand

A total of eight microlet routes (Route 1, Route 2, Route 4, Route 5, Route 6, Route 7, Route 8, and Route 9) are proposed to serve this facility. The existing and future microlet services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:

## Table 3-2: Public Transport Services and Demand (Existing and Future) – Dili Convention Center

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Dili Microlet*** | | | | | | | | | | | |
| M-1 | Becora Terminal | Becora Terminal | Microlet | Clockwise | 11.8 | 1.5 | 240 | 6,420 | 1.5 | 260 | 15,110 |
| M-2 | Becora Terminal | Becora Terminal | Microlet | Counter-Clockwise | 10.1 | 1.5 | 360 | 9,720 | 1 | 400 | 10,390 |
| M-4 | Taibessi Terminal | Taibessi Terminal | Microlet | Clockwise | 12.6 | 3 | 180 | 5,590 | 2 | 270 | 14,390 |
| M-5 | Taibessi Terminal | Taibessi Terminal | Microlet | Clockwise | 17.8 | 2 | 210 | 8,140 | 1.5 | 270 | 23,390 |
| M-6 | Rua do Fomento | Rua do Fomento | Microlet | Clockwise | 12.2 | 1.5 | 230 | 6,200 | 1.5 | 290 | 17,160 |
| M-7 | Taibessi Terminal | Taibessi Terminal | Microlet | Clockwise | 15.9 | 3.5 | 140 | 5,290 | 3 | 170 | 13,480 |
| M-8 | Rua de Becussi | Rua de Becussi | Microlet | Clockwise | 9.5 | 2.5 | 140 | 3,760 | 2 | 170 | 9,550 |
| M-9 | Kampung Baru | Kampung Baru | Microlet | Clockwise | 18.3 | 1.5 | 370 | 10,260 | 1 | 500 | 29,670 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.2.3 Existing Facilities

The current layout of Dili Convention Center is illustrated below. The facility utilizes an open lot in front of the Dili Convention Center which is mainly used for parking spaces of private vehicles as well as loading, unloading and layover spaces for microlet services. A poorly maintained bus stop with concrete seating is provided at the south corner of the site (without other amenities such as lighting) as shown in Figure 3-3. Vehicles enter from the access point in the west corner, circulate in a counterclockwise fashion, and exit via the access point in the east corner (immediately adjacent to the roundabout). Other private vehicles also share the spaces for loading, unloading and parking and facility spaces are not clearly defined by mode/function. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in Appendix A.

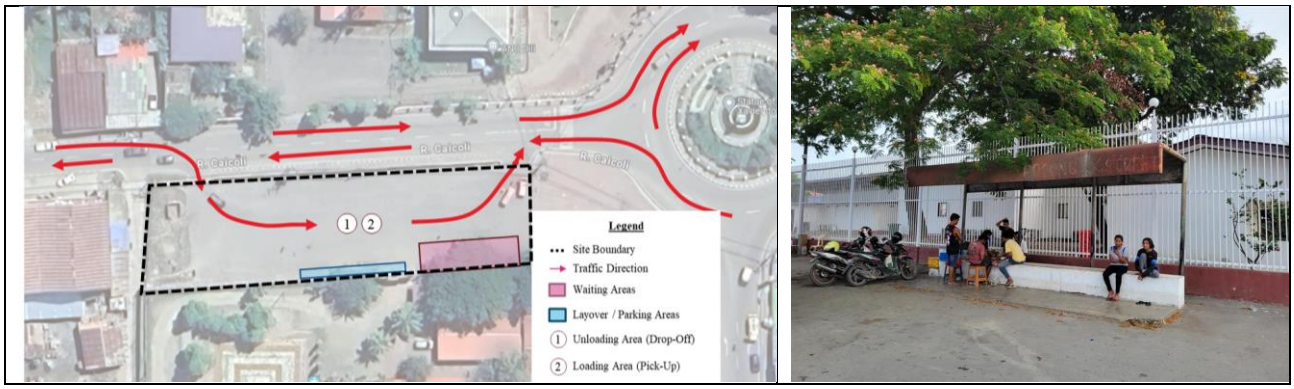



**Figure 3-3: Current Facility Layout and Streetview – Dili Convention Center**

### 3.2.4 Key Routes Serving and Proposed # of Bays

As noted, this facility will be served by eight microlet routes – all operating as thru routes at this key interchange hub. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-3.[26] In total, the facility requires six bays (with each bay size assumed for microlet operation) comprised of six boarding/alighting bays without layover space.

During the ADB Mission held in October 2024, it was agreed to reserve parking spaces for private vehicles for event purposes (as visitors normally use parking spaces in front of Dili Convention Center) – this results

[26] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

in less spaces reserved for loading/unloading spaces for public transport. To overcome such spatial constraints at this location, it is suggested to provide a one-way operation system to optimize the space for maneuvering.

### 3.2.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access** – The main entry point is proposed in the east corner and exit point proposed in the west corner along Rua Caicoli. Another access road in the middle is provided for private vehicles to minimize conflicts between microlet and private vehicle upon accessing the site.
- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas are proposed to be physically separated from private vehicle to reduce potential incidents.
- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, benches) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps) to enable safe access for all. Furthermore, climate adaptation measures (i.e., stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts

## Table 3-3: Bay Assignment by Route for Dili Convention Center

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay4** | **Bay 5** | **Bay 6** | **Lay-over** |
| M-1 | Microlet | Thru | Becora Terminal | Becora Terminal | Loop | 40.0 | 0.24 | 0.48 | C | | | | | | 0 |
| M-2 | Microlet | Thru | Becora Terminal | Becora Terminal | Loop | 60.0 | 0.36 | 0.72 | | | | C | | | 0 |
| M-4 | Microlet | Thru | Taibessi Terminal | Taibessi Terminal | Loop | 30.0 | 0.18 | 0.36 | | | | | C | | 0 |
| M-5 | Microlet | Thru | Taibessi Terminal | Taibessi Terminal | Loop | 40.0 | 0.24 | 0.48 | | | C | | | | 0 |
| M-6 | Microlet | Thru | Rua do Fomento | Rua do Fomento | Loop | 40.0 | 0.24 | 0.48 | | C | | | | | 0 |
| M-7 | Microlet | Thru | Taibessi Terminal | Taibessi Terminal | Loop | 20.0 | 0.12 | 0.24 | | C | | | | | 0 |
| M-8 | Microlet | Thru | Rua de Becussi | Rua de Becussi | Loop | 30.0 | 0.18 | 0.36 | C | | | | | | 0 |
| M-9 | Microlet | Thru | Kampung Baru | Kampung Baru | Loop | 60.0 | 0.36 | 0.72 | | | | | | C | 0 |
| **Total** | | | | | | | | | | | | | | | **0** |

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- At Dili Convention Center public transport vehicles circulate in a clockwise direction, with all circulation being one-way to reduce chances of incidents. Access is only permitted from the east corner and exit from west corner only.
- There are three 12m bays provided which is equivalent to six microlet bays (assuming one 12m bay can accommodate two microlet vehicles). This arrangement allows existing microlet operation and gives flexibility and future proof loading/unloading/layover spaces when microlet vehicles are converted to larger fleet.
- Covered passenger waiting areas are proposed at the south of the site (adjacent to Dili Convention Center) to facilitate seamless boarding/alighting and connecting to the venue.
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.
- Some 26 parking spaces for private vehicles are provided in the middle of the site with access to Rua Caicoli.

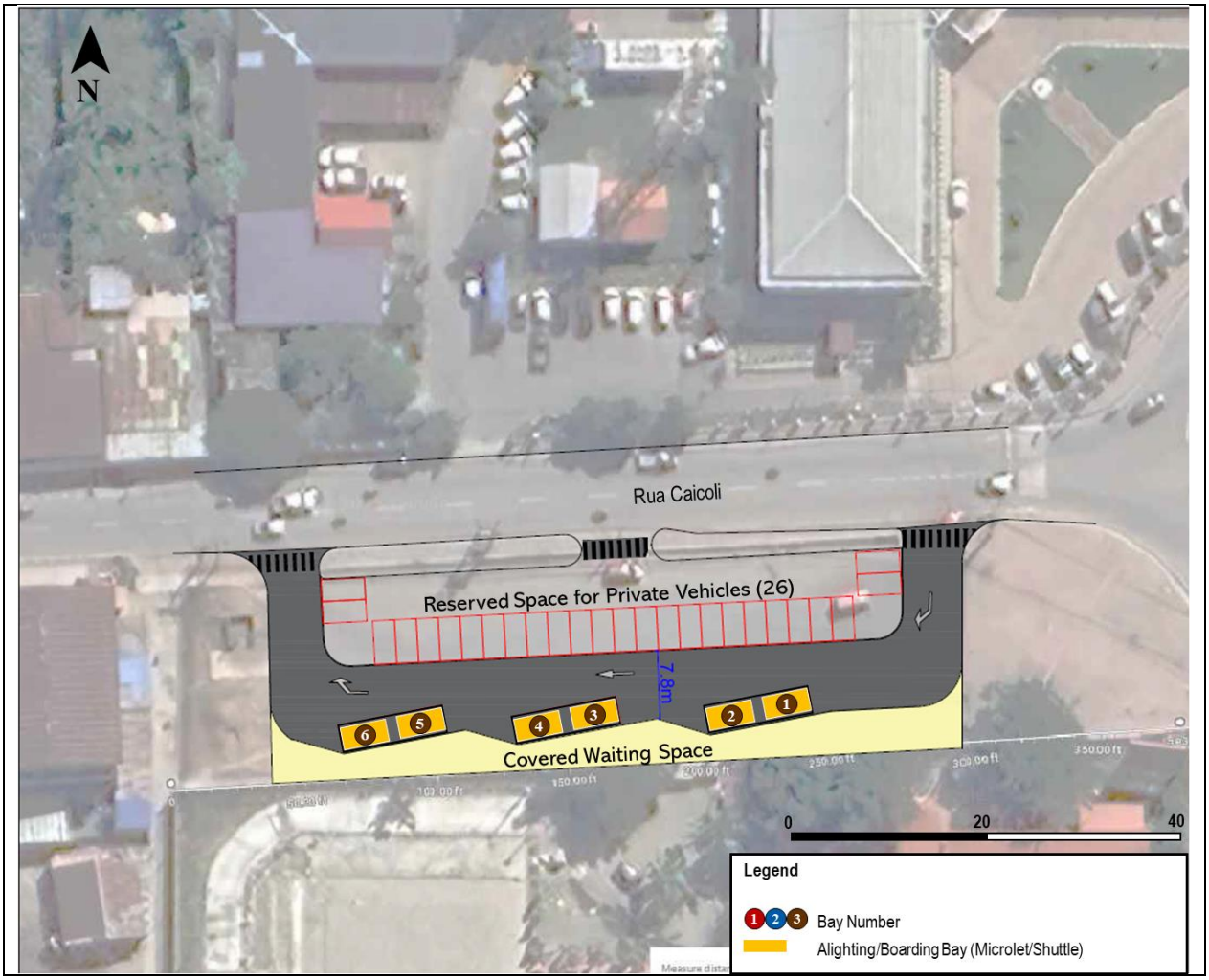



**Figure 3-4: Preliminary Layout/Design for Dili Convention Center**

## 3.3 Facility#2: Becora Terminal

### 3.3.1 Overview of Location and Strategic Importance

The Becora Terminal is one of existing bus terminals located in the east of Dili and serves as a gateway connecting Dili and the East Region such as Baucau, Manatuto, Lospalos, and Viqueque. The area size is about 3,600m$^2$ and surrounded by Benamauc River in west, Rua Pe. Moteiro in south (which is a two-way road, one lane per direction), a local village road in north (narrower two-way road), and various low-floor commercial developments in north and east.

Figure 3-5: Site Location – Becora Terminal

Key generators around the site include commercial establishments (i.e., Traditional Market), education (i.e., EPC Sabraka Laran, Escola Publica EPC Bedois), hotel, and several landmark sites within 500m of the site, as well as hospital (i.e., Centro Salude Comunitaria Becora) and sports center (i.e., Kampu Desportu Becora) within 1.0km of the site.

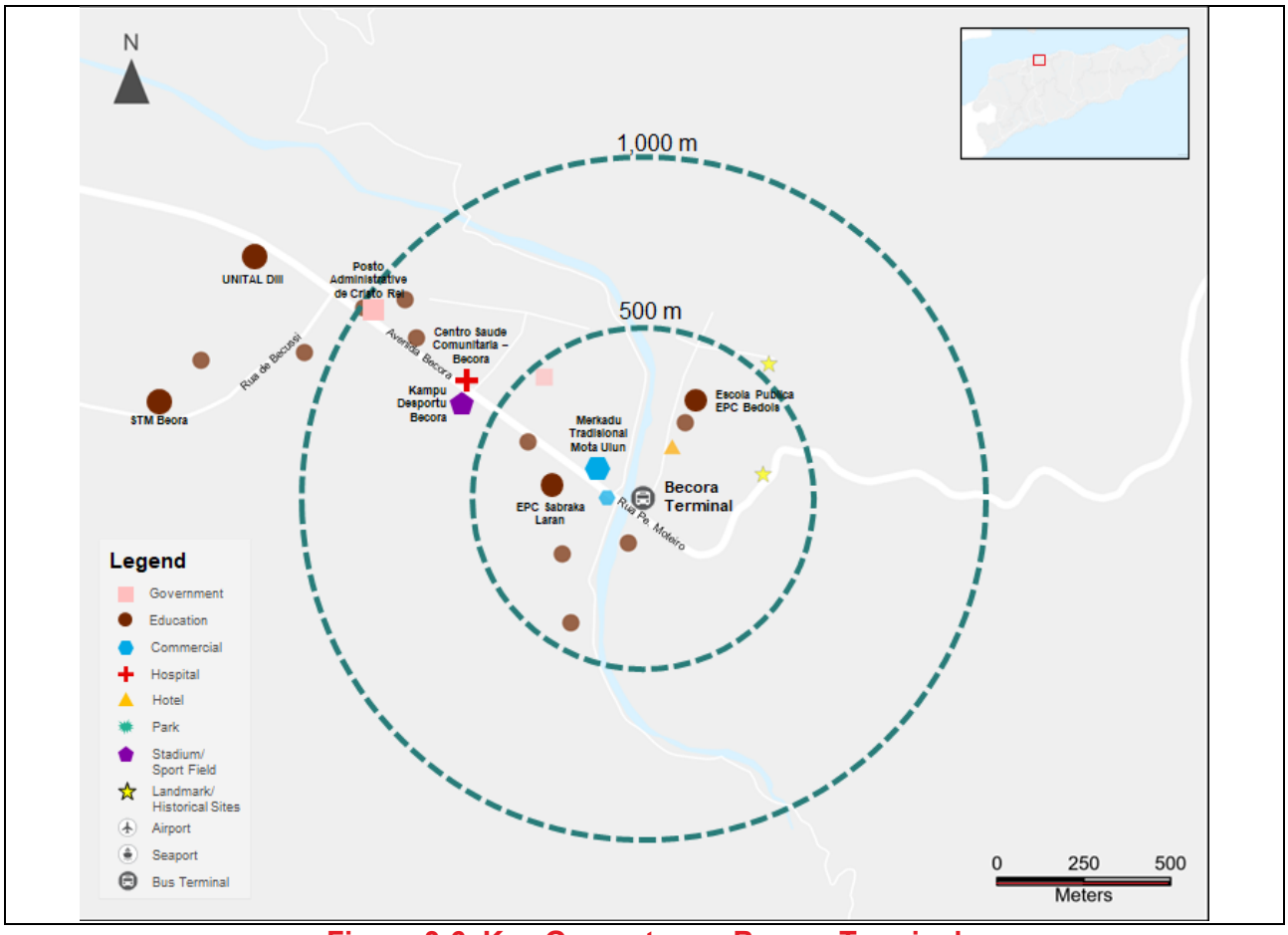



Figure 3-6: Key Generators – Becora Terminal

### 3.3.2 Public Transport Services and Demand

Currently two microlet routes (Route 1 and Route 2) as well as four regional bus routes connecting to municipalities in the east (i.e., Baucau, Lospalos, Manatuto, Viqueque) serve Becora Terminal. In the future this facility will be served by microlet and shuttle services connecting Becora and Hera (see next section for details). The existing and future microlet and regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:

## Table 3-4: Public Transport Services and Demand (Existing and Future) – Becora Terminal

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Dili Microlet*** | | | | | | | | | | | |
| M-1 | Becora Terminal | Becora Terminal | Microlet | Clockwise | 11.8 | 1.5 | 240 | 6,420 | 1.5 | 260 | 15,110 |
| M-2 | Becora Terminal | Becora Terminal | Microlet | Counter-Clockwise | 10.1 | 1.5 | 360 | 9,720 | 1 | 400 | 10,390 |
| ***Regional Bus*** | | | | | | | | | | | |
| P-3 | Becora Terminal | Baucau | Bus | EB/WB | 117.7 | 10 | 39 | 1,218 | Proposed to move to Hera Terminal as per the ADB/MOTC decision in the join Mission conducted in April 2024 | | |
| P-6 | Becora Terminal | Lospalos | Bus | EB/WB | 205.1 | 20 | 6 | 153 | | | |
| P-8 | Becora Terminal | Manatuto | Bus | EB/WB | 58.7 | 60 | 6 | 126 | | | |
| P-11 | Becora Terminal | Viqueque | Bus | EB/WB | 176.6 | 7 | 13 | 377 | | | |
| ***Shuttle Service [C]*** | | | | | | | | | | | |
| S-1 | Becora Terminal | Hera Terminal | Microlet | Clockwise | 15.2 | - | - | - | 3 | 240 | 2,460 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.
[C] Operational scheme for shuttle service is assumed to be provided by existing microlet operators (such as by permitting Microlet Route 1 and Route 2 to provide extended services to Hera or allowing other operators/drivers to provide the service). This requires close coordination with relevant stakeholders including DNTT to ensure feeder services are provided prior to the opening of upgraded Becora Terminal.

### 3.3.3 Existing Facilities

The current layout of Becora Terminal is illustrated below. The terminal includes a sheltered passenger waiting area (with seating and some lighting as well as retail/food kiosk activities placed inside), a ticketing office (although purportedly not used), spaces for loading/unloading and layover (though not designated by function), a security post, and buildings adjacent to the terminal. Vehicles circulate in a clockwise fashion, though some vehicles are observed to operate in an opposite counterclockwise fashion (including private vehicles accessing the village road in north). Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

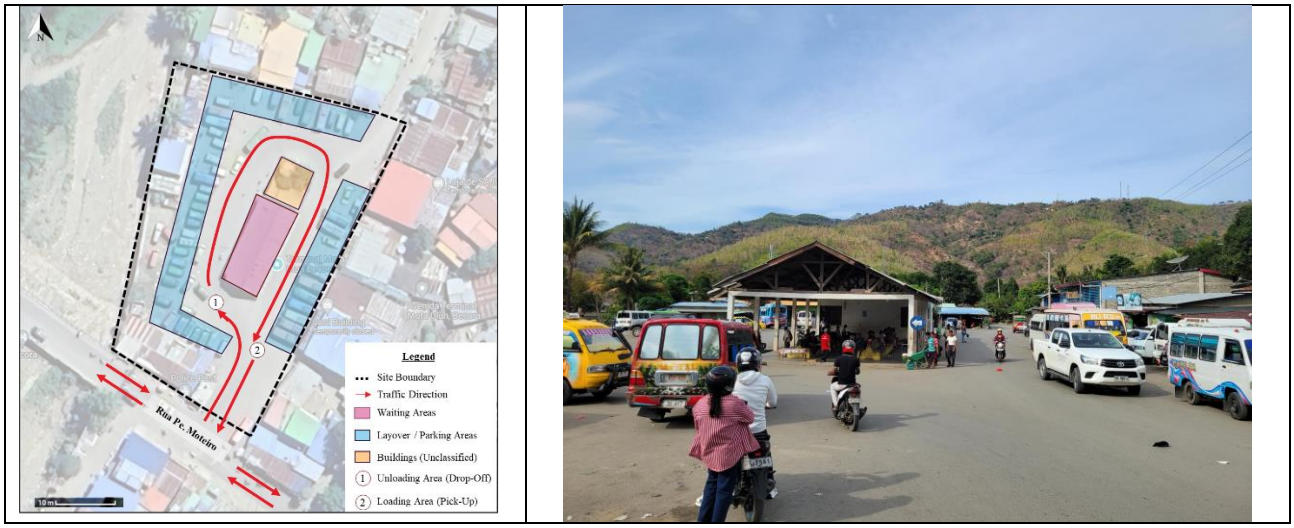



**Figure 3-7: Current Facility Layout and Streetview – Becora Terminal**

### 3.3.4 Key Routes Serving and Proposed # of Bays

As noted, this facility will be served by two microlet routes (Route 1 and Route 2) and shuttle services which will connect Becora Terminal and Hera Terminal in the future (see **Section 3.6** for Hera Terminal). All routes operate as terminating routes. No regional buses will operate at this facility in the future as these will be transferred to Hera Terminal – which is a key outcome of the ADB Mission in April 2024 in line with the

MOTC's strategic decision on public transport terminal. [27] The Becora Terminal focuses on serving connectivity needs of Dili and act as a central link between Dili and Hera, while Hera Terminal serves regional trips.

Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in the table below. [28] In total, the facility requires 17 bays (with each bay size assumed for microlet operation) comprised of 10 boarding/alighting bays and 7 layover spaces.

### 3.3.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access** – The main entry/exit point is proposed in south of the site along existing road Rua Pe. Moteiro (with geometric improvements required for improved access road). The local road in the north will be retained and connected to Rua Pe. Moteiro for local access needs with physical separations from Becora terminal to ensure safe bus operations with minimal impacts from general traffic.
- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas (partially) are proposed to be physically separated to reduce potential bus-to-pedestrian accidents. The pickup and drop-off (PUDO) zone for private vehicles are located to the east/south of the access point of Becora Terminal to reduce the impact of private vehicle on public transport operation.
- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind. Alighting and boarding areas are separated as well, but within a short distance for easy interchange.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.

[27] ADB Timor-Leste Public Transport Project Consultation Mission held on 8-12 April 2024. Aide Memoire (Page 3).
[28] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

## Table 3-5: Bay Assignment by Route for Becora Terminal

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | **Bay 9** | **Bay 10** | **Lay-over** |
| M-1 | Microlet | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Becora Terminal | Loop | 40.0 | 0.96 | 1.92 | | | | A | A | | | | B | | 2 |
| M-2 | Microlet | Terminating Route (100% Layover at This Terminal) | Becora Terminal | Becora Terminal | Loop | 60.0 | 1.44 | 2.88 | A | A | A | | | | B | B | | | 5 |
| S-1 | Microlet | Terminating Routes (No Layover at This Terminal) | Becora Terminal | Hera Terminal | Loop | 20.0 | 0.48 | 0.96 | | | | | | A | | | | B | 0 |
| **Total** | | | | | | | | | | | | | | | | | | | **7** |

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- Circulation spaces are redesigned to allow one-way movement and provide safe, separated driveway for local private vehicles accessing the area in the north. Public transport vehicles circulate in a counter-clockwise direction, with all circulation being one-way to reduce chances of accidents.
- Operation facilities and passenger amenities, as well as the covered passenger waiting area are retained in the middle of the terminal for easier interchange for the passengers. The unloading bay is mainly at east and north of the middle passenger island and loading bays on the west of the island.
- There are five 12m bays provided for loading/unloading which is equivalent to ten microlet bays (assuming one 12m bay can accommodate two microlet vehicles). This arrangement allows existing microlet operation and gives flexibility and future proof loading/unloading/layover spaces when microlet vehicles are converted to larger fleet.
- Seven layover areas for microlet are provided in the north/west of the site.
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.
- Pickup/drop-off zones are proposed to be located in the south along Rua Pe. Moteiro and east of terminal access point to facilitate transfers between modes.
- Although not specifically shown in the design, provision of a bus stop near the bus terminal is preferred and supported by key stakeholders (during a workshop conducted in October 2024) for quick implementation and create momentum and public interest for improved public transport system.

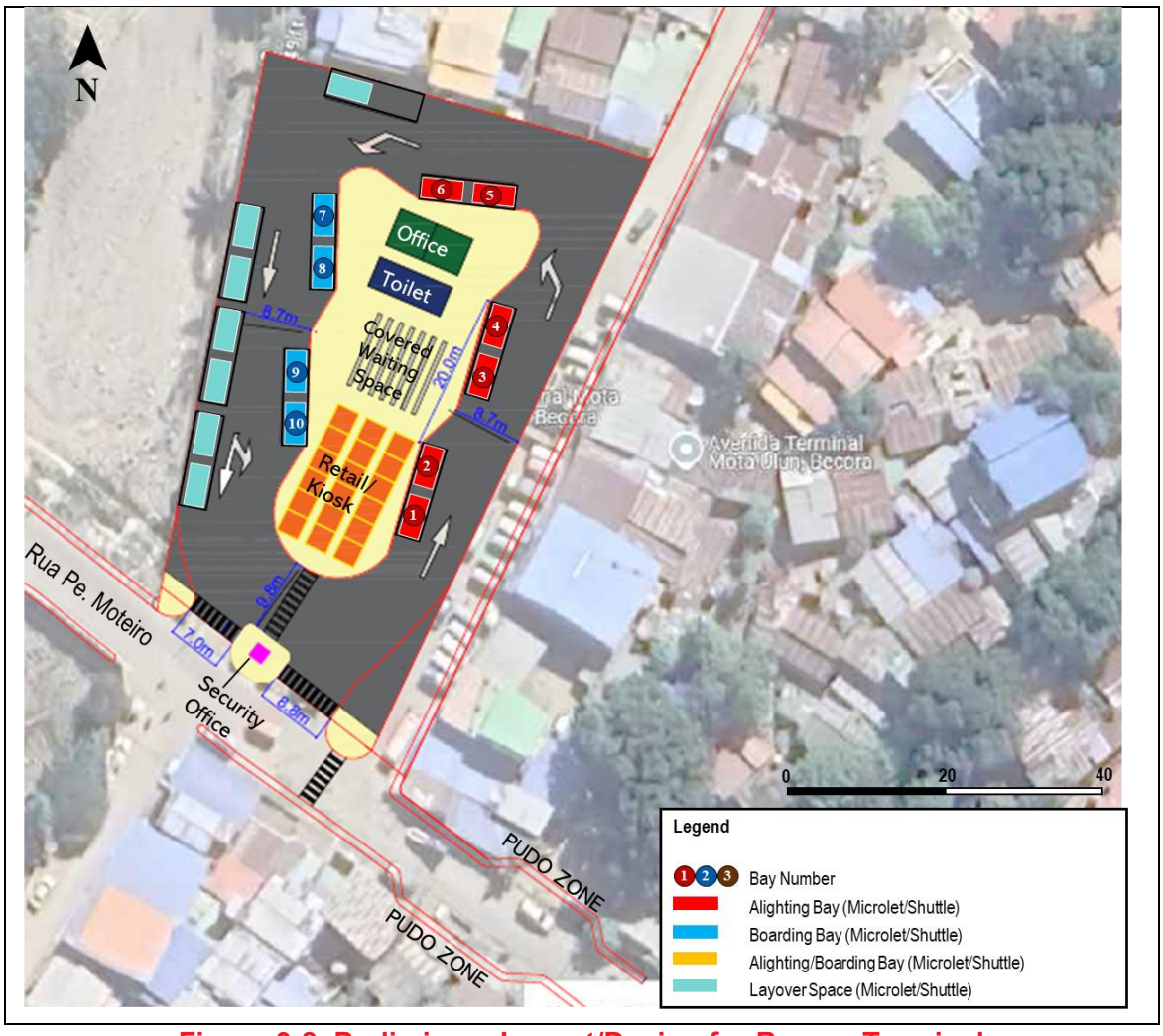



**Figure 3-8: Preliminary Layout/Design for Becora Terminal**

## 3.4 Facility#3: Tibar Terminal

### 3.4.1 Overview of Location and Strategic Importance

The Tibar Terminal is a proposed bus terminal located in the west of Dili and serves as a gateway connecting Dili and the West Region such as Maliana, Suai, Batugade (sharing the border with Indonesia), etc. The area is about 150m north of the Rotunda Tibar (roundabout) as shown in the image below. The area size is about 8,000m$^2$ and located on a greenfield site connected to Rua Tibar-Gleno (two-way, one lane per direction) in south serving as the main access road. Tobar Shortcut (two-way, two lanes per direction) connects this area with the city center in Dili – constituting a major east-west corridor in the city.

Figure 3-9: Site Location – Tibar Terminal

Key generators around the site include several government offices, natural parks and mangrove sites, with the ocean lying at some 500m to the west. Tibar Port is located to the southwest of the site but beyond the catchment area (some 1.5km). Limited developments are observed around the site – however the Tibar area is expected to grow into a major industrial/residential hub in next decades according to the 2022 Dili Urban Master Plan.

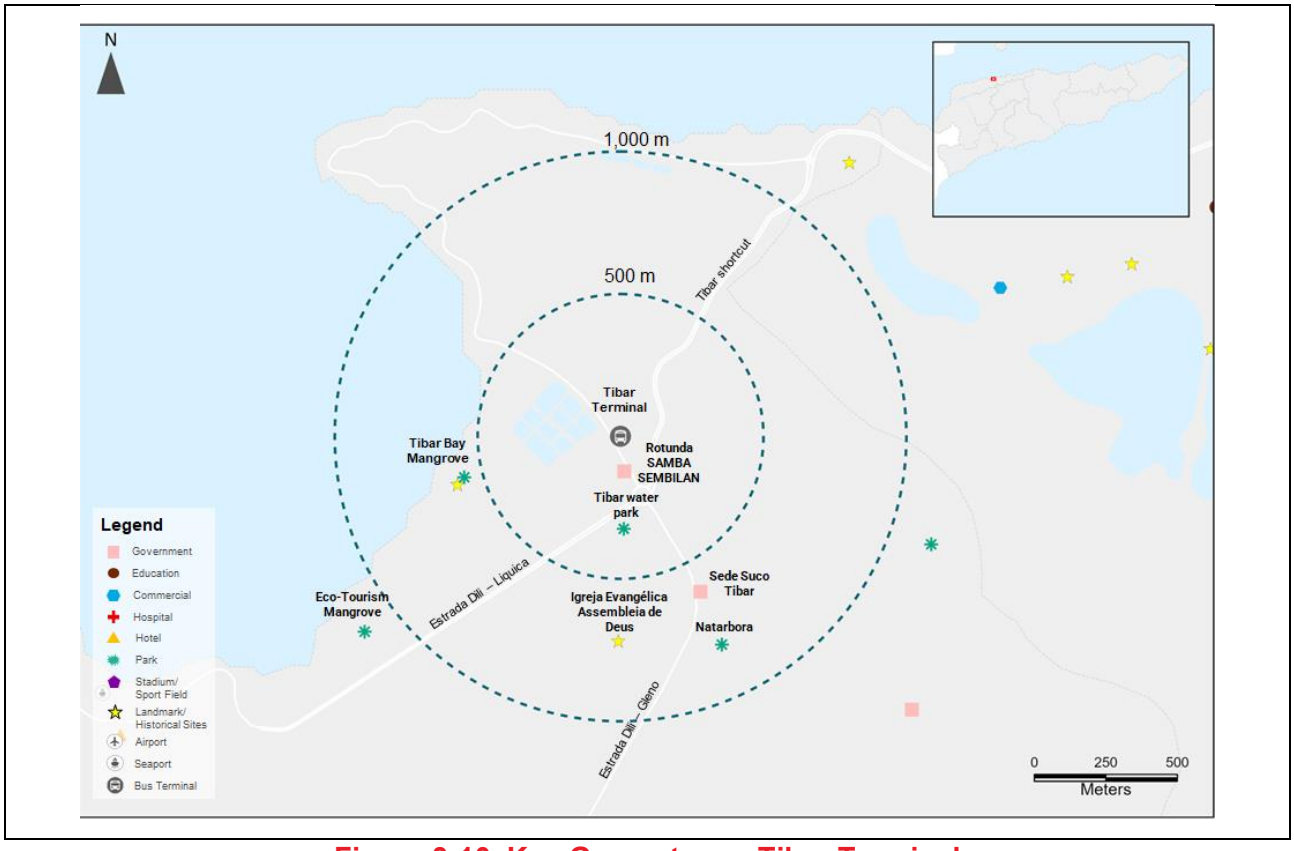



Figure 3-10: Key Generators – Tibar Terminal

### 3.4.2 Public Transport Services and Demand

There is no dedicated public transport facility in the west of Dili. One microlet route (Route 10) and three regional bus routes (i.e., Ermera, Liquica, and Maliana) use Tasitolu areas comprised of on-street stop and off-street open lot (without any facilities). The joint ADB/MOTC Mission team held in October 2024 agreed that given the strategic importance of this location as a future bus terminal, public transport routes serving the western part of Dili will be transferred and extended to Tibar Terminal (with necessary changes to DNTT route licensing regulations to permit route extensions). During the workshop in October 2024, DNTT requested to accommodate international transport (i.e., Indonesia) at this facility. With these assumptions in mind, existing

and future microlet and regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:[29]

**Table 3-6: Public Transport Services and Demand (Existing and Future) – Tibar Terminal**

| | | | | | | Existing [A,B] | | | Future [A,B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Dili Microlet*** | | | | | | | | | | | |
| M-10 | Tasitolu Terminal | Tasitolu Terminal | Microlet | Clockwise | 19.9 | 1 | 420 | 12,830 | 0.5 | 660 | 18,730 |
| M-11 | Tasitolu Terminal | Tasitolu Terminal | Microlet | Clockwise | 14.6 | - | - | - | 1 | 610 | 14,630 |
| ***Regional Bus*** | | | | | | | | | | | |
| P-4 | Tasitolu Terminal | Ermera | Bus | SB/NB | 46.0 | 12 | 19 | 470 | 12 | 21 | 620 |
| P-5 | Tasitolu Terminal | Liquica | Bus | WB/EB | 23.1 | 5 | 56 | 1,970 | 4 | 70 | 2,690 |
| P-7 | Tasitolu Terminal | Maliana | Bus | WB/EB | 132.7 | 20 | 6 | 310 | 15 | 8 | 400 |
| ***International Bus [C] and Pilot Bus*** | | | | | | | | | | | |
| Pilot Bus | Tibar | On-street Interchange at Tourism Information Center | Bus | Loop | 25.6 | - | - | - | 10 | 62 | 1,875 |
| I-1 | Tibar | Indonesia | Bus | WB/EB | - | | | | 60 | 28 | 840 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.
[C] International bus is assumed to operate one trip/hour.

### 3.4.3 Existing Facilities

As noted, there is no existing facility currently. Streetview images show that the site lies on an empty, unpaved lot with no establishments identified nearby (except some utilities). Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

*Site Overview*

*Rua Tibar-Gleno or Access Road (Site on Left Side)*

**Figure 3-11: Current Conditions / Streetview – Tibar Terminal**

### 3.4.4 Key Routes Serving and Proposed # of Bays

As noted, this facility will be served by two microlet routes (Route#10 and Route#11), three regional bus routes, as well as international buses linking the facility with Indonesia. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover

[29] Existing services/demand refer to Tasitolu data as a proxy and future services/demand for Airport Transit Hub which was ultimately replaced by Tibar Terminal at the ADB/MOTC Mission in October 2024.

spaces are summarized by route in Table 3-7.[30] In total, the facility requires 45 bays comprised of 21 boarding/alighting bays (of which 14 for microlet and 7 for regional/international/pilot bus) and 24 layover spaces (of which 21 for microlet and 3 for regional/pilot bus).

### 3.4.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access** – The main entry/exit point is proposed in the west along Rua Tibar-Gleno connected to Rotunda Tibar (with geometric improvements required for improved access road and pedestrian access).
- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas are proposed to be physically separated to reduce potential incidents. Pickup/drop-off zones will be provided along the local road in the west to facilitate transfers between modes (but private vehicles are not allowed to enter the terminal).
- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind. Alighting and boarding areas are separated as well, but within a short distance for easy interchange.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities are provided in the center island for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.

[30] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

## Table 3-7: Bay Assignment by Route for Tibar Terminal

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Dir-ection** | **Trips / Hour** | **Board-ing Bays per Route (With 20% Growth)** | **Alight-ing Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay 4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | **Bay 9** | **Bay 10** | **Bay 11** | **Bay 12** | **Bay 13** | **Bay 14** | **Bay 15** | **Bay 16** | **Bay 17** | **Bay 18** | **Bay 19** | **Bay 20** | **Bay 21** | **Lay-over** |
| M-10 | Microlet | Terminating Route (100% Layover at This Terminal) | Tasitolu Terminal | Tasitolu Terminal | Loop | 120.0 | 2.88 | 5.76 | A | A | A | A | A | A | | | | B | B | B | | | | | | | | | | 19 |
| M-11 | Microlet | Terminating Routes (50% Layover at This Terminal) | Tasitolu Terminal | Tasitolu Terminal | Loop | 60.0 | 1.44 | 2.88 | | | | | | | A | A | A | | | | B | B | | | | | | | | 2 |
| P-4 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Tasitolu Terminal | Ermera | EB/ WB | 5.0 | 0.60 | 0.60 | | | | | | | | | | | | | | | | | C | | | | | 1 |
| P-5 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Tasitolu Terminal | Liquica | EB/ WB | 17.0 | 2.04 | 2.04 | | | | | | | | | | | | | | | A | A | | | | B | B | 1 |
| P-7 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Tasitolu Terminal | Maliana | EB/ WB | 4.0 | 0.48 | 0.48 | | | | | | | | | | | | | | | | | | | C | | | 0 |
| Pilot Bus | Conventi -onal | Terminating Routes (75% Layover at This Terminal) | Tibar | On-street Interchange at Tourism Information Center | Loop | 6.0 | 0.29 | 0.14 | | | | | | | | | | | | | | | | | | | C | | | 1 |
| Inter-national Bus | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Tibar | Indonesia | EB/ WB | 2.0 | 0.24 | 0.24 | | | | | | | | | | | | | | | | | | C | | | | 0 |
| **Total** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **24** |

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- Public transport vehicles circulate in a counter-clockwise direction, with all circulation being one-way to reduce chances of accidents.
- Operation facilities and passenger amenities, as well as the covered passenger waiting area are proposed in the middle island of Tibar Terminal for easier interchange for passengers (with retail areas placed near the entrance gate and toilet facilities around waiting area for easy access for passengers).
- There are 14 12m bays provided for loading/unloading, with seven 12m bays reserved for microlet (Bay#1-14, assuming one 12m bay can accommodate two microlet vehicles) and seven 12m bays (Bay#15-21) for international/regional bus as well as proposed pilot bus. This arrangement allows existing microlet operation and gives flexibility and future proof loading/unloading spaces when microlet vehicles are converted to larger fleet.
- Layover areas for microlets and buses are provided in the south and north of the site along the site boundary.
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.
- Pickup/drop-off zones are proposed in the west along Rua Tibar-Gleno to facilitate transfers between modes.

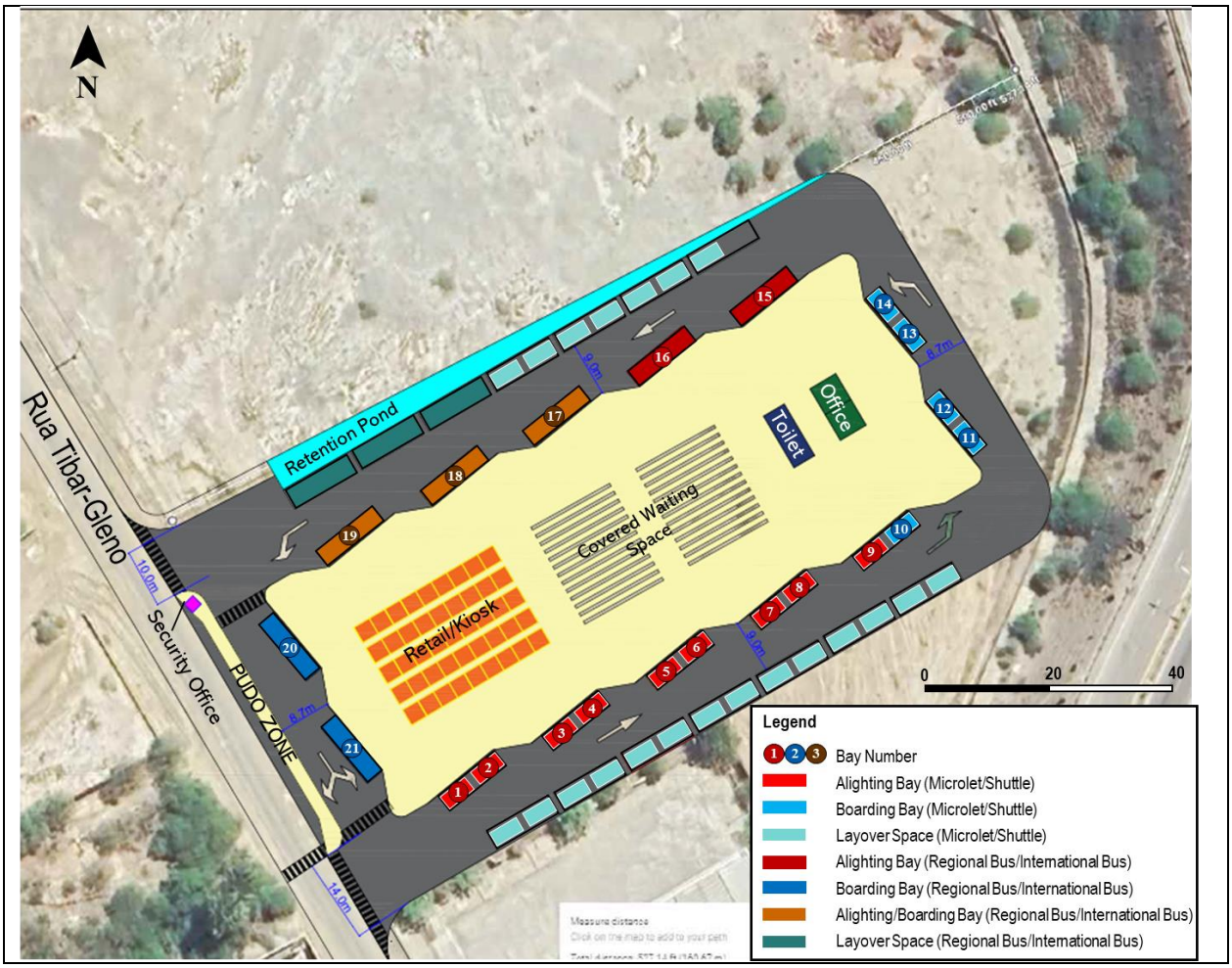



**Figure 3-12: Preliminary Layout/Design for Tibar Terminal**

## 3.5 Facility#4: Manleuana Terminal

### 3.5.1 Overview of Location and Strategic Importance

The Manleuana Terminal is a proposed new bus terminal located in the southeast of Dili and serves as a gateway connecting Dili and the South Region such as Aileu, Ainaro, Same, Suai, etc. The area size is about 9,600 $m^2$ and surrounded by a cluster of markets (i.e., Manleuana Market) in north, and residential areas / schools in east/west/south. Comoro River runs about 500m to the west of the site. The site can be accessed from three directions – with the north access road (two-way road, one lane per direction) serving as the main entry/exit for vehicles to the Manleuana Market, the east access comprised of an unpaved pedestrian pathway (with no vehicles passable), and the south access comprised of narrow gravel roads used by local vehicles and residents.

Figure 3-13: Site Location – Manleuana Terminal

Key generators around the site include Manleuana Market in north and a cluster of residential areas in south (both immediately adjacent to the site) and numerous educational institutes are located within 1.0km of the site such as primary schools, middle schools, and Dili Institute of Technology.

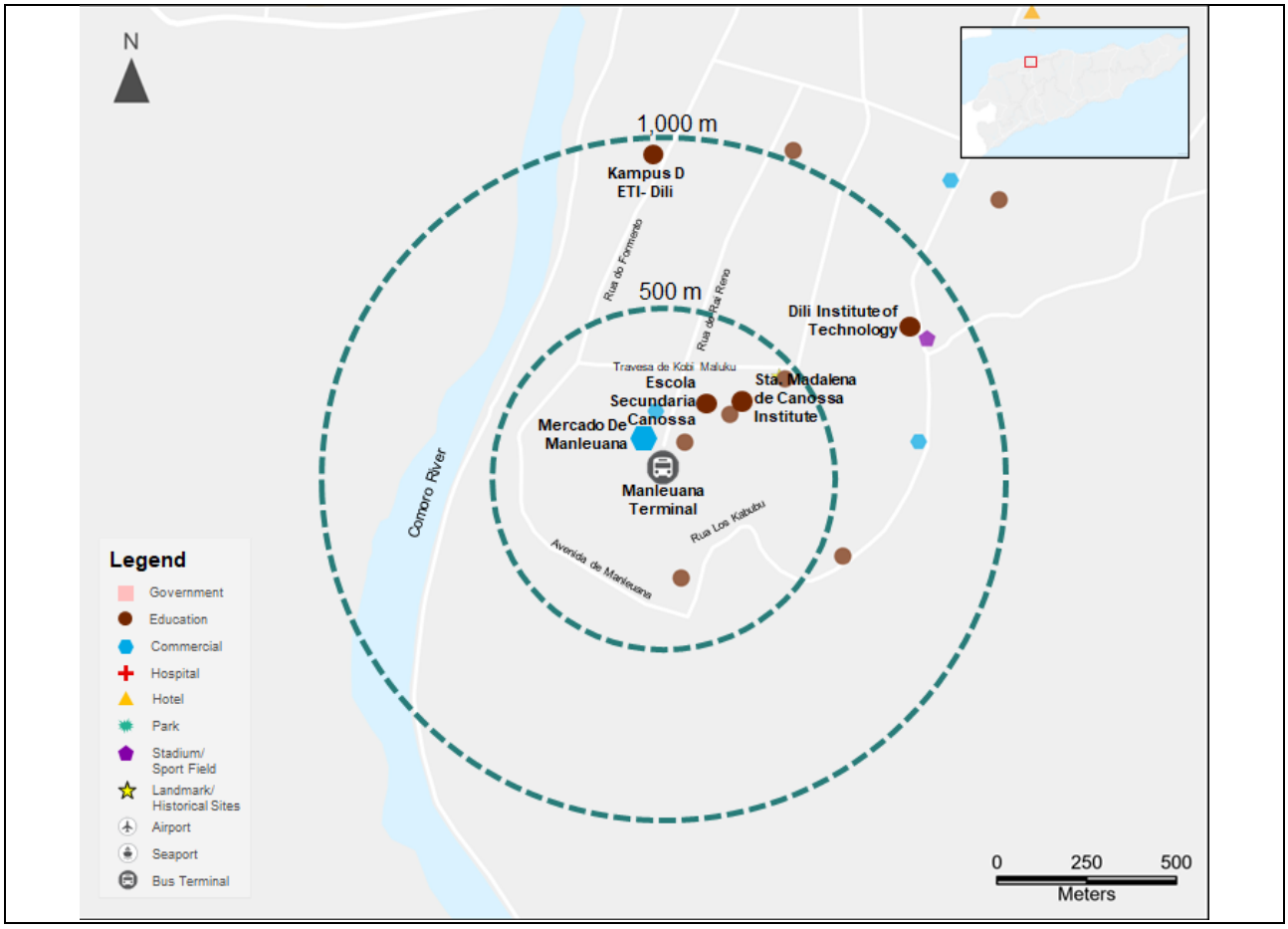



Figure 3-14: Key Generators – Manleuana Terminal

### 3.5.2 Public Transport Services and Demand

Currently three microlet routes (Route 3, Route 11, Route 13) serve this location as terminating routes – with loading/unloading activities taking place on the road inside the market (which is explained in the next section). Three bus routes connecting to/from municipalities in the south also access here as thru routes. In the future a total of four microlet routes and four regional bus routes are proposed to serve this facility. The existing and

future microlet and regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:

**Table 3-8: Public Transport Services and Demand (Existing and Future) – Manleuana Terminal**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Dili Microlet*** | | | | | | | | | | | |
| M-3 | Manleuana Market | Manleuana Market | Microlet | Clockwise | 16.8 | 2 | 340 | 11,880 | 1.5 | 470 | 31,510 |
| M-5 | Taibessi Terminal | Taibessi Terminal | Microlet | Clockwise | 17.8 | - | - | - | 1.5 | 270 | 23,390 |
| M-11 | Tasitolu Terminal | Tasitolu Terminal | Microlet | Clockwise | 14.6 | 1.5 | 440 | 11,520 | 1 | 610 | 14,630 |
| M-13 | Kasnafar | Kasnafar | Microlet | Clockwise | 22.1 | 4 | 120 | 2,910 | 3 | 150 | 3,780 |
| ***Regional Bus*** | | | | | | | | | | | |
| P-1 | Taibessi Terminal | Aileu | Bus | SB/NB | 44.3 | 30 | 4 | 70 | 20 | 5 | 80 |
| P-2 | Taibessi Terminal | Ainaro | Bus | SB/NB | 109.3 | 60 | 2 | 40 | 60 | 2 | 40 |
| P-9 | Taibessi Terminal | Same | Bus | SB/NB | 112.1 | 60 | 4 | 150 | 30 | 6 | 190 |
| P-10 | Taibessi Terminal | Suai | Bus | SB/NB | 171.0 | - | - | - | 20 | 10 | 350 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.5.3 Existing Facilities

Current operation of microlet services at this site (Manleuana Market) is illustrated below. On-street space inside the market is used for loading/unloading with passengers waiting for microlet along the roadside (without any facilities such as covered waiting areas, benches). Microlet services are customed to use available road space at the market for layover with most vehicles observed to be parking in the north of the market. Vehicles circulate in a clockwise fashion (with entry/exit gates separated). A mix of microlet and private vehicles are observed to operate and park at the market with no demarcation of functional spaces by mode. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.


Note: Current operation shown above is at the Manleuana Market which is not a dedicated public transport facility (located about 100m north of the proposed site).

**Figure 3-15: Current Facility Layout and Streetview – Manleuana Terminal**

### 3.5.4 Key Routes Serving and Proposed # of Bays

As noted, this facility will be served by four microlet routes (Route 3, Route 5, Route 11, Route13) and four regional bus routes (Aileu, Ainaro, Same, Suai) in the future. All microlet routes operate as terminating routes, while regional bus routes serve as thru routes and terminate at Taibessi Terminal.

Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-9.[31] In total, the facility requires 25 bays (for microlet) comprised of 12 boarding/alighting bays and 13 layover spaces. Regional bus routes require two loading/unloading bays (as thru routes are assumed to operate with shorter alighting/boarding time compared to terminating routes and no provision for layover). Thus, a total of 27 bays (14 loading/unloading bays and 13 loading spaces) are proposed at this terminal.

### 3.5.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access** – Three access road options are considered from a nearby road to the site (based on the review of existing conditions and field observations). All options involve land acquisition for access road improvements as compared in the maps below. Of these, Option 2 is a preferred option as it requires minimum land acquisition (~960m$^2$), while other two options will require extensive land acquisition outside terminal footprints (with Option 1: North Access Road requiring some 1,440m$^2$ and Option 3: South Access Road some 2,300m$^2$) involving existing residential areas and markets.

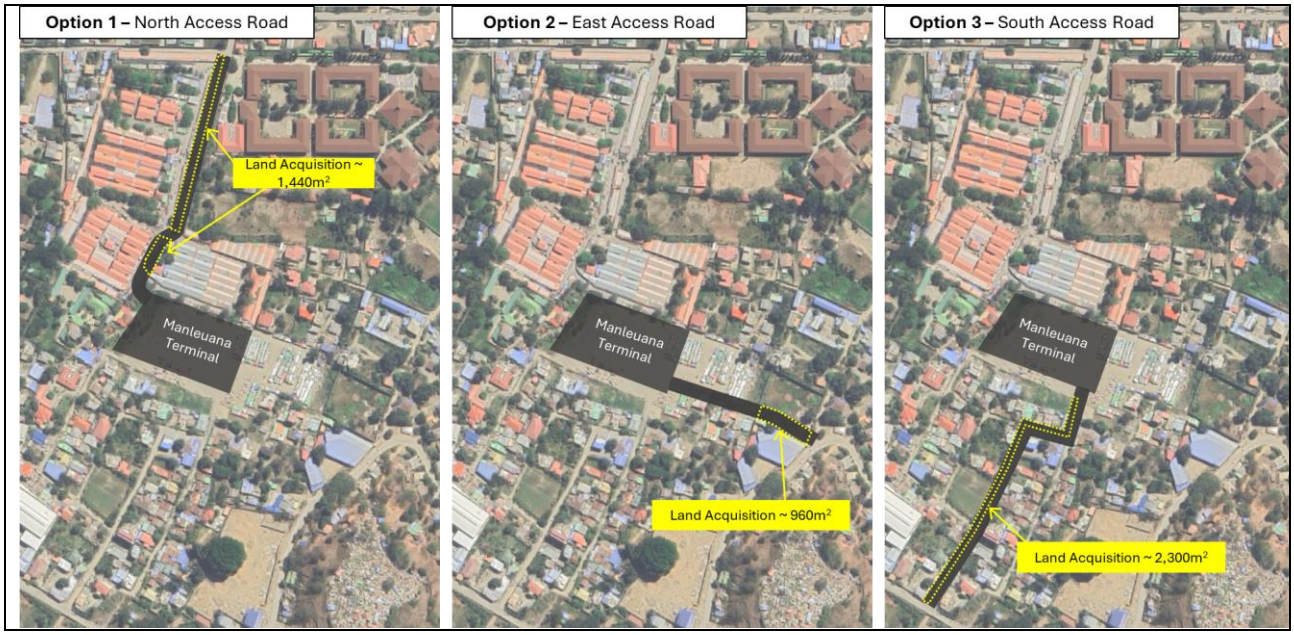



**Figure 3-16: Access Road Options Around Manleuana Terminal**

- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas are proposed to be physically separated to reduce potential incidents. Access road in the east connected to Los Kabubu will have four lane roads (with two lanes / direction) with one lane for public transport and the other for private vehicles and taxi access.
- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind. Alighting and boarding areas are separated as well, but within a short distance for easy interchange including access to taxi stand.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.

[31] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

## Table 3-9: Bay Assignment by Route for Manleuana Terminal

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | **Bay 9** | **Bay 10** | **Bay 11** | **Bay 12** | **Bay 13** | **Bay14** | **Layover** |
| M-3 | Microlet | Terminating Route (100% Layover at This Terminal) | Manleuana Market | Manleuana Market | Loop | 40.0 | 0.96 | 1.92 | A | A | | | | | | | B | | | | | | 6 |
| M-5 | Microlet | Terminating Routes (50% Layover at This Terminal) | Taibessi Terminal | Taibessi Terminal | Loop | 40.0 | 0.96 | 1.92 | | | A | A | | | | | | B | | | | | 4 |
| M-11 | Microlet | Terminating Routes (50% Layover at This Terminal) | Tasitolu Terminal | Tasitolu Terminal | Loop | 60.0 | 1.44 | 2.88 | | | | | A | A | A | | | | B | B | | | 2 |
| M-13 | Microlet | Terminating Routes (50% Layover at This Terminal) | Kasnafar | Kasnafar | Loop | 20.0 | 0.48 | 0.96 | | | | | | | | A | | | B | | | | 1 |
| P-1 | Regional Bus | Thru | Taibessi Terminal | Aileu | NB/SB | 3.0 | 0.09 | 0.09 | | | | | | | | | | | | | C | | 0 |
| P-2 | Regional Bus | Thru | Taibessi Terminal | Ainaro | NB/SB | 1.0 | 0.03 | 0.03 | | | | | | | | | | | | | C | | 0 |
| P-9 | Regional Bus | Thru | Taibessi Terminal | Same | NB/SB | 2.0 | 0.06 | 0.06 | | | | | | | | | | | | | | C | 0 |
| P-10 | Regional Bus | Thru | Taibessi Terminal | Suai | NB/SB | 3.0 | 0.09 | 0.09 | | | | | | | | | | | | | | C | 0 |
| **Total** | | | | | | | | | | | | | | | | | | | | | | | **13** |

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- Public transport vehicles circulate in a clockwise direction, with all circulation being one-way to reduce chances of incidents.
- Operation facilities and passenger amenities are proposed along the perimeter of the site in the north and west, providing direct access to retail/commercial areas as well as Manleuana Market. Passenger waiting areas are proposed on the west of the terminal.
- There are eight 12m bays for loading/unloading, with six bays reserved for microlet (assuming one 12m bay can accommodate two microlet vehicles) and two bays for large bus services (including regional bus, pilot bus and international bus). This arrangement allows existing microlet operation and gives flexibility and future proof loading/unloading/layover spaces when microlet vehicles are converted to larger fleet.
- Layover areas for microlet are provided in the middle of the site.
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.
- Pickup/drop-off zones are proposed inside of the facility (northeast corner of site) but separated from the public transport terminal to facilitate transfers between modes, while minimizing congestion within the facility.

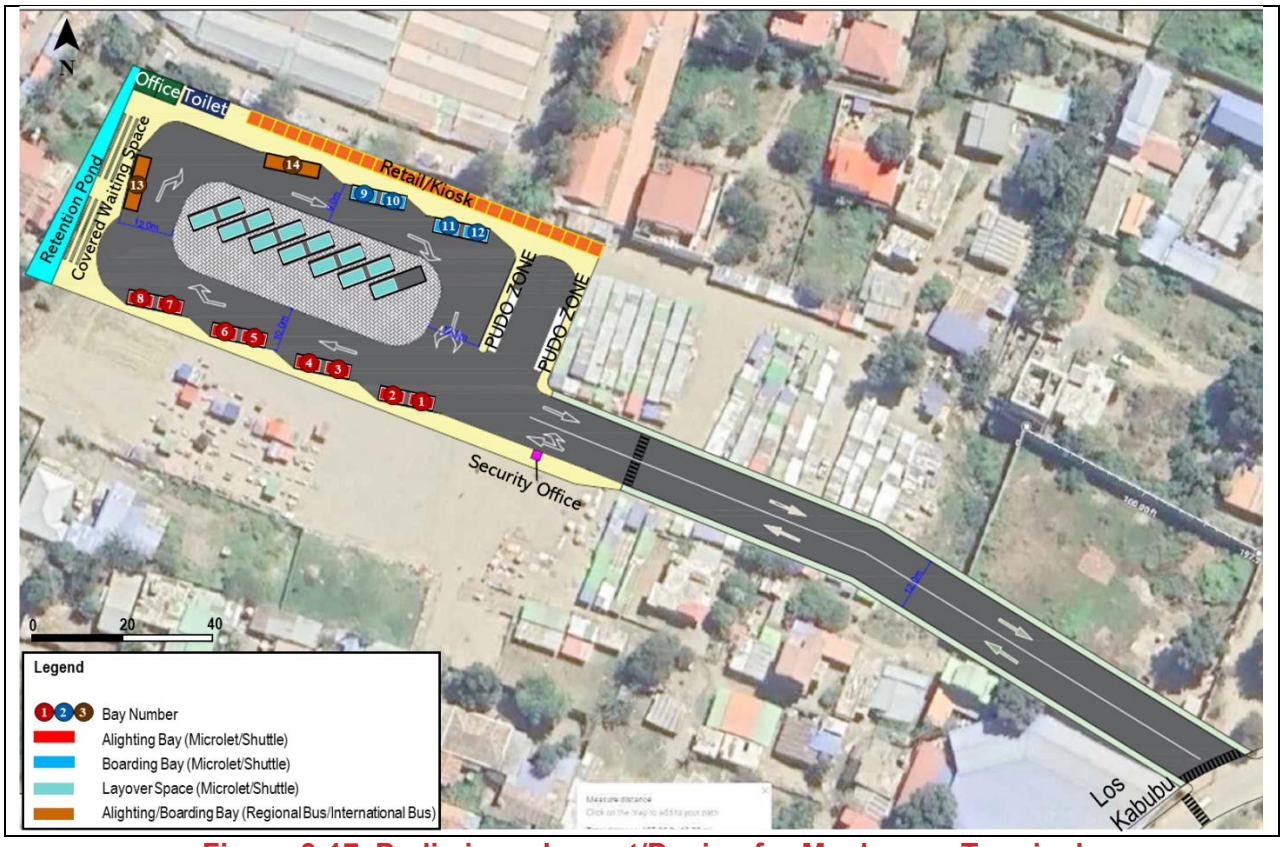



**Figure 3-17: Preliminary Layout/Design for Manleuana Terminal**

## 3.6 Facility#5: Hera Terminal

### 3.6.1 Overview of Location and Strategic Importance

The Hera Terminal is a proposed new terminal located in the east of Dili and serves as a gateway connecting Dili (Becora) and the East Region such as Baucau, Manatuto, Lospalos, and Viqueque. The proposed location is within the driver training institute owned by DNTT, with an estimated area size for the terminal is about 10,000 $m^2$ (about one third of the institute area).[32] The proposed terminal site is surrounded by R. Hera in south (two-way road, one lane per direction), a church in west, and a driving training site in east. The north of the site is green areas with some residential houses spotted.

**Figure 3-18: Site Location – Hera Terminal**

Key generators around the site include government offices (within the site), church, schools, etc. within 500m of the site with some schools scattered along the road within 1.0km of the site.

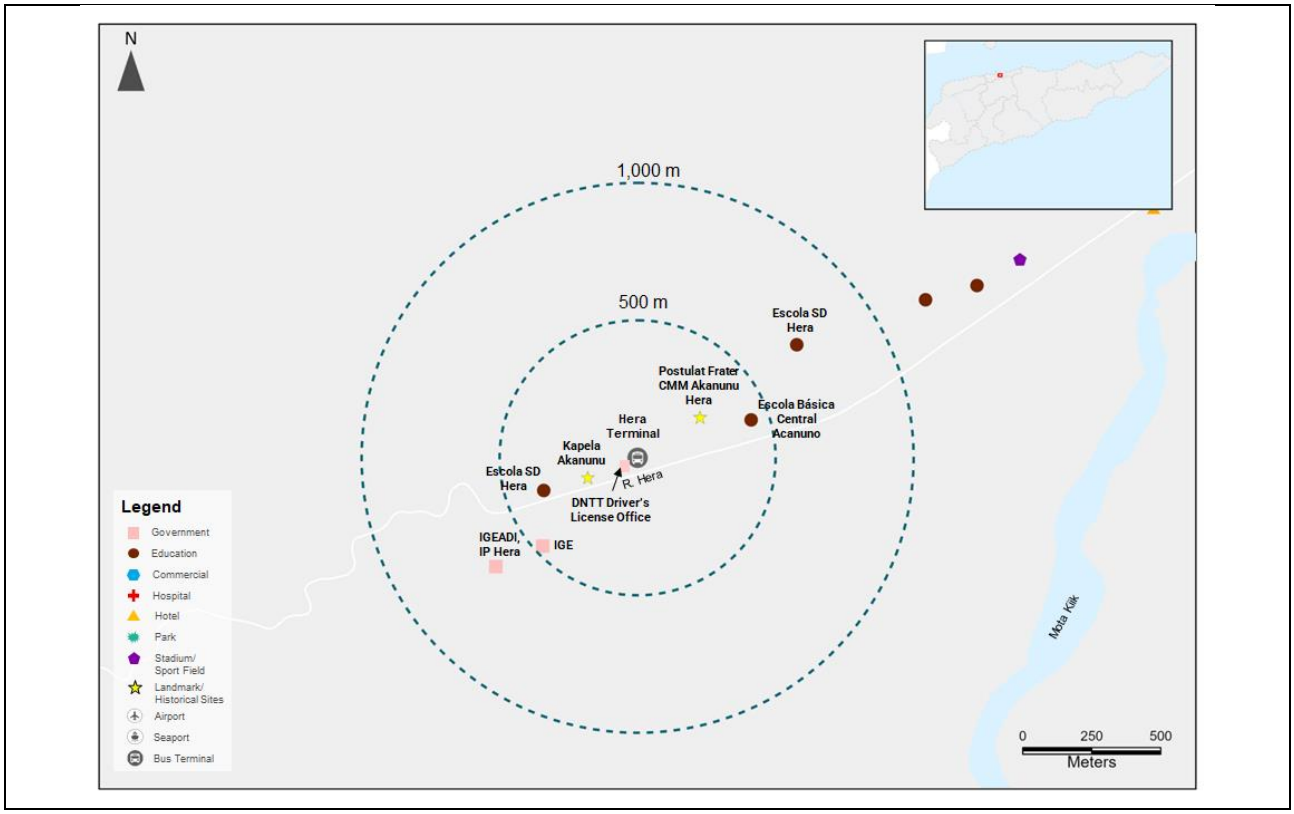



**Figure 3-19: Key Generators – Hera Terminal**

### 3.6.2 Public Transport Services and Demand

Currently no services are provided at this site as there is no facility. Four regional bus routes (Baucau, Manatuto, Lospalos, Viqueque) pass through the site as this location sits between Becora and Baucau. The existing and future microlet and regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:

[32] According to the DNTT, the Korea International Cooperation Agency plans to rehabilitate the existing building to develop a multi-story multi-purpose building.

**Table 3-10: Public Transport Services and Demand (Existing and Future) – Hera Terminal**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Regional Bus*** | | | | | | | | | | | |
| P-3 | Becora Terminal | Baucau | Bus | EB/WB | 117.7 | - | - | - | 7.5 | 51 | 1,650 |
| P-6 | Becora Terminal | Lospalos | Bus | EB/WB | 205.1 | - | - | - | 20 | 7 | 180 |
| P-8 | Becora Terminal | Manatuto | Bus | EB/WB | 58.7 | - | - | - | 60 | 6 | 170 |
| P-11 | Becora Terminal | Viqueque | Bus | EB/WB | 176.6 | - | - | - | 5 | 16 | 480 |
| ***Shuttle Service*** [C] | | | | | | | | | | | |
| S-1 | Becora Terminal | Hera Terminal | Microlet | Clockwise | 15.2 | - | - | - | 3 | 240 | 2,460 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.
[C] Operational scheme for shuttle service is assumed to be provided by existing microlet operators (such as by permitting Microlet Route 1 and Route 2 to provide extended services to Hera or allowing other operators/drivers to provide the service). This requires close coordination with relevant stakeholders including DNTT to ensure feeder services are provided prior to the opening of upgraded Becora Terminal.

### 3.6.3 Existing Facilities

No public transport facilities are provided at this site (as no public transport serves here). The current conditions and street view of the driving test site/office are shown in the figure below. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

*Site Overview* | *Access Road (Site on Right Side)* | *Driving Testing Site* | *Driving Test Institute and Office*

**Figure 3-20: Current Conditions / Streetview – Hera Terminal**

### 3.6.4 Key Routes Serving and Proposed # of Bays

As noted, this facility will be served by four regional bus routes (Baucau, Manatuto, Lospalos, Viqueque) and shuttle services which will connect Becora Terminal and Hera Terminal in the future. All routes operate as terminating routes. Establishing this site as a major transport hub (i.e., bus terminal) in Dili is a key outcome of the ADB Mission in April 2024 in line with the MOTC's strategic decision on public transport terminal. [33]

Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces is summarized by route in Table 3-11.[34] In total, the facility requires nine boarding/alighting bays (i.e., seven for regional bus and two for shuttle) with two layover spaces (shuttle only).

### 3.6.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Middle Section Preferred for Bus Terminal** – During the site visit, two sections are considered for a future bus terminal (the east or the middle with both sites are currently used by a driving test site).

[33] ADB Timor-Leste Public Transport Project Consultation Mission held on 8-12 April 2024. Aide Memoire (Page 3).
[34] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

- **Option#1 (Bus Terminal in East with Driving Test Site in Middle)** – This option proposes building a bus terminal in the east corner of the site, with a driving test site adjacent to the existing building (which will be refurbished and repurposed as a multi-function building with terminal offices). In this site arrangement, passengers would be required to walk some 150m passing through the driving site – which poses grave safety concerns and inconvenient for passengers. This option is therefore not recommended.
- **Option#2 (Bus Terminal in Middle with Driving Test Site in East)** – In contrary, this option proposes building a bus terminal adjacent to the existing building and passengers would benefit from convenient and direct access to terminal facilities (once refurbished). Furthermore, passengers are not required to walk through the driving test site with minimal safety concerns. From the operational and safety point of view, this option is recommended for Hera Terminal.

- **Site Access** – The main entry/exit point is proposed in south along existing road R. Hera (with geometric improvements required for improved access road).
- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas are proposed to be physically separated to reduce potential incidents. Access point to the terminal in the south to/from R. Hera will be for public transport only. Pickup/drop-off zones will be provided along the local road in the south to facilitate transfers between modes, while ensuring that private vehicles are separated from public transport operation (thus are not allowed to enter the terminal).
- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind. Alighting and boarding areas are separated as well, but within a short distance for easy interchange.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.
- **Inspection Site** – The DNTT envisions developing this site into a multi-purpose transport facility comprised of driving training institute, public transport terminal, administrative offices, etc. As such, provision of inspection areas and light maintenance facilities is also a key component of the future facility (given that there is no maintenance site in the eastern part of Dili requiring all vehicles to travel through the city to access the maintenance site near Comoro). Inspection areas are proposed to be away from offices and passenger waiting areas to minimize negative impacts on passenger experiences.[35] The inspection area located on the east of the bus terminal will require separate access points to minimize conflict points between bus fleet in operation and those requiring inspections.

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- Public transport vehicles circulate in a clockwise direction, with all circulation being one-way to reduce chances of accidents.
- Passenger facilities/amenities and passenger waiting area are proposed along the perimeter of the site in the west, and pickup/drop-off zones along R. Hera (for convenient access for visitors/passengers).
- There are eight 12m bays provided for loading/unloading, with one bay reserved for shuttle services (assuming one 12m bay can accommodate two shuttle/microlet vehicles) and seven bays for regional buses. This arrangement gives flexibility and future proof loading/unloading/layover spaces when shuttle services are converted to larger fleet (similar to microlet vehicles).

[35] In general, mixing light maintenance and operations in the bus terminal is not ideal unless full separation of activities can be achieved (i.e., operations, passengers, and maintenance) to eliminate issues with noise and air emissions, grease, dust, etc. Given this is still a potential consideration, it is recommended that any provisions for light maintenance at this site undergo more extensive investigation in the next stage.

- Layover areas for bus/shuttle are provided at the middle of site (with buffer space for additional layover spaces).
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.

Interchange point and pickup/drop-off zones are proposed in the south along R. Hera to facilitate transfers between modes.


**Figure 3-21: Preliminary Layout/Design for Hera Terminal**

## Table 3-11: Bay Assignment by Route for Hera Terminal

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | **Bay 9** | **Lay-over** |
| P-3 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Baucau | EB/WB | 8.0 | 0.96 | 0.96 | | | A | | | | B | | | 0 |
| P-6 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Lospalos | EB/WB | 3.0 | 0.36 | 0.36 | | | | | C | | | | | 0 |
| P-8 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Manatuto | EB/WB | 1.0 | 0.12 | 0.12 | | | | | | C | | | | 0 |
| P-11 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Viqueque | EB/WB | 11.0 | 1.32 | 1.32 | | | | A | | | | B | B | 0 |
| S-1 | Microlet (Shuttle) | Terminating Route (100% Layover at This Terminal) | Becora Terminal | Hera Terminal | EB/WB | 20.0 | 0.48 | 0.96 | A | B | | | | | | | | 2 |

## 3.7 Facility#6: Aldeia Samalakuliba Terminal (Baucau)

### 3.7.1 Overview of Location and Strategic Importance

The Aldeia Samalakuliba Terminal is a proposed bus terminal located in the west of Baucau, the second largest city in Timor-Leste (with the proposed site located about 1.5km to the west from the city center). This location serves as a gateway to several regions including Dili to the west, Lospalos to the east, and Viqueque to the south. The area size is about 11,600m$^2$ with limited developments surrounding the site (except the government building located next to the site). Access road is unpaved which is connected to Ave. Vicente do Reis Bieky Sahe which links to the city center. This site is proposed as a future bus terminal in the 2024 PTMP as the current bus terminal in city center will be re-purposed and re-developed into a sports venue in the future – thus all transport services, operation functions, and terminal facilities need to be transferred to this new site in the future.


**Figure 3-22: Site Location – Aldeia Samalakuliba Terminal**

A few key generators exist around the site include government properties and warehouse within a 500m buffer and a newly built market and several schools within 1 km catchment areas.

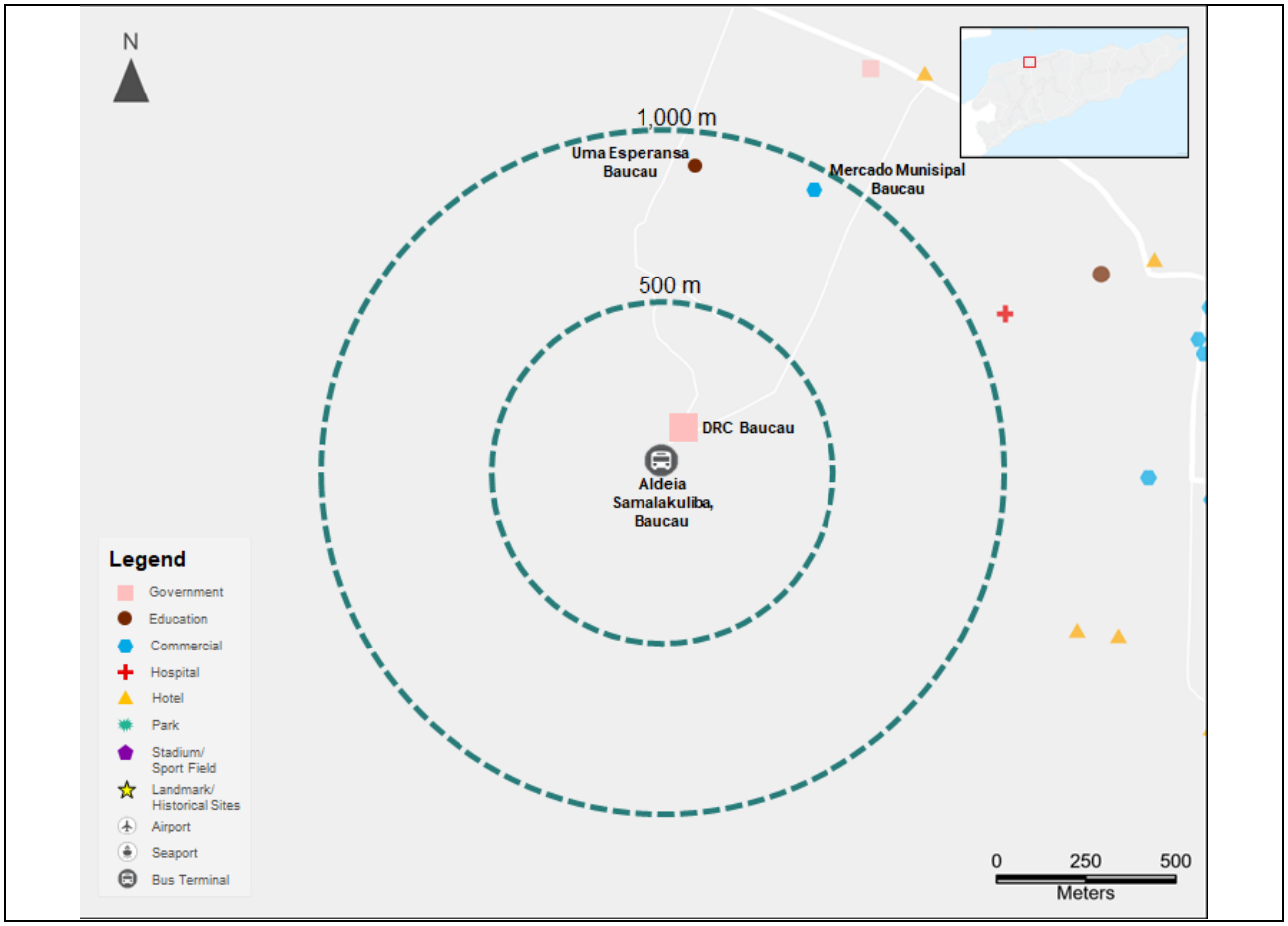



**Figure 3-23: Key Generators – Aldeia Samalakuliba Terminal**

### 3.7.2 Public Transport Services and Demand

Given that no public transport routes serve this location, the existing bus terminal (Baucau Terminal) is used as a proxy for service/demand analysis as well as to develop schemes/design for the future bus terminal. The

existing and future microlet and regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP:

**Table 3-12: Public Transport Services and Demand (Existing and Future) – Aldeia Samalakuliba Terminal**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Route # | Origin | Destination | Vehicle Type | Direction | Distance (km) | Peak Headway (Minutes) | Daily Round Trips | Daily Demand | Peak Headway (Minutes) | Daily Round Trips | Daily Demand |
| ***Regional Bus*** | | | | | | | | | | | |
| P-3 | Becora Terminal | Baucau Terminal | Bus | EB/WB | 117.7 | 10 | 39 | 1,220 | 7.5 | 51 | 1,650 |
| P-6 | Becora Terminal | Lospalos | Bus | EB/WB | 205.1 | - | - | - | 20 | 7 | 180 |
| P-11 | Becora Terminal | Viqueque | Bus | EB/WB | 176.6 | - | - | - | 5 | 16 | 480 |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.7.3 Existing Facilities

As noted, there is no existing facility at Aldeia Samalakuliba Terminal with the proposed site lying on an empty, unpaved lot with no establishments identified nearby (except government building nearby). Streetview of the existing Baucau Terminal are shown below for reference. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

**Figure 3-24: Streetview of Existing Baucau Terminal (Reference Only)**

### 3.7.4 Key Routes Serving and Proposed # of Bays

This facility will be served by three regional bus routes (Dili, Lospalos, and Viqueque) and local microlet services. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces is summarized by route in Table 3-13.[36] It is assumed that the facility requires three loading/unloading bays for regional bus routes (without layover spaces). Furthermore, additional loading/unloading areas for local microlet services are provided to cater for local travel needs (in total nine microlet spaces).

### 3.7.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access** – The main entry/exit point is proposed in east along a proposed local road connected to Ave. Vicente do Reis Bieky Sahe (with geometric improvements required for improved access road).
- **Separation of Public Transport and Private Vehicles** – Boarding/alighting zones and circulation areas are proposed to be physically separated to minimize potential incidents. Pickup/drop-off zones will be provided along the local road in the west to facilitate transfers between modes (but private vehicles are not allowed to enter the terminal).

[36] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

- **Operational Considerations** – No backup maneuvers are assumed within the facility for safety purposes. Routes are assigned to specific bays with potential interchange in mind. Alighting and boarding areas are separated as well, but within a short distance for easy interchange.
- **Provision of Facilities and Passenger Amenities** – Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.

Based on these considerations above, the preliminary layout/design for this site is depicted below. Of note:

- Public transport vehicles circulate in a counterclockwise direction, with all circulation being one-way to reduce chances of incidents.
- Operation facilities and passenger amenities, as well as the covered passenger waiting area are proposed in the middle island of Aldeia Samalakuliba Terminal for easier interchange for passengers (with retail placed close to the gate and toilet close to waiting area for easy access for passengers).
- There are eight 12m bays provided for loading/unloading, with five bays reserved for local microlet services (assuming one 12m bay can accommodate two microlet vehicles) and three bays for regional buses. This arrangement allows existing microlet operation and gives flexibility and future proof loading/unloading/layover spaces when microlet vehicles are converted to larger fleet.
- New pedestrian crossings and sidewalks are provided to enhance passenger connectivity within and outside the facility.
- Interchange point and pickup/drop-off zones are proposed along the local road in the south.


**Figure 3-25: Preliminary Layout/Design for Aldeia Samalakuliba Terminal**

## Table 3-13: Bay Assignment by Route for Aldeia Samalakuliba Terminal

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Bay4** | **Bay 5** | **Bay 6** | **Bay 7** | **Bay 8** | **Bay 9** | **Bay 10** | **Bay 11** | **Bay 12** | **Layover** |
| P-3 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Baucau Terminal | EB/WB | 8.0 | 0.96 | 0.96 | A | B | | | | | | | | | | | 0 |
| P-6 | Regional Bus | Thru | Becora Terminal | Lospalos | EB/WB | 3.0 | 0.09 | 0.09 | | | C | | | | | | | | | | 0 |
| P-11 | Regional Bus | Thru | Becora Terminal | Viqueque | EB/WB | 11.0 | 0.33 | 0.33 | | | C | | | | | | | | | | 0 |
| Microlet A1 | Microlet | Terminating Routes (100% Layover at This Terminal) | Baucau Terminal | Baucau Terminal | EB/WB | 58.0 | 1.39 | 2.78 | | | | A | A | A | | | | B | B | | 0 |
| Microlet A2 | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 20.0 | 0.48 | 0.96 | | | | | | | A | | | | | B | 0 |
| Microlet A3 | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 3.0 | 0.07 | 0.14 | | | | | | | | | C | | | | 0 |
| Microlet A4 | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 1.0 | 0.02 | 0.05 | | | | | | | | | C | | | | 0 |
| Microlet B | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 5.0 | 0.12 | 0.24 | | | | | | | | | C | | | | 0 |
| Microlet D | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 2.0 | 0.05 | 0.10 | | | | | | | | | C | | | | 0 |
| Microlet E | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 31.0 | 0.50 | 1.01 | | | | | | | | A | | | | B | 0 |
| Microlet F1 | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 1.0 | 0.02 | 0.05 | | | | | | | | | C | | | | 0 |
| Microlet F2 | Microlet | | Baucau Terminal | Baucau Terminal | EB/WB | 1.0 | 0.02 | 0.05 | | | | | | | | | C | | | | 0 |

## 3.8 Facility#7: Maliana Market

### 3.8.1 Overview of Location and Strategic Importance

The Maliana Market is a terminating location in the western end of Timor-Leste. An on-street interchange is proposed utilizing on-street space near the market next to a major local road running through the city (two-way road, one lane per direction).

Key generators around the site include commercial properties, hospitals, sports field and government offices (within 500m of the site) and several schools and commercial sites located along major roads connected to the site (within 1.0km of the site).

Figure 3-26: Site Location – Maliana Market

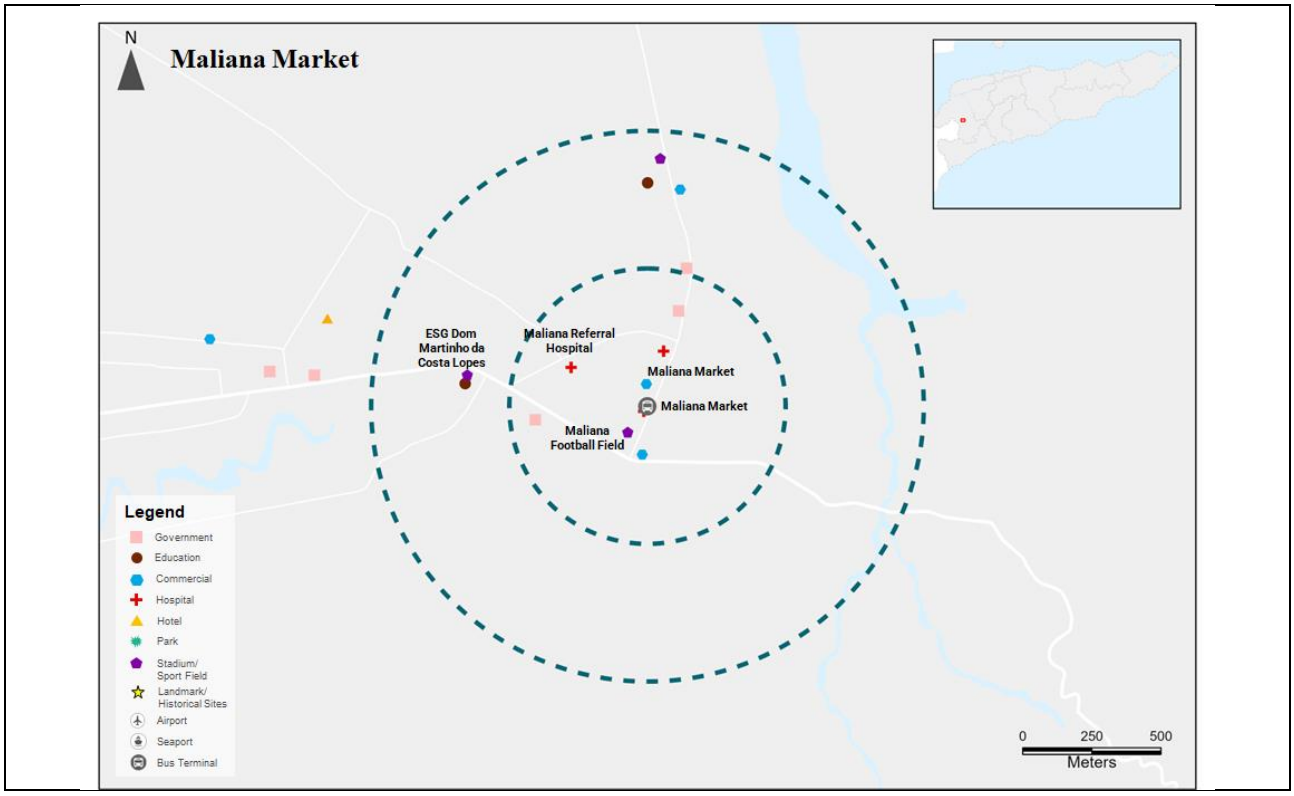



Figure 3-27: Key Generator – Maliana Market

### 3.8.2 Public Transport Services and Demand

Regional Bus Route 7 connects Maliana to Dili. The existing and future regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP.

Table 3-14: Public Transport Services and Demand (Existing and Future) – Maliana Market

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Route # | Origin | Destination | Vehicle Type | Direction | Distance (km) | Peak Headway (Minutes) | Daily Round Trips | Daily Demand | Peak Headway (Minutes) | Daily Round Trips | Daily Demand |
| ***Regional Bus*** | | | | | | | | | | | |
| P-7 | Tasitolu Terminal | Maliana | Bus | WB/EB | 132.7 | 20 | 6 | 310 | 15 | 8 | 400 |
| - | Within Maliana City | Within Maliana City | Microlet | - | - | - | - | - | - | - | - |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.8.3 Existing Facilities

As noted, there is no existing facility at this on-street facility. Streetview images of the proposed on-street facility are provided below for reference. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

**Figure 3-28: Streetview of Malian Market On-Street Interchange**

### 3.8.4 Key Routes Serving and Proposed # of Bays

As noted, this facility is proposed as an on-street interchange and served by one regional route and assumed local microlet service. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-15.[37] In total, it is assumed that the facility requires 2 bays comprised of 1 loading/unloading bay for reginal bus and 1 loading/unloading bay for local microlet (for interchange opportunities).

**Table 3-15: Bay Assignment by Route for Maliana Market**

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Route # | Vehicle Type | Service Type | Terminating Point#1 | Terminating Point#2 | Direction | Trips/ Hour | Boarding Bays per Route (With 20% Growth) | Alighting Bays per Route (With 20% Growth) | Bay 1 | Bay 2 | Layover |
| P-7 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Tibar Terminal | Maliana | EB/WB | 4.0 | 0.48 | 0.48 | C | | 0 |
| - | Microlet | Assumed Terminating | Within Maliana City | Within Maliana City | - | - | - | - | | C | 0 |

### 3.8.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access to Curbside Space –** The site has sufficient curbside space accommodating the required number of bays estimated above by route.
- **ROW and Sidewalk Constraints –** Sidewalks are relatively narrow without provision for access-for-all facilities. Creating a safe and connected walk environment to access the site is essential to the success of this scheme.

Based on these considerations above, the proposed preliminary design for this on-street interchange is depicted below. Of note:

- Two boarding/alighting bays are proposed on the curbside lane (currently used for parking spaces) which will have enhanced passenger facilities such as shelter.

[37] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

- Improved crosswalks, signages and markings are proposed to provide a safe crossing environment for pedestrians and passengers.


**Figure 3-29: Preliminary Layout/Design for Maliana Market**

## 3.9 Facility#8: Suai Market

### 3.9.1 Overview of Location and Strategic Importance

The Suai Market is a terminating location in the southwest of Timor-Leste. An on-street interchange is proposed utilizing on-street space near the market next to a north-south local road running through the city (two-way road, one lane per direction).

Key generators around the site include commercial properties, hospitals, sports field and government offices (within 500 m of the site) and government buildings located along major roads connected to the site (within 1.0 km of the site).


**Figure 3-30: Site Location – Suai Market**

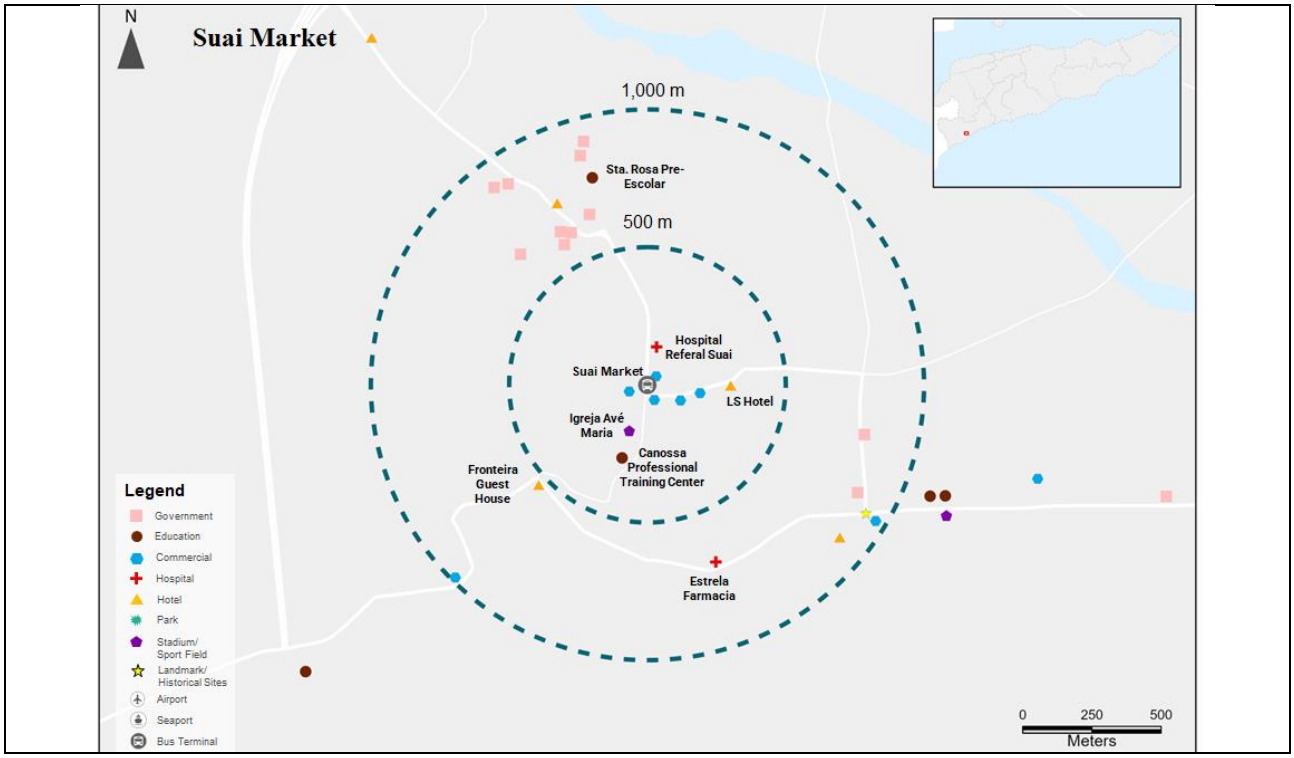



**Figure 3-31: Key Generators – Suai Market**

### 3.9.2 Public Transport Services and Demand

Regional Bus Route 10 connects Suai to Dili. The existing and future regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP.

**Table 3-16: Public Transport Services and Demand (Existing and Future) – Suai Market**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Route # | Origin | Destination | Vehicle Type | Direction | Distance (km) | Peak Headway (Minutes) | Daily Round Trips | Daily Demand | Peak Headway (Minutes) | Daily Round Trips | Daily Demand |
| ***Regional Bus*** | | | | | | | | | | | |
| P-10 | Taibessi Terminal | Suai | Bus | SB/NB | 171.0 | 20 | 10 | 290 | 20 | 10 | 350 |
| - | Within Suai City | Within Suai City | Microlet | - | - | - | - | - | - | - | - |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.9.3 Existing Facilities

As noted, there is no existing facility at this on-street facility. Streetview images of the proposed on-street facility are provided below for reference. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

**Figure 3-32: Streetview of Suai Market On-Street Interchange**

### 3.9.4 Key Routes Serving and Proposed # of Bays

As noted, this facility is proposed as an on-street interchange and served by one regional route and assumed local microlet service. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-17.[38] In total, it is assumed that the facility requires 2 bays comprised of 1 loading/unloading bay for reginal bus and 1 loading/unloading bay for local microlet (for interchange opportunities).

**Table 3-17: Bay Assignment by Route for Suai Market**

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Lay-over** |
| P-10 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Taibessi Terminal | Suai | EB/WB | 3.0 | 0.36 | 0.36 | C | | 0 |
| - | Microlet | Assumed Terminating | Within Suai City | Within Suai City | - | - | - | - | | C | 0 |

### 3.9.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access to Curbside Space –** The site has sufficient curbside space accommodating the required number of bays estimated above by route.
- **ROW and Sidewalk Constraints –** Sidewalks are relatively narrow without provision for access-for-all facilities. Creating a safe and connected walk environment to access the site is essential to the success of this scheme.

[38] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

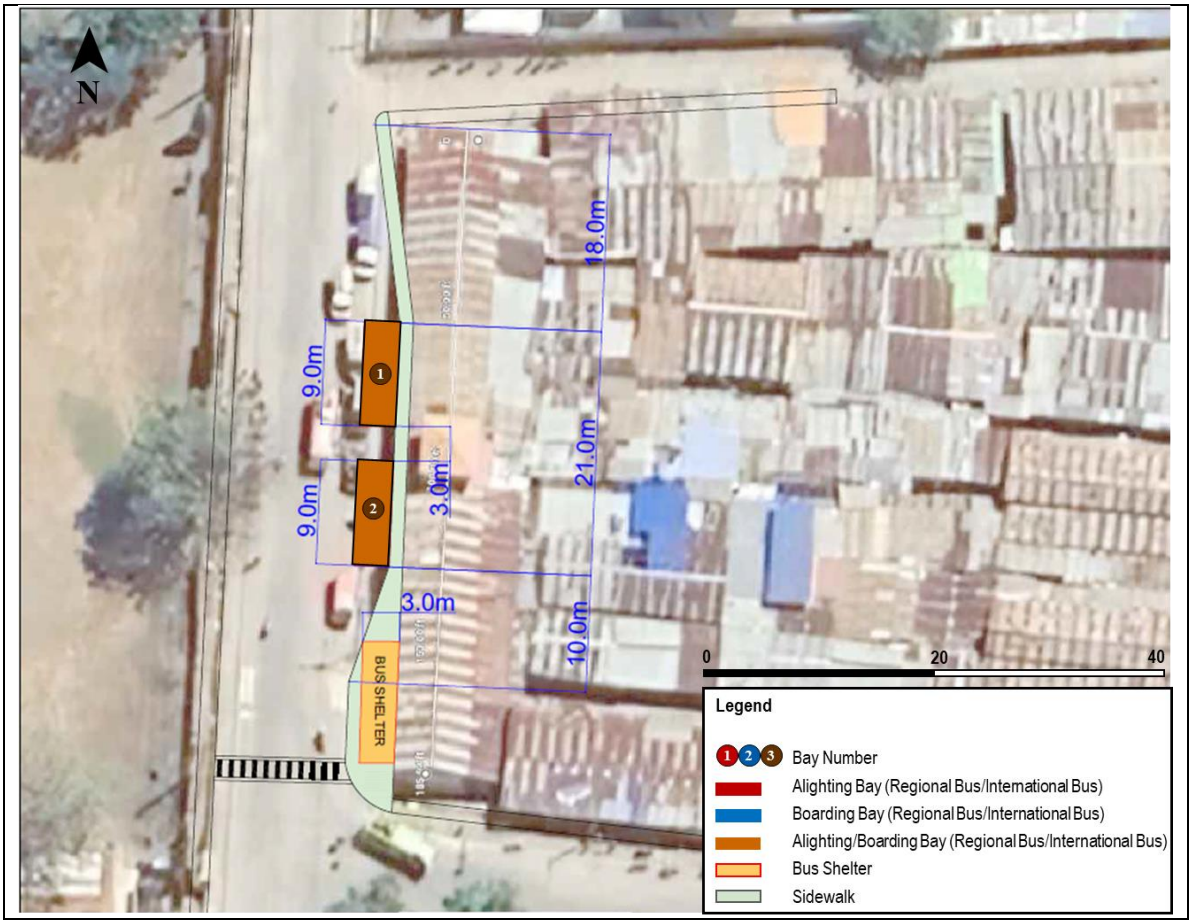



**Figure 3-33: Preliminary Layout/Design for Suai Market**

Based on these considerations above, the proposed preliminary design for this on-street interchange is depicted below. Of note:

- Two boarding/alighting bays are proposed on the curbside lane (currently used by local microlet for loading/unloading) which will have enhanced passenger facilities such as shelter.
- Improved crosswalks, signages and markings are proposed to provide a safe crossing environment for pedestrians and passengers.

## 3.10 Facility#9: Lospalos Bemoris

### 3.10.1 Overview of Location and Strategic Importance

The Lospalso Bemoris is a terminating location in the eastern end of Timor-Leste. An on-street interchange is proposed utilizing on-street space near the traditional market next to an east-west major local road connected to the city (two-way road, one lane per direction).

Key generators around the site include commercial properties, hospitals, sports field and government offices (within 500m of the site) and several schools and commercial sites located along major roads connected to the site (within 1.0km of the site).


**Figure 3-34: Site Location – Lospalos Bemoris**

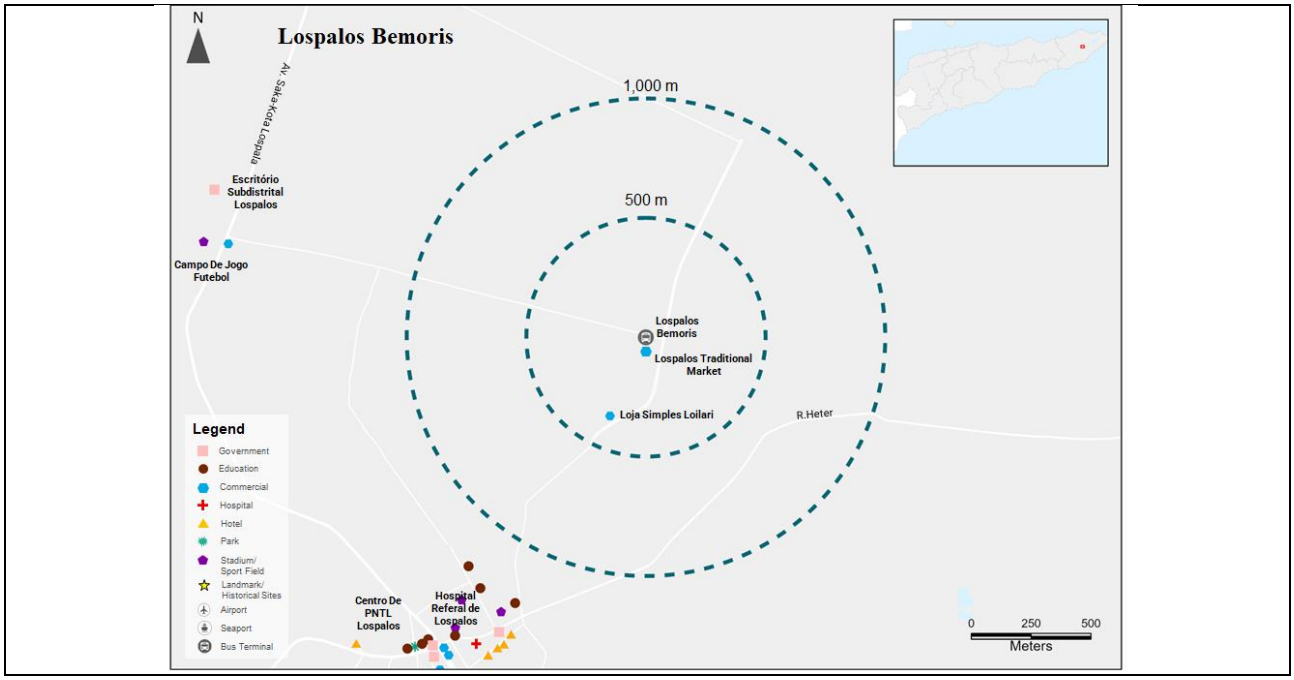



**Figure 3-35: Key Generators – Lospalos Bemoris**

### 3.10.2 Public Transport Services and Demand

Regional Bus Route 6 connects Lospalos to Dili. The existing and future regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP.

**Table 3-18: Public Transport Services and Demand (Existing and Future) – Lospalos Bemoris**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Origin** | **Destination** | **Vehicle Type** | **Direction** | **Distance (km)** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** | **Peak Headway (Minutes)** | **Daily Round Trips** | **Daily Demand** |
| ***Regional Bus*** | | | | | | | | | | | |
| P-6 | Becora Terminal | Lospalos | Bus | EB/WB | 205.1 | 20 | 6 | 160 | 20 | 7 | 180 |
| - | Within Laspalos City | Within Laspalos City | Microlet | - | - | - | - | - | - | - | - |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.10.3 Existing Facilities

As noted, there is no existing facility at this on-street facility. Streetview images of the proposed on-street facility are provided below for reference. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

**Figure 3-36: Streetview of Lospalos Bemoris On-Street Interchange**

### 3.10.4 Key Routes Serving and Proposed # of Bays

As noted, this facility is proposed as an on-street interchange and served by one regional route and local microlet service. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-19.[39] In total, it is assumed that the facility requires 2 bays comprised of 1 loading/unloading bay for reginal bus and 1 loading/unloading bay for local microlet (for interchange opportunities).

**Table 3-19: Bay Assignment by Route for Lospalos Bemoris**

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Direction** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Lay-over** |
| P-6 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Lospalos | EB/WB | 3.0 | 0.36 | 0.36 | C | | 0 |
| - | Microlet | Assumed Terminating | Within Lospalos City | Within Lospalos City | - | - | - | - | | C | 0 |

### 3.10.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access to Curbside Space –** The site has sufficient curbside space accommodating the required number of bays estimated above by route.
- **ROW and Sidewalk Constraints –** Sidewalks are relatively narrow without provision for access-for-all facilities. Creating a safe and connected walk environment to access the site is essential to the success of this scheme.

Based on these considerations above, the proposed preliminary design for this on-street interchange is depicted below. Of note:

- Two boarding/alighting bays are proposed on the curbside lane (adjacent to the market) which will have enhanced passenger facilities such as shelter.
- Improved crosswalks, signages and markings are proposed to provide a safe crossing environment for pedestrians and passengers.

[39] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

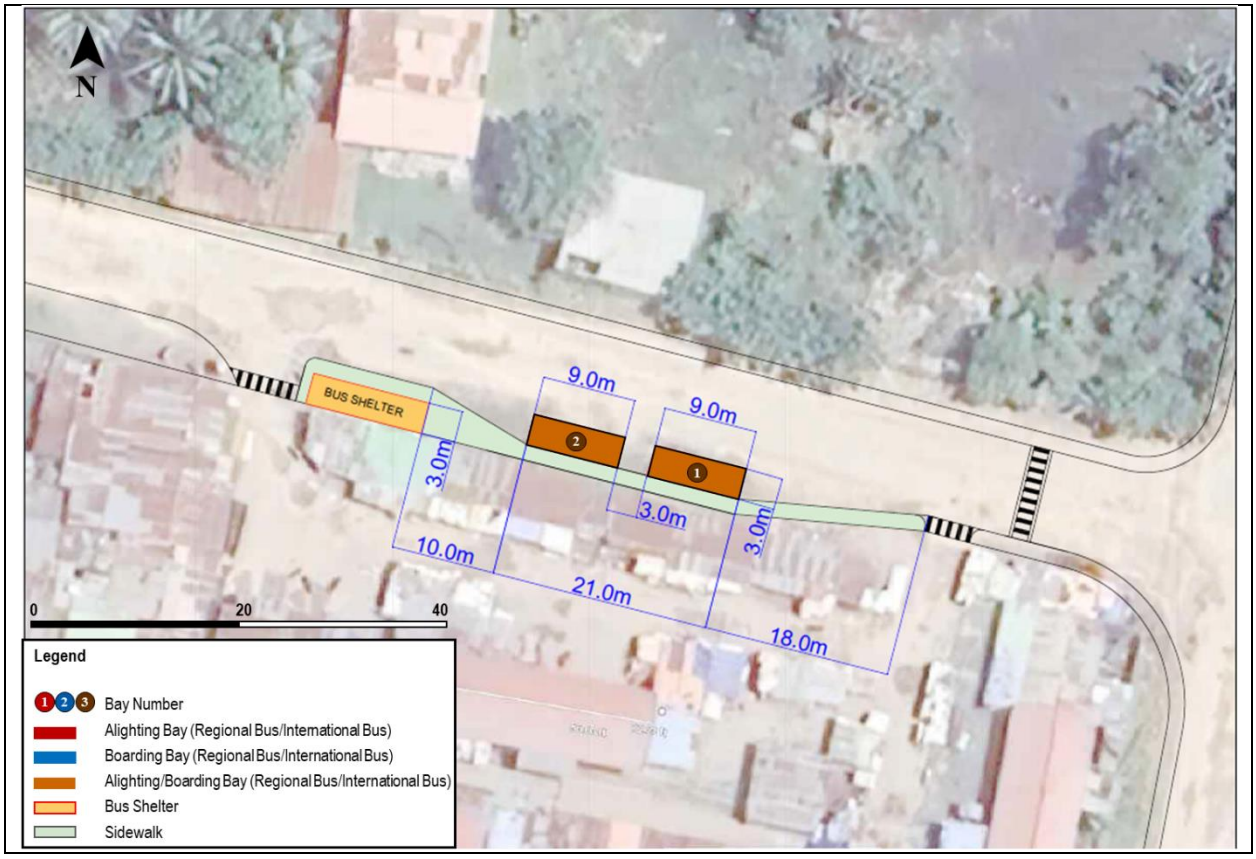



**Figure 3-37: Preliminary Layout/Design for Lospalos Bemoris**

## 3.11 Facility#10: Viqueque City Center

### 3.11.1 Overview of Location and Strategic Importance

The Viqueque City Center is a terminating location in the southeast of Timor-Leste. An on-street interchange is proposed utilizing on-street space (between the Monumento Pancasilla and local police office) which lies at the center of the city. A local road passing through here is a two-way road, one lane per direction.

Key generators around the site include commercial properties, government offices, and schools (within 500m of the site) and several schools, government offices and hotels located in the north along major roads connected to the site (within 1.0km of the site).


**Figure 3-38: Site Location – Viqueque City Center**

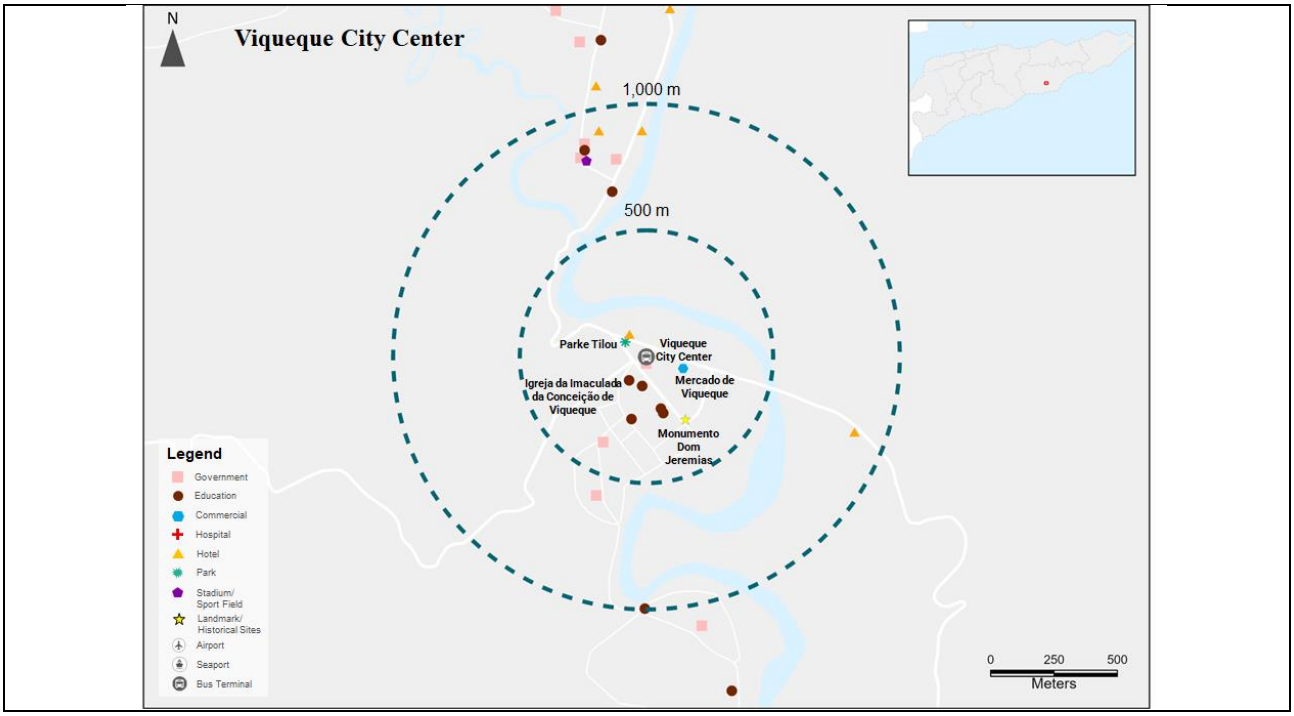



**Figure 3-39: Key Generators – Viqueque City Center**

### 3.11.2 Public Transport Services and Demand

Regional Bus Route 11 connect Viqueque to Dili. The existing and future regional bus services, operation, routing, and demand details are summarized below based on the key findings/results from the 2024 PTMP.

**Table 3-20: Public Transport Services and Demand (Existing and Future) – Viqueque**

| | | | | | | Existing [A, B] | | | Future [A, B] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Route # | Origin | Destination | Vehicle Type | Direction | Distance (km) | Peak Headway (Minutes) | Daily Round Trips | Daily Demand | Peak Headway (Minutes) | Daily Round Trips | Daily Demand |
| ***Regional Bus*** | | | | | | | | | | | |
| P-11 | Becora Terminal | Viqueque | Bus | EB/WB | 176.6 | 7 | 13 | 380 | 5 | 16 | 480 |
| - | Within Viqueque City | Within Viqueque City | Microlet | - | - | - | - | - | - | - | - |

Note:
[A] Daily round trips and demand are based on weekday data.
[B] Daily demand is based on route-level boardings which is further distributed into assumed demand for individual facility sites for revenue analysis.

### 3.11.3 Existing Facilities

As noted, there is no existing facility at this on-street facility. Streetview images of the proposed on-street facility are provided below. Assessment of observed site conditions/issues based on the bus facility enhancement toolkit and assessment framework are summarized in **Appendix A**.

**Figure 3-40: Streetview of Viqueque City Center On-Street Interchange**

### 3.11.4 Key Routes Serving and Proposed # of Bays

As noted, this facility is proposed as an on-street interchange and served by one regional route and local microlet service. Based on the bay estimation process detailed in Facility Design Guidelines in 2024 PTMP, bay assignment of boarding/alighting bay and layover spaces are summarized by route in Table 3-21.[40] In total, it is assumed that the facility requires 2 bays comprised of 1 loading/unloading bay for reginal bus and 1 loading/unloading bay for local microlet (for interchange opportunities).

**Table 3-21: Bay Assignment by Route for Viqueque City Center**

| | | | | | | | # of Equivalent Bays (Based on Dwell Time Calculation) | | Bay Assignment (where A = Alighting Only, B = Boarding Only, and C = Boarding/Alighting) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route #** | **Vehicle Type** | **Service Type** | **Terminating Point#1** | **Terminating Point#2** | **Dir-ection** | **Trips/ Hour** | **Boarding Bays per Route (With 20% Growth)** | **Alighting Bays per Route (With 20% Growth)** | **Bay 1** | **Bay 2** | **Bay 3** | **Lay-over** |
| P-11 | Regional Bus | Terminating Routes (50% Layover at This Terminal) | Becora Terminal | Viqueque | EB/W B | 11.0 | 1.32 | 1.32 | A | B | B | 0 |
| - | Microlet | Assumed Terminating | Within Viqueque City | Within Viqueque City | - | - | - | - | - | - | C | 0 |

### 3.11.5 Proposed Scheme and Preliminary Design

Based on the facility design principles in the Bus Facility Enhancement Toolkit, the following considerations were taken into account in developing schemes/design for this facility:

- **Site Access to Curbside Space –** The site has sufficient curbside space accommodating the required number of bays estimated above by route.
- **ROW and Sidewalk Constraints –** Sidewalks are relatively narrow without provision for access-for-all facilities. Creating a safe and connected walk environment to access the site is essential to the success of this scheme.

Based on these considerations above, the proposed preliminary design for this on-street interchange is depicted below. Of note:

- Three boarding/alighting bays are proposed on the curbside lane which will have enhanced passenger facilities such as shelter.
- Improved crosswalks, signages and markings are proposed to provide a safe crossing environment for pedestrians and passengers.

[40] Bay estimation process is presented in Section 4.6 of the Facility Design Guideline.

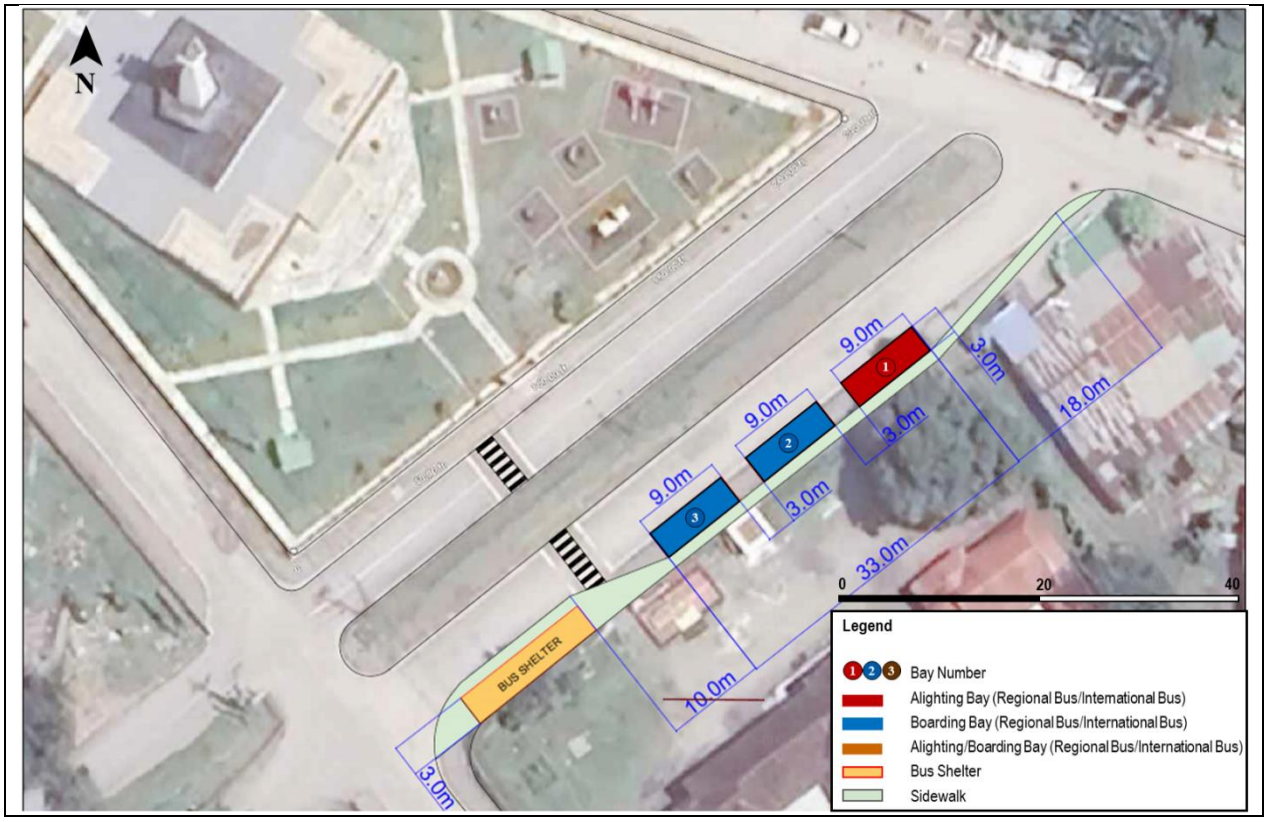



**Figure 3-41: Preliminary Layout/Design for Viqueque City Center**

# 4. Environmental Safeguards

At strategic level, the project is aligned with the goals of the Paris Agreement through (i) mitigation benefits from reduced congestion, improved operational efficiency, and modal shift; and (ii) adaptation measures embedded in facility design, including flood-resilient layouts, drainage, and climate-responsive materials.

A total of ten (10) bus terminal sites are proposed and some of these sites have been visited by the ADB Environmental Safeguards staff and Environmental consultants (under ADB's Technical Assistance) between November 2022 and April 2024. During these visits, initial scoping and sensitive receptor mapping were conducted and based on initial screening, the project has been categorized as 'B' as per ADB SPS, 2009 and hence, an Initial Environmental Examination (IEE) study will be required.

A brief summary of the project settings at each of the proposed ten sites is provided in the table below:

**Table 4-1: Environmental Settings at Ten Proposed Bus Facility Sites**

| Site Name | Environmental Setting |
|---|---|
| Dili Convention Center | • DCC is mainly used for hosting important international and national events.<br>• DCC main building is under the protection of the Secretary of Art and Culture as a Heritage Building. Changes to the surrounding landscape requires coordination with the relevant entity.<br>• The location sits on a flood prone area. The surrounding area is historically known as peatland and was converted for offices during Indonesian occupation. Thus, land elevation earthwork is recommended.<br>• The site features small gutters and narrow u-ditch drainage. The drainage system is poorly maintained. Rainy season causes transitionary flood and the stormwater recedes within hours. Flood height is unknown. Recommending further investigation.<br>• Sensitive receptors in the area include the residents, road users, pedestrians, and operating microlet and commuters, government office (MOTC), and Dili Municipal Stadium. |
| Becora Terminal | • Site located in an urban setting with different types of residential and commercial structures located around the site with a dry riverbed present along the western boundary of the site.<br>• Bedois Church and a Catholic private school is located at approx. 270 m north of the existing terminal. The only access to the church and the school is through the only entrance and exit of the proposed terminal.<br>• The entrance and exit also serves as the main access for the communities living in the lower sections of Camea village.<br>• The riverbank of Beoids River was severely damaged during the cyclone Seroja on 4 April 2021. The streambank has been repaired. But damage to the bridge remains.<br>• The river does not host any aquatic species. Narrow floodplain in Dili's watershed characterizes strong currents of the rivers, which can easily cause riverine inundation. Besides the rivers Dili are ephemeral and inhabitable for aquatic species.<br>• The sensitive receptors identified were the local residents, businesses (i.e., kiosks), churches, students, commuters, and general road users of the main road exposed to high risk of traffic accidents. |
| Tibar Terminal | • Site located in a rural setting consisting of hilly terrain although site is located on flat land with some sparse vegetation consisting of trees and shrubs located around the site and some scattered settlements around the site. |
| Manleuana Terminal | • The site is located within the Manleuana market. The market contains business such as sealing vegetables, clothes, and plants.<br>• The site currently is accessed by microlet as the only means of public transportation to the site.<br>• The location is not within any protected area. And the surrounding area has been disturbed due to recent land use change.<br>• In previous years, the surrounding areas were used primarily for rice padding, but in the recent decade the area has experienced extensive land use change towards residential and real estate businesses.<br>• The sensitive receptors in the area include the Canossa School (near the entrance to the market in the east), Externato de Sao Jose School (along the access road to the market), local residents, businesses in the market, commuters, and the microlet. |
| Hera Terminal | • The site is located on hilly terrain with considerable vegetation on the site and also around it consisting of trees and grasses along with scattered settlements around the terminal site. |

| Site Name | Environmental Setting |
|---|---|
| | • Nearest protected area is the nationally declared (land and sea hybrid) Marine Protected Area (MPA) in the north, namely Cristo Rei. |
| Aldeia Samalakuliba Terminal | • Site is located in a rural setting in a primarily barren plot of land with minimal vegetation located in its surroundings and only some commercial structures located near the site. |
| Maliana | • Site located in an urban setting with different types of residential and commercial structures located around the site. |
| Suai | • Site located in a semi-urban setting consisting of hilly terrain with commercial and residential settlements located along the eastern boundary of the site with the western boundary of the site consisting primarily of trees and vegetation with some scattered settlements. |
| Lospalos | • The site is located on hilly terrain with considerable vegetation on the site and also around it consisting of trees and grasses along with scattered settlements around the terminal site. |
| Viqueque | • Site located in an urban setting with different types of residential and commercial structures located around the site. |

However, during the detailed scoping activities, if any areas of special importance/sensitivities are identified, the project category will be re-assessed at that stage and the detailed scoping and baseline data collection along with stakeholder consultations will be conducted during preparation of the required IEE study as per ADB SPS, 2009 requirements.

The proposed works for the bus terminal development are generally expected to be site specific and of short duration, and any potential impacts are expected to be reversible and short term in nature mainly occurring during the construction stage. The expected works shall mainly consist of the following activities:

- Earth works for land leveling and vegetation removal, wherever necessary
- Masonry, civil and metal works for development of bus terminal structures
- Electrical works for lighting, etc.
- Painting and finishing works

The potential impacts to be assessed during the different project phases are summarized in the table below:

**Table 4-2: Potential Environmental Impacts by Project Phase**

| Project Phase | Potential Impact |
|---|---|
| **Design / Pre-Construction** | • Lack of integration of IEE/EMP requirements into construction bid documents<br>• Relocation of existing utilities<br>• Identification of locations for labor camps and ancillary facilities<br>• Traffic issues<br>• Seismic impacts |
| **Construction** | • Degradation of air quality<br>• Noise / vibration<br>• Occupational health and safety and labor conditions<br>• Community health and safety<br>• Traffic issues<br>• Biodiversity impacts<br>• Construction camps/Camp site<br>• Wastewater generation<br>• Solid waste generation<br>• Disposal of spoil/demolition waste<br>• Communicable diseases<br>• Site restoration |
| **Operation** | • Air quality, noise and vibration from buses and other large commuter vehicles<br>• Waste generation at bus terminals<br>• Community safety risks from accidents due to bus and large commuter vehicular movement<br>• Climate change related impacts such as flooding at Dili Convention Center, Becora transportation hub etc.<br>**Positive impacts**<br>• Employment generation |

| Project Phase | Potential Impact |
|---|---|
| | • Increased tourism and development of business avenues<br>• Increased passenger convenience and travel safety in better vehicles. |

The next steps to prepare one consolidated IEE study for the proposed ten bus terminal sites are as follows:

- Detailed scoping will be conducted of the finalized sub-project sites and re-screening to assess any areas of special importance or significance, potentially ecological significance and for reconfirmation of the project category as per ADB SPS, 2009.
- Accredited laboratories will be engaged for baseline development of key environmental parameters (air, noise and water quality) and for conducting any specific studies/surveys as required.
- Detailed and meaningful stakeholder consultations will be conducted to fulfil ADB SPS, 2009 requirements.
- Impact analysis of various potential impacts likely to arise during various project phases with appropriate mitigation measures and monitoring requirements also provided.
- Preparation of draft IEE study for internal circulation and finalization for disclosure, including an Environmental Management Plan (EMP).
- Checking of Autoridade Nacional de Licenciamento Ambiental (ANLA) requirements to ensure Timor-Leste national requirements are also met in parallel with ADB requirements.

# 5. Gender Equality and Social Inclusion Assessment

This document provides an overview of the comprehensive Gender Equality and Social Inclusion (GESI) Assessment and Action Plan for the Timor-Leste Public Transport Master Plan (PTMP). This assessment was prepared in collaboration with the ADB and the Government of Timor-Leste to enhance the country's public transport system by addressing gender and social inclusion issues. A comprehensive Gender Equality and Social Inclusion Assessment and Action Plan is provided in a separate document.

The report outlines the project's alignment with the Effective Gender Mainstreaming (EGM) category and ADB's Disability Inclusive Rating 3, emphasizing the project's commitment to improving women's access to social services, economic opportunities, and infrastructure, while also being socially inclusive.

The assessment utilized both primary and secondary data collection methods, including bus service/facility interview surveys, key informant interviews (KIIs), focus group discussions (FGDs), perception surveys, and covert observations at existing transport facilities. The methodology aimed to gather comprehensive insights into the current state of public transportation and the specific needs of various sectors.

The national GESI-related policies and plans, including constitutional provisions, gender equality, disability, and social inclusion policies, and programs were also reviewed as part of the assessment. It highlights the political representation of women, support programs for women with children, and the ratification of international conventions.

## 5.1 Key Issues and Challenges Identified

The public transport system in Timor-Leste faces significant accessibility challenges, particularly for PWDs and the elderly. Essential features are lacking, such as ramps, tactile paving, audio announcements, and Braille signages at terminals and in public transport vehicles, making it difficult for these groups to use public transportation comfortably. The poor condition of facilities, such as non-functional public toilets and lack of seating areas, further hinders mobility and comfort.

Safety concerns are prevalent, especially for women and LGBTQIA+ individuals who face significant risks of gender-based violence and harassment. Issues such as forced rides, overcrowded vehicles, physical assaults, inappropriate touching, and smoking inside vehicles discourage these groups from using public transportation. Drivers and staff are often not responsive to emergencies, and there are no evacuation routes or emergency equipment at terminals. While the results of the interview survey indicate that women's travel for education and work may suggest progress in gender equality, it also highlights the need for safe and accessible transportation to ensure their continued empowerment.

Discrimination and social exclusion are also significant issues. PWDs face bullying and derogatory comments from drivers, and the elderly often face discrimination and lack of assistance. These issues discourage these groups from using public transportation. Members of the LGBTQIA+ community also encounter bullying and discrimination, making public transportation an unwelcoming environment for them. Economic barriers, such as inconsistent fare pricing, fare manipulation, and lack of transparency, make public transportation less affordable and less attractive for vulnerable groups, including women, PWDs, and the elderly. The poor condition of facilities at terminals, such as non-functional public toilets, lack of seating areas, and poor waste management, affects the overall acceptability and usability of public transportation.

## 5.2 Potential Impacts on Different Social Groups

The project has potential impacts to various vulnerable groups in Timor-Leste. As women, PWDs, the elderly, and LGBTQIA+ individuals face significant challenges in public transportation such as issues on safety and security, accessibility, and inclusion, several aspects of the project may either worsen or improve their current experiences.

During the construction phase, risks related to health may be experienced by the community due to presence of debris. PWDs may also experience temporary obstructions along sidewalks or roads where construction is taking place which would limit their mobility and pose significant safety risks. On the other hand, benefits to the urban poor sector and the youth are expected as job opportunities may be increased due to the possibility

of getting hired as laborers for the project or business opportunities due to the presence of workers within the area.

Post-construction is also expected to provide benefits to all sectors as it is seen to improve economic opportunities through job creation and better access to transportation. It is also expected that positive impacts will be experienced by the vulnerable sector if all recommendations by the stakeholders, particularly the women, PWDs, the elderly, and LGBTQIA+ individuals are taken into consideration

## 5.3 Opportunities for Enhancing Gender Equality and Social Inclusion

Key informants and participants of FGDs recommended that installing accessibility features, implementing safety and security measures, conducting trainings and stakeholder engagements, and properly enforcing rules and procedures can help improve gender equality and social inclusion in Timor-Leste's public transportation. These measures can significantly enhance the daily lives of Timorese people and facilitate better mobility and inclusivity.

Accessibility of the vulnerable sector can be improved by installing ramps, audio announcements, and Braille signages at all terminals, and ensuring public transport vehicles are equipped with accessibility features like low floors, grab bars, and non-slip flooring, which will make public transportation more inclusive. Improving terminal facilities by rehabilitating seating areas, ensuring functional public toilets, and providing shaded waiting areas and designated seating for pregnant women, the elderly, and PWDs will enhance the overall user experience.

Establishing passenger flow management systems and training drivers and staff to respond to emergencies effectively can improve safety and efficiency. Addressing safety concerns by installing CCTV cameras, voice recorders, streetlights, and building police stations to enhance safety, and providing shelters and support from security forces for victims of violence and abuse, will help create a safer environment for all passengers.

Enforcing compliance with rules and procedures through education and strict enforcement of standard operating procedures for drivers and staff is crucial. Promoting social inclusion and equity through training for drivers and passengers on mutual respect and proper access and designing public transportation to accommodate the needs of all passengers, including PWDs and the elderly, is vital.

These comprehensive measures aim to improve the inclusivity, safety, and accessibility of public transportation for all passengers, especially those facing intersecting barriers related to gender, disability, and social inclusion

## 5.4 Gender Equality and Social Inclusion Action Plan

The Gender Action Plan for Timor-Leste Public Transport, as shown in the table below, is a comprehensive set of targets aimed at promoting gender equality and social inclusion within the country's public transportation system. This plan outlines specific objectives and activities to improve accessibility and inclusivity, enhance safety and security, promote social inclusion and equity, address economic barriers, improve infrastructure and facility conditions, promote gender equality and women's empowerment, and enhance monitoring and evaluation. Key activities include installing ramps and tactile paving at all terminals, implementing audio announcements and Braille signages, providing designated seating and priority queuing for PWDs, elderly, and pregnant women, and equipping public transport vehicles with low floors, grab bars, and non-slip flooring. Additionally, the plan includes installing CCTV cameras and voice recorders, training drivers and staff to respond to emergencies, and conducting awareness campaigns on gender-based violence and harassment. The plan also sets employment targets for women, ensures women's participation in training programs, and conducts gender sensitivity training for all project staff. It emphasizes the importance of developing gender performance indicators, conducting regular assessments, and involving stakeholders in monitoring and evaluation processes. By addressing these key areas, the Gender Action Plan aims to create a more equitable and accessible public transport system that benefits all sectors of society, particularly women, people with disabilities, and other marginalized groups. The MOTC, DNTT, MSSI, Ministry of Finance, community organizations, and local authorities will be responsible for the implementation of these initiatives.

## Table 5-1: Gender Action Plan for Timor-Leste Public Transport

| Activities/ Indicators/ Targets | Linked project outputs[41] | Responsibilities | Timeframe |
|---|---|---|---|
| ***Operational Priority 1: Addressing remaining poverty and reducing inequalities*** | | | |
| Implement transparent fare pricing to prevent fare manipulation, and publicly disclose through multiple channels (notice board, website, mobile application, etc.). | 1, 2 | MTC, DNTT, MSSI, Ministry of Finance, Local Authorities | Medium-term (1-3 years) |
| Develop a ticketing system with differentiated prices for short trips and off-peak fares, to make ticket prices affordable for low-income people. | 1, 2 | MTC, DNTT, MSSI, Ministry of Finance, Local Authorities | Medium-term (1-3 years) |
| Provide subsidies for vulnerable groups, including women, PWDs, and the elderly. | 1, 3 | MTC, DNTT, MSSI, Ministry of Finance, Local Authorities | Medium-term (1-3 years) |
| At least five (5) information and education campaign products developed and disseminated in accessible formats (e.g., infographics, videos, posters, etc. in Tetum language) to promote awareness on GBV-SEAH and VAWC. | 1, 3 | MTC, DNTT, MSSI, Community Organizations, Local Authorities | Medium-term (1-3 years) |
| ***Operational Priority 2: Accelerating progress in gender equality*** | | | |
| Ensure adequate lighting and security measures are in place in all public transportation vehicles and facilities to enhance safety for women, PWDs, the elderly, and LGBTQIA+ individuals, including installation of CCTVs in all public transportation vehicles and terminals to prevent harassment and monitor driver and passenger behavior. | 1 | MTC, DNTT, PNTL, Local Authorities | Short term (0-1 year) |
| At least 33% of those involved in the planning and decision-making process for public transportation are women. | 2 | MTC, DNTT, MSSI, Ministry of Finance, Local Authorities | Long term (3-5 years) |
| At least 10% of skilled positions and 10% of unskilled positions hired in all stages of civil works are women. | 2 | MTC, DNTT, MSSI, Ministry of Finance, Local Authorities | Medium term (1-3 years) |
| Employ at least 33% (skilled and unskilled) women in new jobs, including operation of public transportation (i.e., as drivers and assistants), ticketing and fare collection works, maintenance works, and administration works, at equal pay for work of equal value. | 2 | MTC, DNTT, Ministry of Finance, Local Authorities | Medium term (1-3 years) |
| 100% of all personal involved in the transportation system (MTC, DNTT, local government, drivers, assistants, and other operations and maintenance personnel) will undergo orientation/ trainings on GBV-SEAH, gender equality, disability, and social inclusion, and at least 80% of the said participants report of having an improved understanding of, and practices and behavior toward the issues covered. | 2 | MTC, DNTT, MSSI, Community Organizations, Local Authorities | Medium-term (1-3 years) |
| Ensure at least 50% female participation in public consultations within the project. | 2 | MTC, DNTT, MSSI, Community Organizations, Local Authorities | Long term (3-5 years) |
| ***Operational Priority 3: Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability*** | | | |
| Provide shaded waiting areas and designated seating for pregnant women, women with small children, PWDs, and the elderly. | 1 | MTC, DNTT, Local Authorities | Medium-term (1-3 years) |
| Implement regular waste collection and disposal systems at all terminals. | 1 | MTC, DNTT, Local Authorities | Medium-term (1-3 years) |
| ***Operational Priority 4: Making cities more livable*** | | | |
| Establishment of higher capacity functional public toilets at all terminals for female and male toilet facilities at 2:1 ratio constructed in all terminals; equipped with a continuous supply of water, vending machines with tissues and sanitary pads for women, hooks, diaper-changing tables, and disposal. | 1 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |
| Establishment of toilet facilities for PWDs and an all-gender inclusive toilet in all terminals. | 1 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |
| Install ramps, guidance signs, and tactile pavement and provide information and access to emergency response available (e.g., GBV/ VAWC helpdesks) at all terminals. | 1 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |
| Implement audio announcements and Braille signages at all terminals and in public transport vehicles; Equip public transport vehicles with low floors, grab bars, and non-slip flooring. | 1 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |

[41] Project outputs are: 1 – climate-resilient and optimized public transport network system developed; 2 – institutional capacity strengthened; and 3 – regulatory framework for low carbon and climate-resilient development strengthened.

| Activities/ Indicators/ Targets | Linked project outputs[41] | Responsibilities | Timeframe |
|---|---|---|---|
| Provide designated seating and priority queuing for PWDs, elderly, women with small children, and pregnant women. | 1 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |
| At least 75% of surveyed women, PWDs, elderly, and LGBTQIA+ individuals confirm that the mentioned facilities are more accessible and safer. | 1, 2 | MTC, DNTT, Local Authorities | Short-term (0-1 year) |
| Train drivers and staff to respond to emergencies effectively and establish safety policies, including evacuation routes and emergency equipment. | 1 | MTC, DNTT, PNTL, Local Authorities | Short-term (0-1 year) |
| ***Operational Priority 6: Strengthening governance and institutional capacity*** | | | |
| Implement a feedback mechanism or grievance redress mechanism (GRM) to receive complaints and establish a structured procedure for grievance resolution; The GRM shall be accessible in accessible channels (e.g., helpdesks, cellular phone, online platform) and information on the availability and process of the GRM shall be disseminated through consultations and other accessible platforms (e.g., e.g., infographics, videos, posters, etc. in Tetum language). | 1,2 | MTC, DNTT, MSSI, Local Authorities | Short-term (0-1 year) |
| Appoint a project staff responsible for gender mainstreaming and Gender Action Plan implementation, monitoring, and reporting. | 2 | MTC, DNTT, MSSI, Community Organizations, Local Authorities | Long-term (3-5 years) |
| Appoint a Gender/ Gender and Social Specialist to support the implementation of the Gender Action Plan. | 2 | MTC, DNTT, MSSI, Community Organizations, Local Authorities | Long-term (3-5 years) |
| Establish and implement a comprehensive program to prevent and address GBV-SEAH during civil works and operations and maintenance. | 1, 2 | MTC, DNTT, Local Authorities | Medium-term (1-3 years) |

# 6. Institutional and Governance Arrangements

The 2024 PTMP conducted a comprehensive review of the existing institutional and legal framework (including a review of legal, regulatory, and policy framework governing public transport, assessment of the government's capacity to manage and operate the public transport system, etc.), best practice review on the operation and management of public transport facilities/services in comparable contexts, a gap assessment on institutional / capacity arrangements, recommendations on an operational mode/framework for public transport facilities, and a roadmap for capacity development in line with the proposed operational framework.

The feasibility study builds upon the previous work documented extensively in the 2024 PTMP and focuses on achieving the following objectives:

- Identify key entities and their relevant roles to public transport in particular bus terminals / facilities
- Propose responsibility matrix by entity for bus terminal/facilities development and improvement (i.e., construction, operation, maintenance, and management of bus facilities, as well as fee collection and traffic / safety enforcement)

## 6.1 Key Entities and Relevance to Public Transport

Based on a review of current roles and responsibilities and the proposed institutional arrangements in the 2024 PTMP, key entities and their relevant responsibilities pertain to public transport are summarized in the table below:

**Table 6-1: Key Entities and Relevance to Public Transport**

| Entity | Key Responsibilities | Public Transport Relevance |
|---|---|---|
| **Ministry of Transport and Communications (MOTC)** | - MOTC's key responsibilities among others include (i) develop policies and draft regulations; (ii) implement and enforce legal and regulatory activities; (iii) coordinate and promote the management, maintenance, and improvement of transport infrastructure; (iv) propose and execute policy guidelines for urbanism, infrastructure, road networks, buildings, and public works; (v) create and implement the legal and regulatory framework for construction; (vi) conserve and repair bridges, roads, river, and sea with a focus on flood control; (vii) prepare and develop the implementation of the national road plan / land development plans, and (viii) coordinate transportation and encourage complementarity between different modes of transport. | - MOTC will be a key stakeholder in planning and guiding the implementation of public transport facilities.<br>- Of note, design and implementation of transport infrastructure works was transferred to the Ministry of Public Works (MPW) in 2018. |
| **National Directorate of Land Transport (DNTT)** | - The DNTT operates under the jurisdiction of MOTC and has prime responsibility for land transport management and operations (including issuing driver and vehicle licenses, permits, and ensuring compliance with vehicle conditions). It also oversees essential aspects such as line markings, signage, and road furniture to promote safe navigation throughout the national road system.<br>- DNTT is further responsible for identifying and establishing intercity bus stops, implementing protective measures, and determining the locations of bus laybys. To execute these measures, DNTT collaborates closely with the National Directorate for Roads Bridges and Flood Control (DRBFC), which falls under the Ministry of Public Works. This coordination facilitates the effective implementation of safety and traffic control measures, with DNTT defining the required road safety protocols and traffic control measures before DRBFC carries out their implementation. | - DNTT has prime responsibility for identifying and ensuring the provision of bus facilities including terminals, bus stops, laybys, waiting areas, and appropriate signage (with MPW / DRBFC responsible for actual implementation). |
| **Ministry of Finance (MOF)** | - MOF is the central government agency responsible for designing, executing, coordinating, and evaluating the | - MOF will be a key stakeholder in the |

| Entity | Key Responsibilities | Public Transport Relevance |
|---|---|---|
| | planning and monitoring of the annual budget and public finances.<br>- MOF plays a crucial role in controlling the project budget flow, managing public finance, and coordinating development project funding with other line ministries.<br>- Additionally, MOF is involved in negotiating and managing public-private partnerships (PPP), ensuring financial assessments and risk sharing for the sustainability of projects.<br>- Its expertise in financial matters contributes to the effective implementation of transport initiatives. | financing of public transport infrastructure projects and operations and will be a key negotiator if there are any facilities or other initiatives that are to be implemented through PPPs. |
| **Ministry of Interior (MOI)** | - MOI is the central government agency entrusted with designing, executing, coordinating, and evaluating policies related to internal security, migration and border control, civil protection, and police cooperation.<br>- The MOI plays a vital role in ensuring the safe operation of road vehicles, with a particular emphasis on enforcement through the national police.<br>- The Government of Timor-Leste has set up the National Directorate of Road Safety (DNSR) under MOI to spearhead its initiatives in improving road safety.<br>- DNSR collaborates closely with DNTT, National Police of Timor-Leste (PNTL), and other government entities responsible for road safety regulations, as well as engaging with a wider group of stakeholders dedicated to reducing road accidents. | - MOI, in conjunction with DNSR coordinate road traffic safety and enforcement – which includes the safe operation of public transport vehicles on the roads and managing traffic concerns or unsafe conditions to maintain a safe public transport system and transport network. |
| **Ministry of Justice (MOJ)** | - MOJ is the central government agency entrusted with ensuring the implementation and functioning of justice, law, human rights, and land and property-related matters.<br>- Within the MOJ, the General Directorate of Land and Property (Direção Geral das Terras e Propriedades or DGTP) is responsible for executing, coordinating, and evaluating policies concerning land and property.<br>- This includes the administration and management of immovable property for both public and private domains, maintaining an information system on state property, and providing geospatial information for effective land control.<br>- The MOJ and DGTP play a crucial role in upholding legal frameworks and safeguarding land and property rights within the transport sector. | - As the regulatory framework and capacity to regulate the public transport system develops in Timor-Leste, MOJ will have a role in evaluating and upholding legal frameworks.<br>- Additional DGTP within MOJ will coordinate land requirements for public transport facilities. |
| **Ministry of Planning and Territory (MOP)** | - MOP is the central government body responsible for the design, management, and evaluation of urban planning policies aimed at promoting economic acceleration and social development through strategic planning, integrated planning, and rationalization of financial resources.<br>- The ministry also oversees the implementation of Strategic Development Plans, with a particular focus on infrastructure, urban planning, mining, and spatial planning.<br>- MOP holds authority over the national planning agency and the Major Projects Secretariat. Collaboration between DNTT and MOP is essential for the successful implementation of the National Road Plan.<br>- Within MOP, the General Directorate of Territorial Planning (GDTP) is responsible for spatial planning and the implementation of national spatial planning policies, encompassing territorial, urban, and coastal planning, as well as geospatial and cartographic information management | - MOP will coordinate strategic integrated planning that integrates public transport and broader Urban Master Plans – they play a crucial role in ensuring integration between public transport and the urban environment.<br>- MOP also set broader urban policy targets which can be aligned with public transport. |
| **Agência de Desenvolvimento Nacional (ADN) or National** | - Established under Decree Law 2011, ADN operates under the authority of the Prime Minister, while being supervised by the Minister for Planning and Investment.<br>- Its primary responsibilities encompass the review of capital development projects, assessing their cost benefits through | - ADN will be a key stakeholder in the delivery of any major public transport facilities and major |

| Entity | Key Responsibilities | Public Transport Relevance |
|---|---|---|
| **Development Agency** | comprehensive analysis. ADN also plays a pivotal role in monitoring project implementation and execution by employing a quality certification system.<br>- These endeavors contribute to the efficient utilization of financial resources, fostering national development, and promoting economic activities at both the national and local levels. | infrastructure relating to the public transport system, playing a monitoring and certification role as the projects proceed. |
| **Major Projects Secretariat (MPS)** | - Established under Decree Law No. 8/2011, MPS provides technical and administrative support to the Council for the Administration of the Infrastructure Fund (CAFI).<br>- Its key roles include conducting preliminary and formal evaluations of projects for funding from the Infrastructure Fund, considering both technical and financial aspects. MPS also handles project scheduling and returns, performs secretarial duties during CAFI meetings, drafts meeting minutes, and prepares releases on behalf of CAFI.<br>- Additionally, MPS reports its activities to the Council of Ministers monthly, ensuring effective project management and communication. | - MPS will provide support to CAFI for any major public transport facilities or infrastructure projects – including evaluation of projects for their benefits. |
| **Ministry of Public Works (MPW)** | - MPW is the central government agency tasked with the design, implementation, coordination, and evaluation of policies (approved by the Council of Ministers) in various areas, including public works for roads, bridges, flood control, urban planning, housing, water supply distribution/management, sanitation, and electricity.<br>- Within the road sector, MPW serves as the primary agency responsible for studying, planning, and executing construction projects for the protection, conservation, and repair of roads and bridges.<br>- Under MPW, the DRBFC is specifically responsible for the planning and development of the national road network, encompassing national roads, municipal roads, urban roads, and rural roads.<br>- As part of road construction, MPW is also responsible for providing facilities along the roads that can be utilized for public transport services.<br>- Note that DNTT controls the provision of facilities including terminals in Dili and in municipalities outside Dili, on route laybys and waiting areas and appropriate signage.<br>- In addition to terminals, DNTT also holds the responsibility of identifying and designating on-route stops for each route.<br>- Once the need for these stops has been specified, DNTT collaborates with DRBFC to design the on-route stops into new road construction or upgrades or retrofit existing roads that lack adequate public transport facilities with the necessary on-route stops. | - MPW will implement road-based public transport infrastructure initiatives such as bus stops or bus lanes.<br>- They will coordinate closely with DNTT and MOTC who will provide planning input, however MPW will ultimately deliver the initiatives and maintain on-road initiatives.<br>- MPW are also responsible for general road quality, which is an important aspect of public transport reliability. |
| **National Procurement Commission (NPC)** | - Established under Decree Law 14/2011, NPC operates under the Minister of Planning and Investment.<br>- Its primary responsibility is to manage all public procurement exceeding a value of US$1 million.<br>- The NPC has a twofold mandate: (i) to provide procurement services to line ministries and other public entities involved in major infrastructure projects, and (ii) to ensure transparency in the state procurement process.<br>- Following a thorough review and approval, the NPC assumes responsibility for overseeing capital procurement activities. | - NPC will be responsible for the procurement of suppliers (both designers and construction contractors) for the delivery of public transport projects, providing a transparent assessment of proposals. |
| **National Police of Timor-Leste (PNTL)** | - The National Command of Operations, under the General Command of PNTL, is responsible for making decisions and executing actions related to public security. | - PNTL play an integral role in managing road safety. Public transport |

| Entity | Key Responsibilities | Public Transport Relevance |
|---|---|---|
| | - Within the National Command of Operations, there are various units and services, including the Traffic and Road Safety department.<br>- The Traffic and Road Safety Unit has a specific mission to ensure order and public security in various areas such as roads, ports, airports, and transport terminals.<br>- They are responsible for policing access roads, protecting passengers and goods in different modes of transportation, enforcing laws and regulations related to vehicle and pedestrian movement, organizing traffic flow, preventing road accidents, conducting road surveillance, defining road signage and markings, promoting road safety campaigns, and educating citizens about traffic laws. | is a key mode within the road-based transport system in Timor-Leste and therefore PNTL should be actively involved in policing public transport operators and other road users to ensure passenger safety |
| **Municipality** | - Municipality of Dili has unique roles over existing Taibessi Terminal where they operate/maintain the terminal and collect fees (such as entry and parking). Apart from this, the municipality is also responsible for collecting parking levies. | - Municipality may play a vital role in collecting fees for bus terminal operation and management, though coordination with DNTT and other relevant agencies required. |

## 6.2 Proposed Responsibility Matrix

The table below summarizes the roles and responsibilities for key entities relating to key public transport functions in particular for bus terminals/facilities (i.e., planning, constructing, operating / maintaining, managing, collecting fees/levies) – using the Responsible, Accountable, Consulted, and Informed framework as follows:[42]

- **Responsible** – Those who do the work to achieve the task (others can be commissioned or delegated to assist or support);
- **Accountable** – Those who approve/sign off, either technical or budgetary terms, on key outputs, performance, or desired outcomes;
- **Consulted** – Opinions are sought throughout the planning and delivery stage or may be involved in implementation/operation. Likely to be two-way communication; and
- **Informed** – Those who are kept up to date on progress, on a specific or general basis on completion of the task or function. Likely to be one-way communication.

[42] The overarching institutional framework and assessment was conducted in Section 3.5 in the 2024 PTMP.

## Table 6-2: Proposed Responsibility Matrix for Envisioned Bus Terminal Functions

| Key Functions Related to Public Transport | Description | MOTC | DNTT | MOF | MOI | MOJ | MPW | MOP | AND (Under MOP) | MPS (Under MOP) | NPC | PNTL | Muni-cipality | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vision and Strategy** | - Formulation of public transport vision, strategies, and plans | R | A | C | C | C | C | C | C | C | C | - | C | - MOTC has prime responsibilities over planning and guiding the implementation of public transport facilities |
| **Budget & Financing** | - Planning and monitoring of annual budget and finances | A | A | R | - | - | - | - | - | - | C | - | C | - MOF plays a crucial role in controlling the project budget flow and managing public finances<br>- MOF involved in negotiations if initiatives are implemented through public-private partnerships (PPP)<br>- Coordination with NPC required for procurement |
| **Facility Planning** | - Planning of bus terminals and investment plans | R | A | C | C | C | C | C | C | C | C | - | C | - Primary planning roles of bus terminals fall under MOTC / DNTT with various inputs from other ministry lines |
| **Facility Design and Construction** | - Design and construction of bus terminals | R | A | I | I | A | A | I | I | I | I | - | I | - Coordination with MPW required over road-based public transport infrastructure<br>- Coordination with MOJ required over land requirements & property rights for public transport |
| **Facility O&M and Management** | - Operation, maintenance and management of bus terminals | A | R | - | C | - | C | C | - | - | - | - | C | - Coordination between ministries / departments required over safe operation and managing traffic concerns<br>- Coordination with MOP may be required in ensuring integration between bus terminals and surrounding urban environment<br>- Coordination with MPW may be required in ensuring quality access roads |
| **Road-Based Planning** | - Planning of on-street interchange (as part of road infrastructure) | R | A | C | C | C | A | C | C | C | C | - | C | - |
| **Road-Based Infrastructure Provision** | - Design and construction of on-street interchange (as part of road infrastructure) | R | A | I | I | A | R | I | I | I | I | - | I | - Close coordination required between MOTC and MPW over provision of on-street public transport facilities<br>- Coordination with MOJ required over land requirements & property rights for public transport |

| Key Functions Related to Public Transport | Description | MOTC | DNTT | MOF | MOI | MOJ | MPW | MOP | AND (Under MOP) | MPS (Under MOP) | NPC | PNTL | Muni-cipality | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Road-Based O&M and Management** | - Operation, maintenance and management of on-street interchange (as part of road infrastructure) | A | R | - | C | - | C | C | - | - | - | - | C | - Coordination between ministries / departments required over safe operation and managing traffic concerns<br>- Coordination with MPW may be required in ensuring quality bus stops/shelters, bays, and other passenger amenities. |
| **Fare Collection [A]** | - Collection of fees / levies for bus terminal O&M and management | A | R | C | - | - | - | - | - | - | - | - | R | - Regulatory / policy changes may be required to institute new fare collection schemes<br>- Coordination with other entities such as operators and municipality (as warranted) may be required to manage collection of levies from fare revenue, commercial rental, advertisement, and on-street parking. |
| **Traffic Management and Enforcement** | - Enforcement of traffic and road safety | C | R | - | A | - | C | - | - | - | - | C | C | - Coordination required between DNTT, DNSR, PNTL, and other government entities responsible for traffic and road safety |
| **Monitoring and Outcomes** | - Monitoring of bus terminal O&M and management against target performance and outcomes | A | R | - | - | - | - | - | - | - | - | - | C | - No monitoring mechanism in place currently<br>- Monitoring the performance of the public transport system and measuring outcomes against policy goals and contractual agreements |
| **Supplier Procurement** | - Procurement of services and goods | A | C | C | - | - | - | - | - | - | R | - | C | - Coordination with NPC required over procurement |

Abbreviations: R – Responsible; A – Accountable; C – Consulted; and I – Informed.

Notes:

[A] Roles and responsibilities of entities in regard to fare collection may be further fine-tuned subject to government plans.

## 6.3 Operational Framework for Bus Terminal Operation, Management and Maintenance

Establishing a comprehensive operational framework for the operation, management, and maintenance of bus terminals in Timor-Leste is essential for ensuring efficient, safe, and sustainable public transportation services across urban, inter-city, and rural areas. Drawing on international best practices, this section presents a simple framework focusing on governance/management structures and operation standards for cleaning and maintenance, as well as standard forms of agreements for facility use, service operations, leasing, etc.

### 6.3.1 Operational Framework

#### *6.3.1.1 Governance and Management Structure*

Key components of the governance and management structure are as follows:

- **Oversight Authority** – The MOTC will oversee the implementation and adherence to this framework.
- **Terminal Management Entity** – A dedicated Terminal Management Unit (TMU) will need to be established within the MOTC/DNTT or an existing unit/team with similar functions. Alternatively, management responsibilities could be contracted out through private operator. The TMU will be responsible for daily operations, maintenance, and management of the bus terminals.
- **Staffing and Roles –** At minimum, the following roles are proposed to operate, manage, and maintain bus terminal/facilities.
    - **Terminal Manager**: Oversees overall terminal operations, ensures compliance with policies, and liaises with stakeholders.
    - **Operations Supervisor**: Manages scheduling, platform assignments, and supervises ground staff.
    - **Maintenance Supervisor**: Oversees cleaning and maintenance activities, ensuring facilities are in optimal condition.
    - **Customer Service Representatives**: Assist passengers with inquiries, ticketing, and provide general support.
    - **Security Personnel**: Ensure the safety and security of passengers and terminal property.

#### *6.3.1.2 Standard Operating Procedures (SOPs)*

Standard operating procedures (SOPs) in principles consist of bus scheduling and platform allocations, passenger flow management, and emergency response protocols. These are fundamental elements of the SOPs and shall be further developed by entity responsible for bus terminal operation, maintenance, and management. Key elements are:

- **Bus Scheduling and Platform Allocation**:
    - Develop a scheduling system that minimizes congestion and ensures timely departures and arrivals.
    - Allocate platforms based on destination, bus size, and frequency to optimize space utilization.
- **Passenger Flow Management:**
    - Designate clear signage for boarding, alighting, ticketing, and waiting areas.
    - Implement crowd control measures during peak hours to maintain order and safety.
- **Emergency Response Protocols:**
    - Establish procedures for medical emergencies, fires, natural disasters, and security threats.

- Conduct regular drills and training sessions for staff to ensure preparedness.

### 6.3.2 Cleaning and Maintenance Standards

Establishing standards for cleaning and maintenance of bus terminals/facilities is essential to ensure that facilities function according to the standards allowing efficient operations without disruptions and posing negative impressions and impacts to users who access the site.

**Table 6-3: Cleaning and Maintenance Standards**

| Category | Type of Cleaning/ Maintenance | Description |
|---|---|---|
| Cleaning Protocols | Daily Cleaning | • Sweep and mop all floors, especially in high-traffic areas<br>• Clean and sanitize restrooms, ensuring the availability of supplies<br>• Empty trash bins and ensure waste is disposed of properly |
| | Weekly Cleaning | • Deep clean waiting areas, including seating and fixtures<br>• Wash windows and glass surfaces |
| | Monthly Cleaning | • Perform thorough cleaning of exterior areas, including platforms and parking zones<br>• Inspect and clean ventilation systems |
| Maintenance Protocols | Routine Maintenance | • Conduct daily inspections of facilities to identify and address minor repairs<br>• Ensure all lighting, signage, and electronic systems are functioning correctly |
| | Preventive Maintenance | • Schedule regular servicing of mechanical systems<br>• Inspect structural elements quarterly to identify wear and tear |
| | Emergency Maintenance | • Establish a rapid response team to address urgent repairs that could impact safety or operations |
| Quality Assurance | Not Time-Bound | • Implement a checklist system to monitor cleaning and maintenance tasks<br>• Conduct regular audits and solicit passenger feedback to ensure standards are met |

### 6.3.3 Standard Forms of Agreement

Standard forms of agreement specify terms and conditions for bus operators utilizing facilities, relationship among involved entities, terms for leasing spaces within the terminal, etc. Key elements of the standard forms of agreement are provided as follows, with a sample standard agreement template for bus terminal operation and management included in **Appendix H**.

**Table 6-4: Standard Forms of Agreement**

| Category | Purpose | Key Clauses |
|---|---|---|
| Facility Use Agreement | Outline terms and conditions for bus operators utilizing terminal facilities | • Duration: Define the period of use and conditions for renewal.<br>• Fees: Specify usage fees, payment schedules, and penalties for late payments.<br>• Operator Responsibilities: Detail obligations regarding adherence to schedules, maintenance of their designated areas, and compliance with terminal regulations.<br>• TMU Responsibilities: Outline services provided, such as security, utilities, and maintenance of common areas. |
| Service Operation Agreement | Define the relationship between the TMU and service providers, including cleaning, maintenance, and security services | • Scope of Work: Detail specific services to be provided, including frequency and quality standards.<br>• Performance Metrics: Establish key performance indicators (KPIs) to assess service quality.<br>• Compensation: Specify payment terms, including rates, invoicing procedures, and penalties for non-performance.<br>• Termination: Define conditions under which the agreement can be terminated by either party. |
| Leasing Agreement | Set terms for leasing retail or office spaces within the terminal to third parties. | • Lease Term: Define the length of the lease and renewal options.<br>• Rent: Specify rental rates, payment schedules, and escalation clauses.<br>• Tenant Responsibilities: Detail obligations regarding fit-out, maintenance of leased space, and adherence to terminal policies. |

| Category | Purpose | Key Clauses |
|---|---|---|
| | | • Landlord Responsibilities: Outline services provided, such as utilities, security, and maintenance of common areas. |
| Public-Private Partnership (PPP) Agreement | Facilitates private sector participation in terminal operations, maintenance, and revenue generation | • Roles and Responsibilities: Clearly define the roles of the public and private entities in managing, maintaining, and operating the bus terminal.<br>• Investment and Funding: Specify how costs will be shared between the government and the private partner, including capital investments and operational expenses.<br>• Revenue Sharing: Outline the profit-sharing mechanism from commercial activities such as leasing, advertising, and service fees.<br>• Performance Standards: Establish service level agreements (SLAs) and penalties for non-compliance.<br>• Exit Strategy: Define procedures for contract termination, asset transfer, and dispute resolution. |

# 7. Bus Facility Options Analysis

This section presents an options analysis to address observed issues and explore other potential solutions (besides developing new bus facilities) to support informed investment decisions. Such options include:

- **Option#1: Regulation and Enforcement** – This option explores the potential of enhancing safe operations in the terminal through better regulation and enforcement.
- **Option#2: Innovative O&M Contracting** – This option aims to address the lack of quality maintenance at the terminal through innovative O&M contracting.
- **Option#3: Retrofitting Facilities** – This option considers cost effectiveness of retrofitting existing bus terminals/facilities compared to building new facilities. Retrofitting involves modifying existing structures to meet current standards and accommodate new technologies, while new construction entails building from the ground up.

These options are analyzed to address the key operational and facility/amenity issues observed at the bus terminal/facilities (as identified in Section 1.4). Each option is evaluated based on its applicability to the issues with rating of **High**, **Moderate**, and **Low** along with implications for the evaluation.

A summary of options analysis and evaluation are presented in Table 7-1, with a matrix of issues and options with evaluation highlighted in Table 7-2. Of note, Option#1 (Regulation and Enforcement) and Option#2 (Innovative O&M Contracting) can both address operational and infrastructure issues to some extent through proper enforcement and operation/maintenance compliance as part of O&M contracting. However, these two options cannot address infrastructure issues thus should be treated as complementary to support infrastructure investments. Option#3 (Retrofitting Facilities) can address operational and infrastructure issues partially but not as a whole. Existing sites (such as Becora) lack essential facilities (such as designated loading/unloading bays, layover spaces, circulation areas) and passenger amenities in compliance with standards. It is considered more cost effective to build new facilities ensuring operational efficiency, safety, and better passenger experience at the core of bus facility schemes/design.

**Table 7-1: Summary of Options Analysis and Evaluation**

| Option | Overall Applicability | Implications |
|---|---|---|
| Option#1: Regulation and Enforcement | High | Regulations and enforcement are effective for addressing operational issues like safety, queuing, and access control but limited in addressing physical infrastructure gaps directly. Furthermore, a regulatory framework and enforcement mechanisms to enforce safe and efficient operations are currently not in place. |
| Option#2: Innovative O&M Contracting | High | Contracting combines operational improvements with maintenance and incentivizes compliance, though fully addressing physical issues requires building / upgrading facilities. |
| Option#3: Retrofitting Facilities | Moderate | Retrofitting directly addresses infrastructure gaps, particularly for facility/amenity issues. However, existing sites (such as Becora) lack essential facilities (such as designated loading, unloading, and layover spaces) and passenger amenities in compliance with standards (no standards exist currently). It is considered more cost effective to build new facilities as a whole ensuring operational efficiency, safety, and better passenger experience. |

Note: Evaluation of applicability is based on a 1-3 scoring scale (1 = Low, 2 = Moderate, 3 = High). No weighting is assumed. A total composite score for this overall applicability is 36 where Low is given to scores lower than 12, Moderate between 13 and 24, and High between 25 and 36. The total composite score of each option is as follows: Option#1 = 28 (High), Option#2 = 29 (High), and Option#3 = 20 (Moderate).

## Table 7-2: Matrix of Issues and Relevance of Options Analysis

| Issue Type | Key Issues | Current Situation | Option#1: Regulation and Enforcement | Option#2: Innovative O&M Contracting | Option#3: Retrofitting Facilities |
|---|---|---|---|---|---|
| Operational | Safety of Passengers | Current operation around the terminal (i.e., loading/unloading at the perimeter parking space, clockwise operation with doors on the left) require passengers to walk through circulation areas for boarding/alighting a vehicle and cross active roadways creating potential conflicts with vehicles. | **High** – Laws / regulations can mandate designated pedestrian and vehicle circulation areas and enforce compliance of operators/ drivers to enhance safety. | **Moderate** – O&M contracts can incorporate safety improvements and monitoring mechanisms, but implementation depends on operators and agencies. | **Low** – Retrofitting existing facilities (only Becora with some facilities) may improve some physical areas, but it doesn't address enforcement or operational behavior directly as vehicle and passenger functions are not physically separated currently. |
| | Unsafe Operations within Terminal | Vehicles spaces (loading, unloading and layover) are not orderly designed with some vehicles making back-up movements to enter/leave the space | **High** – Enforcement can ensure orderly vehicle movement and eliminate unsafe practices such as backing into spaces. | **High** – O&M contracts can incentivize proper vehicle operation (or penalize) through performance-based criteria. | **Moderate** – Retrofitting can redesign layouts/design to reduce unsafe operations, but this depends on enforcement for maximum impact. |
| | Layover / Queuing for Passengers on Circulation Areas Within Market | No designated space for each mode is provided at existing terminals which may be confusing to passengers and also results in potential conflicts between modes. | **Moderate** – Regulations can assign designated spaces for each mode, but enforcement may be challenging as *keliling* is a common practice to collect more passengers (as revenue directly linked to number of passengers). | **High** – Contracts can include requirements for clear queuing systems with designated spaces for each mode (along with penalties for occupying circulation areas for pickup/drop-off). | **Moderate** – Retrofitting can help create designated queuing areas (and loading / unloading areas), but it requires significant upfront investment (and no less cost efficient compared to building new facilities). |
| | Bus Facilities Used by Mixed Modes | Non-designated vehicles (such as private vehicles, motorbikes) are allowed to enter the site which add more congestion to the site and results in delays to microlet/regional bus. | **High** – Enforcement can restrict access for non-designated vehicles other than permitted public transport vehicles to reduce congestion and delays. | **Moderate** – Contracts can include access control provisions (such as signage, gate control), but enforcement may still be required. | **Low** – Physical retrofits can help limit access, but operational enforcement is still necessary to prevent violations. |
| | Lack of Maintenance/ Cleaning Inside Terminal | The passenger waiting areas, floor, and the facility are not regularly cleaned with discarded trash and litter observed around the facility (thus leading to unattractive waiting environment) and have limited maintenance based on their deteriorated conditions. | **Moderate** – Regulations can mandate minimum maintenance standards, but compliance may vary. Monitoring mechanism need to be instituted to ensure such compliance. | **High** – O&M contracts can include regular cleaning and maintenance requirements with penalties for non-compliance. | **Low** – Retrofitting doesn't directly address lack of maintenance and cleaning issues. |
| | Vehicles Blocking Bus Stop Hindering Efficient Operation | Trucks and other non-public transport vehicles were observed parking in the designated bus stop/ loading areas, blocking public transport vehicles from directly accessing the stop. This also forces passengers to access the vehicles from outside the bus stop area (and possibly enter the active roadway). | **High** – Enforcement can penalize non-public transport vehicles parking at bus stops, ensuring safe and efficient operation for public transport and creating an accessible environment for passengers. | **Moderate** – Contracts can include monitoring and reporting mechanisms to address blockages, but impact is limited as blockage of such designated space by private vehicles is beyond control of operators/drivers. Strict enforcement is required. | **Low** – Retrofitting bus facilities/stops won't prevent vehicles from blocking them unless coupled with enforcement. |

| Issue Type | Key Issues | Current Situation | Option#1: Regulation and Enforcement | Option#2: Innovative O&M Contracting | Option#3: Retrofitting Facilities |
|---|---|---|---|---|---|
| Facility / Amenity | Dirt Surfacing and Lack of Pedestrian Crossing Markings | The facility has unpaved sections (e.g., access roads near the entry gate, potholes within the site) which affect passenger experience and operation efficiency. In addition, the surfacing can be muddy during rain, soiling clothes of pedestrians / users passing by | **Moderate** – Regulations can mandate minimum standards for pavement (such as concrete) and provision of crossings, but this requires direct investment in infrastructure. | **Moderate** – O&M contracts can include maintenance of pedestrian crossings, but this doesn't address initial infrastructure gaps. | **Moderate** – Retrofitting can directly address unpaved surfaces and add well-designed pedestrian crossings (with access for all elements), improving safety and experience of passengers. However, this needs to be integrated with overall bus terminal / facility improvements. |
| | Limited Provision of Passenger Amenities | There is limited provision of passenger amenities creating unattractive waiting environment. Some sites such as Becora have buildings with covered facilities, but these are poorly maintained and not safe/comfortable for passengers. | **Moderate** – Regulations can mandate minimum standards for amenities, but this requires direct investment in infrastructure. | **High** – Contracts can incentivize provision and maintenance of passenger amenities, ensuring a more attractive environment for passengers. | **Moderate** – Retrofitting can improve amenities, but cost constraints and maintenance issues need to be considered. However, this needs to be integrated with overall bus terminal / facility improvements. |
| | No Road Markings for Vehicle Navigation & Pedestrian Crossing | There is limited provision of road markings to navigate vehicles in an orderly manner and safe crossing environments for pedestrians. This endangers both drivers as well as passengers accessing the site. | **Moderate** – Regulations can mandate minimum provisions / standards for road markings for vehicles and crossings for pedestrians, but this requires direct investment in infrastructure. | **Moderate** – Contracts can include performance-based incentives to maintain visible road markings and strict compliance of drivers to follow marked areas for vehicles. | **Moderate** – Retrofitting can directly create proper markings and crossings, leading to immediate safety improvements. However, this needs to be integrated with overall bus terminal / facility improvements. |
| | Deteriorating Roads on Access Road | Access roads leading to/from the terminals are deteriorating with poor maintenance (as many potholders observed) affecting vehicle operation and posing safety issues. | **Moderate** – Regulations cannot address physical deterioration, but this requires direct investment in infrastructure. | **Moderate** – O&M contracts can include requirements for road repairs and maintenance. Demarcation of responsibilities between bus terminal operators and road agencies must be clarified. | **Moderate** – Retrofitting directly addresses road deterioration, improving safety and operational efficiency. However, this needs to be integrated with overall bus terminal / facility improvements. |
| | Minimal Provision of Lighting & Covered Facilities | While there is limited provision of lighting within the waiting area, lighting is dim in the parking lot where the majority of vehicles load/unload. This can cause visibility and safety issues when passengers cross active circulation areas. | **Moderate** – Regulations can require a minimum standard for lighting and covered facilities, but this requires direct investment in infrastructure. | **High** – Contracts can include provisions for lighting upgrades and maintenance of covered areas, improving the user experience. | **Moderate** – Retrofitting can immediately address these deficiencies by installing proper lighting and covered facilities (with immediate impact on user safety and security). However, this needs to be integrated with overall bus terminal / facility improvements. |
| | Lack of Access-for-All Facilities (i.e., Ramps for Disabled People) | Access-for-all facilities such as tactile paving, ramps, wheelchair facilities are also lacking in particular considerations for disadvantaged social groups such as elderly and disabled people. | **Moderate** – Regulations can mandate inclusive design, but this requires direct investment in infrastructure. | **Moderate** – Contracts can include incentives to maintain access-for-all facilities, but retrofitting is still required initially. | **Moderate** – Retrofitting can directly address physical barriers to accessibility, improving inclusiveness for disabled users. However, this needs to be integrated with overall bus terminal / facility improvements. |

# 8. Risk Assessment

This section provides an overview of potential risks to implement the project – including technical risk (based on site assessment and facility design/scheme study), financial uncertainties, safeguard risks (including environment and social), legal and institutional risks, and other unforeseen events. Such risks are assessed by site or as a whole project depending on the scale/applicability of risks.

## 8.1 Risk Assessment Framework

A risk assessment framework to guide evaluation of potential risks to implement the project is summarized as below:

- **Technical Risks** – this risk entails site-level operational/facility design considerations (i.e., terminal facilities, passenger amenities, loading/unloading space, etc.) in compliance with standards.
- **Legal / Regulatory Risks** – this legal/regulatory risk is applicable to the project as a whole as introduction of new laws, amendments, and orders can impact the scope/timeline of the project (including unclear ownership of lands which could increase the project cost).
- **Institutional / Governance Risks** – this institutional risk is applicable to the project as a whole as changes in the government administration could impact the scope/timeline of the project (including any changes/updates to responsibilities of government agencies involved in public transport).
- **Financial Uncertainties** – this risk is partially discussed in Section 5 (Financial Viability Assessment) that looks at financial viability of the project based on capex, opex, and repex as well as the government budget to support the project.
- **Social Risks** – this social risk includes due consideration of affected people and socially disadvantaged groups at the site level ensuring their voices are incorporated in the project design.
- **Other Unforeseen Events** – other unforeseen events may include natural disasters (in particular Dili is located on low-lying areas facing the ocean with multiple river channels in the city), pandemic, etc.

## 8.2 Risk Assessment, Mitigation Strategies, and Contingency Plan

The results of risk assessment are presented in the table below. In short, by proactively addressing these risks through careful planning and stakeholder engagement, the feasibility project can enhance its resilience and improve the likelihood of successful completion. Regularly reviewing and updating risk management strategies will also be crucial as the project progresses.

**Table 8-1: Risk Assessment, Mitigation Strategies, and Contingency Plan**

| Risk Category | Implications | Mitigation Strategies | Contingency Plan |
|---|---|---|---|
| Technical Risks | • Inadequate design may lead to operational inefficiencies, user dissatisfaction, and non-compliance with standards.<br>• Potential delays and increased costs due to redesigns or modifications. | • Conduct comprehensive site assessments and engage with experienced architects and engineers to ensure compliance with all relevant standards (both local and international if no such standards available in local context). | • Prepare budget for potential cost changes (contingency) if initial plans do not meet operational or regulatory requirements.<br>• Prepare alternative design options if needed to accommodate any future changes during detailed engineering design stage. |
| Legal / Regulatory Risks | • New laws or amendments may extend project timelines and increase project costs. | • Establish a compliance monitoring system to ensure adherence to legal requirements throughout the project lifecycle. | • Establish clear roles / responsibilities among relevant government agencies over terminal construction, O&M, management, etc. |

| Risk Category | Implications | Mitigation Strategies | Contingency Plan |
|---|---|---|---|
| | • Changes in design, site boundary, or location may involve land ownership issues.<br>• Possible legal challenges could arise, delaying project approval and implementation. | • Develop a clear land acquisition plan (as warranted), including negotiations with landowners and securing necessary permits in advance.<br>• While terminal footprints are assumed to be located on government-owned land, limited land acquisition may be required for access road improvements at selected sites (notably Manleuana), which will be addressed through a resettlement planning framework | • Allocate a buffer in the project timeline and budget to address potential legal challenges and land acquisition delays. |
| Institutional / Governance Risks | • Changes in government administration may result in shifting priorities or responsibilities, impacting project continuity and support.<br>• Potential for reduced funding or changes in oversight that may affect project scope. | • Identify key stakeholders and decision-makers within government agencies to facilitate communication and collaboration.<br>• Engage in advocacy efforts to maintain project visibility and support within changing political contexts. | • Develop a communication plan to manage stakeholder expectations and maintain transparency throughout the project lifecycle. |
| Financial Uncertainties | • Fluctuations in capital and operational expenditures can threaten financial viability and lead to project delays and increased costs.<br>• Dependence on government budgets may introduce uncertainty in funding availability. | • Utilize financial modeling and forecasting to identify potential funding gaps and plan accordingly.<br>• Explore multiple funding avenues, such as public-private partnerships, grants, or alternative financing to minimize reliance on a single source. | • Establish a financial reserve or seek alternative funding sources to mitigate potential shortfalls.<br>• Explore private sector participation in bus terminal O&M, management, etc. |
| Social Risks | • Ignoring the needs of affected populations can lead to community opposition, project delays, and reputational damage.<br>• Failure to engage socially disadvantaged groups may exacerbate inequities. | • Implement a robust community engagement strategy to involve local residents and affected groups in the planning process.<br>• Conduct social impact assessments to identify and address the needs and concerns of vulnerable populations.<br>• Establish channels for ongoing feedback from the community to ensure their voices are heard throughout the project. | • Create a social impact mitigation plan that includes resources for addressing community concerns and grievances. |
| Other Unforeseen Events | • Natural disasters, pandemics, or other unexpected events can severely disrupt project timelines and increase costs. | • Conduct a detailed risk assessment to identify potential natural disasters specific to the project area and plan accordingly.<br>• Incorporate resilience measures into the design. | • Allocate a buffer in the project timeline and budget to address climate change impacts.<br>• Prior to bus terminal operations, develop an emergency response plan that includes safety protocols, communication strategies, recovery plan, training, etc. |

# 9. Phasing Plan

This section presents a phasing of the selected ten bus facilities to ensure successful implementation of the project considering various elements such as government plan/priorities, strategic importance, site conditions, budget and financial situation, government capacity, etc. As a starting point, the ten facilities are delineated into two phases, Phase 1 (2027-2028) and Phase 2 (2028-2029), with 2029 assumed as full opening of all bus terminals/ on-street interchanges across the country.[43]

**Table 9-1: Phasing Plan of Ten Bus Facility Sites**

| # | Facility Site | Proposed Phase | Rationale / Note |
|---|---|---|---|
| 1 | Dili Convention Center | Phase 1 (2027-2028) | • This site sits at the heart of Dili City and is currently used by various microlet routes. Improving this site first will have a strategic importance to the public as it can bring immediate and tangible benefits to users. The initial investment cost is lower given on-street interchange. |
| 2 | Becora Terminal | Phase 1 (2027-2028) | • Becora is an existing site and serves as the east gateway to municipalities in the east such as Becora. Improving this site is a stepping-stone to developing other facilities in the east. |
| 3 | Tibar Terminal | Phase 2 (2028-2029) | • Tibar Terminal will serve as the west gateway connecting municipalities in the west. Surrounding areas have not been developed as of today and future developments may impact its location. The site is assumed as public land but is not secured at this stage. Thus, this site can be developed at a later stage (Phase 2) to ensure integration with surrounding environments to maximize synergy effects. |
| 4 | Manleuana Market | Phase 1 (2027-2028) | • Manleuana will serve as the south gateway and its land is already secured by the government. Given strategic importance of this site (adjacent to Manleuana Market) and potential to create revenues from surrounding environments, this site can be designated as Phase 1. |
| 5 | Hera Terminal | Phase 2 (2028-2029) | • Hera Terminal is the second east gateway terminal (outside of Dili City area) and will accommodate reginal buses in the future. This can be developed after Becora Terminal. |
| 6 | Aldeia Samalakuliba (Baucau) | Phase 1 (2027-2028) | • This site in Baucau is a major bus terminal connecting populace in the eastern municipalities to Dili. Among regional sites, this location should be prioritized to ensure improving regional connectivity between Dili and Baucau / other municipalities in the east. |
| 7 | Maliana | Phase 2 (2028-2029) | • An on-street interchange is proposed at this regional site. Given the strategic importance of developing Dili as a transport hub for regional connectivity, this site can be developed at a later stage (Phase 2), though its priority depends on the government decision given lower cost investment. |
| 8 | Suai Market | Phase 2 (2028-2029) | |
| 9 | Lospalos Bemoris | Phase 2 (2028-2029) | |
| 10 | Viqueque City Center | Phase 2 (2028-2029) | |

[43] Note: Phasing is based on the assumed construction timeline which is subject to change based on government priorities and plans.

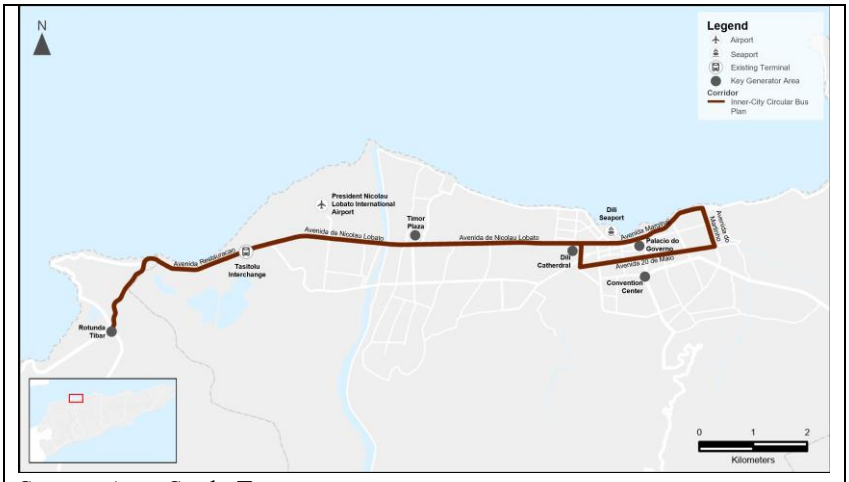
# 10. Supporting Public Transport Reform Programs

As noted in Section 1.4 in the rationale/objectives of this study, six supporting public transport reform programs are prepared (in addition to the main bus terminal/facilities development and improvement) to develop and expand a quality public transport system for the Timorese. These supporting public transport reform programs include: (i) Dili Pilot Bus Project; (ii) Public Transport Fare and Fare Structure Modelling; (iii) Traffic Management Study to Improve Public Transport Operations; (iv) Stringent Emission Standards for Public Transport Vehicles; (v) Hybrid Courier Service Model; and (vi) Microlet Operation Framework. This section presents a summary of key findings of each study (for details please see Technical Working Paper).

## 10.1 Supporting Program#1: Dili Pilot Bus Project

### 10.1.1 Background

During the ADB Mission in April/October 2024, the Minister of MOTC expressed the interest in introducing a pilot bus program along the major east-west corridor (Ave. de Nicolau Lobato) connecting Rotunda Tibar with the city center (as shown in Figure 10-1). This pilot program is expected to result in reduced congestion, safer travel, scheduled services, improved facilities, and more importantly this will be a showcase to demonstrate a modern and innovative transport system to residents of Dili. A preliminary pilot bus assessment was conducted building upon the previous work conducted during the preparation of the 2024 PTMP.




Source: Arup Study Team
Notes: The route alignment is indicative based on the Minister's concept.

**Figure 10-1: Proposed Pilot Bus Corridor**

### 10.1.2 Key Findings

Key findings of this program are as follows:

- **Pilot Bus Corridor** – The proposed corridor for Dili Pilot Bus is 25.6 km (both ways) connecting the future Tibar Terminal in the west to the city center in the east along the major east-west corridor including several major roads (such as Av. Pres. Nicolau Lobato). The corridor comprises of 2-3 lanes per direction (with some one-way roads in the city center) and a majority of roads are classified as having exclusively at-grade segments (with some 4% on elevated viaduct or bridge). The corridor serves various significant commercial centers and key generators including Airport, Timor Plaza, universities, government offices, etc.

- **Route** – The Dili Pilot Bus is proposed to mirror the existing Microlet Route#10 (the busiest and most popular route operating as clockwise loop) with extension to the future Tibar Terminal in the west. This route is proposed to serve higher demand sections to receive greater service (thus maximizing revenue potential and financial viability). A full-length of 25.6 km (roundtrip) is proposed as a pilot trial which can serve as a prelude to expanding route/service coverage if deemed successful.

- **Service Headways** – As noted in Section 3.4, daily demand for the proposed pilot bus service is estimated at 3,750 for roundtrip. With a 11% of peak-hour factor, the maximum peak hour load (for one-way) is estimated at 204 in 2035. Based on the maximum peak hour load on the corridor, the approximate number of trips and headway for a 9m bus (with a full capacity of 40 passengers)

assuming 85% occupancy are derived – overall, a 10-minute headway is adopted for the pilot bus service.

- **Vehicles** – 9m diesel bus is proposed for the Dili Pilot Bus service (which is similar size as existing regional buses that are suitable for current road conditions in Dili). In 2035, the peak number of vehicles required (including 10% spare) is 10 buses.
- **Key Operating Statistics** – Annual ridership in 2035 is projected at around 1.4 million. Annual vehicle-hours are estimated to be about 0.58 million veh-kms. Annualized veh-hours are estimated to be about 33,568 hours.

Based on the Operating Plan above, the Infrastructure Plan is developed as below:

- **Bus Lanes** – Based on the road profile/inventory data and field investigations (i.e., selected road segments are two-way with three or more lanes), a cumulative 7.2 km of bus lane segments are identified as feasible for the Dili Pilot Bus corridor.
- **Bus Stops** – Based on the bus stop concepts and guidelines, a total of 59 bus stops are proposed along the pilot bus corridor. Of these, 39 proposed bus stops are located at mid-block of the road accounting for some 66% of the total, followed by 10 far-side stops and 10 near-side stops (constituting some 17% respectively). In terms of stop configuration, 23 off-line bus stops are proposed with bus bays and 36 locations are proposed as online stops. No bulbout bus stop are proposed. In terms of bus shelter type, 46 bus stops (or 78% of the total) are proposed with enhanced bus shelter (6.0m long) to serve key generators, while 13 stops (or 22%) will have a regular shelter (3.0m long) for coverage stops. In terms of sidewalk width, 56 bus stops are proposed on typical sidewalk width (1.5m to 3.0m), one stop at narrow area (with sidewalk space less than 1.5m), and two stops on wide sidewalk (3.0m or wider).
- **Terminal** – Terminals are strategic significant off-street facilities, with larger footprint and robust facilities and buildings (often requiring land and impacting cost and schedule compared to on-street interchanges). Based on the results of the prior feasibility study assessment, Tibar Terminal is proposed as a terminating location for the Dili Pilot Bus service. Proposed facilities at this terminal include 14 bays for loading/unloading (of which one bay assigned for Dili Pilot Bus service) as well as 14 layover bays (all bays are assumed to be able to accommodate 12m conventional bus to future proof the terminal facility/sizing in the long-term). Enhanced passenger facilities will be provided for better service/travel experience (such as covered waiting areas, kiosk/retail, toilet, office) as well as access-for-all facilities (such as lighting, tactile paving, curb ramps). Furthermore, climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage) are proposed to strengthen the resilience of the facility against climate change impacts.
- **Pedestrian Crossings** – Enhancement of walk journeys to bus stops is an essential element to create an attractive, convenient, and safe Dili Pilot Bus service that meets the needs of users of all abilities. Pedestrian improvements (including sidewalks, streetlights, trees, signage, etc.) are proposed around all bus stops. In terms of sidewalks, additional 10m sidewalks improvements on both sides of the bus stops are assumed (thus total 20m sidewalk improvements at each bus stop). In addition, crossing improvements (including crosswalk, curb ramps, tactile paving, etc.) are proposed at 39 locations along the corridor. Lastly, based on an inventory of existing signalized locations, 15 locations are identified for pedestrian signal improvements along the corridor.
- **Depot** – A depot is a bus facility where several key activities for bus operations and maintenance take place including overnight storage, washing/cleaning, maintenance, etc. The depot size of Dili Pilot Bus is estimated at 2,200$m^2$ and can accommodate ~12 buses (including 10% spare and 20% future margin). The depot area ratio per bus (based on the total fleet size per total depot area) is 183$m^2$ – which is in the ballpark of the recommended bus-to-depot size for small-sized depot (i.e., 165-200$m^2$ for a depot with less than 80 buses) based on international bus depot design guidelines.[44]
- **Other Innovative Measures** – Innovative measures such as intelligent transport system (ITS) are key to helping the bus system operate efficiently and effectively, while creating an attractive and convenient passenger experience. A number of ITS components are proposed for Dili Pilot Bus

including on-board bus technology, passenger information system (such as panels) at select bus stops, back-end system, etc. Other ITS components such as automatic fare collection system (AFCS), transit signal priority (TSP), and other management related ITS items (such as management information system, contract management system, inventory management, etc.) are not considered in this pilot bus study.[45]

## 10.2 Supporting Program#2: Public Transport Fare and Fare Structure Modelling

### 10.2.1 Background

In parallel with the refinement of the microlet service network and introduction of a pilot bus scheme, there is also a need to set-up more rigorous fare structures for public transport services by undertaking high-level financing modeling and scenario analyses of the proposed pilot bus system and underlying microlet and other public transport services in Dili. Currently there is no formal ticketing/fare system in Timor-Leste. Setting up transparent and effective fare schemes can attract potential users from various social and geographics groups, while contributing to the revenue stream that transport operators can rely on. Such fare schemes need to be considered for various factors including affordability, conditions of vehicles, requirements for subsidy (if any), payment media, payment validation, etc. Thus, the focus of this scope of work includes assessment of the fare scheme and structure for public transport including consideration of fare setting, revenue schemes, institutional arrangements, financial implications, etc. As part of this study, an institutional survey was sent to the MOTC and National Directorate of Land Transport of Timor-Leste (DNTT) to provide official clarifications regarding regulations/policies, fare setting and structure, subsidy, and fare collection.

### 10.2.2 Key Findings

The findings highlight that the existing system – rooted in outdated regulations, manual cash collection, and informal operator arrangements – poses significant challenges to operational efficiency, financial sustainability, and equitable access. Without reform, the system will continue to struggle with fare leakage, service unreliability, and social inclusion, especially among disadvantaged groups. The current fare regime does not provide the legal, institutional, or operational structure necessary for a reliable and accountable public transport service. Addressing these issues requires integrated interventions across policy, technology, business models, and institutional governance.

Drawing from successful models in Fiji and Jakarta, this paper recommended a clear roadmap for modernization, anchored by a hybrid fare collection system, business model restructuring, revised fare policy, and legal-institutional reforms. These reforms are not merely technical in nature – they are essential to achieving inclusive growth of the country, improving institutional credibility, and advancing climate resilient and digital transformation objectives. The following conclusions and recommendations are drawn from the assessment:

- **Adopt a Hybrid Fare Collection Model** – Implementing digital fare collection on Dili's busiest microlet route offers a pragmatic entry point for wider fare system reform in Timor-Leste. Leveraging existing electronic mobile payment platforms such as T-Pay and Mosan avoids costly development and benefits from their existing networks and regulatory approval. At the same time, retaining cash as a valid fare option is critical to inclusivity, especially for low-income and rural riders. A phased roll-out by mode and geographical areas will allow the system to mature before it is extended to the wider populace/regions, ultimately improving transparency, financial sustainability and service quality across Timor-Leste's public transport network.
- **Establish a Central Fare System Operator** – Appoint a single entity through a transparent tender process to manage the fare system's operations, maintenance, and service quality. The operator should be held accountable through a formal service contract and government oversight.

[45] Detailed assessment is required to understand operational requirements, specifications, and local needs/opportunities for such ITS systems.

- **Restructure the Business Model** – Transition from the current revenue-linked model to a service contract framework. Depending on the availability of public subsidies, either a net-cost or gross-cost contract should be adopted to align operator incentives with service quality.
- **Revisit the Fare Scale** – The current fare of US$0.25 per ride, in place since 2015, is outdated and insufficient to cover rising operating costs. A phased fare adjustment, guided by a formal mechanism, is necessary to ensure financial viability while maintaining affordability.
- **Retain Flat Fare Structure in the Short Term** – While distance-based and zonal fares offer better alignment with service usage, the flat fare model should be maintained initially due to its simplicity and ease of implementation. Interchange discounts can be introduced to improve affordability for multi-leg journeys.
- **Implement Fare Adjustment Mechanism** – Establish a structured, transparent process for periodic fare reviews based on fuel prices, inflation, operating costs, and service quality. The Fare Adjustment Mechanism (FAM) should include affordability safeguards for vulnerable groups.
- **Expand Fare Concessions** – Establish a formal subsidy and concession scheme beyond students to include the elderly, people with disabilities, and low-income users. These groups should be identified through verified eligibility and reimbursed through public budget allocations.
- **Strengthen Legal and Regulatory Framework** – Enact new ministerial regulations or laws to authorize digital payment systems, define enforcement mechanisms, and regulate contractual fare operations. Legal clarity is essential for enforcement and long-term sustainability.
- **Clarify Institutional Roles** – Until the proposed LTA is operational, DNTT should lead fare system implementation, supported by MOTC and other relevant agencies. Clear coordination mechanisms are essential for effective governance.

## 10.3 Supporting Program#3: Traffic Management Study to Improve Public Transport Operations

### 10.3.1 Background

Currently, microlets and other public transport services load and unload passengers at non-designated areas. This practice has detrimental impacts on traffic flow and congestion (with vehicles queuing up to load/unload passengers as well as racing to capture passengers), as well as pedestrian and passenger safety. In addition, vehicles are often observed illegally parking in public transport loading/unloading zones, as well as on sidewalks, blocking the path for pedestrians. Enforcement of traffic regulations rules is limited. Lastly, traffic flow on main corridors in peak hours is often heavily congested due to the limited provision of traffic signals (i.e., quantity and spatial coverage of traffic signals across the urban road network in Dili) as well as the underlying one-way road network in downtown Dili (with the 2024 PTMP identifying key bottleneck areas including those related to sudden lane drops/changes, directional changes, and one-way streets – all creating significant congestion and circuitous/inefficient public transport routing). Combined, these elements impact reliability and convenience of the current public transport system and may impact any refined/improved systems planned for the future.

Against this backdrop, this study aims to conduct a comprehensive assessment of traffic and parking operations along the selected pilot bus corridor in Dili (refer to the Working Paper#1: Pilot Bus Study), then formulate improvement measures to reduce parking conflicts as well as mitigate traffic delays incurred by public transport (this may include removing or relocating curbside parking, enhancing management of curbside parking and loading zones, as well as modifying street circulation and direction of flow) – paving the way for public transport to flourish by reducing traffic-related impacts and conflicts that slow down the current system and make public transport slow and unreliable.

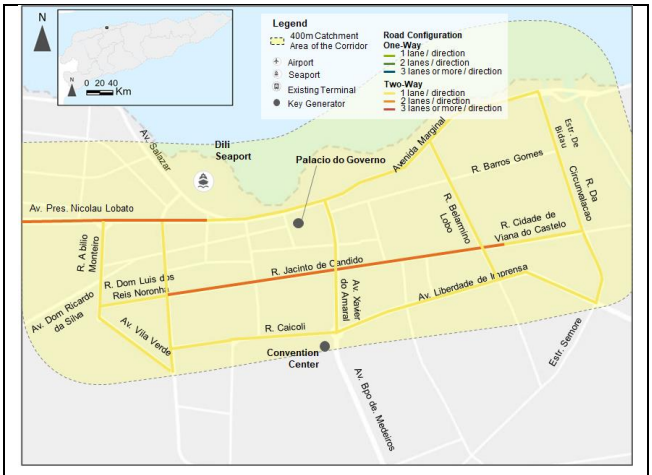
### 10.3.2 Key Findings

Based on the comprehensive review/assessment of road/traffic infrastructure (supply-side), traffic assessment (demand-side), and parking assessment, we've identified key issues and bottlenecks that impact safe and

efficient traffic operation and management (in particular from the perspective of public transport operation) – which are used as key inputs to come up with improvement strategies/plans as summarized below:

- **Goals and Strategies** – The overarching goal/objective of traffic/parking management is to create a safe and efficient road/street environment that enhances the travel experience for residents/visitors and ensures convenient access for all. This goal is supported by three strategies as follows:
    - **Strategy#1: Road Configuration Optimization** – Establish a coherent mix of one/two-way roads in the city center to allow more optimal and efficient routing for public transport and private vehicles and reduce the need of making detours to reach destinations at shortest time possible.
    - **Strategy#2: Junction & Crossing Improvement** – Improve junctions to manage efficient vehicle flows and create safe walk/crossing environment to enhance pedestrian safety supported by latest technologies (including modernization of ITS to optimize efficiency and effectiveness of signals).
    - **Strategy#3: Parking Management and Enforcement** – Enhance both on-street and off-street parking facilities to reduce the pressure on roadside parking and minimize illegal parking ensuring clear pathways for public transport, vehicles and pedestrians. At the same time, imposing strict enforcement is essential to restore a favorable environment for public transport as well as sidewalks for their intended purpose.

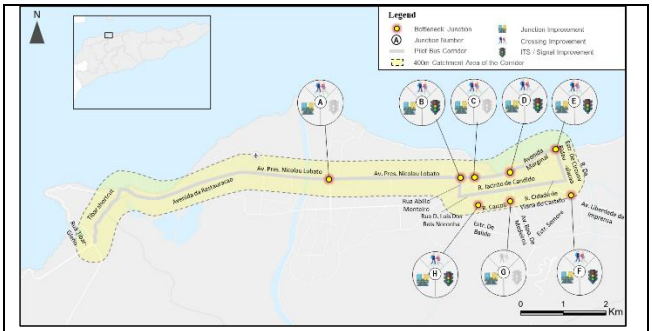
- **Strategy#1: Road Configuration Optimization –** Some 10km of one-way roads along the major corridors are proposed to be modified to two-way operation (i.e., one-way, two-lane roads into two-way, one-lane road; one-way, three lane road into two-way, two-lane roads) considering road configuration and ROW. The total length of all lanes increased by some 2km from about 22.4km to about 24.6km by adding additional lanes to increase roadway capacity for all vehicles including public transport.



Source: Arup Study Team

**Figure 10-2: Proposed Road Configuration**

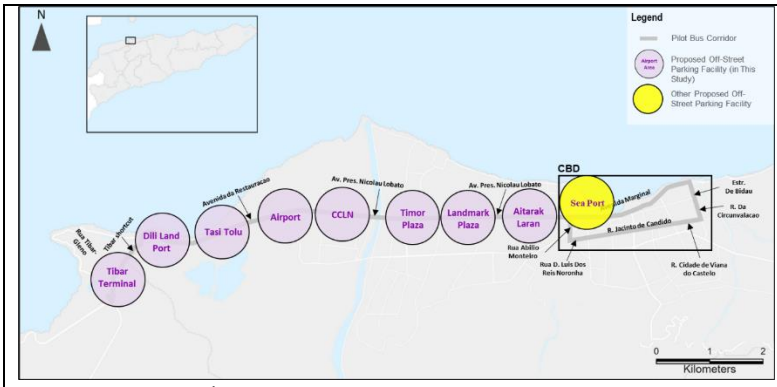
- **Strategy#2: Junction & Crossing Improvement –** Some eight junctions are identified for various improvements including junction improvements at eight locations, crossing improvements at seven locations, as well as signalization improvements at four locations. Junction improvements include road surface pavement and road lane markings to improve channelization of vehicular lanes, etc. to enhance efficient and safe traffic movement at junction and improve visibility of lanes for safe driving. Crossing improvements include zebra crossings, curbs/ramps, as well as tactile pavement to enhance the safety and convenience of pedestrians (including disadvantaged groups) when crossing the junctions. Signalization improvements include provision of signals at existing unsignalized locations to improve efficiency and effectiveness of all vehicles including public transport.



Source: Arup Study Team

**Figure 10-3: Proposed Junction Improvements**

- **Strategy#3: Parking Management and Enforcement** – Two types of parking facility improvements are proposed based on the review of existing parking conditions: (i) on-street parking facility, which aim is to enhance on-street parking management leveraging existing on-street parking spots (mainly within CBD) by introducing modern parking management technologies; and (ii) off-street parking facility, which aim is to reduce illegal on-street parking by developing new off-street parking facilities along major roads served by public transport (outside CBD). Key improvements include:



Source: Arup Study Team

**Figure 10-4: Proposed Off-Street Parking**

  - **On-Street Parking Facility** – The key issue to parking within the CBD in Dili is absence of parking space management as this is currently handed by on-site staff (hired by municipality) who hands a ticket to users and collects fees manually at irregular times (without monitoring system and enforcement mechanisms). To overcome parking management issues in Dili, it is suggested to install parking meters to better manage and control existing on-street parking spaces (assumed to install one parking meter for every two spaces). Therefore, a total of 380 parking meters are proposed to cover existing parking spaces of 759.
  - **Off-Street Parking Facility** – Development of off-street parking facilities is necessary to accommodate some 400 parking spaces along the major east-west corridor in Dili (i.e., Ave. Pres. Nicolau Lobato). A total of eight parking lots are proposed, with a capacity of 400 spaces (assuming 50 per each lot). Each space is assumed around 18.8m$^2$ – assuming parking space of 12.5m$^2$ (based on 5m x 2.5m) and 50% additional space allocated for circulation and maneuvering area (or 6.25m$^2$). This translates into a total area of 1,000m$^2$ per lot (each parking lot can be flexibly used to accommodate motorbikes and private vehicles, while decreasing the number of full-size automobile spaces).
  - **Parking Enforcement** – A multi-faced approach that includes development of a parking strategy with parking restrictions, payment systems, technologies, and enforcement/management system will be required to create enabling conditions to improve parking enforcement. Such actions include developing parking strategies (including rationalizing parking rules, parking signages, etc. as well as potential adoption of technologies to support monitoring and enforcement), capacity building and training, and public awareness and engagement.

## 10.4 Supporting Program#4: Stringent Emission Standards for Public Transport Vehicles

### 10.4.1 Background

The 2024 PTMP envisions improving public transport in Timor-Leste by encouraging a mode shift to reduce the scale of emissions from transport to align with the country's commitment to the Paris Agreement. Existing public transport in Dili includes 13 microlet routes with about 900 vehicles registered in the city as of 2023. According to the DNTT, nearly 41% of the total registered microlets are over 10 years old, with the average microlet age at 11.8 years – this advanced average age may impact emissions and road safety.[46] MOTC is keen to modernize the current fleet by replacing this fleet with cleaner, more emissions efficient vehicles (such as Euro 4/5 emission standards) or by transitioning to electric vehicles. However, such a transition would necessitate refinements to existing policies/regulations/standards on fleet procurement (including minimum

[46] Source: 2024 PTMP

standards), lifecycle cost analysis (including total cost of ownership between different types of bus models chosen), capacity building of local operators, maintenance requirements, procurement planning for replacing vehicles, etc. Against this backdrop, the focus of this activity is to understand potential for instituting more stringent emissions requirements for public transport services in Dili and elsewhere in the country.

### 10.4.2 Key Finding

The major findings of this working paper are summarized as follows:

- **Existing Microlet Conditions** – A review of the existing microlet conditions focusing on Dili was conducted based on the 2025 microlet fleet data which identified key findings on the operating environment and fleet conditions of the Dili microlet including second-hand, old vehicles predominant in the public transport market, a large share of vehicles older than 15-20 years old (nearly 40% of the total fleet), and high competition and supply of microlet vehicles on lucrative routes.

- **Legal, Regulatory and Institutional Framework** – Based on a review of policy / regulations and institutional arrangements, several issues were identified including weak regulatory framework (such as limited inspection after entry of vehicles, lack of stringent emission standards), minimal monitoring and enforcement mechanism, and weak financial incentives for vehicle renewal / replacement. While there are some policies / mechanisms in place regarding vehicle inspection and time-bound requirements for new registrations and license renewals, the overall regulatory environment allows for a substantial number of older vehicles to remain in operation, posing challenges for safety, efficiency, and environmental sustainability within Dili's public transport system.

- **Best Practices** – Two case studies in Indonesia and Fiji were reviewed to identify key successful factors and lessons learned from their experiences in modernizing public transport system and improving monitoring and oversight over vehicle emission limits and efficiency in line with international standards. Each country provides valuable lessons for instituting more stringent emissions requirements for public transport services in Dili and elsewhere in the country including inclusion of emission standards in the existing framework, coordination efforts among multiple government agencies, service reforms, institutional capacity building, as well as financial incentives to create enabling conditions for decarbonization of public transport sector and reduction of emissions.

- **Stringent Emission Standards Roadmap & Action Plans** – The proposed actions span six key components: (A) Legal and Regulatory Framework, (B) Institutional Capacity and Enforcement, (C) Financial Incentives, and (D) Other including Fuel, Service Reform, and Public Awareness. Each indicative action is structured to be practical, time-bound, and implementable, with clear roles assigned to relevant government entities. The timeframe for actions is set as follows: short-term (1-2 years), medium-term (3-5 years), and long-term (5+ years). The plan includes the development of a national low-emission transport strategy, amendments to relevant vehicle/import regulations, establishment of vehicle age and emission limits, creation of inspection and data systems, and the introduction of financial incentives such as loan/grant, donor support programs, etc.

- **Prioritization Strategies and Potential Microlet Replacement** – A two-tier approach in identifying priority routes/vehicles for potential replacement of existing microlet vehicles with newer models (such as Euro 4) was presented based on the assumption that private operators will be responsible for renewal of microlet vehicles with support from the government (such as financial incentives, etc.). Case studies demonstrated that replacement programs should be done in phases with the initial phase targeting at 10+ % of eligible vehicles to minimize service disruptions to microlet operations. Some 99 existing microlet vehicles aged over 21 years across the network were proposed for the initial replacement once the stringent emissions standards (based on the above roadmap) are in place to guide such vehicle transition towards cleaner public transport system.

- **Reallocation of Old Retired Vehicles to Underserved Regions** – As part of the broader strategy to reduce transport emissions in Dili, the phasing out of older public transport vehicles is a key priority. However, in recognition of the limited transport services available in rural areas, the government may consider reallocating some of these retired vehicles to underserved regions as a short-term measure. While this approach is not ideal from an environmental standpoint, it may be necessary due to economic constraints and the immediate mobility needs of rural populations. This temporary reallocation could also serve as a transitional solution for operators whose vehicles are being replaced

in Dili, allowing them to continue providing services while the national fleet upgrade progresses. To ensure long-term sustainability, this strategy should be accompanied by a clear roadmap for eventual fleet modernization across all regions, including rural and peri-urban areas.

- **Preliminary GHG Emissions Assessment** – Preliminary GHG emission reductions were assessed to estimate potential reductions in GHG emissions due to vehicle renewal from the current microlet (assumed Euro 2) to a newer model (Euro 4). At Dili's microlet network level, the microlet fleet currently generates about 4,500 tons of GHG emissions. By replacing 10% of older fleet to newer models, it is estimated that some 103 tons of GHG emissions can be saved (or about 2% reduction in the current/base emission level).

## 10.5 Supporting Program#5: Hybrid Courier Service Models

### 10.5.1 Background

Bus terminals in Dili located in the east, west and south of the capital function as gateways for rural communities that are home to some 60% of the population and key suppliers of agricultural products. Areas surrounding the bus terminals also are used by vendors to transfer and sell goods/products. Vehicles serving these terminals also transport both passengers and goods/products. Therefore, proposed public transport terminal enhancements may also be leveraged and could facilitate the introduction of "hybrid" services providing efficient, affordable transport of both people and commodities.

Therefore, the intention of this study is to identify opportunities for hybrid courier services (i.e., transport services carrying both passengers and logistics goods which are often observed in rural areas) and furthermore potential physical implications on the terminal designs, as some segregation of these activities can make the facility more efficient and safer to operate, while generating revenue potential from non-public transport services such as renting spaces for logistic hubs.

### 10.5.2 Key Findings

The major findings from the existing conditions of goods transport and logistics, a review of policies/regulations, and best practices on hybrid passenger-goods service are summarized as follows:

- **Current Logistics Operating Conditions** – Preliminary surveys reveal informal hybrid transport operations already widespread in the country (in particular around markets in Dili), with vendors traveling from distant municipalities (Baucau, Ainaro, Maliana) carrying agricultural produce and parcels using anggunas and other passenger services. This indicates that hybrid passenger–goods transport is not a new behavior; rather, it is an existing system that requires risk controls, service discipline, and basic facilities to become safer and more reliable.

- **Support for Regulated Courier Services Among Existing Vendors** – A majority of interviewed vendors expressed support for formalized hybrid courier services, indicating strong market demand for regulated passenger-cargo integration. Additionally, a majority of vendors are willing to pay a modest fee (US$1–2 per day) for secure market space, implying that a formalized hybrid service with proper terminal facilities could be sustainable if fees are affordable.

- **Infrastructure Gaps** – Existing terminals and roads adjacent to the markets lack dedicated goods-handling facilities, standardized cargo tariffs, and safety protocols for mixed passenger-freight operations. This contributes to operational inefficiency, congestion, and safety risks – particularly where goods are loaded informally on street side or mixed unsafely with passengers.

- **Regulatory Framework** – The legal baseline exists but requires operational rules. Decree-Law No. 2/2003 distinguishes passenger, goods, and mixed transport in principle. However, hybrid operations require implementing provisions that define cargo eligibility, safe storage, service standards, tariffs, liability, and enforcement procedures. The revised Action Plan therefore strengthens the short-term focus on a hybrid vehicle safety and cargo eligibility regulation and complementary service protocols.

- **International Precedents** – Fiji's Land Transport Authority successfully regulates "carriers" through dedicated vehicle classifications, route permits, and fare controls that balance passenger affordability with operator viability. Indonesia's angkot system demonstrates effective cross-subsidy mechanisms

where cargo revenues support passenger services on remote routes, while that of China illustrates benefits of setting up hybrid passenger-cargo operation sites at relevant terminals, equipped with dedicated cargo handling areas along with spaces for marketing/retail activities to generate potential revenue opportunities.

Three hybrid courier service models are outlined below (with each model leveraging current operating conditions and scalable nationwide):

- **Model 1: Intercity Bus Courier Integration** formalizes terminal-to-terminal parcels and approved goods carriage on intercity passenger services, prioritizing Dili-to-municipality movements. It emphasizes designated cargo space, terminal-based handling, transparent tariffs, and safe storage of goods so that loads cannot slide, tip, or fall during travel, consistent with international cargo securing principles.
- **Model 2: Urban Microlet Courier Service** is deliberately constrained to protect passenger reliability. It is designed as stop-to-stop only, limited to small parcels, and restricted to terminals and designated exchange stops, with pilots focusing on off-peak and peripheral corridors. This ensures to prevent ad hoc parcel drop-offs that may undermine schedules and worsen reliability and dwell time in urban areas.
- **Model 3: Rural Angguna Integration** targets the Dili-bound agricultural produce flow that already exists, and it captures efficiency gains by organizing return-trip backhaul from Dili to rural areas. This model strengthens rural access while improving operator viability by using existing capacity more efficiently.

The proposed actions span six key components: (A) Legal and Regulatory Framework, (B) Infrastructure, (C) Financial Mechanisms, (D) Operation and Services, and (E) Capacity Building. Each indicative action is structured to be practical, time-bound, and implementable, with clear roles assigned to relevant government entities. The timeframe for actions is set as follows:

- **Short-Term Actions (1-2 Years)** prioritize legal and operational readiness, such as establishing guiding policy for hybrid services, introducing the hybrid service category and route permits, and implementing safety and cargo eligibility rules and service protocols. Short-term institutional actions also include inter-agency coordination and training for drivers and terminal staff.
- **Medium-Term Actions (3-5 Years)** focus on launching pilot services on key corridors (such as Dili-Baucau), constructing dedicated terminal infrastructure including cargo handling bays, loading zones, and passenger safety features, establish a hybrid fleet development fund providing financial incentives for vehicle upgrades and operator participation, and coordinating terminal-transport integration initiatives to ensure seamless passenger transfers and cargo consolidation at terminals.
- **Long-Term Actions (5+ Years)** focus on completing national network expansion, integrating technology platforms enabling seamless booking, tracking, and payment systems, and scaling infrastructure investments to support comprehensive hybrid operations at selected terminals, as well as developing a tracking system to monitor hybrid service performance.

## 10.6 Supporting Program#6: Microlet Operation Framework

### 10.6.1 Background

The public transport sector is largely informal with many individual operators and drivers operating public transport services in Timor-Leste. Beyond licensing and route allocation, National Directorate of Land Transport (DNTT), a government body overseeing land transport within the Ministry of Transport and Communications (MOTC), plays a limited role in the oversight, monitoring, evaluation, and enforcement of public transport service operations. This situation creates key impediments to efficient and attractive public transport, impacting schedule adherence, on-time performance, in-vehicle comfort, safety of passengers, as well as maintenance and enforcement.

Recent efforts to better regulate the public transport landscape include establishing a Land Transport Authority (LTA) to oversee and manage the public transport system (as of mid-2025, the LTA has yet to be established).

Along with public sector reforms, formalization of operator association could be an initial steppingstone to better regulation, management, and monitoring of the public transport network. Instead of negotiating with multiple individual operators and drivers, the government can deal/negotiate with a smaller subset of associations, which can represent the interests of the larger populace of operators and drivers. Association decisions (on behalf of these parties) are to be complied with by members of the association – this could include stricter driver or license requirements, driving standards, vehicle maintenance standards, vehicle operating protocol (i.e., stop only at designated stops and not at non-designated locations), integrated and coordinated fare schemes, marketing, etc.

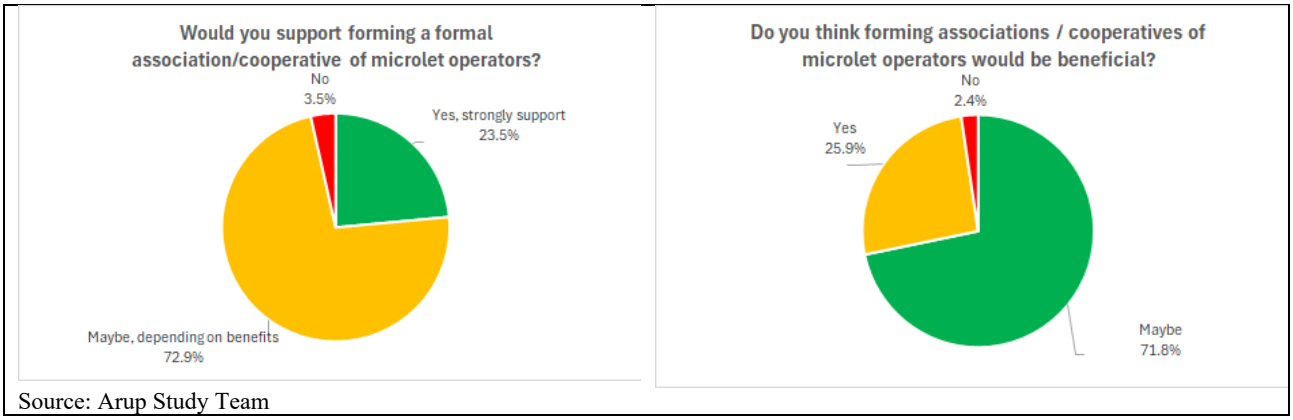
As such, the focus of this scope is on how to best formulate operator associations to ensure coordinated operations and maintenances, allowing for collective bargaining, contracting and service level agreements (i.e., incentives and penalties), and the pooling of resources for the benefits of its members – which will ultimately lead to improved service quality and profitability of public transport services.

### 10.6.2 Key Findings

Key findings are as follows:

- **Current Sector Challenges** – The current microlet sector is highly fragmented, informally managed, and constrained by minimal government oversight. Individual operators and drivers face unstable incomes, weak maintenance regimes, and unsafe, uncoordinated operations that undermine the overall quality and reliability of microlet services in Dili.
- **Institutional and Legal Gaps** – The review of the legal and institutional framework highlighted that, despite the existence of foundational legislation (such as Decree Law 2/2003), implementation remains limited. The DNTT currently oversees licensing and inspection functions but lacks sufficient capacity for planning, monitoring, and enforcement. Establishment of an LTA is foreseen in government policy, but it has not yet been realized. As such, strengthening institutional capacity within MOTC/DNTT in the short term is critical to enable effective regulation and support sector formalization.
- **Best Practices** – The international case studies from Indonesia, Fiji, and Philippines provided valuable insights into how informal transport sectors have been reorganized elsewhere. Jakarta's angkot integration demonstrated the importance of government-supported cooperatives and service contracts; Fiji's voluntary associations showed how operator dialogue and incentives can improve compliance; and the Philippines' jeepney modernization highlighted the risks of overly rapid, mandatory consolidation without sufficient financial or institutional support. These lessons underscore the need for a phased, adaptive reform process tailored to local realities.
- **Microlet Association Models** – Based on these lessons, three institutional models for microlet operations were developed and assessed: (i) Voluntary Association with Government Incentives; (ii) Mandatory Cooperative Scheme with Service Contracts; and (iii) Hybrid Association combining voluntary association and gradual contractual formalization. The MCA concluded that the Hybrid Association (Model#3) provides the most balanced and realistic approach – achieving meaningful service improvements while remaining financially and institutionally feasible. It allows MOTC and DNTT to formalize operations incrementally, with early focus on voluntary organization, training, and simple performance agreements, and later evolution toward route-based gross-cost contracts as digital fare systems and institutional capacities mature.
- **Operator's Appetite and Perceptions Towards Associations –** Approximately 10% of existing microlet operators in Dili were interviewed to assess the appetite and willingness to support forming operator associations, as well as concerns and types of assistance that may influence decisions to join future associations. A combined 96.5% support or would consider supporting formation of an association/cooperative (20 strongly; 62 maybe; 3 no). Similarly, 97.6% believe associations would be beneficial or potentially beneficial (22 yes; 61 maybe; 2 no). This indicates that most operators are open to associations if design features address their concerns. [47]

[47] Note: The high proportion of "maybe" responses in the operators' appetite/perception towards associations suggest conditional openness rather than outright opposition. The "maybe" responses are strongly associated with concerns around trust and governance – notably lack of trust among operators




Source: Arup Study Team

**Figure 10-5: Operator's Appetite and Perceptions Towards Association**

- The phasing plan for the proposed Hybrid Association model comprises three stages:
    - **Phase 1 (Year 1-2): Laying the Foundation** – The first phase focuses on creating an enabling legal and institutional framework to recognize operator associations and allow service contracting. It includes stakeholder engagement and capacity building through workshops and training on cooperative governance and safety. Pilot associations will be formed on lower-risk routes (prioritizing routes with limited overlap with the pilot bus corridor, ageing fleets, and high competition pressure) with incentives such as priority license renewals and access to microcredit. Service improvements like scheduled departures and designated stops will be tested, while technology procurement such as e-ticketing and GPS is initiated for future deployment.
    - **Phase 2 (Year 3–5): Scaling and Mixed Contracting** – The second phase expands associations and introduces mandatory cooperatives on other selected priority corridors, coupled with gross-cost service contracts and clear KPIs. Electronic fare collection systems will be deployed to improve transparency and data availability. Fleet renewal incentives, including low-interest loans and grants, will be tied to cooperative participation and performance. Monitoring and enforcement will be strengthened using GPS data and inspections. A subsidy framework will be developed to fund service contracts and maintain fare affordability.
    - **Phase 3 (Year 5+): Full Formalization and Integration** – The final phase consolidates smaller associations into zonal cooperatives to achieve economies of scale and simplify contract management. All routes transition to gross-cost service contracts, with standardized service frequencies and branding. A dedicated authority assumes responsibility for planning, contracting, and monitoring. Microlet services are integrated with broader bus services through common ticketing and coordinated schedules, while financial sustainability is ensured through fare adjustments, subsidies, and alternative revenue sources.
    - **Government Support Mechanisms** – Throughout all phases, government involvement is critical. Key actions include regulatory reform to establish the legal basis for associations and service contracting, an incentive framework offering tax breaks and fuel subsidies, capacity building for operators and officials, mobilization of funding for modernization and technology, and robust monitoring and enforcement through data-driven inspections and compliance mechanisms.

(77.4% of "maybe" respondents) and risk of poor leadership/management (64.5%) – and with a desire for enabling measures such as legal recognition/formal registration (90.3%) and targeted financial support (58.1%). These findings indicate that (i) many operators may support association formation in principle, but will only commit once governance arrangements are credible, transparent, and demonstrably fair; and (ii) operators are seeking safeguards that reduce uncertainty and protect them from financial impact due to associations. As such, additional stakeholder engagement is required, with drivers and owners actively involved in shaping governance rules, accountability mechanisms, and a phased implementation approach to build trust and demonstrate benefits before implementation.

# 11. Indicative Costs and Revenues

## 11.1 Overview

This section presents indicative, order-of-magnitude cost and revenue estimates for the proposed Timor-Leste Public Transport Project. The estimates cover capital expenditure (CAPEX), operating and maintenance costs (OPEX), and indicative revenue streams associated with bus terminals, on-street interchanges, and selected supporting public transport programs. These inputs will inform investment decisions, financial viability assessment, economic assessment, and procurement. Final costs arrangements will be confirmed during detailed engineering design (DED) and subsequent procurement stages.

## 11.2 Indicative Capital Costs by Component

Indicative capital cost estimates are prepared for each project component based on preliminary facility layouts, with unit rates derived from local estimates as well as benchmarking comparable studies in the region. All capital costs are expressed in 2025 constant prices and include an allowance for physical contingencies (i.e., 20%) to reflect uncertainties at the feasibility study stage. Capital cost estimates for supporting public transport reform programs are indicative only, as these components are assessed at a strategic or pre-feasibility level and will require further refinement.

### 11.2.1 Bus Terminal & On-Street Interchange

Capital costs for bus facilities (i.e., bus terminals, on-street interchanges) include various passenger facilities and amenities defined as follows:

- **Bus Terminal** – includes terminal facility roof, concrete bus bays (assumed for a 9m bus to accommodate actual buses), drop-off areas, parking areas, waiting and queuing areas (with seating), pavement markings, wayfinding signages, ticket and fare collection booth, retail and kiosk, security office, operation office, administration office, air conditioning (inside the offices), fans at waiting areas, toilets, lighting, tactile paving, circulation areas, utility removal and relocation, as well as other additional works (including site formation, utility connections+, drainage, mechanical and electrical works). Besides bus facilities, innovative measures (such as ITS) and climate adaptation measures (i.e., retention pond, rainwater storage, stormwater drainage, solar panel) are also proposed to future proof facilities and create an innovative and attractive bus terminal for Timorese.

- **On-Street Interchange** – includes bus shelter (enhanced 6m shelter), concrete bus bays (assumed for a 9m bus), sidewalk improvement, streetlights, trees, utility poles, tactile paving, signage, additional sidewalk improvement on each side of bus stop (to improve access to bus stops), as well as other additional works (including site cleaning, drainage, etc.). Similarly, climate adaptation measures (i.e., stormwater drainage, solar panel) are proposed to future proof facilities against climate change events.

Indicative cost estimates for the priority bus facilities with the unit cost of each element and assumptions are presented in the table below. The size of each facility site is informed by the facility schemes and preliminary design from **Section 3.2** to **Section 3.11**. Key findings are as follows:

- The total cost for all ten facility sites is about US$18.4 million, which includes the construction cost for bus terminal/on-street interchange, cost for supporting programs and contingency. Of this, the total capital cost for all ten facility sites is about US$14.9 million (including bus facilities at terminal/on-street interchange, ITS elements, climate resilient facilities). Of the selected ten sites, Tibar Terminal is the most expensive site accounting for about US$5.6 million (37.8%), followed by Hera Terminal at US$2.6 million (17.5%), Manleuana Terminal at US$2.4 million (16.2%), Aldeia Samalakuliba Terminal at US$2.3 million (15.3%), and Becora Terminal at US$1.4 million (9.6%). On-street interchange sites are less expensive items with Dili Convention Center and other four regional sites including Maliana, Suai, Lospalos and Viqueque each accounting for some 0.1 million (0.7%) of the total capital cost estimates.

- The cost for other soft components including consulting service cost is about US$0.2 million, capacity building cost and social development program cost is about US$0.1 million. Contingency is assumed as 20% of the total cost of construction cost, about US$3.1 million.

## Table 11-1: Indicative Capital Costs for Bus Facilities

| | # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Site** | **Dili Convention Center** | **Becora Terminal** | **Tibar Terminal** | **Manleuana Terminal** | **Hera Terminal** | **Aldeia Samalakuliba Terminal** | **Maliana Market** | **Suai Market** | **Lospalos Bemoris** | **Viqueque City Center** | |
| | **Facility Type** | **On-Street Interchange** | **Bus Terminal** | **Bus Terminal** | **Bus Terminal** | **Bus Terminal** | **Bus Terminal** | **On-Street Interchange** | **On-Street Interchange** | **On-Street Interchange** | **On-Street Interchange** | **Total** |
| | **Cost Item** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** | **US$** |
| 1 | Bus Facilities at Terminal | 0 | 1,037,737 | 3,646,854 | 1,679,422 | 1,662,173 | 1,506,582 | 0 | 0 | 0 | 0 | 9,532,768 |
| 2 | ITS at Terminal | 0 | 182,734 | 829,228 | 334,404 | 364,086 | 311,724 | 0 | 0 | 0 | 0 | 2,022,176 |
| 3 | Climate Resilient Facilities at Terminal | 0 | 217,300 | 1,163,900 | 409,800 | 590,300 | 457,900 | 0 | 0 | 0 | 0 | 2,839,200 |
| 4 | Bus Facilities at On-Street Interchange | 63,527 | 0 | 0 | 0 | 0 | 0 | 63,527 | 63,527 | 63,527 | 63,527 | 317,635 |
| 5 | ITS at On-Street Interchange | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Climate Resilient Facilities at On-Street Interchange | 41,600 | 0 | 0 | 0 | 0 | 0 | 41,600 | 41,600 | 41,600 | 41,600 | 208,000 |
| | Sub-Total | **105,127** | **1,437,771** | **5,639,982** | **2,423,626** | **2,616,559** | **2,276,206** | **105,127** | **105,127** | **105,127** | **105,127** | **14,919,779** |
| 7 | Consulting Service | This cost item is provided only for the total cost (not individual site-level cost) | | | | | | | | | | 200,000 |
| 8 | Capacity Building | This cost item is provided only for the total cost (not individual site-level cost) | | | | | | | | | | 100,000 |
| 9 | Social Development Program | This cost item is provided only for the total cost (not individual site-level cost) | | | | | | | | | | 100,000 |
| | **Sub-Total Cost with Other Supporting Components** | This cost item is provided only for the total cost (not individual site-level cost) | | | | | | | | | | **15,319,779** |
| 10 | Contingency (20%) | This cost item is provided only for the total cost (not individual site-level cost) | | | | | | | | | | 3,063,956 |
| | **Gran Total with Contingency** | | | | | | | | | | | **18,383,735** |
| | **Gran Total with Contingency (Rounded to Nearest Thousand)** | | | | | | | | | | | **18,384,000** |

### 11.2.2 Supporting Program#1: Dili Pilot Bus Project

Based on the proposed schemes in Section 10.1, the total capital cost for the pilot bus project is estimated at about US$12.4 million including bus fleet, bus stops, bus lanes, depot and ITS as shown in the table below.

**Table 11-2: Capex of Pilot Bus Project**

| # | Cost Item [A] | Final Quantities | Unit | Unit Cost (US$) | Total Cost (US$) | Total Cost (US$) by Component | Breakdown of Costs (%) Excluding Contingency | Notes |
|---|---|---|---|---|---|---|---|---|
| 1 | 9m Bus | 10 | Bus | 110,000 | 1,100,000 | 1,100,000 | 11.4% | Assume to be Euro 4/5 City Bus (including 5% customs duty, 2.5% sales tax, 30% excise tax applicable to vehicles value of over US$50,000 according to Timor-Leste Customs Authority). Unit cost of 9m diesel bus is assumed to be US$80,000 based on general market prices in the region. |
| 2 | Regular Shelter (3.0m) | 13 | number | 1,700 | 22,100 | 689,100 | 7.1% | Local unit cost of a regular bus shelter 3m x 1.8m |
| 3 | Enhanced Shelter (6.0m) | 46 | number | 2,600 | 119,600 | | | Local unit cost of an enhanced bus shelter 6m x 1.8m |
| 4 | Bus Shelter for Microlet Feeder Routes | 322 | number | 1,700 | 547,400 | | | Local unit cost of a regular bus shelter 3m x 1.8m |
| 5 | Bus Stops (Offline) | 23 | number | 11,000 | 253,000 | 397,000 | 4.1% | Assumed one 12m concrete offline bus bay cost with 3m width including excavation, bay, markings, curb/gutter improvement (future proofing for larger conventional bus) |
| 6 | Bus Stops (Online) | 36 | number | 4,000 | 144,000 | | | Assumed one 12m concrete online bus space with 3m width including curb and gutter improvement (without bay) (Unit cost assumed to be 1/3 of the offline bus bay based on other similar bus project experiences in the region and localized to Dili) |
| 7 | Bus Lanes | 7,196 | m | 300 | 2,158,800 | 2,158,800 | 22.4% | Cost includes pavement resurfacing of 3m bus lanes with curbs, color markings, signage, etc. |
| 8 | Pedestrian Improvements | 59 | number | 5,800 | 342,200 | 478,700 | 5.0% | Costs include sidewalks, streetlight, trees, utilities, signage, etc. |
| 9 | Crossing Improvements | 39 | number | 3,500 | 136,500 | | | Costs include tactile paving, curb ramps, zebra crossing, signage, etc. |
| 10 | Depot | 12 | Per bus | 160,000 | 1,920,000 | 1,920,000 | 19.9% | Assume to build a new depot to accommodate larger fleet (including bus fleet with 10% spare and 20% future expansion). Unit cost is per bus based on similar bus project experiences in the region and localized to Dili |
| 11 | ITS | 1 | lumpsum | 2,900,000 | 2,900,000 | 2,900,000 | 30.1% | Cost includes on-board technology on bus fleet, selected bus stops, pedestrian signals, and back-end system |
| **Subtotal** | | | | | **9,643,600** | **9,643,600** | 100.0% | |
| 12 | Consulting Service | 1 | lumpsum | 500,000 | 500,000 | 500,000 | | Assumed cost for consulting services |
| 13 | Capacity Building | 1 | lumpsum | 100,000 | 100,000 | 100,000 | | Assumed cost for capacity building |
| 14 | Social Development Program | 1 | lumpsum | 100,000 | 100,000 | 100,000 | | Assumed cost for social development program |
| **Subtotal** | | | | | **10,343,600** | **10,343,600** | | |
| 15 | Contingency | - | 20% | % | 2,068,720 | 2,068,720 | | |
| **Total** | | | | | **12,412,320** | **12,412,320** | | |
| **Total (Rounded to Nearest Thousand)** | | | | | **12,413,000** | **12,413,000** | | |

Notes:
[A] Land acquisition/resettlement costs are not included in this cost estimate as these require further assessment. Terminal costs are not included here as this is included in the Public Transport Terminal/Facility Feasibility Study. For reference, the cost for Tibar Terminal is estimated at US$5.7 million.

### 11.2.3 Supporting Program#2: Public Transport Fare and Fare Structure Modelling

Based on the preliminary assessment in Section 10.2, further assessment on developing more detailed specifications of a fare collection system suitable to the context of Timor-Leste is essential based on best practices and successful experiences in comparable cities to Dili. As such, a lumpsum of US$0.6million (with 20% contingency) is assumed for such consulting services in this cost estimate.

### 11.2.4 Supporting Program#3: Traffic Management Study to Improve Public Transport Operations

Based on the preliminary assessment in Section 10.3, the total cost for traffic improvement/management is estimated at US$6.6 million, with a breakdown of each cost presented in the table below:

**Table 11-3: Cost Estimate for Traffic Improvement Measures**

| Cost Item | Unit Cost (US$) | Quantities | Unit | Total Cost (US$) |
|---|---|---|---|---|
| **Road Improvement (1/2 Way Lane Modification)** | | | | |
| Road Lane Upgrade (1 Lane 2 Way) | 60 | 23,280 | m | 1,396,800 |
| Road Lane Upgrade (2 Lane 2 Way) | 60 | 11,400 | m | 684,000 |
| **Junction Improvement** | | | | |
| Junction Road Improvement (3-arm) | 4,000 | 4 | number | 16,000 |
| Junction Road Improvement (4-arm) | 8,000 | 4 | number | 32,000 |
| Crossing Facilities Improvement (3-arm) | 10,000 | 4 | number | 40,000 |
| Crossing Facilities Improvement (4-arm) | 14,000 | 3 | number | 42,000 |
| **Parking Meter** | | | | |
| On-Street Parking Meter | 600 | 380 | number | 228,000 |
| Off-Street Parking Lot | 92,000 | 8 | number | 736,000 |
| **ITS** | | | | |
| Intersection Signalization (3-arm) | 144,000 | 3 | number | 432,000 |
| Intersection Signalization (4-arm) | 192,000 | 2 | number | 384,000 |
| ITS System for City Level | 1,000,000 | 1 | lumpsum | 1,000,000 |
| Subtotal | | | | 4,990,800 |
| Consulting Service | 300,000 | 1 | lumpsum | 300,000 |
| Capacity Building | 100,000 | 1 | lumpsum | 100,000 |
| Social Development Program | 100,000 | 1 | lumpsum | 100,000 |
| **Subtotal With Other Components** | | | | **5,490,800** |
| Contingency | 20% | | | 1,098,160 |
| **Total Cost With Contingency** | | | | **6,588,960** |
| **Total Cost With Contingency (Rounded to Nearest Thousand)** | | | | **6,589,000** |

### 11.2.5 Supporting Program#4: Stringent Emission Standards for Public Transport Vehicles

Based on the preliminary assessment in Section 10.4, further assessment on developing framework/specifications of stringent emission standards suitable to the context of Timor-Leste is essential. As such, a lumpsum of US$0.6million (with 20% contingency) is assumed for such consulting services in this cost estimate.

### 11.2.6 Supporting Program#5: Hybrid Courier Service Models

Based on the preliminary assessment in Section 10.5, the total cost for enhancing hybrid courier service is estimated at US$1.2 million, with a breakdown of each cost presented in the table below:

**Table 11-4: Cost Estimate for Hybrid Courier Service**

| Cost Item | Average Size per Site (m2) | Unit Cost (US$) | Quantities | Unit | Total Cost by Type (US$) |
|---|---|---|---|---|---|
| Gateway Storage Hub | 300 | 450 (per m2) | 3 | m2 | 405,000 |
| Regional Storage Hub | 100 | 450 (per m2) | 3 | m2 | 135,000 |
| Distribution | 10 | 500 (per m2) | 6 | m2 | 30,000 |
| **Subtotal** | | | | | **570,000** |
| Consulting Service | - | 200,000 | 1 | lumpsum | 200,000 |
| Capacity Building | - | 100,000 | 1 | lumpsum | 100,000 |
| Social Development Program | - | 100,000 | 1 | lumpsum | 100,000 |
| **Subtotal With Other Components** | | | | | **970,000** |
| Contingency | - | 20% | | | 194,000 |
| **Total with Contingency** | | | | | **1,164,000** |
| **Total with Contingency (Rounded to Nearest Thousand)** | | | | | **1,164,000** |

### 11.2.7 Supporting Program#6: Microlet Operation Framework

To support the transition of current individual operators/drivers to a more organized/coordinated microlet operation framework (including associations), a number of soft components are proposed based on the preliminary assessment in Section 10.6 – including institutional framework to develop microlet associations,

cooperate branding & marking plan, public outreach campaign, and social development program. The total cost of these soft components is estimated at about US$0.6 million.

### 11.2.8 Total Project Cost

As presented in Table 11-5, the total project cost is about US$40.4 million (including 20% contingency). The biggest ticket item is bus terminal & on-street interchange improvement at US$18.4 million (45.4%), followed by pilot bus project at US$12.4 million (30.9%), traffic management at US$6.6 million (16.3%), and hybrid courier service model at US$1.2 million (3.0%). Other three programs including public transport fare model, stringent emissions standards, and microlet operation framework cost US$0.6 million each (1.5%).

**Table 11-5: Total Project Cost by Component**

| # | Component | Total Cost – Unrounded (US$) [A] | Total Cost (US$) – Rounded to the Nearest Thousand [A, B] | % | Type of Improvements / Assumptions |
|---|---|---|---|---|---|
| 1 | Bus Facilities | 18,383,735 | 18,384,000 | 45.4% | • 5 bus terminals and 5 on-street interchanges with provision of innovative measures, access road/walk improvements, climate change facilities<br>• Cost includes bus terminal cost, consulting service (public outreach), capacity building, and social development program. |
| 2 | Polit Bus Project | 12,412,320 | 12,413,000 | 30.9% | • Proposed 25.6km round trip service with 59 bus stops<br>• 10 buses (9m Euro 5 diesel city bus)<br>• 1 depot to accommodate the fleet with ITS enhancement<br>• Cost includes bus system cost, consulting service, capacity building, and social development program. |
| 3 | Public Transport Fare Model | 600,000 | 600,000 | 1.5% | • Consulting services for developing specifications of fare collection system<br>• Cost includes consulting service (i.e., feasibility study) |
| 4 | Traffic Management | 6,588,960 | 6,589,000 | 16.3% | • Traffic circulation modifications & ITS traffic enhancement<br>• Key intersection improvements (including signals & crossings)<br>• On-street parking meter facilities, and off-street parking facilities<br>• Cost includes traffic/parking facilities cost, consulting service, capacity building, and social development program. |
| 5 | Stringent Emission Standards | 600,000 | 600,000 | 1.5% | • 10% of existing microlet fleet in Dili (~90 vehicles) assumed to be replaced by more environmentally friendly vehicles (i.e., Euro 4/5 class)<br>• Cost includes consulting service (i.e., feasibility study) |
| 6 | Hybrid Courier Service Model | 1,164,000 | 1,164,000 | 3.0% | • Provision of logistics storage facilities including 3 gateway storage hub and 6 regional storage hub<br>• Cost includes storage facilities cost, consulting service (public outreach), capacity building, and social development program. |
| 7 | Microlet Operation Framework | 600,000 | 600,000 | 1.5% | • Consulting services to develop institutional framework<br>• Corporate branding, marketing, public outreach, social development program |
| **Total** | | **40,349,015** | **40,350,000** | | |

Notes:
[A] All cost items are inclusive of 20% contingency.
[B] The total cost in this table may not match with that of financial section (Section 12) due to rounding and that of economic section (Section 13) due to conversion factors used to generate the cost required for economic analysis.

## 11.3 Indicative Annualized O&M Costs

This section presents a summary of indicative annualized O&M costs by component in align with the capital cost items presented in Section 11.2.

### 11.3.1 Bus Terminal & On-Street Interchange

Annualized O&M cost estimates for bus facilities (i.e., bus terminals and on-street interchanges) comprise of various elements including bus infrastructure O&M, ITS O&M, and other direct operating expenses (facility operation/management costs), and personnel cost. Key assumptions on O&M are summarized as follows:

**Table 11-6: O&M Cost Assumptions for Bus Terminal & On-Street Interchange**

| # | Component | Assumptions |
|---|---|---|
| 1 | Bus Facilities O&M | • Bus facilities include bus terminal, shelter, bays, terminal operation offices, passenger waiting areas, etc. |

| # | Component | Assumptions |
|---|---|---|
| | | • Assumed to be 2% of capita cost |
| 2 | ITS O&M | • Assumed to be 2% of capital cost of ITS |
| 3 | Climate Resilient Facilities O&M | • Climate resilient facilities include retention pond, drainage, stormwater system, solar panel, etc.<br>• Assumed to be 2% of capital cost |
| 4 | Other Direct Operating Expenses | • Other direct operating cost includes miscellaneous cost such as management, utility bills, etc.<br>• Assumed to be 5% of the total OPEX cost of bus facilities, ITS, and climate resilient facilities. |
| 5 | Personnel | • Personnel cost is related to the size of facilities and number of bays provided at the facility as well as provision of offices.<br>• Assumed staff includes operation, technical maintenance, administrative, and management. |

Total O&M cost estimates by component are summarized in the table below. Of note, the total annualized O&M cost is about US$0.67 million, with personnel cost accounting for US$0.3 million (52.8%), followed by bus facilities O&M at about US$0.2 million (29.7%), climate resilient facilities at about US$0.06 million (9.2%), ITS O&M at about US$0.04 (6.1%), and other direct operating expenses at US$0.1 million (2.2%).

**Table 11-7: Annualized O&M Costs for Bus Terminal & On-Street Interchange**

| # | Component | Annualized Cost (US$) | Breakdown (%) | Notes |
|---|---|---|---|---|
| 1 | Bus Facilities O&M | 197,009 | 29.7% | Assumed to be 2% of capital cost |
| 2 | ITS O&M | 40,444 | 6.1% | Assumed to be 2% of capital cost |
| 3 | Climate Resilient Facilities O&M | 60,944 | 9.2% | Assumed to be 2% of capital cost |
| 4 | Other Direct Operating Expenses | 14,920 | 2.2% | Assumed to be 5% of OPEX cost of bus facilities, ITS, and climate resilient facilities |
| 5 | Personnel | 350,900 | 52.8% | Estimated number of staff required for operation and management of bus facilities. See Appendix D for build-up cost estimates |
| **Total Annual O&M Cost (US$)** | | **664,217** | **100.00%** | |
| **Total Annual O&M Cost (US$)** | | **670,000** | | **-** |

### 11.3.2 Supporting Program#1: Dili Pilot Bus Project

Annualized O&M for the pilot bus is estimated at about US$1.0 million including vehicle operating expenses, labor, and bus infrastructure and ITS O&M.

**Table 11-8: Annualized O&M Costs for Pilot Bus Project**

| # | Component | Cost Item | Final Quantities | Unit | Unit Cost (US$) | Total Cost (US$) | Total Cost by Component (US$) | Notes |
|---|---|---|---|---|---|---|---|---|
| 1 | Annual Bus Operation O&M | Vehicle-Related O&M | 1 | Lump Sum | 339,685 | 339,685 | 732,991 | Includes bus fuel cost, bus maintenance cost and bus registration/license cost |
| 2 | | Bus-Related Personnel | 1 | Lump Sum | 188,000 | 188,000 | | The bus-related personnel include driver, technical maintenance staff, operation staff, administration staff and management |
| 3 | | Non-Bus Related O&M | 1 | Lump Sum | 205,306 | 205,306 | | Includes cost for administration and casualty & liability |
| 4 | O&M for Bus Infrastructure | O&M for Bus Stops &Shelters | 2% | % | - | 22,000 | 162,000 | Assumed as 2% of CAPEX [A] |
| 5 | | O&M for Bus Lanes | 2% | % | - | 44,000 | | Assumed as 2% of CAPEX [A] |
| 6 | | O&M for Depot | 5% | % | - | 96,000 | | Assumed as 5% of CAPEX [A] |
| 7 | O&M for ITS | O&M for ITS | 5% | % | - | 145,000 | 145,000 | Assumed as 5% of CAPEX [A] |
| **Total** | | | | | | **1,039,991** | | |
| **Total (Rounded to Nearest Ten Thousand)** | | | | | | **1,040,000** | | |

Notes:
[A] Annualized O&M costs for bus infrastructure and ITS are assumed as follows: bus stops/shelters (2% of capex), depot (5% of capex) and ITS (5% of CAPEX) based on regional experience and benchmarking of other similar projects.

### 11.3.3 Supporting Program#2: Public Transport Fare and Fare Structure Modelling

Consulting services are proposed in capex for this program. As such, no O&M cost is assumed at this stage.

### 11.3.4 Supporting Program#3: Traffic Management Study to Improve Public Transport Operations

Annualized O&M for traffic management is estimated at about US$0.1 million, including O&M for road, junctions, parking facilities, as well as ITS elements.

**Table 11-9: Annualized O&M Costs for Traffic Management**

| # | Cost Item | Ratio | Unit | Unit Cost (US$) | Total Cost (US$) | Notes |
|---|---|---|---|---|---|---|
| 1 | Road Improvement O&M | 2% | % | - | 41,616 | Assumed as 2% of CAPEX [A] |
| 2 | Junction Improvement O&M | 2% | % | - | 2,600 | Assumed as 2% of CAPEX [A] |
| 3 | Parking Facilities O&M | 2% | % | - | 19,280 | Assumed as 2% of CAPEX [A] |
| 4 | ITS O&M | 2% | % | - | 36,320 | Assumed as 2% of CAPEX [A] |
| **Total** | | | | | **99,816** | |
| **Total (Rounded to Nearest Ten Thousand)** | | | | | **100,000** | |

Notes:
[A] Annualized O&M costs for civil items and ITS are assumed as 2% of capex based on regional experience and benchmarking of other similar projects.

### 11.3.5 Supporting Program#4: Stringent Emission Standards for Public Transport Vehicles

Consulting services are proposed in capex for this program. As such, no O&M cost is assumed at this stage.

### 11.3.6 Supporting Program#5: Hybrid Courier Service Models

Annualized O&M for traffic management is estimated at about US$0.1 million, including O&M for road, junctions, parking facilities, as well as ITS elements.

**Table 11-10: Annualized O&M Costs for Traffic Management**

| # | Cost Item | Ratio | Unit | Unit Cost (US$) | Total Cost (US$) | Notes |
|---|---|---|---|---|---|---|
| 1 | Courier Facilities O&M | 2% | % | - | 11,400 | Assumed as 2% of CAPEX [A] |
| **Total** | | | | | **11,400** | |

Notes:
[A] Annualized O&M costs for civil items is assumed as 2% of capex based on regional experience and benchmarking of other similar projects.

### 11.3.7 Supporting Program#6: Microlet Operation Framework

Consulting services are proposed in capex for this program. As such, no O&M cost is assumed at this stage.

## 11.4 Indicative Revenues

This section presents a summary of revenues estimated for (i) bus terminal operations and management based on the feasibility study; and (ii) other supporting public transport reform programs based on preliminary assessment (where applicable). Indicative revenue estimates are prepared to reflect potential system-level revenue generation from farebox and non-farebox sources, including passenger fares, kiosk and retail rentals, advertising, parking charges, and storage rentals associated with courier services.

Revenue projections are based on demand estimates from the 2024 Public Transport Master Plan and assume the implementation of organized terminal operations, enforcement of designated loading and parking arrangements, etc. These revenue estimates are indicative and non-guaranteed, and actual revenues will depend on policy decisions, service performance, and institutional effectiveness during implementation. The table below presents different types of revenues applicable to each component and assumptions used to estimate revenues (with detailed assumptions presented in Appendix E).

**Table 11-11: Type of Revenue Schemes**

| Component [A] | Type of Revenues | Assumptions [B] |
|---|---|---|
| Bus Terminal & On-Street Interchange | Farebox Revenues (from Microlet Operations) | • Estimated based on yearly ridership forecast by route from the 2024 PTMP<br>• 5% of fare revenues per year (based on the existing fare structure, i.e., US$0.25/ride for adults and US$0.15/ride for students) is assumed to be allocated to bus terminal O&M (including entry fees) |
| | Kiosk Rental at Terminal [C, D] | • Commercial space (3m x 3m) provided within the terminal assumed to be rented out to merchants at a daily rental fee of US$2.0/day (rounded a daily minimum fee based on US$6.0 per $m^2$ per month). |

| Component [A] | Type of Revenues | Assumptions [B] |
|---|---|---|
| | Advertisement at Terminal | • Revenue generated from advertising on panel/displays/walls of infrastructure (i.e., terminals and on-street interchange). Bus shelters assumed to have 2 advertisement displays (with assumed fees of US$2-5/day) depending on locations. |
| Dili Pilot Bus | Fare Revenue (from Pilot Bus) | • Estimated based on assumed ridership for the pilot bus route<br>• Pilot bus fare is assumed as follows as proposed by MOTC/DNTT (US$0.50/ride for adults and US$0.30/ride for students) which is 100% increase from the existing fare scale |
| | Advertisement | • Revenue generated from advertising include those from bus (external and internal) as well as advertisement panel on bus shelters (with assumed advertising fees of US$5/day). |
| Traffic Management | Off-Street Parking | • Daily parking utilization is estimated for daytime (where parking hours last from 7:00AM-9:00PM, with 80% utilization rate per space) and nighttime (where parking hours last from 9:00PM to 7:00AM, with 30% utilization rate per space) based on the benchmarking of other cities in Southeast Asia.<br>• Based on the above and a parking fee of US$0.5 per hour per space (as per the Decree law No.8/2008), the daily off-street parking fee per space is estimated at US$7.0. |
| | On-Street Parking | • Daily parking utilization is estimated for daytime only (where parking hours last from 8:00AM-6:00PM, with 80% utilization rate per space). On-street parking outside of this period is assumed as free of charge.<br>• Based on the above and a parking fee of US$0.5 per hour per space (as per the Decree law No.8/2008), the daily on-street parking fee per space is estimated at US$4.0. |
| Hybrid Courier Service | Rental Storage Facilities | • Commercial space at storage hubs with annual rental fees per site estimated at US$20,000 for gateway storage hubs (300m$^2$) and US$5,000 for regional storage hubs (100m$^2$) which is adjusted based on a daily rental fee of US$2.0/day (applicable to commercial space of 3m x 3m) |

Source: https://timor-leste.gov.tl/wp-content/uploads/2010/03/DL_2003_19_PortFees_and_Charges_.pdf
Notes:
[A] At this stage, no revenue is assumed for Public Transport Fare and Fare Structure Modelling (Supporting Program#2), Stringent Emission Standards for Public Transport Vehicles (Supporting Program#4), and Microlet Operation Framework (Supporting Program#6).
[B] Revenue projections assume the establishment of clear legal authority for terminal management entities to levy and retain user fees, rental income, and advertising revenues. Until such authority is formalized, revenues may need to be centrally collected and budgeted, affecting cash flow and financial sustainability.
[C] Decree-Law No. 19/2003 outlines the fees and charges associated with port services, including the leasing of office space within port premises. Section 34 of this decree-law specifies that the Port Authority may lease buildings or parts thereof for business activities directly related to port operations, with monthly rentals determined based on market values and location, starting from a minimum of US$6.00 per square meter per month.
[D] Based on sample interviews with existing market owners/coordinators at Manleuana Market, market vendors pay US$50 for initial cost to rent space (with some using space for free of charge). The market coordinator (under the Ministry of State of Administration) also mentioned that a new law on allocation of taxes for market space is being drafted currently.

Key findings are as follows:

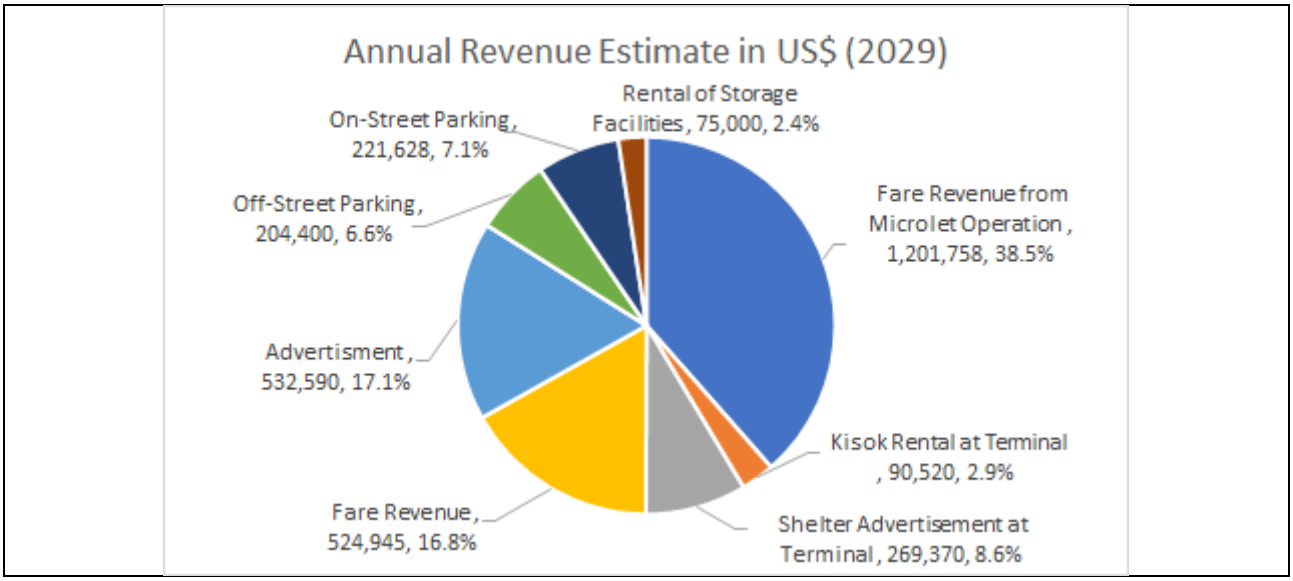
- The total annual revenue is estimated at about US$3.12 million, with revenue from bus terminal (including on-street interchange) being the largest revenue source accounting for US$1.56 million (50.0%), which includes US$1.20 million (38.5%) from fare revenue from microlet operation, US$0.27 million (8.6%) from shelter advertisement at terminal, and US$0.09 million (2.9%) from kiosk rental at terminal. Additionally, Dili pilot bus service revenue totals about US$1.06 million (33.9%), which includes US$0.53 million (17.1%) from advertisement and US$0.52 million (16.8%) from fare revenue from pilot bus. The revenue from traffic management accounts for US$0.43 million (13.7%), including US$0.22 million (7.1%) for on-street parking and US$0.20 million (6.6%) for off-street parking. Lastly, the revenue for hybrid courier service model is estimated at US$0.08 million (2.4%). The annual revenue estimates for 2029 year (which represents the full-year annual revenue) are illustrated in Table 11-12 and Figure 11-1.

- A revenue projection over 30 years (up to 2058) is illustrated in Table 11-13. Annual fare revenue is assumed to grow yearly in align with ridership while other items (such as kiosk rental, advertising, parking, and courier storage) are assumed to be the same.[48]

[48] Inflation factors and other valuables are not factored in revenue analysis in this section, which are further discussed in the subsequent financial and economic analysis.

## Table 11-12: Annual Revenue Estimate in US$ (2029)

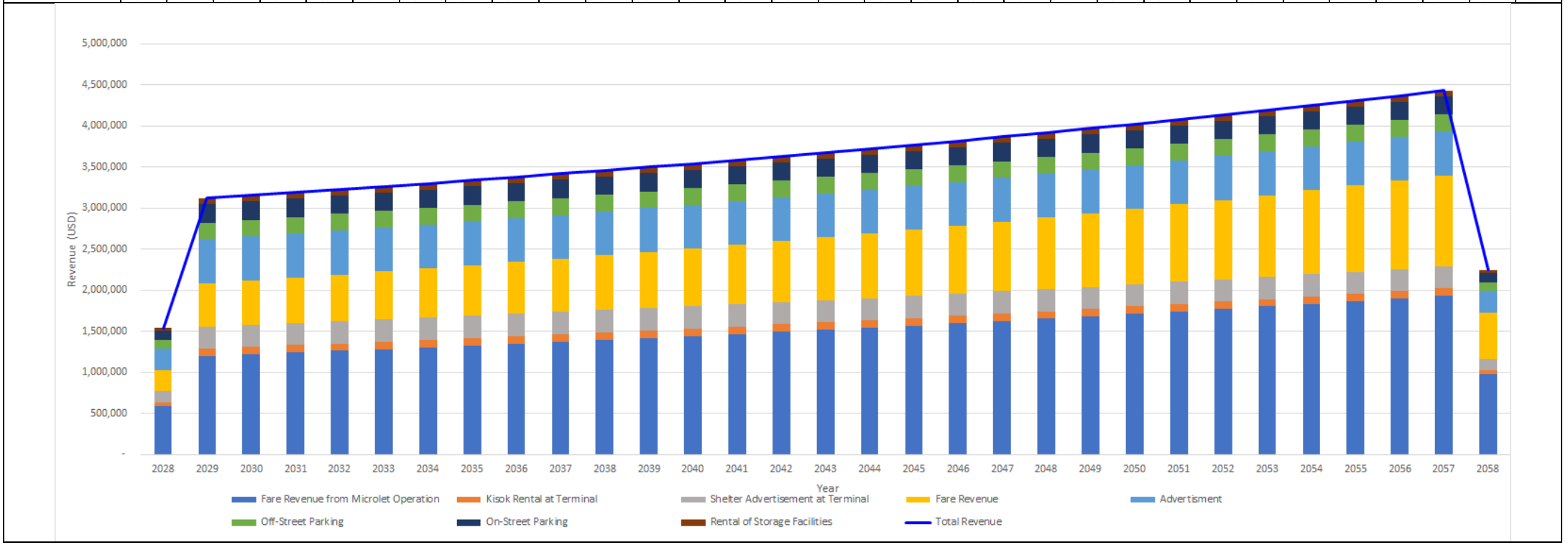
| Component | Revenue Item | Annual Revenue (US$) | Composition (%) |
|---|---|---|---|
| Bus Terminal & On-Street Interchange | Farebox Revenues (from Microlet Operations) | 1,201,758 | 38.5% |
| | Kiosk Rental at Terminal | 90,520 | 2.9% |
| | Advertisement at Terminal | 269,370 | 8.6% |
| | **Sub-Total** | **1,561,648** | **50.0%** |
| Dili Pilot Bus | Fare Revenue (from Pilot Bus) | 524,945 | 16.8% |
| | Advertisement (Including pilot bus fleet and bus stops) | 532,590 | 17.1% |
| | **Sub-Total** | **1,057,535** | **33.9%** |
| Traffic Management | Off-Street Parking | 204,400 | 6.6% |
| | On-Street Parking | 221,628 | 7.1% |
| | **Sub-Total** | **426,028** | **13.7%** |
| Hybrid Courier Service | Rental Storage Facilities | 75,000 | 2.4% |
| | **Sub-Total** | **75,000** | **2.4%** |
| **Total** | | **3,120,211** | **100.0%** |




## Figure 11-1: Composition of Annual Revenue Estimate in US$ (2029)

## Table 11-13: Revenue Projection for 30 Years (US$ in 1,000)

| Item | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fare Revenue from Microlet Operation | 591 | 1,202 | 1,222 | 1,243 | 1,264 | 1,285 | 1,307 | 1,329 | 1,352 | 1,375 | 1,398 | 1,421 | 1,445 | 1,470 | 1,495 | 1,520 | 1,546 | 1,573 | 1,600 | 1,627 | 1,655 | 1,684 | 1,713 | 1,742 | 1,772 | 1,803 | 1,835 | 1,866 | 1,899 | 1,932 | 983 |
| Kisok Rental at Terminal | 45 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 45 |
| Shelter Advertisement at Terminal | 135 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 135 |
| Fare Revenue | 256 | 525 | 539 | 554 | 569 | 584 | 600 | 616 | 633 | 650 | 667 | 685 | 704 | 723 | 742 | 762 | 783 | 804 | 826 | 848 | 871 | 894 | 919 | 943 | 969 | 995 | 1,022 | 1,049 | 1,078 | 1,107 | 568 |
| Advertisement | 266 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 533 | 266 |
| Off-Street Parking | 102 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 204 | 102 |
| On-Street Parking | 111 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 222 | 111 |
| Rental of Storage Facilities | 38 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 38 |
| **Total Revenue** | **1,543** | **3,120** | **3,155** | **3,190** | **3,226** | **3,263** | **3,300** | **3,339** | **3,378** | **3,418** | **3,458** | **3,500** | **3,543** | **3,586** | **3,631** | **3,676** | **3,723** | **3,770** | **3,819** | **3,869** | **3,919** | **3,971** | **4,025** | **4,079** | **4,135** | **4,192** | **4,250** | **4,309** | **4,370** | **4,433** | **2,248** |




Note: Revenue estimates for 2028 and 2058 are based on the half-year analysis, given that the operations start from 1 July 2028 and end at 30 June 2058.

# 12. Financial Viability Assessment

## 12.1 Overview

In this section, the financial assessment examines the capital expenditure (CAPEX), operational expenditure (OPEX), replacement capital expenditure (REPEX), system revenue, financing costs and commercial costs of the proposed Timor-Leste public transport system to test the system's operational, financial and commercial viability and funding requirements:

- Operational viability is defined as total system revenues (farebox and non-farebox revenues) less system-wide OPEX, i.e., all OPEX incurred for the system which includes OPEX components for the Bus Terminal, Pilot Bus Services, Traffic Management and Courier Service. A project is deemed operationally viable if total system revenue can cover total system-wide OPEX.
- Financial viability is defined as total system revenues less system-wide OPEX, CAPEX and REPEX (full replacement and midlife renewal), i.e., capital expenditure incurred for the system during construction and operation period. A project is deemed financially viable if total system revenue covers the sum of total system-wide OPEX, CAPEX and REPEX.
- Commercial viability is defined as total system revenues less system-wide OPEX, CAPEX, REPEX and financing (e.g., upfront fee, commitment fee, interest rates during construction and operation) and commercial (e.g., tax) costs during construction and operation periods. REPEX includes full replacement and midlife renewals. A project is deemed commercially viable if total system revenue can cover the sum of total system-wide OPEX, CAPEX, REPEX, financing and commercial costs.

The financial assessment was conducted across the forecast period of the project, which includes a two-year construction period (i.e., Construction Year 1 (CY 1) and Construction Year 2 (CY 2)), and thirty-year operating period (i.e., Operating Year 1 (OY 1) to Operating Year 30 (OY 30)). The commencement of the first forecast period is 1 July 2026, as informed by the construction start date of 1 July 2026, and therefore, the financial period in the financial model is from July to June the following year. For example, the first construction period is 1 July 2026 to 30 June 2027, and the first operations period is 1 July 2028 to 30 June 2029 after construction is completed on 30 June 2028. Key assumptions used in financial viability assessment are presented in Appendix F.

## 12.2 System Revenue

Total system revenues amount to US$162.89 million over the forecast period, consisting of fare revenues from microlet and pilot bus services operations amounting to US$102.9 million (63.2%). Other non-farebox revenues (i.e., kiosk rentals, parking, advertisement) total to the remaining US$59.99 million or 36.8% of total cumulative revenue. The breakdown of the system-wide revenue is provided in the table below.

**Table 12-1: System Revenue Breakdown (US$ Million)**

| Item [A] | Amount in US$ million, Cumulative Over Forecast Period (Real) | Amount in US$ million, Cumulative Over Forecast Period (Nominal) [A] |
|---|---|---|
| **Bus Terminal** | **56.95** | **83.38** |
| Fare Revenue from Microlet Operation | 46.15 | 67.88 |
| Kiosk Rental at Terminal | 2.75 | 3.90 |
| Shelter Advertisement at Terminal | 8.08 | 11.60 |
| **Pilot Bus Services** | **39.46** | **57.95** |
| Fare Revenue from Pilot Bus Services | 23.48 | 35.02 |
| Advertisement from Pilot Bus Services | 15.98 | 22.93 |
| **Traffic Management** | **12.78** | **18.34** |
| Off-street Parking | 6.13 | 8.80 |
| On-street Parking | 6.65 | 9.54 |
| **Courier Service** | **2.25** | **3.23** |
| Rental of Storage Facilities | 2.25 | 3.23 |
| **Total Revenue** | **114.44** | **162.89** |

| Item [A] | Amount in US$ million, Cumulative Over Forecast Period (Real) | Amount in US$ million, Cumulative Over Forecast Period (Nominal) [A] |
|---|---|---|

Note:
[A] No revenue is assumed for other supporting programs including Public Transport Fare and Fare Structure Modelling (i.e., highlighting a roadmap for modernization, anchored by a hybrid fare collection system, business model restructuring, revised fare policy, and legal-institutional reforms) and Stringent Emission Standards for Public Transport Vehicles (i.e., highlighting a stringent emissions standards roadmap and prioritization strategies for potential microlet replacement).

The system revenue profile during the operations period is as below:

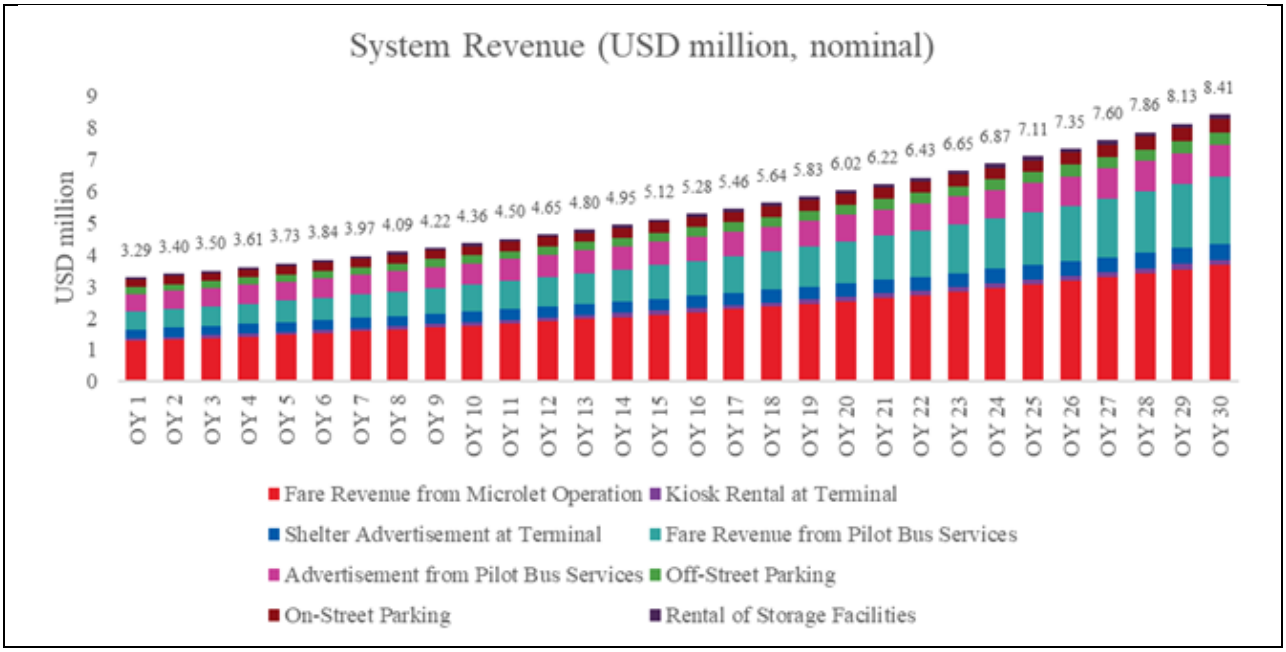



**Figure 12-1: System Revenue Profile Over Operation Period (US$)**

## 12.3 CAPEX

CAPEX consists of the development of Bus Terminal, Pilot Bus Services, Traffic Management, Courier Service and Others as presented in Table 12-2. The profile of the CAPEX disbursement over the 2-year construction period are Figure 12-2. Note that Construction Year 1 ("CY 1") refers to July 2026 – June 2027 and Construction Year 2 ("CY 2") refers to July 2027 – June 2028.

**Table 12-2: CAPEX Breakdown (US$ Million)**

| CAPEX item | Amount in US$ million, Cumulative Over Forecast Period (Real) [A] | Amount in US$ million, Cumulative Over Forecast Period (Nominal) [B] |
|---|---|---|
| **Bus Terminal** | **14.92** | **15.37** |
| Bus Facilities at Terminal | 9.53 | 9.82 |
| ITS at Terminal | 2.02 | 2.08 |
| Climate Resilient Facilities at Terminal | 2.84 | 2.92 |
| Bus Facilities at On-Street Interchange | 0.32 | 0.33 |
| Climate Resilient Facilities at On-Street Interchange | 0.21 | 0.21 |
| **Pilot Bus Services** | **9.64** | **9.93** |
| 9m Diesel Bus | 1.10 | 1.13 |
| Bus Shelter | 0.69 | 0.71 |
| Bus Stop | 0.40 | 0.41 |
| Bus Lanes | 2.16 | 2.22 |
| Pedestrian and Crossing Improvements | 0.48 | 0.49 |
| Depot | 1.92 | 1.98 |
| ITS | 2.90 | 2.99 |
| **Traffic Management** | **4.95** | **45.10** |
| Road Improvement | 2.08 | 2.14 |

| CAPEX item | Amount in US$ million, Cumulative Over Forecast Period (Real) [A] | Amount in US$ million, Cumulative Over Forecast Period (Nominal) [B] |
|---|---|---|
| Junction Improvement | 0.09 | 0.09 |
| Parking Facilities | 0.96 | 0.99 |
| ITS | 1.82 | 1.87 |
| **Courier Service** | **0.57** | **0.59** |
| Storage Facilities | 0.57 | 0.59 |
| **Others** | **10.22** | **10.53** |
| Consulting Service | 2.70 | 2.78 |
| Capacity Building | 0.40 | 0.41 |
| Social Development Program | 0.40 | 0.41 |
| Contingency | 6.72 | 6.92 |
| **Total CAPEX** | **40.30** | **41.52** |

Note:
[A] Contingency and non-capital cost items (such as consulting services, capacity building, etc.) are combined under "Others" category. As such, the total cost by bid component (i.e., Bus Terminal) differs from indicative capital costs shown in Section 11.2.
[B] This is a nominal number (i.e. after taking into account inflation of 2.0% p.a.) based on a real number (i.e. before inflation). We have assumed 2025 is the base year (inflation index = 1), and 2026 onwards will start inflating by 2.0% p.a.

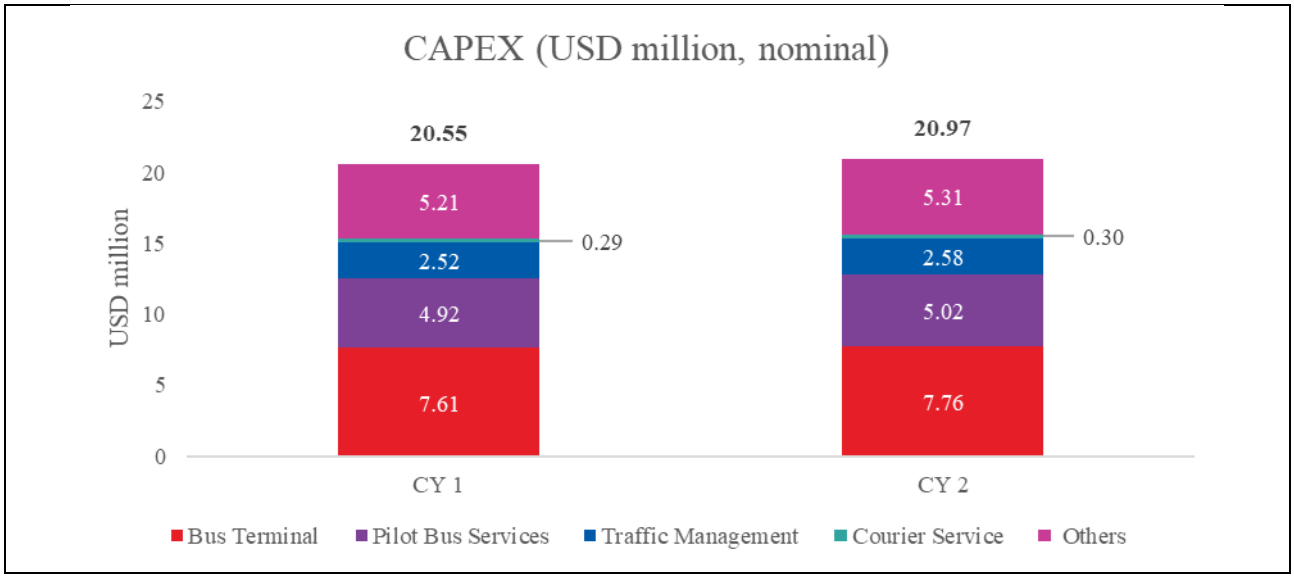



**Figure 12-2: CAPEX Profile Over Construction Period**

## 12.4 REPEX

REPEX consists of midlife renewal and full replacements in accordance with the timing and quantum as described in Appendix F. US$6.19 million and US$14.85 million of midlife renewal and full replacements, respectively, will be incurred during the operations period, with their profile presented in the figure below. Please note that Operation Year 1 ("OY 1") refers to July 2028 – June 2029 and Operation Year 30 ("OY 30") refers to July 2057 – June 2058. The REPEX profile over the forecast period is presented below:

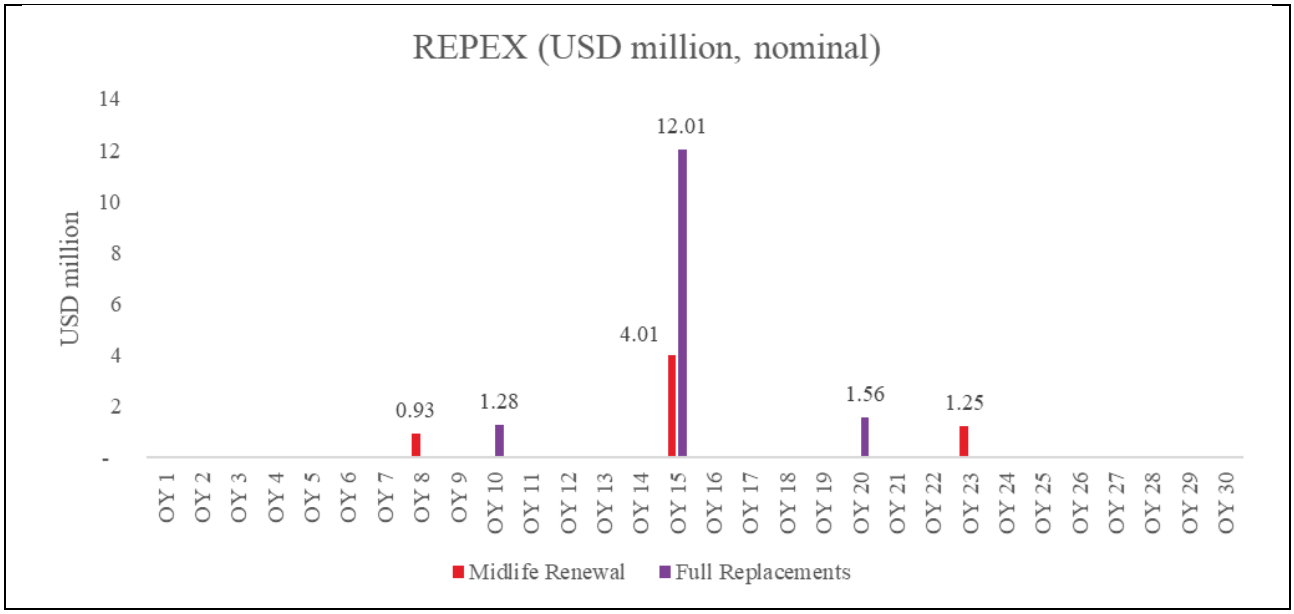



**Figure 12-3: REPEX Profile Over the Operations Period (Nominal Values in US$ Million)**

To provide more clarity regarding the CAPEX and REPEX profile during the project life, below is a figure that demonstrates the CAPEX and REPEX profile over the construction and operations periods:

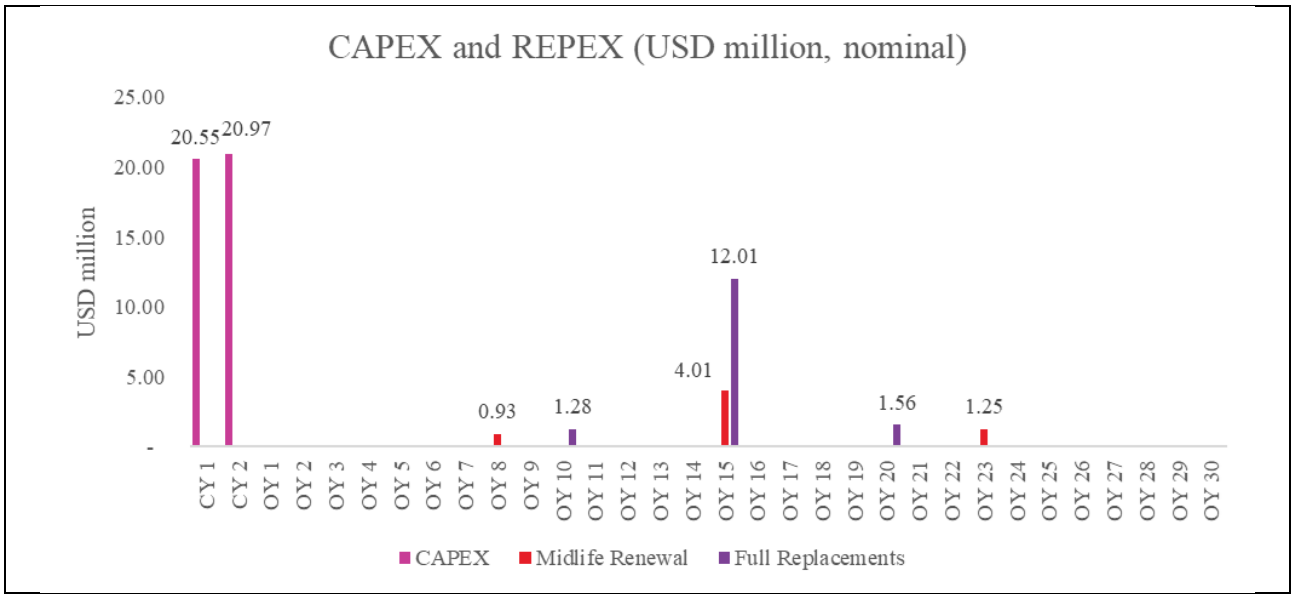



**Figure 12-4: CAPEX and REPEX Profile over Construction and Operation Period (Nominal Values in US$ Million)**

## 12.5 OPEX

OPEX for Bus Terminal, Pilot Bus Services, Traffic Management and Courier Service amounts to US$1.81 million p.a., in real 2025 values. The OPEX profile in nominal values (with 2% inflation p.a., based on estimates from IMF World Economic Outlook, as detailed Appendix F) over the operations period (i.e., OY 1 to OY 30; or 1 July 2028 to 30 June 2058) is presented in the table below:

**Table 12-3: Cumulative OPEX Breakdown**

| OPEX item | Amount in US$ million p.a., real (2025 values) | Amount in US$ million, cumulative over forecast period, real (2025 values) | Amount in US$ million, cumulative over forecast period, nominal |
|---|---|---|---|
| **Bus Terminal** | **0.67** | **19.93** | **28.60** |
| Infrastructure O&M | 0.20 | 5.91 | 8.48 |
| ITS O&M | 0.04 | 1.21 | 1.74 |

| OPEX item | Amount in US$ million p.a., real (2025 values) | Amount in US$ million, cumulative over forecast period, real (2025 values) | Amount in US$ million, cumulative over forecast period, nominal |
|---|---|---|---|
| Climate Resilient Facilities O&M | 0.06 | 1.83 | 2.62 |
| Other Direct Cost | 0.02 | 0.45 | 0.64 |
| Salary | 0.35 | 10.53 | 15.11 |
| **Pilot Bus Services** | **1.05** | **31.20** | **44.77** |
| Vehicle-Related O&M - Diesel Bus | 0.34 | 10.19 | 14.62 |
| Bus-Related Personnel - Diesel Bus | 0.19 | 5.64 | 8.09 |
| Non-Bus Related O&M - Diesel Bus | 0.21 | 6.16 | 8.84 |
| Bus Infrastructure O&M | 0.16 | 4.86 | 6.97 |
| ITS O&M | 0.15 | 4.35 | 6.24 |
| **Traffic Management** | **0.10** | **2.97** | **4.26** |
| Road Improvement O&M | 0.04 | 1.25 | 1.79 |
| Junction Improvement O&M | 0.001 | 0.05 | 0.08 |
| Parking Facilities O&M | 0.02 | 0.58 | 0.83 |
| ITS O&M | 0.04 | 1.09 | 1.56 |
| **Courier Service** | **0.01** | **0.34** | **0.49** |
| Storage Facilities O&M | 0.01 | 0.34 | 0.49 |
| **Total OPEX** | **1.83** | **54.44** | **78.12** |

The OPEX profile over the operations period is presented in the figure below:

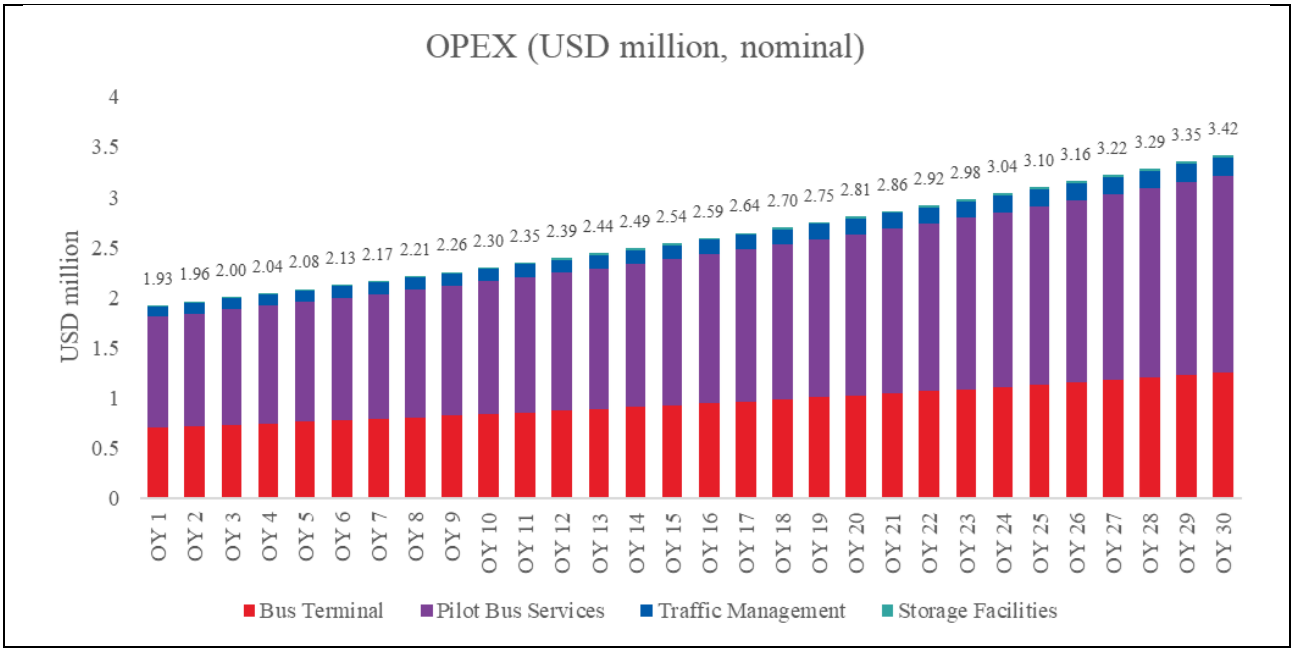



**Figure 12-5: OPEX Profile Over Operations Period, Nominal in US$ Million**

## 12.6 Operational Viability Assessment

Operational viability of the project is assessed to determine whether the system revenue could cover OPEX associated with the operations of the project.

Over the 30-year operating period, the project will accumulate US$162.89 million in system revenue (nominal) and incur US$78.12 million in total OPEX (nominal), which results in US$84.77 million of total operating surplus (averaging US$2.83 million per year in operating surplus generation). On the basis that the project is expected to generate operating surpluses throughout, the project can be considered as operationally viable.

The following figure reflects the operating viability of the project:

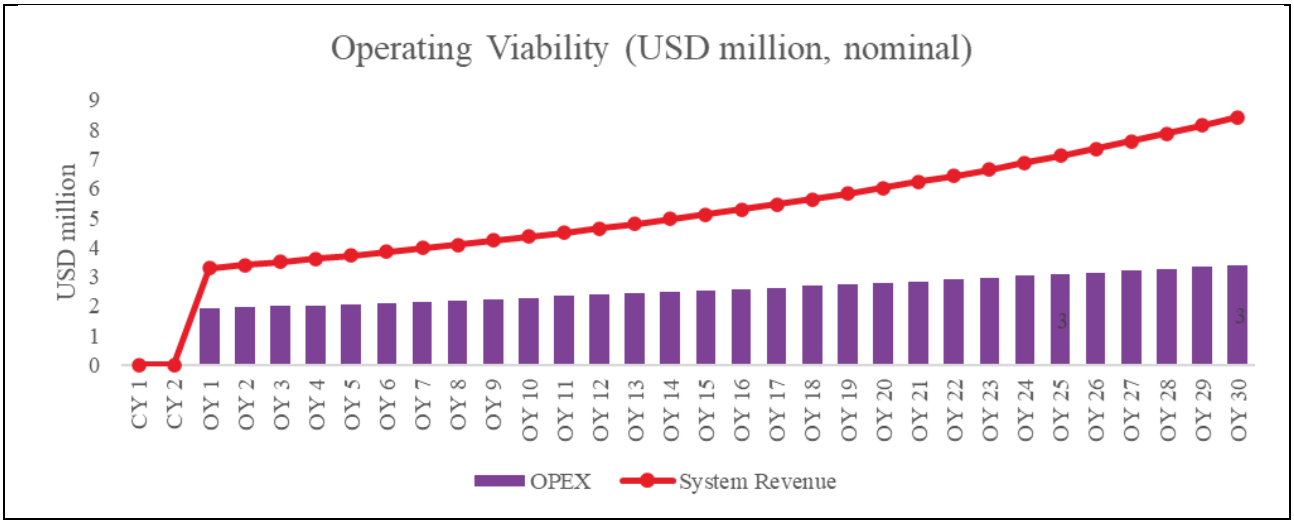



**Figure 12-6: Operating Viability**

## 12.7 Financial Viability Assessment

Financial viability of the project is assessed to determine whether the system revenue could cover CAPEX, REPEX and OPEX associated with the implementation and operations of the project.

As aforementioned, the project will accumulate US$162.89 million in system revenue and incur US$78.12 million in total OPEX over the 30-year operation period. With regards to CAPEX (nominal; without interest during construction, upfront fees and commitment fees), the project is expected to incur US$41.52 million during the 2-year construction period and with regards to REPEX (nominal), the project is expected to incur US$21.04 million during the operations period.

Taking into account of the total system revenue netted off with OPEX, CAPEX and REPEX, the project will generate a cumulative project cashflow surplus of approximately US$22.21 million (nominal) which infers that the project can be considered as financially viable on the basis the project is expected to generate enough system revenue to cover CAPEX, OPEX and REPEX within the operations period.

However, the cumulative project cashflow is expected to turn into a surplus (positive) only after OY 25, resulting in pre-tax project IRR of 2.23% and pre-tax project NPV of -US$21.56 million . This considerably low level of pre-tax project IRR and negative pre-tax project NPV infer that the project may not be justifiable as an investment without any financial support.

The following figure reflects the financial viability of the project:

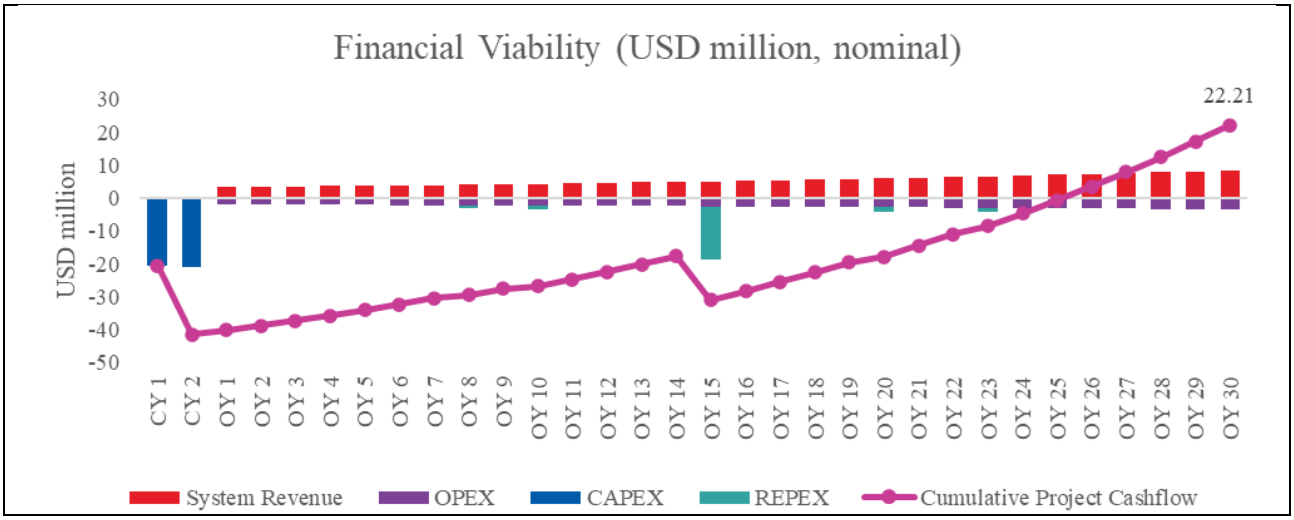



**Figure 12-7: Financial Viability**

## 12.8 Commercial Viability Assessment

Commercial viability of the project is assessed to determine whether the system revenue could cover CAPEX, REPEX, OPEX, financing and commercial (i.e., tax) costs associated with the operations of the project.

The project will incur US$2.87 million (nominal) in financing costs during construction period (i.e., upfront fee, commitment fee and interest during construction) and US$97.38 million (nominal) in financing costs during operations period (i.e., interest during operations). The project will incur no tax expenses because of the lack of profit before tax (i.e., taxable income) due to operating cashflow not being enough to cover depreciation and financing costs every year during the operations period.

With the assumption that financing costs during construction period will be capitalized (i.e., rolled up into loan balance), the project yields a cumulative free cashflow to equity of -US$ 36.99 million (nominal) and post-tax equity IRR of -12.72% by the end of the operations period. On the basis the project is not expected to generate enough system revenue to cover CAPEX, OPEX, REPEX, financing and commercial costs within the operation period, this project cannot be considered as "commercially viable", and the project requires support in the form of CAPEX reduction or increased operating revenue to ensure commercial viability.

The following figure reflects the commercial viability of the project:

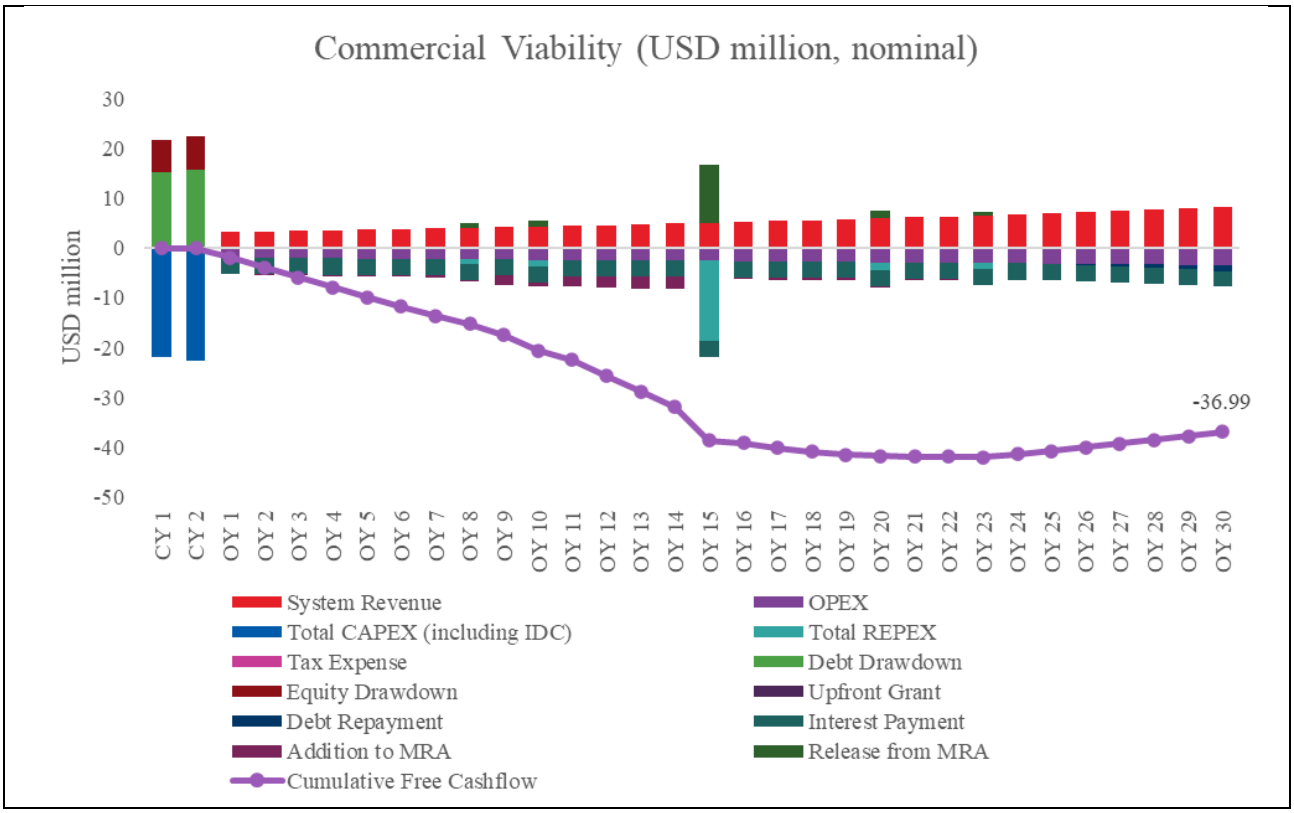



**Figure 12-8: Commercial Viability**

## 12.9 Financial Assessment – Requirements to Achieve Commercial Viability

Commercial viability may be achieved by applying the following options: (i) CAPEX reduction; (ii) additional operating revenue; or (iii) combination of both. In this Section, the requirements for each option will be analyzed to ensure the project will generate a post-tax equity IRR of 12%. This 12% hurdle rate was assumed based on a number of feedback received from market sounding exercises for other bus scheme procurement and transactions in Southeast Asia, which Arup was involved in. The 12% hurdle rate may be deemed acceptable for investors under the following conditions:

- That there is a balanced risk allocation for the bus scheme implementation and service delivery between the government procuring entity and the private sector party; and
- That private sector party is not expected to bear demand risk (ridership risk).

Prior to undertaking a scenario analysis, the Base Case scenario is defined as follows:

- Base Case scenario assumes that the Government delivers the public transport scheme, with financing in the form of a commercial loan

The following sub-sections now consider the following potential scenarios in order to achieve a target equity IRR of 12%:

- Scenario 1: CAPEX reduction applied to Base Case scenario
- Scenario 2: Increased operating revenue (as a proxy for operating subsidy required) applied to Base Case scenario
- Scenario 3: Combination of Scenarios 1 and 2 above applied to Base Case scenario

### 12.9.1 Scenario 1: CAPEX Reduction

In order to generate a post-tax equity IRR of 12%, the project requires a CAPEX reduction of US$31.25 million (nominal), which translates to a 75.27% in CAPEX, which is significant given that the Base Case scenario only yields -12.72% post-tax equity IRR. The CAPEX reduction requirement to achieve a post-tax equity IRR of 8%, 9%, 10% and 11% can also be seen below:

**Table 12-4: CAPEX Reduction Requirements**

| Post-Tax Equity IRR | % | 8% | 9% | 10% | 11% | 12% |
|---|---|---|---|---|---|---|
| CAPEX Reduction | US$, cumulative, nominal [A] | US$28.40 million | US$29.15 million | US$29.88 million | US$30.58 million | US$31.25 million |
| | % of reduction in CAPEX | 68.41% | 70.22% | 71.97% | 73.65% | 75.27% |

[A] Cumulative CAPEX incurred over the 2-year construction period

### 12.9.2 Scenario 2: Increased Operating Revenue

In order to generate a post-tax equity IRR of 12%, the project requires an additional US$4.28 million p.a. in operating revenue during the operation period, which translates to cumulative additional operating revenue of US$128.48 million over the operations period. The additional operating revenue requirement to achieve post-tax equity IRR of 8%, 9%, 10% and 11% can also be seen in the following table:

**Table 12-5: Additional Operating Revenue Requirements**

| Post-Tax Equity IRR | % | 8% | 9% | 10% | 11% | 12% |
|---|---|---|---|---|---|---|
| Additional Operating Revenue | US$, annual, nominal | US$3.25 million | US$3.46 million | US$3.70 million | US$3.98 million | US$4.28 million |
| | US$, cumulative, nominal [A] | US$97.47 million | US$103.89 million | US$111.09 million | US$119.36 million | US$128.48 million |
| | % increase in cumulative operating revenue | 59.84% | 63.78% | 68.20% | 73.30% | 78.87% |

[A] Cumulative OPEX over the 30-year operations period

### 12.9.3 Scenario 3: Combination of CAPEX Reduction and Increase Operating Revenue

There are numerous possible combinations of CAPEX reduction and additional operating revenue that may generate a post-tax equity IRR of 12%. The table below shows five possible combinations ranging from:

- Only applying CAPEX reduction;

- Only applying increase in operating revenue; and
- Combinations of CAPEX reduction on a decreasing scale, with a corresponding increase in operating revenue to achieve the target post-tax equity IRR of 12%.

**Table 12-6: Combination Requirements, Nominal**

| Post-Tax Equity IRR | % | 8% | 9% | 10% | 11% | 12% |
|---|---|---|---|---|---|---|
| **CAPEX Reduction** | US$, cumulative, nominal [A] | US$31.25 million | US$24.91 million | US$16.61 million | US$8.30 million | - |
| | % of reduction in CAPEX | 75.27% | 60.00% | 40.00% | 20.00% | - |
| **Additional Operating Revenue** | US$, cumulative, nominal [A] | - | US$26.46 million | US$60.39 million | US$94.27 million | US$128.50 million |
| | % increase in cumulative operating revenue | - | 16.24% | 37.07% | 57.87% | 78.87% |

[A] Cumulative CAPEX incurred over the 2-year construction period
[B] Cumulative OPEX over the 30-year operations period

The table above shows that higher CAPEX reduction will lead to no or lower additional operating revenue requirements. Achieving the target post-tax equity IRR through solely CAPEX reduction will require US$31.25 million, however achieving the target post-tax equity IRR through solely additional operating revenue will require a larger sum of US$128.50 million across the operation period. This significant difference is caused by time value of money whereby the additional operating revenue will be escalated by inflation over a 30-years operating period, while the CAPEX reduction will be escalated by inflation over the initial 2-year construction period.

The following table is another representation of the CAPEX reduction and additional operating revenue requirements in present value (PV) terms to disregard impacts from time value of money.[49] In PV terms, the requirement to achieve target post-tax equity IRR from solely CAPEX reduction or solely additional operating revenue is similar (i.e., US$24.79 million and US$31.26 million, respectively).

**Table 12-7: Combination Requirements, Present Value**

| Post-Tax Equity IRR | % | 12% | 12% | 12% | 12% | 12% |
|---|---|---|---|---|---|---|
| CAPEX Reduction | US$, cumulative, PV | US$24.79 million | US$19.76 million | US$13.18 million | US$6.59 million | - |
| Additional Operating Revenue | US$, cumulative, PV | - | US$6.44 million | US$14.70 million | US$22.94 million | US$31.26 million |

### 12.9.4 Sensitivity Analysis

A sensitivity analysis has been carried out on the Base Case scenario to understand the impact of loan interest rate reduction on the resulting post-tax equity IRR. Keeping all other technical, commercial and financial assumptions the same, the reduction of loan interest rate through the use of sovereign and concessional loan increases post-tax equity IRR, as below:

[49] Discounted with WACC of 9.73%

**Table 12-8: Loan Interest Rates Sensitivity Analysis**

| Loan Type | Interest Rate [A] | Post-Tax Equity IRR | Post-Tax Equity NPV | Change from Base Case |
|---|---|---|---|---|
| Base Case (Commercial Loan) | 10.50% | -12.72% | -US$ 23.38m | - |
| Sovereign Loan | 5.47% | -6.35% | -US$ 13.46m | + 6.37% |
| Concessional Loan | 2.00% | 1.59% | -US$ 8.85m | + 14.31% |

[A] Note: This sensitivity analysis only considers a reduction in interest rate (i.e., other financing costs such as upfront fee and commitment fee remain the same as Base Case, as detailed in Appendix F). Commercial loan interest rate is based on Timor-Leste's lending interest rate in February 2025, Banco Central de Timor-Leste. Sovereign loan interest rate is based on ADB's Regular OCR Flexible Loan Product, while concessional loan interest rate is based on ADB's Concessional Loan Product, ADB.

The utilization of concessional loan is able to turn the project's post-tax equity IRR positive (i.e., 1.59%). However, the project still results in a negative equity NPV of -US$8.85 million , which is considered unattractive for potential equity investors. Hence, optimizing loan interest rate through sovereign loan or concessional loan, in conjunction with CAPEX reduction and/or additional operating revenue, will be imperative to increase the project's commercial viability and attractiveness.

## 12.10 Preliminary Procurement Model Recommendation

Based on the operational, financial and commercial viability assessments, as well as the sensitivity analysis, it is recommended that the **Timor-Leste government to fully deliver the public transport system**. Despite being operationally and financially viable, the project will still likely be unattractive and unmarketable to the private sector because of the project's inability to provide equity returns for potential investors (i.e., not commercially viable), unless the public transport system costs can be reduced without jeopardizing service quality, or operating subsidies are provided to private sector parties.

There is potential for the project to be commercially viable through the realization of CAPEX reduction, additional operating revenue and loan interest reduction, and the Timor-Leste Government is likely to be better placed to realize these because the Timor-Leste Government should be eligible for official development assistance (ODA) from development banks in the form of an upfront grant that could be used to reduce the project's CAPEX burden and also in the form of sovereign or concessional loan which would have lower interest rates than commercial loans to reduce overall financing costs of the project.

# 13. Economic Assessment

## 13.1 Background

The Public Transport Master Plan 2024 for Timor-Leste has identified key issues affecting the country's public transport system and outlines an investment program aimed at achieving the plan's vision. A feasibility study was conducted for the priority investment program covering preliminary designs, route reorganization, technical assessments, project costing, environmental and social assessments, economic and financial assessments. The study evaluated selected projects including development and improvement of ten public transport facilities (such as terminals and bus stops), the introduction of a pilot bus service using larger capacity buses, integrated courier service, and traffic management and improvement at city level in Dili. These components are proposed for inclusion in a project to be funded by the Asian Development Bank (ADB). An economic evaluation of the proposed project components was undertaken in accordance with the ADB Guidelines for the Economic Analysis of Projects.[50]

## 13.2 Economic Evaluation Approach

Economic analysis was carried out by estimating the incremental costs and benefits to the society under two scenarios, namely "without project" and "with-project" scenarios. The "without project" scenario represent the current state of public transport facilities and operations. The "with-project" scenario encompasses implementation of proposed project components and the resulting improvement in operation of the public transport system. The capital and operation costs of the proposed project were estimated based on the project preliminary design and operational planning.

The project will improve mobility within and around the terminal facilities, improve time spent at various stages of public transport travel, encourage shift to public transport from private vehicles, improve passenger safety and experience at bus terminals and bus stops, improve public transport operation, improve travel speed on Dili city road network, reduce greenhouse gas (GHG) emission with improved vehicle circulation and create employment opportunities. The study estimated a five percent shift from private modes to public transport modes with the project improvements compared to without project situation. Potential benefits identified by the project are indicated in Table 13-1. Estimates of each of the identified benefit parameters were made both for the without and with project option over the analysis period. Analysis and estimates were made based on projected traffic, estimated changes in speeds and public transport usage and other project design aspects.

**Table 13-1: List of Identified Project Benefits**

| No. | Potential Benefits | Description |
|---|---|---|
| 1 | Travel time and vehicle operating cost savings (vehicles) | Reduction in peak hour travel time spent for all vehicles due to speed improvements around the terminal facility (about 1 km around the site) |
| 2 | Travel time savings (passenger) | Reduction in peak hour travel time spent for all passengers due to speed improvements around the site |
| 3 | Travel time savings (pedestrians) | Reduction in peak hour travel time spent by pedestrians using the sidewalk in front of the terminal due to sidewalk improvements |
| 4 | Perceived waiting time savings | Perceived waiting time savings due to facility improvements (better waiting experience) |
| 5 | Operation time savings for public transport in terminal | Reduction in total operating time within the terminal (including unloading, loading, layover and moving time from entry to exit) |
| 6 | Employment creation at terminal | Jobs created due to provision of commercial rental space |
| 7 | Direct travel time savings for pilot bus passengers | Reduction in travel time spent in pilot buses compared to microlet due to speed improvements |
| 8 | Perceived travel time savings for pilot bus passengers | Perceived travel time savings due to vehicle improvements (better in-vehicle experience) |
| 9 | Waiting time savings for pilot bus passengers at stops | Reduction in accumulated passenger waiting time at stop due to scheduled services provided by pilot bus (compared to microlets with longer dwell time thus longer waiting time at stop) |

[50] Asian Development Bank. 2017. Guidelines for the Economic Analysis of Projects. Manila.

| No. | Potential Benefits | Description |
|---|---|---|
| 10 | Reduced incidents of sexual harassment against women | Reduction in number of sexual harassment incidents against female users due to larger space and safety in vehicle |
| 11 | Travel Time Savings for Vehicles at City Level | Reduction in travel time spent in vehicles due to speed improvements (due to traffic and parking improvement in Dili) |
| 12 | Vehicle operating cost (VOC) savings and GHG emission reduction | Reduction of VOC and GHG emissions due to expected shift from private vehicle to public transport, speed increase and reduced driving in private vehicles |
| 13 | Accidents reduction | Reductions of accidents (including light injury, heavy injury and fatalities) due to mode shift and reduced driving |
| 14 | Employment Opportunities from Courier Service | Jobs created due to provision of courier service facilities (such as logistics/distribution center) |

Economic viability can be expressed with a number of indicators incorporating the concept of discounting and two of these have been calculated from the annual cost and benefit streams; the Net Present Value (NPV) and the Economic Internal Rate of Return (EIRR). Normally the NPV and EIRR will give the same indications of viability. The NPV is the difference between the present value of costs and the present value of benefits. If the NPV is greater than zero the project is considered to be viable. The EIRR is the discount rate at which the present value of benefits equals the present value of costs, and thus provides a measure of the return on an investment that illustrates the rate of return more readily than the NPV criterion. If it exceeds the required discount rate then the project is considered viable. For the current project a discount rate of 9% is considered as per ADB guidelines.

The economic evaluation was conducted using constant prices without taking the impact of inflation on prices. Project costs and benefits are valued in 2025 prices. Costs and benefits are valued in monetary terms and expressed in economic prices to avoid distortions in the input prices of labor, materials, equipment and foreign exchange due to market imperfections by removing taxes and applying shadow exchange rate and shadow wage rate factors. Timor-Leste use United States Dollar (USD) as its currency and the evaluation was conducted using US$ as the unit of currency. With all transactions conducted in Timor-Leste in US Dollar, shadow exchange rate factor (SERF) is taken as 1.0. A shadow wage rate factor (SWRF) of 0.6 for unskilled labor was adopted from previous analysis.[51] The project implementation is expected to commence in 2026 and an operational period of 30 years starting in 2028 following the construction completion in 2028 was considered for the analysis.

## 13.3 Economic Costs

The economic costs of the project comprise (i) capital investment for civil works including social and environmental mitigation measures, construction management, and physical contingencies; and (ii) operation and maintenance cost over the life of the project. Construction and testing is expected to take two and half years starting from 2026 and complete by mid-2028. The work will mainly be carried out away from existing traffic lanes and expect only limited traffic flow disruption during the implementation and no additional road user cost due to disruption during construction was considered.

Financial costs are converted to economic costs in line with ADB guidelines. The project investment cost is given in Table 13-2. During operation, the project will incur operation and maintenance costs as well as renewal of facilities after a period of time. The operation and maintenance costs is estimated at $1.815 million per year. Renewal or replacement of facilities will be required in the case of some of the bus facilities and systems and include renewal of bus facilities at Terminals in year 15, replacement of ITS facilities at year 15, replacement of transit hub facilities every 10 years, and pilot bus replaced every 15 years. These costs are added to the operation and maintenance costs.

**Table 13-2: Project Investment Costs (2025)**

| Intervention | Financial cost [A] (excluding tax), US$ million | Conversion factor | Economic cost, US$m |
|---|---|---|---|
| Bus Terminal and facilities | 15.18 | 0.964[b] | 14.63 |

[51] Proposed Loans for Additional Financing Democratic Republic of Timor-Leste: Road Network Upgrading Sector Project, Report and Recommendation of the President to the Board of Directors, Asian Development Bank, November 2015

| Intervention | Financial cost [A] (excluding tax), US$ million | Conversion factor | Economic cost, US$m |
|---|---|---|---|
| Pilot Bus service | 9.45 | 0.982 [C] | 9.28 |
| Traffic Management | 4.85 | 0.964 [B] | 4.68 |
| Consulting services | 3.43 | 1.000 [D] | 3.43 |
| Contingency (20%) | 6.58 | 0.972 | 6.40 |
| **Total excluding taxes** | **39.50** | | **38.42** |

Source: Consultants estimates
Note:
[A] Project cost based on preliminary designs (2025 prices) excluding 2% local tax
[B] Considering 6% unskilled labor at a SWRF of 0.6
[C] Considering 3% unskilled labor at a SWRF of 0.6
[D] No unskilled labor component

## 13.4 Economic Benefits

The project will provide several benefits as listed in Table 13-1. The main quantifiable economic benefits are vehicle operating cost (VOC) savings, savings in travel time, employment creation, improved safety for passengers and environmental benefits from reduced vehicle emissions. There are also potential for reduced wait times with increased bus frequency and improved perception of waiting time with improved facilities. Benefits related to wait times are not considered in the analysis. Reduced wait times are related to bus operation and not enough information to value improved perception of wait time.

**Vehicle operating cost savings.** Unit VOC costs at different speed levels were estimated and used to arrive at the total vehicle operating cost in the without and wit project scenarios. To quantify unit VOC values, HDM-4 model developed for Tasitolu to Airport Junction road project in 2021 was used. The prices were updated to 2025 prices considering inflation.

**Travel time cost savings.** Travel time savings based on improved traffic operation have been monetized by applying values of time estimated for different categories of road users. Values of time was estimated from average household income data from surveys and updated to 2025 value by applying per capita income growth rate of 2 percent per annum. The value of time estimated is given in Table 13-3. Non-working time is valued at 30% of working time.

**Table 13-3: Adopted Values of Passenger Working and Non-Working Time**

| Vehicle Type | Value of Working Time (US$/hour) | Value of Non-Working Time (US $/hour) |
|---|---|---|
| Car/SUV | 3.07 | 0.92 |
| Bus & motorcycle | 1.02 | 0.31 |

Source: Consultants estimates

The proposed project will lead to reductions in greenhouse gas (GHG) emissions due to mode shift, improved traffic operation and improved speeds. Emissions reductions were calculated by comparing emissions "without-project" and "with-project", with the emissions under the two scenarios calculated using emission factors. The reduction in GHG emissions was valued at US$59.5 per Ton in 2025 prices (2024 value of US$57.0 used for ADB projects increased by world inflation rate of 4.3% for 2025).[52] The economic cost of GHG emission is escalated at 2% per annum in real terms for the analysis period for benefit estimation.

The improved circulation in the terminals and the surrounding areas and reduced private vehicle travel is likely to have road safety benefits in terms of reduced traffic crashes and resulting fatalities, injuries and damages. The crash rate data also indicate a higher crash rate in the case of non-public transport modes and the shift to public transport modes reduce overall crash incidences. Road safety benefits are valued at seventy times the per capita income for fatalities and for injuries at 10 percent of fatality rate.[53] The valuation of crash related costs are escalated at 2% per annum in real terms.

[52] International Monetary Fund, World Economic Outlook Database, April 2025
[53] The unit value of fatalities and injuries was based on International Road Assessment Programme (iRAP). 2016. Star Ratings and Investment Plans: Data Analysis and Reporting Specification. London

The project will also create employment at the kiosks built at the public transport hubs and the hybrid courier service facility. Employment generated are valued at a monthly minimum wage rate of US$112. Each kiosk will employ 2 persons resulting in a total number of 248 jobs created across all at kiosks. Also, the courier service facility will generate a total of 96 jobs. The valuation of employment created are escalated at 2% per annum in real terms.

## 13.5 Results of Economic Analysis

An economic analysis of the proposed project investments was carried out following the Asian Development Bank's (ADB) guidelines. The analysis compared the incremental benefits with the initial investment costs and operation and maintenance costs over 30 years of operation. The main assumptions used are listed in Table 13-4.

**Table 13-4: Main Assumptions for Economic Analysis**

| Assumption | Value |
|---|---|
| Price base year | 2025 |
| Discount year | 2025 |
| Currency of analysis | US dollar |
| Construction start year | 2026 |
| Construction end year | 2028 |
| First year of benefits | 2029 |
| Appraisal period | 3 years of implementation and 30 years of operation |
| Numeraire used | Domestic price numeraire |
| Value of time (in work, 2022) | $3.07/hour (car passengers)<br>$1.02/hour (bus passengers) |
| Value of time (non-work, 2022): | $0.92/hour (car)<br>$0.31/hour (bus passengers) |
| GDP growth assumption | 2024-2030: 3.1%; 2031-2040: 2.5%<br>Beyond 2040: 2.0% |
| Shadow wage rate factor | 0.6 (unskilled) |
| Shadow exchange rate factor | 1.0 |
| Conversion factor applied to construction | 0.964 |
| Conversion factor applied to taxes, duties, transfers | 0.00 |

Source: Consultants' estimates

The results of the economic analysis are summarized in Table 13-5, expressed in terms of the key economic indicators: benefit–cost ratio, economic internal rate of return (EIRR), and net present value (NPV) at a 9% discount rate. The project economic analysis demonstrates economic viability with an EIRR of 16.7%. The cost and benefit streams for the overall project are provided in Table 13-7.

**Table 13-5: Results of Economic Analysis**

| Project Description | EIRR (%) | NPV ($m) | Benefit-Cost Ratio |
|---|---|---|---|
| Public Transport Facilities | 16.7 | 27.8 | 1.94 |

Notes:
EIRR = economic internal rate of return; NPV = net present value
NPV uses a 9% discount rate

Sensitivity tests were carried out to determine the effect of variations in key input parameters. Table 13-6 shows the results of sensitivity tests which indicates overall project is economically viable even with significant adverse variations. Overall project EIRR is over the threshold of 9.0% if costs are increased and benefits are reduced by 23% each.

**Table 13-6: Sensitivity Analysis Results – Overall Project**

| Case | EIRR % | NPV, $m | Switching value |
|---|---|---|---|
| Base case | 16.7 | 27.8 | - |
| Cost +20% | 13.5 | 18.5 | +60% |
| Benefits -20% | 12.9 | 13.0 | -37% |
| No Emission, Accident and employment benefits | 13.6 | 15.2 | - |
| Two-year delay | 15.0 | 21.7 | - |
| Cost+20% & benefits -20% | 10.0 | 3.7 | +/-23% |

| Case | EIRR % | NPV, $m | Switching value |
|---|---|---|---|

Notes:
EIRR = economic internal rate of return, NPV = net present value.
Switching value indicate the percentage change in variable which will result in an NPV of zero and EIRR becomes 9.0%.

## Table 13-7: Cost and Benefit Streams (2025 Domestic Prices, US$m, Undiscounted)

| Year | Incremental costs | | Incremental benefits | | | | | Net Benefits |
|---|---|---|---|---|---|---|---|---|
| | Capital works | Recurrent works | VOC savings | Time savings | Emission reductions | Crash reduction | Employment creation | |
| 2025 | 0.0 | - | - | - | - | - | - | - |
| 2026 | 9.61 | - | - | - | - | - | - | (9.61) |
| 2027 | 19.21 | - | - | - | - | - | - | (19.21) |
| 2028 | 9.61 | - | - | - | - | - | - | (9.61) |
| 2029 | - | 1.81 | 0.92 | 5.23 | 0.36 | 0.33 | 0.46 | 5.50 |
| 2030 | - | 1.81 | 1.24 | 7.02 | 0.50 | 0.45 | 0.47 | 7.86 |
| 2031 | - | 1.81 | 1.25 | 7.05 | 0.51 | 0.46 | 0.48 | 7.95 |
| 2032 | - | 1.81 | 1.26 | 7.09 | 0.53 | 0.47 | 0.49 | 8.03 |
| 2033 | - | 1.81 | 1.27 | 7.13 | 0.55 | 0.48 | 0.50 | 8.12 |
| 2034 | - | 1.81 | 1.28 | 7.17 | 0.57 | 0.49 | 0.51 | 8.20 |
| 2035 | 0.76 | 1.81 | 1.29 | 7.21 | 0.58 | 0.50 | 0.52 | 7.53 |
| 2036 | - | 1.81 | 1.30 | 7.25 | 0.60 | 0.51 | 0.53 | 8.38 |
| 2037 | 1.01 | 1.81 | 1.31 | 7.29 | 0.62 | 0.52 | 0.54 | 7.47 |
| 2038 | - | 1.81 | 1.32 | 7.33 | 0.64 | 0.54 | 0.55 | 8.57 |
| 2039 | - | 1.81 | 1.33 | 7.37 | 0.66 | 0.55 | 0.56 | 8.66 |
| 2040 | - | 1.81 | 1.34 | 7.41 | 0.68 | 0.56 | 0.57 | 8.76 |
| 2041 | - | 1.81 | 1.35 | 7.45 | 0.71 | 0.57 | 0.59 | 8.85 |
| 2042 | 11.44 | 1.81 | 1.36 | 7.49 | 0.73 | 0.58 | 0.60 | (2.49) |
| 2043 | 0.76 | 1.81 | 1.37 | 7.53 | 0.75 | 0.60 | 0.61 | 8.29 |
| 2044 | - | 1.81 | 1.38 | 7.58 | 0.78 | 0.61 | 0.62 | 9.15 |
| 2045 | - | 1.81 | 1.40 | 7.62 | 0.80 | 0.62 | 0.63 | 9.26 |
| 2046 | - | 1.81 | 1.41 | 7.66 | 0.83 | 0.64 | 0.65 | 9.36 |
| 2047 | 1.01 | 1.81 | 1.42 | 7.70 | 0.85 | 0.65 | 0.66 | 8.47 |
| 2048 | - | 1.81 | 1.43 | 7.74 | 0.88 | 0.66 | 0.67 | 9.58 |
| 2049 | - | 1.81 | 1.44 | 7.79 | 0.91 | 0.68 | 0.69 | 9.69 |
| 2050 | - | 1.81 | 1.45 | 7.83 | 0.94 | 0.69 | 0.70 | 9.80 |
| 2051 | 0.76 | 1.81 | 1.47 | 7.87 | 0.97 | 0.71 | 0.71 | 9.16 |
| 2052 | - | 1.81 | 1.48 | 7.92 | 1.00 | 0.72 | 0.73 | 10.04 |
| 2053 | - | 1.81 | 1.49 | 7.96 | 1.03 | 0.74 | 0.74 | 10.16 |
| 2054 | - | 1.81 | 1.50 | 8.01 | 1.07 | 0.76 | 0.76 | 10.28 |
| 2055 | - | 1.81 | 1.51 | 8.03 | 1.09 | 0.77 | 0.77 | 10.37 |
| 2056 | - | 1.81 | 1.52 | 8.05 | 1.12 | 0.79 | 0.79 | 10.46 |
| 2057 | - | 1.81 | 1.52 | 8.07 | 1.15 | 0.81 | 0.80 | 10.55 |
| 2058 | - | 1.81 | 1.53 | 8.10 | 1.18 | 0.82 | 0.82 | 10.64 |
| | | | | | | | **EIRR (%)** | **16.7** |
| | | | | | | | **NPV ($ million)** | **27.80** |

EIRR = economic internal rate of return, NPV = net present value.
Source: Consultants' estimate

# 14. Conclusion

## 14.1 Summary

This feasibility study provides a comprehensive assessment of public transport investments in Timor-Leste, with a focus on bus terminals and on-street interchanges supported by six complementary reform programs, aligned with the Government of Timor-Leste's policy objectives and ADB's strategic priorities. Key findings are as follows:

- **Technical Feasibility Assessment** – From a technical perspective, all ten priority facilities can be delivered within the proposed footprints based on the site assessment, with facility schemes/design developed for each site. Preliminary facility designs incorporate appropriate sizing assumptions, passenger circulation arrangements, accessibility standards, and provisions for future service expansion. Social and land-related impacts are limited, with potential impacts identified primarily in relation to access road improvements at selected sites (such as Manleuana). Climate-resilient design measures, including improved drainage systems and flood mitigation considerations (such as retention pond, rainwater storage), have been integrated into facility schemes and designs to address identified climate and hazard risks.

- **Environment –** The proposed works for the bus terminal development are generally expected to be site specific and of short duration, and any potential impacts are expected to be reversible and short term in nature mainly occurring during the construction stage. Key actions are identified to prepare an initial environmental examination during project implementation to ensure compliance with national regulations and ADB safeguard requirements.

- **Gender Equality and Social Inclusion** – The Gender equality and social inclusion considerations have been integrated into facility design. Public transport facilities will incorporate universal accessibility features, improved lighting, safe waiting areas, and design elements responding to the mobility needs of women, elderly persons, and persons with disabilities. A Gender Equality and Social Inclusion Action Plan was prepared to support inclusive participation, employment opportunities, and safer public transport environments

- **Supporting Public Transport Reform Programs** – The supporting public transport reform programs assessed in this study reinforce the infrastructure investments and provide a pathway for longer-term system transformation. In particular, the Dili pilot bus project, traffic management, and hybrid courier services offer opportunities to demonstrate improved service quality and efficient movement of people and goods, while reforms to fare structure, microlet operations, and emissions standards support transition to sustainable public transport system that meets the needs of users for safety, security, convenience, affordability, accessibility and availability.

- **Total Project Cost** – The total indicative cost (inclusive of 20% contingency) is estimated at about US$40.4 million, including (i) US$18.4 million for bus terminal & on-street interchange (45.4%); (ii) US$12.4 million for pilot bus project (30.9%); (iii) US$0.6 million for public transport fare structure (1.5%); (iv) US$6.6 million for traffic management program (16.3%); (v) US$0.6 million for stringent emission standards for microlet fleet replacement (1.5%); (vi) US$1.2 million for hybrid courier service model (3.0%); and US$0.6 million for microlet operation framework (1.5%).

**Table 14-1: Total Project Cost by Component**

| # | Component | Total Cost – Unrounded (US$) [A] | Total Cost (US$) – Rounded to the Nearest Thousand [A, B] | % | Type of Improvements / Assumptions |
|---|---|---|---|---|---|
| 1 | Bus Facilities | 18,383,735 | 18,384,000 | 45.4% | • 5 bus terminals and 5 on-street interchanges with provision of innovative measures, access road/walk improvements, climate change facilities<br>• Cost includes bus terminal cost, consulting service (public outreach), capacity building, and social development program. |
| 2 | Polit Bus Project | 12,412,320 | 12,413,000 | 30.9% | • Proposed 25.6km round trip service with 59 bus stops<br>• 10 buses (9m Euro 5 diesel city bus) |

| # | Component | Total Cost – Unrounded (US$) [A] | Total Cost (US$) – Rounded to the Nearest Thousand [A, B] | % | Type of Improvements / Assumptions |
|---|---|---|---|---|---|
| | | | | | • 1 depot to accommodate the fleet with ITS enhancement<br>• Cost includes bus system cost, consulting service, capacity building, and social development program. |
| 3 | Public Transport Fare Model | 600,000 | 600,000 | 1.5% | • Consulting services for developing specifications of fare collection system<br>• Cost includes consulting service (i.e., feasibility study) |
| 4 | Traffic Management | 6,588,960 | 6,589,000 | 16.3% | • Traffic circulation modifications & ITS traffic enhancement<br>• Key intersection improvements (including signals & crossings)<br>• On-street parking meter facilities, and off-street parking facilities<br>• Cost includes traffic/parking facilities cost, consulting service, capacity building, and social development program. |
| 5 | Stringent Emission Standards | 600,000 | 600,000 | 1.5% | • 10% of existing microlet fleet in Dili (~90 vehicles) assumed to be replaced by more environmentally friendly vehicles (i.e., Euro 4/5 class)<br>• Cost includes consulting service (i.e., feasibility study) |
| 6 | Hybrid Courier Service Model | 1,164,000 | 1,164,000 | 3.0% | • Provision of logistics storage facilities including 3 gateway storage hub and 6 regional storage hub<br>• Cost includes storage facilities cost, consulting service (public outreach), capacity building, and social development program. |
| 7 | Microlet Operation Framework | 600,000 | 600,000 | 1.5% | • Consulting services to develop institutional framework<br>• Corporate branding, marketing, public outreach, social development program |
| **Total** | | **40,349,015** | **40,350,000** | | |

Notes:
[A] All cost items are inclusive of 20% contingency.
[B] The total cost in this table may not match with that of financial section (Section 12) due to rounding and that of economic section (Section 13) due to conversion factors used to generate the cost required for economic analysis.

- **Financial Analysis –** Based on the operational, financial and commercial viability assessments, as well as the sensitivity analysis, it is recommended that the Timor-Leste government to fully deliver the public transport system. Despite being operationally and financially viable, the project will still likely be unattractive and unmarketable to the private sector because of the project's inability to provide equity returns for potential investors (i.e., not commercially viable), unless the public transport system costs can be reduced without jeopardizing service quality, or operating subsidies are provided to private sector parties. There is potential for the project to be commercially viable through the realization of CAPEX reduction, additional operating revenue and loan interest reduction, and the Timor-Leste Government is likely to be better placed to realize these because the Timor-Leste Government should be eligible for official development assistance (ODA) from development banks in the form of an upfront grant that could be used to reduce the project's CAPEX burden and also in the form of sovereign or concessional loan which would have lower interest rates than commercial loans to reduce overall financing costs of the project

- **Economic Assessment –** Economic analysis demonstrates that the project generates substantial economic benefits through travel time savings, improved operational efficiency, enhanced road safety, reduced congestion, and environmental improvements. The project contributes to improved productivity by facilitating access to employment, education, healthcare, and markets across urban and regional areas. The project is economically viable under conservative assumptions. The overall economic internal rate of return of the project over its 30-year operation period is estimated to be 16.7%, exceeding the 9.0% threshold. Sensitivity analysis indicates that the project remains robust under variations in investment costs and demand projections due to the broad system-wide benefits generated by improved transport organization and service reliability.

- **Institutional Arrangements and Governance** – Institutional capacity constraints represent a cross-cutting risk to implementation. The study therefore proposes phased implementation, transitional management arrangements, and targeted capacity building to align project scope with institutional readiness (with MOTC/DNTT assuming primary responsibilities prior to the establishment of a Land Transport Authority). This approach reduces risk while preserving the long-term vision of a modern, integrated public transport system.

In conclusion, the proposed Timor-Leste Public Transport Project represents a sound and strategic investment that directly addresses the country's most pressing public transport challenges while laying a credible foundation for longer-term, system-wide reform. By prioritizing well-designed, climate-resilient bus terminals and on-street interchanges, the project responds to immediate operational inefficiencies, safety concerns, and accessibility gaps that currently undermine the performance and attractiveness of public transport services across both urban and regional contexts. Furthermore, the feasibility study provides a robust basis for ADB loan preparation, supports informed decision-making by the Government of Timor-Leste, and establishes a coherent framework for sequencing future public transport investments and reforms.

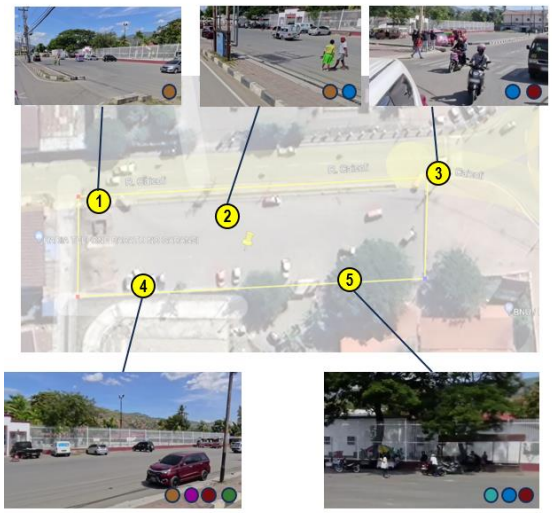
## 14.2 Next Steps

While the feasibility study assesses a comprehensive public transport investment and reform package, it also recognizes that components differ in readiness and complexity. In particular, elements related to supporting public transport reform programs (such as pilot bus, traffic management, fare structure, fleet emissions standards, hybrid courier service, and microlet operation framework) are assessed at a strategic or pre-feasibility level and will require further development. After completion of this study, it is expected that the government will initiate DED preparation for priority facilities based on the results of this feasibility study.

# Appendix A

## Bus Facility Enhancement Toolkit & Observed Issues by Site

# A.1 Dili Convention Center




| ❶ Orderly / Organized | |
|---|---|
| 1-1 | Passenger and vehicle areas are mixed |
| 1-2 | All types of vehicle mixed together, no dedicated area |
| 1-3 | No clear zones for loading/unloading, circulation areas etc. |
| 1-4 | One-Way Operation |
| 1-5 | Paved surface with pothole |
| 1-6 | No offices for operators and administrators |
| 1-7 | No preparate road marking and signage |
| 1-8 | Inadequate lighting systems |
| 1-9 | Key junction are not signalised |
| 1-10 | Access require upgrade to be highly accessibility |
| 1-11 | Illegal parking of private vehicle |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No dedicated PUDO for private vehicle |
| 2-2 | No zone provision for multi-model interchange |
| 2-3 | Small shelter size and require upgrade |
| 2-4 | Small number of benches |
| 2-5 | Existing retail or kiosk are not well organised |
| 2-6 | No ticket information center |
| 2-7 | No toilet at terminal |
| 2-8 | No wayfinding signage in the terminal |
| 2-9 | Walk system require upgrade to be highly accessibility |

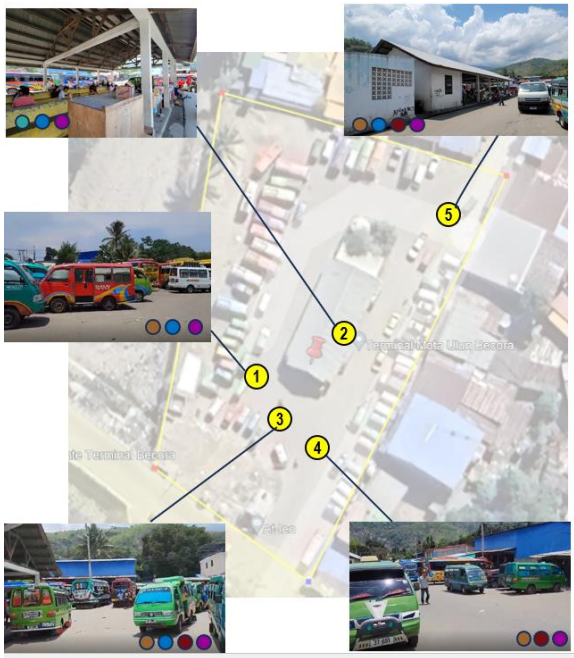
| ❸ Inclusive | |
|---|---|
| 3-1 | No accessibility ramp at crosswalk |
| 3-2 | No dedicated sidewalk in terminal |
| 3-3 | No tactile pavement provision |
| 3-4 | No Crime Prevention Through Environmental Design |

| ❹ Secure | |
|---|---|
| 4-1 | No CCTV facilities provision |
| 4-2 | No lighting systems |
| 4-3 | No guard room/ security person |

| ❺ Safe | |
|---|---|
| 5-1 | No dedicated sidewalk in terminal |
| 5-2 | No crosswalk at key junction |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No good landscaping |
| 6-2 | No rainwater treatment system provision |

# A.2 Becora Terminal




| ❶ Orderly / Organized | |
|---|---|
| 1-1 | Passenger and vehicle areas are mixed |
| 1-2 | All types of vehicle mixed together, no dedicated area |
| 1-3 | No clear zones for loading/unloading, circulation areas etc. |
| 1-4 | Two-way operation existing in the terminal |
| 1-5 | Paved surface but not good maintained |
| 1-6 | No offices for operators and administrators |
| 1-7 | No preparate road marking and signage |
| 1-8 | Inadequate lighting systems |
| 1-9 | Key junction are not signalised |
| 1-10 | Access require upgrade to be highly accessibility |
| 1-11 | Illegal parking of private vehicle |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No dedicated PUDO for private vehicle |
| 2-2 | No zone provision for multi-model interchange |
| 2-3 | Existing shelter is old and require upgrade |
| 2-4 | Existing Bench require upgrade |
| 2-5 | Existing retail or kiosk are not well organised |
| 2-6 | No ticked/information centre at terminal |
| 2-7 | No toilet at terminal |
| 2-8 | No wayfinding signage in the terminal |
| 2-9 | Walk system require upgrade to be highly accessibility |

| ❸ Inclusive | |
|---|---|
| 3-1 | No accessibility ramp at crosswalk |
| 3-2 | No dedicated sidewalk in terminal |
| 3-3 | No tactile pavement provision |
| 3-4 | No Crime Prevention Through Environmental Design |

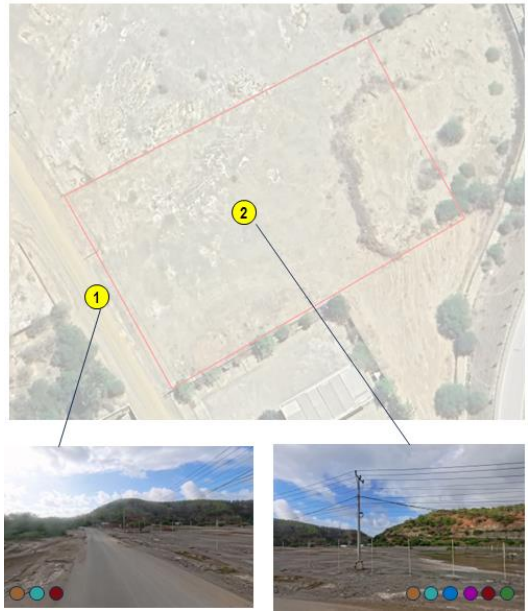
| ❹ Secure | |
|---|---|
| 4-1 | No CCTV facilities provision |
| 4-2 | Inadequate lighting systems |

Notes: A guard post located at the entrance.

| ❺ Safe | |
|---|---|
| 5-1 | No dedicated sidewalk in terminal |
| 5-2 | No crosswalk at key junction |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No good landscaping |
| 6-2 | No rainwater treatment system provision, potential flooding risk |

# A.3 Tibar Terminal








| ❶ Orderly / Organized | |
|---|---|
| 1-1 | No facilities were provided as there was no existing terminal |
| 1-2 | |
| 1-3 | |
| 1-4 | |
| 1-5 | |
| 1-6 | |
| 1-7 | |
| 1-8 | |
| 1-9 | |
| 1-10 | Access road require upgrade to be highly accessibility |
| 1-11 | No facilities were provided as there was no existing terminal |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No facilities were provided as there was no existing terminal |
| 2-2 | |
| 2-3 | |
| 2-4 | |
| 2-5 | |
| 2-6 | |
| 2-7 | |
| 2-8 | |
| 2-9 | Walk system require upgrade for external road to be highly accessibility |

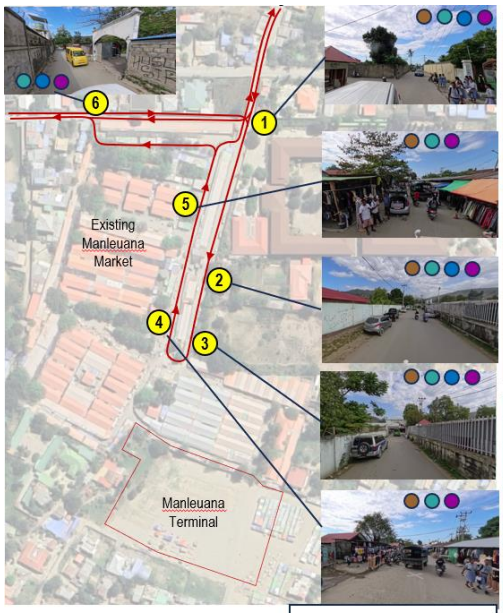
| ❸ Inclusive | |
|---|---|
| 3-1 | No facilities were provided as there was no existing terminal |
| 3-2 | |
| 3-3 | |
| 3-4 | |

| ❹ Secure | |
|---|---|
| 4-1 | No facilities were provided as there was no existing terminal |
| 4-2 | |
| 4-3 | |

| ❺ Safe | |
|---|---|
| 5-1 | No facilities were provided as there was no existing terminal |
| 5-2 | No crosswalk |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No facilities were provided as there was no existing terminal |
| 6-2 | |

# A.4 Manleuana Market














| ❶ Orderly / Organized | |
|---|---|
| 1-1 | Passenger and vehicle areas are mixed at Manleuana Market |
| 1-2 | All types of vehicle mixed, no dedicated area at Manleuana Market |
| 1-3 | No clear zones for loading/unloading, circulation areas etc. at Manleuana Market |
| 1-4 | |
| 1-5 | Paved surface but not good maintained at Manleuana Market |
| 1-6 | No offices for operators and administrators currently |
| 1-7 | No preparate road marking and signage at Manleuana Market |
| 1-8 | Inadequate lighting systems |
| 1-9 | Key junction are not signalised |
| 1-10 | the circulation need to be optimized, and access road require upgrade to be highly accessibility |
| 1-11 | Illegal parking of private vehicle and motorcycle at Manleuana Market and access road |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No dedicated PUDO for private vehicle |
| 2-2 | No zone provision for multi-model interchange |
| 2-3 | No covered passenger area at Manleuana Market |
| 2-4 | No bench provided |
| 2-5 | Existing retail or kiosk are not well organised |
| 2-6 | No ticked/information centre at Manleuana Market |
| 2-7 | No toilet at Manleuana Market |
| 2-8 | No wayfinding signage at Manleuana Market |
| 2-9 | Walk system require upgrade to be highly accessibility at Manleuana Market and access road |

| ❸ Inclusive | |
|---|---|
| 3-1 | No crosswalk |
| 3-2 | No dedicated sidewalk at Manleuana Market and access road |
| 3-3 | No tactile pavement provision |
| 3-4 | No Crime Prevention Through Environmental Design at Manleuana Market |

| ❹ Secure | |
|---|---|
| 4-1 | No CCTV facilities provision |
| 4-2 | Inadequate lighting systems at Manleuana Market |
| 4-3 | No guard room/ security person at Manleuana Market |

| ❺ Safe | |
|---|---|
| 5-1 | No dedicated sidewalk at Manleuana Market and access road |
| 5-2 | No crosswalk at key junction |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No good landscaping at Manleuana Market |
| 6-2 | No rainwater treatment system provision |

# A.5 Hera Terminal


| ❶ Orderly / Organized | |
|---|---|
| 1-1 | No facilities were provided as there was no existing terminal |
| 1-2 | |
| 1-3 | |
| 1-4 | |
| 1-5 | |
| 1-6 | |
| 1-7 | |
| 1-8 | |
| 1-9 | |
| 1-10 | Access road require upgrade to be highly accessibility |
| 1-11 | No facilities were provided as there was no existing terminal |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No facilities were provided as there was no existing terminal |
| 2-2 | |
| 2-3 | |
| 2-4 | |
| 2-5 | |
| 2-6 | |
| 2-7 | |
| 2-8 | |
| 2-9 | Walk system require upgrade for external road to be highly accessibility |

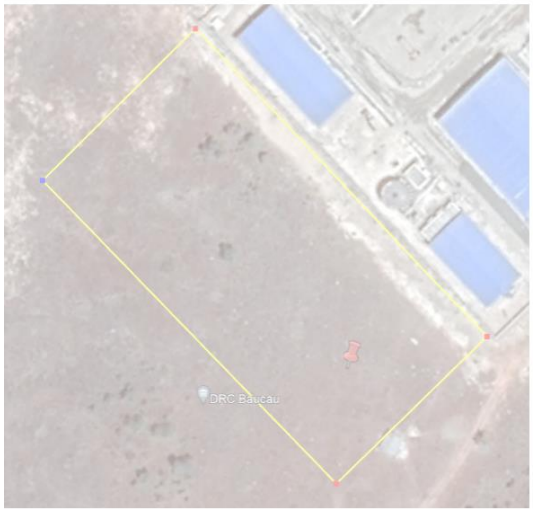
| ❸ Inclusive | |
|---|---|
| 3-1 | No facilities were provided as there was no existing terminal |
| 3-2 | |
| 3-3 | |
| 3-4 | |

| ❹ Secure | |
|---|---|
| 4-1 | No facilities were provided as there was no existing terminal |
| 4-2 | |
| 4-3 | |

| ❺ Safe | |
|---|---|
| 5-1 | No facilities were provided as there was no existing terminal |
| 5-2 | No crosswalk |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No facilities were provided as there was no existing terminal |
| 6-2 | |

# A.6 Aldeia Samalakuliba Terminal




| ❶ Orderly / Organized | |
|---|---|
| 1-1 | No facilities were provided as there was no existing terminal |
| 1-2 | |
| 1-3 | |
| 1-4 | |
| 1-5 | |
| 1-6 | |
| 1-7 | |
| 1-8 | |
| 1-9 | The key junction need to be signalized |
| 1-10 | Access road require upgrade to be highly accessibility |
| 1-11 | No facilities were provided as there was no existing terminal |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No facilities were provided as there was no existing terminal |
| 2-2 | |
| 2-3 | |
| 2-4 | |
| 2-5 | |
| 2-6 | |
| 2-7 | |
| 2-8 | |
| 2-9 | Walk system require upgrade for external road to be highly accessibility |

| ❸ Inclusive | |
|---|---|
| 3-1 | No facilities were provided as there was no existing terminal |
| 3-2 | |
| 3-3 | |
| 3-4 | |

| ❹ Secure | |
|---|---|
| 4-1 | No facilities were provided as there was no existing terminal |
| 4-2 | |
| 4-3 | |

| ❺ Safe | |
|---|---|
| 5-1 | No facilities were provided as there was no existing terminal |
| 5-2 | No crosswalk at key junction |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No facilities were provided as there was no existing terminal |
| 6-2 | |

# A.7 Maliana, Suai, Lospalos and Viqueque

Maliana

Suai

Lospalos

Viqueque

| ❶ Orderly / Organized | |
|---|---|
| 1-1 | No facilities were provided as there was no existing terminal |
| 1-2 | |
| 1-3 | |
| 1-4 | |
| 1-5 | |
| 1-6 | |
| 1-7 | |
| 1-8 | |
| 1-9 | The key junction need to be signalized |
| 1-10 | Access road require upgrade to be highly accessibility |
| 1-11 | No facilities were provided as there was no existing terminal |

| ❷ Convenient \ Comfortable | |
|---|---|
| 2-1 | No facilities were provided as there was no existing terminal |
| 2-2 | |
| 2-3 | |
| 2-4 | |
| 2-5 | |
| 2-6 | |
| 2-7 | |
| 2-8 | |
| 2-9 | Walk system require upgrade for external road to be highly accessibility |

| ❸ Inclusive | |
|---|---|
| 3-1 | No facilities were provided as there was no existing terminal |
| 3-2 | |
| 3-3 | |
| 3-4 | |

| ❹ Secure | |
|---|---|
| 4-1 | No facilities were provided as there was no existing terminal |
| 4-2 | |
| 4-3 | |

| ❺ Safe | |
|---|---|
| 5-1 | No facilities were provided as there was no existing terminal |
| 5-2 | No crosswalk at key junction |
| 5-3 | No pedestrian signals provision |

| ❻ Climate Resilient | |
|---|---|
| 6-1 | No facilities were provided as there was no existing terminal |
| 6-2 | |

# Appendix B

## Collection of Engineering Data

# B.1 Utilities Data by Site

Utilities data collected as part of site conditions analysis are summarized in this section which entails various elements that affect the design and construction of bus facilities including civil, structural, utilities, geotechnical, land tenure, etc. Only data collected during the feasibility study phase are included in this report as the team were unable to receive requested data such as utilities at certain locations.

**Table B-2: Data Collection Framework**

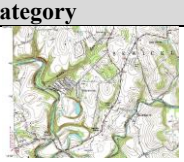
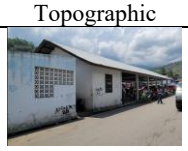
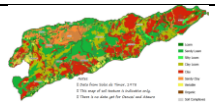
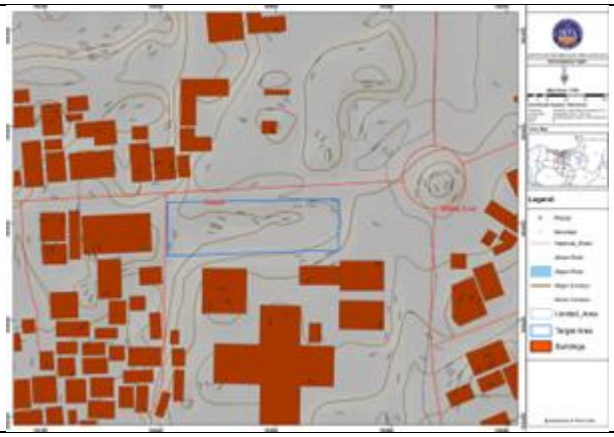
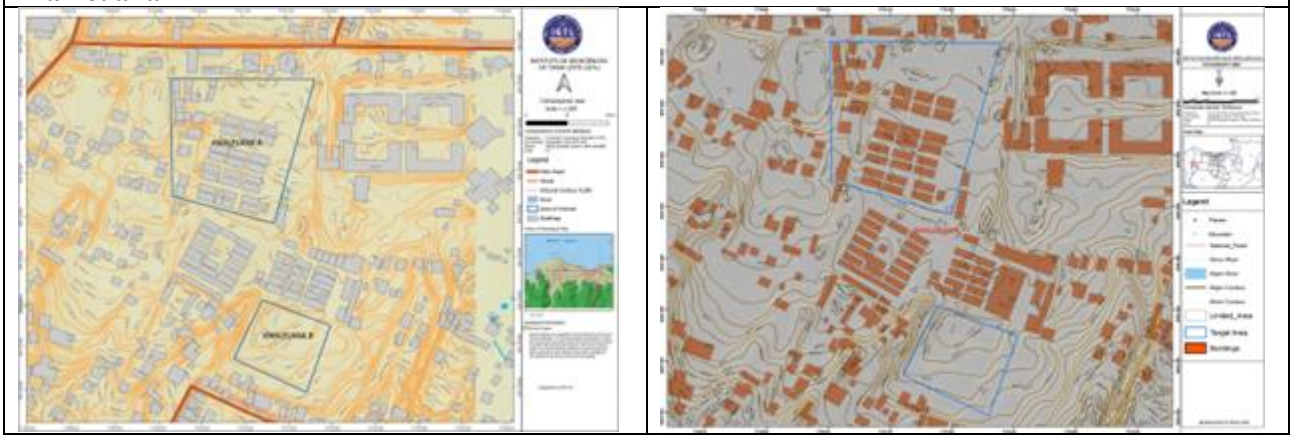
| Category | Description | Source of Data |
|---|---|---|
|  Topographic | Topographic and site formation includes terrain levels and elevation changes of a site. This will assess any potential impact on the site stemming from topographic and terrain considerations. | https://en-gb.topographic-map.com/map-shcdn/East-Timor/?center=-8.68964%2C126.11206&zoom=9 |
|  Structural (Buildings) | This category looks at the presence of structures and buildings established within the boundary of a site as the development/improvement of a bus facility may require demolish of such structures/buildings – which will have cost and timeline implications. | Field Survey |
|  Utilities | This category looks at the presence of utilities such as water pipes, power poles build underground and on the ground within the boundary of a site, as the development/improvement of a bus facility may require relocation of such utilities – which will have cost and timeline implications. | Technical Working Group (DNTT) |
|  Geotech | Identifies soil texture of a site – which has key implications on the detailed site formation during the DED and construction stage (such as expansion and contraction to improve and consolidate the ground). | Timor Leste - Map of Soil Texture (fao.org) |

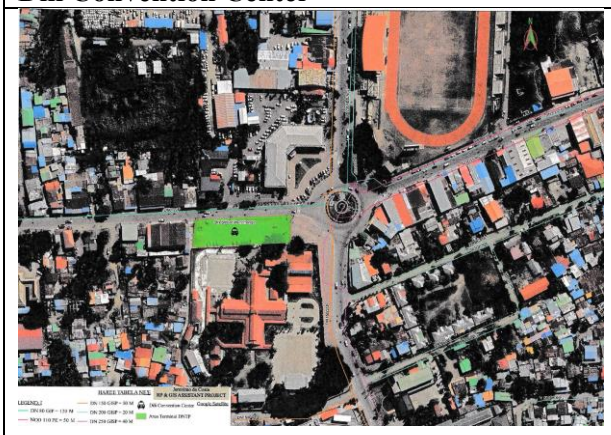
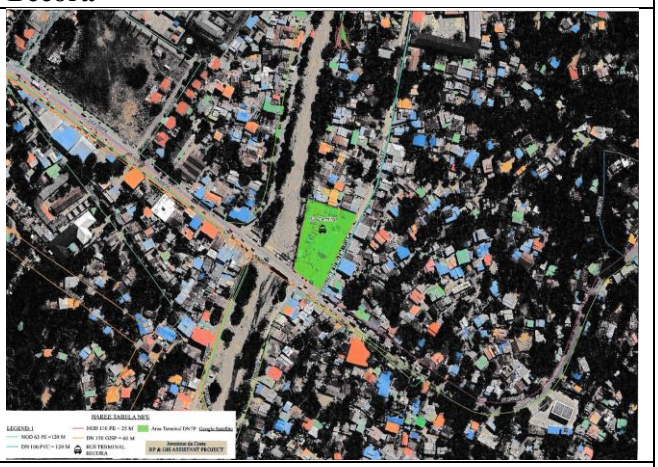
**Table B-3: Topographic Maps**

| **Dili Convention Center** | |
|---|---|
|  |  |
| **Becora** | |

Manleuana

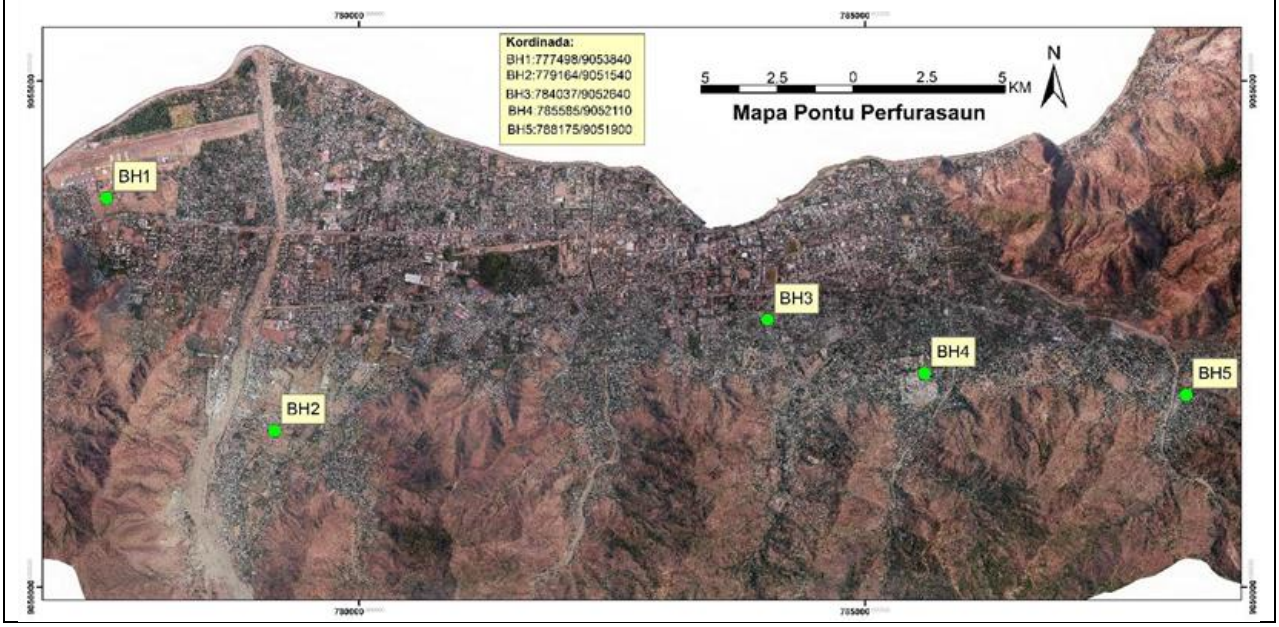


## Table B-4: Utilities Maps

| Dili Convention Center | Becora |
|---|---|
|  |  |
| **Manleuana** | **Maliana** |
|  |  |

| Lospalos | Suai |
|---|---|
|  |  |

**Table B-5: Geotech Map**

| Dili City |
|---|
|  |

# Appendix C

## Survey Results

# C.1 Background of Additional Traffic Survey

## Objectives for Additional Survey

The previous surveys conducted in April/May 2023 (i.e., screenline traffic count at city level, terminal surveys (public transport operation by route) identified public transport services, operation, and demand within the terminal. This additional survey focuses on external access leading to/from the terminals in particular traffic and pedestrian volumes and activities with likely significant impact on the surrounding environment. These findings will help the design of road/walk improvements outside the terminal to provide smooth traffic movement to/from the terminal as well as create a safe, comfortable walking environment for pedestrians (both users and passersby).

## Type of Survey

1. Traffic Count Survey
2. Pedestrian Count Survey
3. Roadside Activity Survey

This document outlines each of the surveys and the proposed survey locations and survey plans.

## Select Bus Terminals


## Survey Arrangement

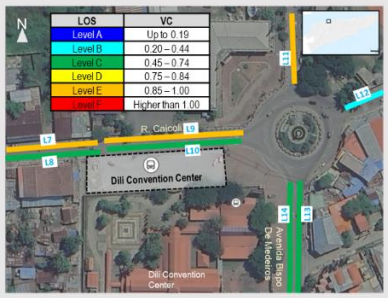
| No. | Terminal | Facility Type | Location | Traffic Count Survey | | | Pedestrian Count Survey | | | Roadside Activity Survey | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Weekday | Saturday | Sunday | Weekday | Saturday | Sunday | Weekday | Saturday | Sunday |
| 1 | Becora Terminal | Bus Terminal | Dili East | √ | | | √ | | | √ | | |
| 2 | Dili Convention Center | On-Street Interchange | Dili Center | √ | | | √ | | | √ | | |
| 3 | Manleuana Terminal | Bus Terminal | Dili South | √ | | √ | √ | | √ | | | |
| 4 | Airport Transit Hub | Bus Terminal | Dili West | √ | | √ | √ | | √ | | | |
| 5 | Terminal de Baucau | Bus Terminal | Baucau | √ | | | √ | | | | | |
| 6 | Hera Terminal | Bus Terminal | Dili East | √ | | | √ | | | | | |

Notes:
1. Data for other regional locations are based on the surveys conducted during the Master Plan stage.
2. After the survey conduced in September 2024, the ADB Mission held in October 2024 concluded that the Dili West Bus Terminal to be developed at Tibar and the airport transit hub was proposed as an on-street interchange. Given both sites are located along the major east-west corridor, survey results for Airport Transit Hub are used as a proxy for analysis at Tibar (including transport, economic, etc.).

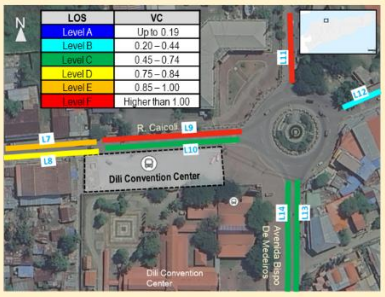
# C.2 Dili Convention Center

## Dili Convention Center (Vehicle)

**Existing Scenario 2024 (Mid-Day Peak)**




**Reference Scenario 2035 (Mid-Day Peak)**



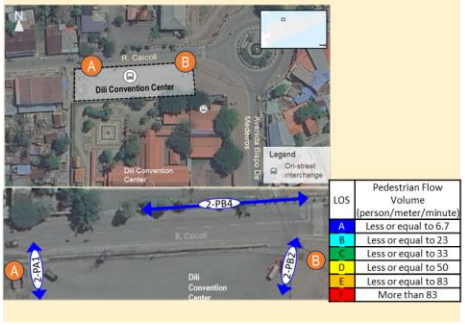

- Traffic of R. Caicoli eastbound (north of site) and Avenida Bispo De Medeiros (north) with high traffic existing and will exceed the road capacity in the 2035
- Geometric improvements are required for R. Caicoli, and road management measure are required for Avenida Bispo De Medeiros (such as prohibition of on-street parking )

| Terminal | Day | Link | Road Name | Direction | # of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Dili Convention Center | Weekday | L7 | R. Caicoli | EB | 1 | 750 | 601 | 0.80 | 709 | 0.94 | 613 | 0.82 | 630 | 0.84 | 750 | 1.00 | 650 | 0.87 |
| | | L8 | R. Caicoli | WB | 1 | 750 | 607 | 0.81 | 538 | 0.72 | 540 | 0.72 | 640 | 0.85 | 570 | 0.76 | 570 | 0.76 |
| | | L9 | R. Caicoli | EB | 1 | 750 | 555 | 0.74 | 729 | 0.97 | 629 | 0.84 | 590 | 0.79 | 770 | 1.03 | 660 | 0.88 |
| | | L10 | R. Caicoli | WB | 1 | 750 | 658 | 0.88 | 496 | 0.66 | 461 | 0.61 | 700 | 0.93 | 520 | 0.69 | 490 | 0.65 |
| | | L11 | Avenida Bispo De Medeiros | SB | 2 | 2,000 | 1,443 | 0.72 | 1,976 | 0.99 | 1,897 | 0.95 | 1,520 | 0.76 | 2,090 | 1.05 | 2,000 | 1.00 |
| | | L12 | R. Caicoli | EB | 2 | 1,500 | 757 | 0.50 | 595 | 0.40 | 611 | 0.41 | 800 | 0.53 | 630 | 0.42 | 650 | 0.43 |
| | | L13 | Avenida Bispo De Medeiros | SB | 1 | 1,000 | 724 | 0.72 | 650 | 0.65 | 776 | 0.78 | 770 | 0.77 | 690 | 0.69 | 820 | 0.82 |
| | | L14 | Avenida Bispo De Medeiros | NB | 1 | 1,000 | 750 | 0.75 | 596 | 0.60 | 638 | 0.64 | 790 | 0.79 | 630 | 0.63 | 670 | 0.67 |

## Dili Convention Center (Pedestrian)

**Existing Scenario 2024**


**Reference Scenario 2035**



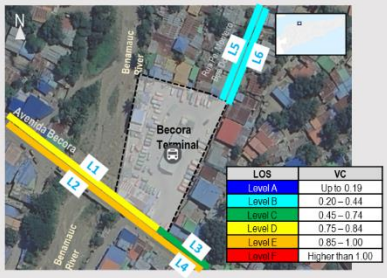

- The sidewalk width is sufficient for both existing and future.
- However, safety pedestrian crossing facilities are required at both access point of future terminal.

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS |
| Dili Convention Center | Weekday | 2-PA1 | Sidewalk | 2-direction | 1 | 0.3 | 0.7 | 99 | 3 | A | 100 | 3 | A |
| | | 2-PB2 | Sidewalk | 2-direction | 3 | 0.3 | 2.7 | 284 | 2 | A | 300 | 2 | A |
| | | 2-PB4 | Sidewalk | 2-direction | 1 | 0.3 | 0.7 | 114 | 3 | A | 120 | 3 | A |

# C.3 Becora Terminal

## Becora Terminal (Vehicle)

**Existing Scenario 2024 (AM Peak)**



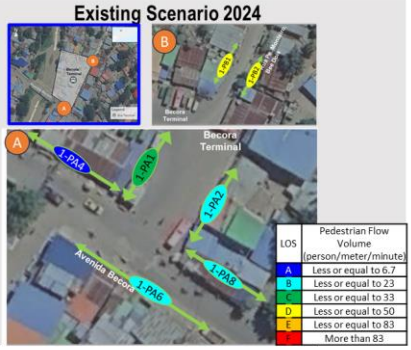

**Reference Scenario 2035 (AM Peak)**


- Traffic of all roads are within the road capacity for both existing and future scenario.

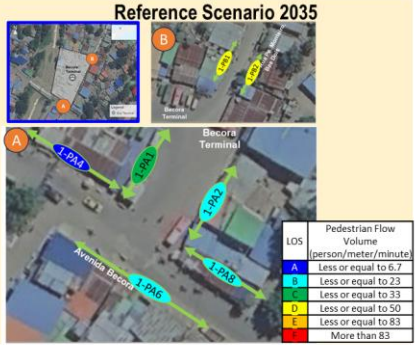
| Terminal | Day | Link | Road Name | Direction | #of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Becora | Weekday | L1 | Avenida Becora | EB | 1 | 1000 | 753 | 0.75 | 859 | 0.86 | 872 | 0.87 | 800 | 0.80 | 920 | 0.92 | 930 | 0.93 |
| | | L2 | Avenida Becora | WB | 1 | 1000 | 936 | 0.94 | 762 | 0.76 | 798 | 0.80 | 1,000 | 1.00 | 810 | 0.81 | 850 | 0.85 |
| | | L3 | Avenida Becora | EB | 1 | 750 | 485 | 0.65 | 643 | 0.86 | 645 | 0.86 | 520 | 0.69 | 690 | 0.92 | 690 | 0.92 |
| | | L4 | Avenida Becora | WB | 1 | 750 | 668 | 0.89 | 567 | 0.76 | 550 | 0.73 | 710 | 0.95 | 610 | 0.81 | 590 | 0.79 |
| | | L5 | Rua Pe. Monteiro, Bee Dois | NB | 1 | 750 | 199 | 0.27 | 190 | 0.25 | 179 | 0.24 | 210 | 0.28 | 200 | 0.27 | 190 | 0.25 |
| | | L6 | Rua Pe. Monteiro, Bee Dois | SB | 1 | 750 | 235 | 0.31 | 174 | 0.23 | 204 | 0.27 | 250 | 0.33 | 190 | 0.25 | 220 | 0.29 |

## Becora Terminal (Pedestrian)

**Existing Scenario 2024**




**Reference Scenario 2035**



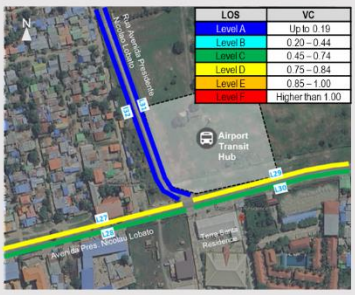

- The sidewalk along Rua Pe. Monteiro, Bee Dois required futher improvement (widening) to serve the Becora terminal better
- Crossing facilities are required for both terminal access for safety reason.

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS |
| Becora | Weekday | 1-PA1 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 282 | 24 | C | 300 | 25 | C |
| | | 1-PA2 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 178 | 15 | B | 190 | 16 | B |
| | | 1-PA4 | Sidewalk | 2-direction | 2 | 0.3 | 1.7 | 143 | 2 | A | 150 | 2 | A |
| | | 1-PA6 | Sidewalk | 2-direction | 1 | 0.3 | 0.7 | 301 | 8 | B | 320 | 8 | B |
| | | 1-PA8 | Sidewalk | 2-direction | 1 | 0.3 | 0.7 | 343 | 9 | B | 370 | 9 | B |
| | | 1-PB1&PB2 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 399 | 34 | D | 430 | 36 | D |

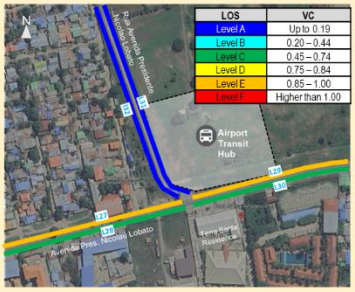
# C.4 Airport Transit Hub

## Airport Transit Hub (Vehicle)

**Existing Scenario 2024 (AM Peak)**




**Reference Scenario 2035 (AM Peak)**



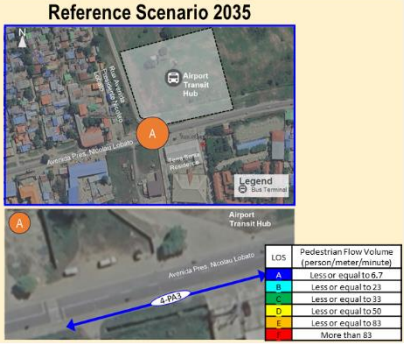

- Traffic of all roads are within the road capacity for both existing and future scenario.
- Traffic signals are recommended at the intersection of Avenida Pres. Nicolau Lobato and Rua Avenida Presidente Nicolao Lobatoto better handle access traffic of terminal and pedestrian crossings

| Terminal | Day | Link | Road Name | Direction | # of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Airport Transit Hub | Weekday | L27 | Avenida Pres. Nicolau Lobato | EB | 2 | 2,000 | 1,610 | 0.81 | 1,086 | 0.54 | 1,364 | 0.68 | 2,000 | 1.00 | 1,350 | 0.68 | 1,700 | 0.85 |
| | | L28 | Avenida Pres. Nicolau Lobato | WB | 2 | 2,000 | 1,018 | 0.51 | 1,135 | 0.57 | 1,333 | 0.67 | 1,270 | 0.64 | 1,410 | 0.71 | 1,660 | 0.83 |
| | | L29 | Avenida Pres. Nicolau Lobato | EB | 2 | 2,000 | 1,589 | 0.79 | 1,048 | 0.52 | 1,335 | 0.67 | 1,980 | 0.99 | 1,300 | 0.65 | 1,660 | 0.83 |
| | | L30 | Avenida Pres. Nicolau Lobato | WB | 2 | 2,000 | 1,034 | 0.52 | 1,139 | 0.57 | 1,338 | 0.67 | 1,290 | 0.65 | 1,420 | 0.71 | 1,660 | 0.83 |
| | | L31 | Rua Avenida Presidente Nicolao Lobato | SB | 1 | 750 | 7 | 0.01 | 13 | 0.02 | 10 | 0.01 | 10 | 0.01 | 20 | 0.03 | 10 | 0.01 |
| | | L32 | Rua Avenida Presidente Nicolao Lobato | NB | 1 | 750 | 45 | 0.06 | 56 | 0.07 | 44 | 0.06 | 60 | 0.08 | 70 | 0.09 | 50 | 0.07 |

## Airport Transit Hub (Pedestrian)

**Existing Scenario 2024**


**Reference Scenario 2035**

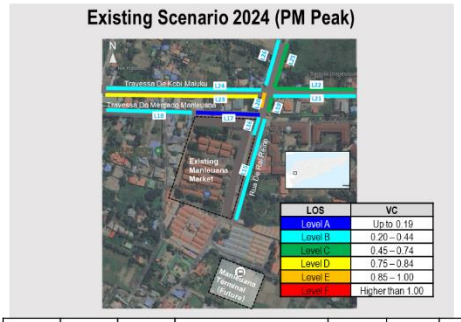


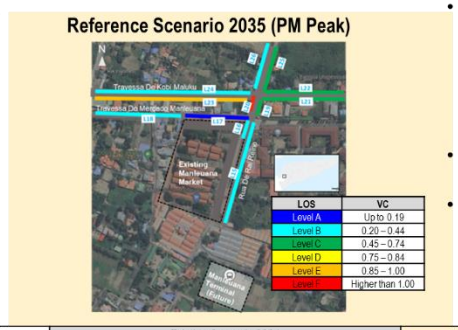

- The sidewalk width is sufficient for both existing and future.
- Additional pedestrian crossing facility are required on the south side of Airport Transition Hub for passenger easier cross Avenida Pres. Nicolau Lobato and access to the terminal.

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS |
| Airport Transit Hub | Weekday | 4-PA3 | Sidewalk | 2-direction | 2 | 0.3 | 1.7 | 141 | 2 | A | 180 | 2 | A |

# C.5 Manleuana Market

## Manleuana Market (Vehicle)

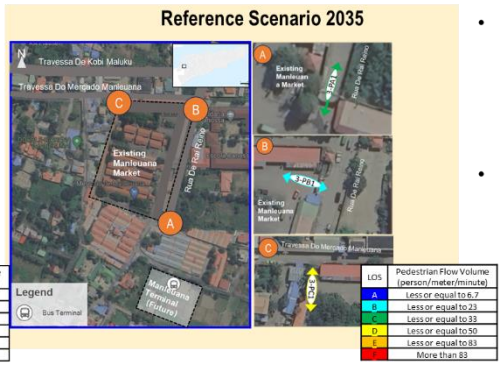



- Traffic of Rua De Rai Reino northbound (road section between Travessa De Kobi Maluku and Travessa Do Mercado Manleuana) with high traffic existing and will exceed the road capacity in the 2035
- Other road links show operate in Satisfied level.
- The road improvement are required for Rua De Rai Reino, road widening, junction improvement, etc. and the traffic circulation need further optimize to increase accessibility of terminal.

| Terminal | Day | Link | Road Name | Direction | # of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Manleuana Market | Weekday | L15 | Rua De Rai Reino | SB | 1 | 750 | 204 | 0.27 | 315 | 0.42 | 246 | 0.33 | 250 | 0.33 | 390 | 0.52 | 310 | 0.41 |
| | | L16 | Rua De Rai Reino | NB | 1 | 750 | 177 | 0.24 | 304 | 0.40 | 212 | 0.28 | 220 | 0.29 | 380 | 0.51 | 260 | 0.35 |
| | | L17 | Travessa Do Mercado Manleuana | WB | 1 | 750 | 15 | 0.02 | 8 | 0.01 | 15 | 0.02 | 20 | 0.03 | 10 | 0.01 | 20 | 0.03 |
| | | L18 | Travessa Do Mercado Manleuana | WB | 1 | 750 | 193 | 0.26 | 266 | 0.35 | 236 | 0.31 | 240 | 0.32 | 330 | 0.44 | 290 | 0.39 |
| | | L19 | Rua De Rai Reino | SB | 1 | 750 | 356 | 0.47 | 420 | 0.56 | 393 | 0.52 | 440 | 0.59 | 520 | 0.69 | 490 | 0.65 |
| | | L20 | Rua De Rai Reino | NB | 1 | 750 | 692 | 0.92 | 708 | 0.94 | 738 | 0.98 | 860 | 1.15 | 880 | 1.17 | 920 | 1.23 |
| | | L21 | Travessa De Kobi Maluku | WB | 1 | 750 | 305 | 0.41 | 404 | 0.54 | 312 | 0.42 | 380 | 0.51 | 500 | 0.67 | 390 | 0.52 |
| | | L22 | Travessa De Kobi Maluku | EB | 1 | 750 | 331 | 0.44 | 535 | 0.71 | 402 | 0.54 | 410 | 0.55 | 670 | 0.89 | 500 | 0.67 |
| | | L23 | Travessa De Kobi Maluku | WB | 1 | 750 | 361 | 0.48 | 579 | 0.77 | 565 | 0.75 | 450 | 0.60 | 720 | 0.96 | 700 | 0.93 |
| | | L24 | Travessa De Kobi Maluku | EB | 1 | 750 | 75 | 0.10 | 288 | 0.38 | 165 | 0.22 | 90 | 0.12 | 360 | 0.48 | 210 | 0.28 |
| | | L25 | Travessa De Kobi Maluku | SB | 1 | 750 | 257 | 0.34 | 295 | 0.39 | 353 | 0.47 | 320 | 0.43 | 370 | 0.49 | 440 | 0.59 |
| | | L26 | Travessa De Kobi Maluku | NB | 1 | 750 | 281 | 0.37 | 335 | 0.45 | 208 | 0.28 | 350 | 0.47 | 420 | 0.56 | 260 | 0.35 |

## Manleuana Market (Pedestrian)

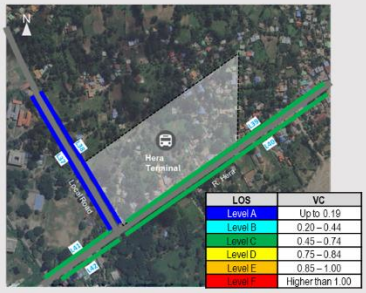

- The existing pedestrian space is adequate for pedestrian circulation, but the currently there are no dedicated sidewalks, which could lead to safety issues.
- Recommended upgrades to the pedestrian system, including safe sidewalks and crossing facilities

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS |
| Manleuana Market | Weekday | 3-PA1 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 222 | 19 | B | 280 | 24 | C |
| | | 3-PB1 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 218 | 19 | B | 270 | 23 | B |
| | | 3-PC1 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 428 | 36 | D | 530 | 45 | D |

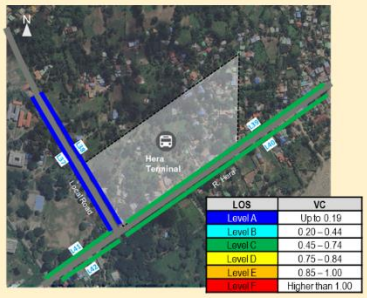
# C.6 Hera Terminal

## Hera Terminal (Vehicle)

**Existing Scenario 2024 (AM Peak)**




**Reference Scenario 2035 (AM Peak)**




- Traffic of all roads are within the road capacity for both existing and future scenario.
- The local road need to be upgraded in conjunction with hub design

| Terminal | Day | Link | Road Name | Direction | # of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Hera Terminal | Weekday | L37 | Local Road | SB | 1 | 750 | 52 | 0.07 | 30 | 0.04 | 22 | 0.03 | 60 | 0.08 | 30 | 0.04 | 20 | 0.03 |
| | | L38 | Local Road | NB | 1 | 750 | 23 | 0.03 | 48 | 0.06 | 39 | 0.05 | 20 | 0.03 | 50 | 0.07 | 40 | 0.05 |
| | | L39 | R. Hera | EB | 1 | 750 | 448 | 0.60 | 401 | 0.53 | 381 | 0.51 | 480 | 0.64 | 430 | 0.57 | 410 | 0.55 |
| | | L40 | R. Hera | WB | 1 | 750 | 407 | 0.54 | 358 | 0.48 | 385 | 0.51 | 430 | 0.57 | 380 | 0.51 | 410 | 0.55 |
| | | L41 | R. Hera | EB | 1 | 750 | 439 | 0.59 | 413 | 0.55 | 398 | 0.53 | 470 | 0.63 | 440 | 0.59 | 420 | 0.56 |
| | | L42 | R. Hera | WB | 1 | 750 | 393 | 0.52 | 334 | 0.44 | 366 | 0.49 | 420 | 0.56 | 360 | 0.48 | 390 | 0.52 |

## Hera Terminal (Pedestrian)

**Existing Scenario 2024**


**Reference Scenario 2035**

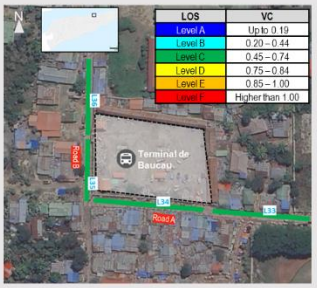

- The sidewalk width is sufficient for both existing and future.
- Additional pedestrian crossing facility are required on the south side of Hera Terminal for passenger easier cross R. Hera and access to the terminal.

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/meter/minute) | LOS |
| Hera Terminal | Weekday | 6-PA2 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 27 | 3 | A | 30 | 3 | A |
| | | 6-PA3 | Sidewalk | 2-direction | 1 | 0.3 | 0.7 | 69 | 2 | A | 70 | 2 | A |
| | | 6-PA4 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 63 | 6 | A | 70 | 6 | A |

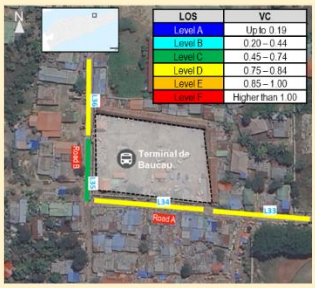
# C.7 Terminal de Baucau

## Terminal de Baucau (Vehicle)

**Existing Scenario 2024 (AM Peak)**




**Reference Scenario 2035 (AM Peak)**



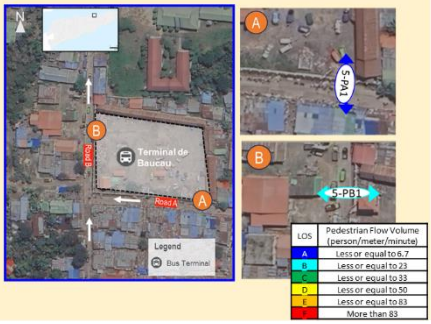

- Traffic of all roads are within the road capacity for both existing and future scenario.
- Since the Baucau terminal will be relocated, the traffic flow for Terminal de Baucau will be the reference for future terminal design

| Terminal | Day | Link | Road Name | Direction | # of Lanes | Capacity Per Lane | Existing Scenario 2024 | | | | | | Reference Scenario 2035 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AM Peak | | Mid-day Peak | | PM Peak | | AM Peak | | Mid-day Peak | | PM Peak | |
| | | | | | | | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio | Traffic Flow (PCU/hr) | V/C Ratio |
| Terminal de Baucau | Weekday | L33 | Road A | WB | 1 | 750 | 496 | 0.66 | 438 | 0.58 | 318 | 0.42 | 630 | 0.84 | 560 | 0.75 | 400 | 0.53 |
| | | L34 | Road A | WB | 1 | 750 | 452 | 0.60 | 410 | 0.55 | 311 | 0.41 | 570 | 0.76 | 520 | 0.69 | 390 | 0.52 |
| | | L35 | Road B | NB | 1 | 750 | 373 | 0.50 | 315 | 0.42 | 275 | 0.37 | 470 | 0.63 | 400 | 0.53 | 350 | 0.47 |
| | | L36 | Road B | NB | 1 | 750 | 449 | 0.60 | 335 | 0.45 | 281 | 0.37 | 570 | 0.76 | 430 | 0.57 | 360 | 0.48 |

## Terminal de Baucau (Pedestrian)

**Existing Scenario 2024**


**Reference Scenario 2035**




- The sidewalk width is sufficient for both existing and future.
- Since the Baucau terminal will be relocated, the pedestrian flow for Terminal de Baucau will be the reference for future terminal design

| Terminal | Day | Link | Type | Direction | Existing Sidewalk Width (m) | Reduction Width for Safety Reason (m) | Adopted Sidewalk Width (m) | Existing Scenario 2024 | | | Reference Scenario 2035 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS | Max Peak Hourly Ped Flow | Pedestrian Flow Volume(person/ meter/minute) | LOS |
| Terminal de Baucau | Weekday | 5-PA1 | Sidewalk | 2-direction | 2 | 0.3 | 1.7 | 156 | 2 | A | 200 | 2 | A |
| | | 5-PB1 | Sidewalk | 2-direction | 0.5 | 0.3 | 0.2 | 122 | 11 | B | 150 | 13 | B |

# Appendix D

## Cost Estimates

# D.1 Bus Terminal Cost Estimates

**Table D-1: Bus Terminal Cost Estimates (US$)**

| | | | | | #2 | #3 | #4 | #5 | #6 |
|---|---|---|---|---|---|---|---|---|---|
| # | Cost Item | Unit Cost | Unit | Assumptions/Notes | Becora Terminal | Tibar Terminal | Manleuana Terminal | Hera Terminal | Aldeia Samalakuliba Terminal |
| 1 | Terminal Facility Roof | 300 | m2 | Assume same area as waiting & queuing area | 159,600 | 1,227,900 | 346,800 | 354,900 | 358,200 |
| 2 | Bus Shelter (Enhanced 6m, Wide 1.8m) | 2,600 | number | Cost includes covered facilities and seating | 13,000 | 36,400 | 20,800 | 0 | 20,800 |
| 3 | 10m Concrete Bus Bay (1 Bay) | 11,000 | number | Cost includes excavation, curbs, markings | 55,000 | 154,000 | 88,000 | 88,000 | 88,000 |
| 4 | Drop-Off Area | 200 | m2 | Include road pavement and sidewalk on each end (5m x 1.8m) | 29,600 | 37,400 | 32,200 | 32,200 | 32,200 |
| 5 | Parking Area | 80 | m2 | Include road pavement | 14,240 | 49,760 | 97,600 | 124,080 | 0 |
| 6 | Waiting & Queuing Area (With Seating) | 200 | m2 | Cost includes waiting facilities and seating | 106,400 | 818,600 | 231,200 | 236,600 | 238,800 |
| 7 | Pavement Markings | 70 | number | Assume road makings over the area of 5m x 3m with the letters of "Bus Stop" | 350 | 980 | 560 | 1,050 | 560 |
| 8 | Wayfinding Signage | 300 | number | Assume 10 signages per terminal site | 3,000 | 3,000 | 3,000 | 600 | 3,000 |
| 9 | Ticket & Fare Collection Booth | 500 | m2 | Cost includes building costs | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| 10 | Retail & Kiosk | 500 | m2 | Cost includes building costs | 82,000 | 206,000 | 124,500 | 107,500 | 52,000 |
| 11 | Security Office | 500 | m2 | Cost includes building costs | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| 12 | Operation Office | 500 | m2 | Cost includes building costs | 12,500 | 12,500 | 12,500 | 0 | 12,500 |
| 13 | Administration Office | 500 | m2 | Cost includes building costs | 12,500 | 12,500 | 12,500 | 0 | 12,500 |
| 14 | Air Conditioning | 1,100 | number | Assume 1 A/C for each office | 3,300 | 3,300 | 3,300 | 0 | 3,300 |
| 15 | Fan | 300 | number | Assume 1 fan to cover passenger areas of 100m2 (10m x 10m) plus 1 per office building | 2,700 | 13,200 | 4,500 | 4,500 | 4,500 |
| 16 | Toilets | 12,000 | number | Assume a toilet building of 8m x 6m including toilet facilities | 12,000 | 12,000 | 12,000 | 12,000 | 12,000 |
| 17 | Lighting for Vehicles | 1,300 | number | Assume 1 per every 100m2 of concrete area (pickup, drop-off, and parking) | 11,700 | 32,500 | 19,500 | 20,800 | 15,600 |
| 18 | Streetlight | 300 | number | Assume 1 per every 100m2 of the total facility area | 9,900 | 29,400 | 17,700 | 18,300 | 13,800 |
| 19 | Tactile Paving | 60 | m2 | Based on the unit cost of 0.6 x 1.0 tactile indicator array | 3,900 | 10,920 | 6,240 | 6,240 | 6,240 |
| 20 | Circulation Areas | 80 | m2 | Circulation space assumed based on design and benchmarking similar bus projects in the region | 149,280 | 296,880 | 210,320 | 203,760 | 209,520 |
| 21 | Utilities Removal / Relocation | 600 | number | Assume utility poles removal/relocation every 400m2 (20m x 20m) | 5,400 | 15,000 | 9,000 | 9,600 | 7,200 |
| 22 | Retention Pond | 200 | m2 | Assume 3% of a site area with a pond depth of 3m | 0 | 0 | 0 | 0 | 0 |

| | | | | | #2 | #3 | #4 | #5 | #6 |
|---|---|---|---|---|---|---|---|---|---|
| # | Cost Item | Unit Cost | Unit | Assumptions/Notes | Becora Terminal | Tibar Terminal | Manleuana Terminal | Hera Terminal | Aldeia Samalakuliba Terminal |
| 23 | Rainwater Storage | 3,200 | number | Rainwater harvesting system for a communal system | 3,200 | 3,200 | 3,200 | 3,200 | 3,200 |
| 24 | Floodwater Drainage | 300 | m | The cost includes excavation and precast concrete (Box culvert) | 75,000 | 96,000 | 105,000 | 279,000 | 144,000 |
| 25 | Solar Pannel Roof (Terminal) | 1,300 | m2 | Lumpsum cost per unit for large-scale building/facilities | 139,100 | 1,064,700 | 301,600 | 308,100 | 310,700 |
| **Subtotal** | | | | | **913,670** | **4,146,140** | **1,672,020** | **1,820,430** | **1,558,620** |
| | Additional Works | 10% | % | Additional works include site formation, mechanical & electrical works, other utilities treatment, etc. | 91,367 | 414,614 | 167,202 | 182,043 | 155,862 |
| | Innovative Facilities Improvement | 20% | % | Cost includes innovative facilities such as ITS system at the terminal | 182,734 | 829,228 | 334,404 | 364,086 | 311,724 |
| **Subtotal (With Additional Improvements)** | | | | | **1,621,087** | **5,389,982** | **2,173,626** | **2,366,559** | **2,026,206** |
| | Road & Traffic Improvement | 200,000 | lumpsum | Cost includes 50m road/traffic upgrades outside of terminal (including traffic light) | 200,000 | 200,000 | 200,000 | 200,000 | 200,000 |
| | Sidewalk & Crossing Improvement | 50,000 | lumpsum | Cost includes 50m walk upgrades and 2 crosswalk improvements (6m x 3m) | 50,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| External Access Improvements Outside of Terminal | | | | | 250,000 | 250,000 | 250,000 | 250,000 | 250,000 |
| **Subtotal (With Exter Access Improvements Outside of Terminal)** | | | | | **1,437,771** | **5,639,982** | **2,423,626** | **2,616,559** | **2,276,206** |

# D.2 On-Street Interchange Cost Estimates

**Table D-2: On-Street Interchange Cost Estimates (US$)**

| | | | | | #1 | #7 | #8 | #9 | #10 |
|---|---|---|---|---|---|---|---|---|---|
| # | Cost Item | Unit Cost | Unit | Assumptions/Notes | Dili Convention Center [A] | Maliana Market [B] | Suai Market [B] | Lospalos Bemoris [B] | Viqueque City Center [B] |
| 1 | Bus Shelter (Enhanced 6m, Wide 1.8m) | 2,600 | number | Cost includes covered facilities and seating | 7,800 | 7,800 | 7,800 | 7,800 | 7,800 |
| 2 | Concrete Bus Bay | 9,600 | number | Cost includes excavation, curbs, markings and concrete pavement resurfacing. Assumed to accommodate 9m bus. | 33,000 | 33,000 | 33,000 | 33,000 | 33,000 |
| 3 | Sidewalk Improvement | 20 | m2 | Sidewalk Improvement (Shelter - Regular 3m, Wide 1.8m) | 540 | 540 | 540 | 540 | 540 |
| 4 | Streetlights at Bus Stop | 300 | number | Improvements only at stops with new shelters | 900 | 900 | 900 | 900 | 900 |
| 5 | Trees at Bus Stop | 200 | number | Improvements only at stops with new shelters | 600 | 600 | 600 | 600 | 600 |
| 6 | Utility Pole at Bus Stop | 600 | number | Improvements only at stops with new shelters | 1,800 | 1,800 | 1,800 | 1,800 | 1,800 |
| 7 | Tactile Paving | 60 | m2 | Based on the unit cost of 0.6 x 1.0 tactile indicator array | 120 | 120 | 120 | 120 | 120 |
| 8 | Additional Sidewalk Improvement (Normal) | 20 | m2 | Assumed 10m improvement on each side of bus stop x width of sidewalk (including shelter + PWD) | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 |
| 9 | Administration Office | 500 | m2 | Assume to include a 3m x 3m office with several functions including admin and operation | 4,500 | 4,500 | 4,500 | 4,500 | 4,500 |
| 10 | Bus Stop Divider Width | 60 | m2 | Reflectorized thermoplastic pavement markings assuming 6mm depth | 0 | 0 | 0 | 0 | 0 |

| | | | | | #1 | #7 | #8 | #9 | #10 |
|---|---|---|---|---|---|---|---|---|---|
| # | Cost Item | Unit Cost | Unit | Assumptions/Notes | Dili Convention Center [A] | Maliana Market [B] | Suai Market [B] | Lospalos Bemoris [B] | Viqueque City Center [B] |
| 11 | Bus Stop Vertical Signage | 300 | number | Assume 1 signage per bay | 900 | 900 | 900 | 900 | 900 |
| 12 | Bus Stop Horizontal Signage | 70 | number | Assume road makings over the area of 5m x 3m with the letters of "Bus Stop" | 210 | 210 | 210 | 210 | 210 |
| 13 | Floodwater Drainage | 300 | m | The cost includes excavation and precast concrete (Box culvert) | 33,900 | 33,900 | 33,900 | 33,900 | 33,900 |
| 14 | Solar Pannel Roof (On-Street Interchange) | 700 | m2 | Lumpsum cost per unit for small-scale building/facilities | 7,700 | 7,700 | 7,700 | 7,700 | 7,700 |
| **Subtotal** | | | | | **95,570** | **95,570** | **95,570** | **95,570** | **95,570** |
| ` | Additional Works | 10% | % | Additional works include site formation, mechanical & electrical works, etc. | 9,557 | 9,557 | 9,557 | 9,557 | 9,557 |
| **Subtotal (With Additional Improvements)** | | | | | **105,127** | **105,127** | **105,127** | **105,127** | **105,127** |

**Note:**
[A] Dili convention center includes the cost for five bays to account for additional bays/shelters required to accommodate all eight thru routes proposed to serve this facility.
[B] Given unclear operation nature of local microlet in regional cities, each regional site is assumed to have at least three bays to serve both regional and local transport needs.

# D.3 Personnel Cost for Bus Terminal O&M

## Table D-3: Personnel Cost for Bus Terminal O&M (US$)

| | | | | | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 | #10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Cost Item | Unit Cost [A] | Unit | Assumptions /Notes | Dili Convention Center | Becora | Tibar | Manleuana | Hera [B] | Baucau | Maliana Market | Suai Market | Lospalos Bemoris | Viqueque City Center |
| 1 | Technical Maintenance Staff | 4,440 | number | 2 per terminal office [B] | - | 8,800 | 8,800 | 8,800 | 30,800 | 8,800 | - | - | - | - |
| 2 | Operation Staff-Junior | 2,700 | number | Includes security guards (1 per 4 bus bays) and janitors (2 per terminal with on-site bathrooms); two-shift rotation is assumed | 5,400 | 21,600 | 32,400 | 21,600 | 21,600 | 16,200 | 5,400 | 5,400 | 5,400 | 5,400 |
| 3 | Administrative Staff-Junior | 2,900 | number | 4 per terminal office [B] | - | 11,600 | 11,600 | 11,600 | 26,100 | 11,600 | - | - | - | - |
| 4 | Administrative Staff-Senior | 3,600 | number | 1 per terminal office | - | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | - | - | - | - |
| 5 | Management-Junior | 3,600 | number | 1 per terminal office | - | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | - | - | - | - |
| 6 | Management-Senior | 10,800 | number | 1 per terminal office | - | 10,800 | 10,800 | 10,800 | 10,800 | 10,800 | - | - | - | - |
| **Subtotal** | | | | | **5,400** | **56,400** | **67,200** | **56,400** | **92,900** | **51,000** | **5,400** | **5,400** | **5,400** | **5,400** |
| **Grand Total** | | | | | | | | | | | | | | **350,900** |
| **Grand Total (Rounded to Nearest Hundred)** | | | | | | | | | | | | | | **350,900** |

Note:
[A] Unit cost is in terms of annual wage and modelled on the average monthly wage of relevant field types as stated in the Timor-Leste Labour Force Survey 2021 Report (https://www.inetl-ip.gov.tl/wp-content/uploads/2023/05/Final-Report-Labour-Force-Survey-TL-2021.pdf). All cost has already included 20% additional renumeration/contingency.
[B] Given the preliminary site designs for the ten terminals/facilities, it is assumed that Hera Terminal (with the largest building footprint and a dedicated corporate office) will serve as the operation control center of the whole public transport network. As such, additional staff are assumed to be positioned at this location, including five additional junior administrative staff and five technical maintenance staff, with one staff of each type corresponding to one of the terminal offices in Becora, Tibar, Manleuana, and Baucau, and the last staff responsible for all other facilities that do not include an office.

# Appendix E

## Assumptions for Revenue Analysis

# E.1 Terminal - Revenue Assumptions

**Table E-1: Revenue Assumptions**

| Type of Revenues | Item | Amount | Unit |
|---|---|---|---|
| ***Farebox Revenues*** | | | |
| Fare of Microlet | • Student Fare | 0.15 | US$ |
| | • Adult Fare | 0.25 | US$ |
| Fare of Regional Bus | • Fare for Route P-1 | 2 | US$ |
| | • Fare for Route P-2 | 8 | US$ |
| | • Fare for Route P-3 | 4 | US$ |
| | • Fare for Route P-4 | 3 | US$ |
| | • Fare for Route P-5 | 2 | US$ |
| | • Fare for Route P-6 | 8 | US$ |
| | • Fare for Route P-7 | 6 | US$ |
| | • Fare for Route P-8 | 2 | US$ |
| | • Fare for Route P-9 | 9 | US$ |
| | • Fare for Route P-10 | 12 | US$ |
| | • Fare for Route P-11 | 8 | US$ |
| | • Fare for Route A-1(airport route) | 5 | US$ |
| | • Fare for Route A-2(airport route) | 5 | US$ |
| | • Fare for Route I-1(international route) | 35 | US$ |
| Allocation percentage of Fare to Bus Terminal Operation | • Existing condition of allocation % of fare revenue to terminal operation | 0% | % |
| | • Future condition of allocation % of fare revenue to terminal operation | 5% | % |
| ***Commercial Space Rental*** | | | |
| Rental of Kiosk | • Annual Rental per 9m2 kiosk (3m x 3m) | 730 | US$ |
| ***Advertisement*** | | | |
| Annual Advertisement Fee per shelter | • Advertisement Fee at Dili & Baucau | 5,475 | US$ |
| | • Advertisement Fee at regional city | 2,190 | US$ |

# E.2 Terminal - Fare Revenue Analysis

**Step 1 – Annual Ridership and Terminal Served by Route**

The Year 2024 and 2035 service plan for public transport were developed in the 2024 PTMP. The table below shows a summary of ridership by route and the terminals served by each route (with assignment of each route, i.e., terminating or thru route).

**Table E-2: Annual Ridership and Terminal Served by Route**

| Route | Annual Ridership (People trips) | | Year 2024 Route Assignment | | | | | | | | | | Year 2035 Route Assignment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 2024 | Year 2035 | Becora | Tibar [A] | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana | Becora | Tibar | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana |
| M-1 | 1,911,720 | 2,302,640 | Terminate | | | Thru | | | | | | | Terminate | | | Thru | | | | | | |
| M-2 | 2,988,130 | 3,196,070 | Terminate | | | Thru | | | | | | | Terminate | | | Thru | | | | | | |
| M-3 | 3,948,730 | 5,234,110 | | | Terminate | | | | | | | | | | Terminate | | | | | | | |
| M-4 | 1,949,070 | 2,483,990 | | | | Thru | | | | | | | | | | Thru | | | | | | |
| M-5 | 2,840,700 | 4,081,080 | | | | Thru | | | | | | | | | Terminate | Thru | | | | | | |
| M-6 | 2,202,910 | 3,064,730 | | | | Thru | | | | | | | | | | Thru | | | | | | |
| M-7 | 1,733,090 | 2,228,680 | | | | Thru | | | | | | | | | | Thru | | | | | | |
| M-8 | 1,288,150 | 1,633,950 | | | | Thru | | | | | | | | | | Thru | | | | | | |
| M-9 | 3,736,300 | 5,396,950 | | | | Thru | | | | | | | | | | Thru | | | | | | |
| M-10 | 4,638,520 | 6,755,860 | | Terminate | | | | | | | | | | Terminate | | | | | | | | |
| M-11 | 3,437,330 | 4,364,890 | | | Terminate | | | | | | | | | Terminate | Terminate | | | | | | | |
| M-12 | 922,290 | 989,800 | | | | | | | | | | | | | | | | | | | | |
| M-13 | 967,890 | 1,267,170 | | | Thru | | | | | | | | | | Terminate | | | | | | | |
| A-1 | | 105,850 | | | | | | | | | | | | | | | | | | | | |
| A-2 | | 21,900 | | | | | | | | | | | | | | | | | | | | |
| P-1 | 19,098 | 23,738 | | | Thru | | | | | | | | | | Thru | | | | | | | |
| P-2 | 11,548 | 14,483 | | | Thru | | | | | | | | | | Thru | | | | | | | |
| P-3 | 495,199 | 666,382 | Terminate | | | | | Terminate | | | | | | | | | Terminate | Terminate | | | | |
| P-4 | 163,721 | 215,536 | | Terminate | | | | | | | | | | Terminate | | | | | | | | |
| P-5 | 651,010 | 888,105 | | Terminate | | | | | | | | | | Terminate | | | | | | | | |
| P-6 | 84,048 | 100,206 | Terminate | | | | | | Terminate | | | | | | | | Terminate | Thru | Terminate | | | |
| P-7 | 136,987 | 177,013 | | Terminate | | | | | | | | Terminate | | Terminate | | | | | | | | Terminate |
| P-8 | 50,073 | 64,086 | Terminate | | | | | | | | | | | | | | Terminate | | | | | |
| P-9 | 43,880 | 57,402 | | | Thru | | | | | | | | | | Thru | | | | | | | |
| P-10 | 89,373 | 106,882 | | | | | | | | | Terminate | | | | Thru | | | | | | Terminate | |
| P-11 | 110,849 | 140,739 | Terminate | | | | | | | Terminate | | | | | | | Terminate | Thru | | Terminate | | |
| S-1 [B] | | 971,412 | | | | | | | | | | | Terminate | | | | Terminate | | | | | |
| I-2 | | 306,600 | | | | | | | | | | | | Terminate | | | | | | | | |

Notes:
[A] The current ridership at Tasitolu (the terminating point in Dili) is used as a proxy to estimate ridership at Tibar.
[B] Shuttle bus service (S-1) connecting Becora and Hera is assumed to be free at this stage. Further assessment of a business model or assignment of other microlet routes or route to/from Metinaro to this S-1 route is required to estimate detailed revenues for this route.

**Step 2 – Annual Ridership by Terminal**

The ridership served by each terminal is estimated by the ridership on the route and the terminal's contribution to the route (terminating or thru), When a route terminates at two terminals, the total route ridership will be divided equally (50%) between the terminate terminals, and when a route transits or thru a terminal, the ridership for the thru terminal is assumed to be 10% of the total route ridership, and the remaining route ridership will be divided equally between the terminating terminals. Based on the data indicated in Step 1, ridership served by each terminal are summarized in the table below:

**Table E-3: Annual Ridership by Terminal**

| Route | Year 2024 Ridership | | | | | | | | | | Year 2035 Ridership | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Becora | Tibar [A] | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana | Becora | Tibar | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana |
| M-1 | 1,720,548 | | | 191,172 | | | | | | | 2,072,376 | | | 230,264 | | | | | | |
| M-2 | 2,689,317 | | | 298,813 | | | | | | | 2,876,463 | | | 319,607 | | | | | | |
| M-3 | | | 3,948,730 | | | | | | | | | | 5,234,110 | | | | | | | |
| M-4 | | | | 194,907 | | | | | | | | | | 248,399 | | | | | | |
| M-5 | | | | 284,070 | | | | | | | | | 3,672,972 | 408,108 | | | | | | |
| M-6 | | | | 220,291 | | | | | | | | | | 306,473 | | | | | | |

| Route | Year 2024 Ridership | | | | | | | | | | Year 2035 Ridership | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Becora | Tibar [A] | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana | Becora | Tibar | Manleuana Market | Dili Convention Center | Hera | Baucau | Lospalos | Viqueque | Suai | Maliana |
| M-7 | | | | 173,309 | | | | | | | | | | 222,868 | | | | | | |
| M-8 | | | | 128,815 | | | | | | | | | | 163,395 | | | | | | |
| M-9 | | | | 373,630 | | | | | | | | | | 539,695 | | | | | | |
| M-10 | | 4,638,520 | | | | | | | | | | 6,080,274 | | | | | | | | |
| M-11 | | | 3,437,330 | | | | | | | | | 2,182,445 | 2,182,445 | | | | | | | |
| M-12 | | | | | | | | | | | | | | | | | | | | |
| M-13 | | | 96,789 | | | | | | | | | | 1,267,170 | | | | | | | |
| A-1 | | | | | | | | | | | | | | | | | | | | |
| A-2 | | | | | | | | | | | | | | | | | | | | |
| P-1 | | | 1,910 | | | | | | | | | | 2,374 | | | | | | | |
| P-2 | | | 1,155 | | | | | | | | | | 1,448 | | | | | | | |
| P-3 | 247,600 | | | | | 247,600 | | | | | | | | | 333,191 | 333,191 | | | | |
| P-4 | | 163,721 | | | | | | | | | | 215,536 | | | | | | | | |
| P-5 | | 651,010 | | | | | | | | | | 888,105 | | | | | | | | |
| P-6 | 42,024 | | | | | | 42,024 | | | | | | | | 45,093 | 10,021 | 45,093 | | | |
| P-7 | | 68,494 | | | | | | | | 68,494 | | 88,506 | | | | | | | | 88,506 |
| P-8 | 50,073 | | | | | | | | | | | | | | 64,086 | | | | | |
| P-9 | | | 4,388 | | | | | | | | | | 5,740 | | | | | | | |
| P-10 | | | | | | | | | 89,373 | | | | 10,688 | | | | | | 96,194 | |
| P-11 | 55,425 | | | | | | | 55,425 | | | | | | | 63,332 | 14,074 | | 63,332 | | |
| S-1 [B] | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| I-2 | | | | | | | | | | | | 306,600 | | | | | | | | |
| **Total** | **4,804,986** | **5,521,745** | **7,490,302** | **1,865,007** | **-** | **247,600** | **42,024** | **55,425** | **89,373** | **68,494** | **4,948,839** | **9,761,466** | **12,376,947** | **2,438,809** | **505,702** | **357,285** | **45,093** | **63,332** | **96,194** | **88,506** |

Notes:
[A] The current ridership at Tasitolu (the terminating point in Dili) is used as a proxy to estimate ridership at Tibar.
[B] Shuttle bus service (S-1) connecting Becora and Hera is assumed to be free at this stage. Further assessment of a business model or assignment of other microlet routes or route to/from Metinaro to this S-1 route is required to estimate detailed revenues for this route.

### Step 3 – Summary of Ridership and Fare Revenue

Estimated fare revenue for terminals based on ridership on different routes serve at each terminal (with different fares on different routes as shown in the assumption table), summed to calculate total fare revenue for routes served by each terminal. Given not all revenues can be used for terminal O&M, we assumed 5% of the total fare revenue to be allocated for bus terminal use for future condition and existing condition is 0%. The ridership and revenue in the table below:

**Table E-4: Summary of Ridership and Fare Revenue**

| Site | Annual Ridership | | | Annual Fare Revenue (Allocated for Bus Terminal Use) | | |
|---|---|---|---|---|---|---|
| | Year 2024 | Year 2030 | Year 2035 | Year 2024 | Year 2030 | Year 2035 |
| Becora | 4,804,986 | 4,802,144 | 4,948,839 | 0 | 54,024 | 55,674 |
| Tibar | 5,521,745 | 8,823,593 | 9,761,466 | 0 | 702,526 | 777,198 |
| Manleuana | 7,490,302 | 11,187,780 | 12,376,947 | 0 | 134,527 | 148,826 |
| Dili Convention Center | 1,865,007 | 2,378,446 | 2,438,809 | 0 | 26,758 | 27,437 |
| Hera | - | 490,712 | 505,702 | 0 | 112,966 | 116,417 |
| Baucau | 247,600 | 319,676 | 357,285 | 0 | 68,247 | 76,276 |
| Lospalos | 42,024 | 43,978 | 45,093 | 0 | 17,591 | 18,037 |
| Viqueque | 55,425 | 59,021 | 63,332 | 0 | 23,609 | 25,333 |
| Suai | 89,373 | 93,813 | 96,194 | 0 | 56,288 | 57,716 |
| Maliana | 68,494 | 85,022 | 88,506 | 0 | 25,507 | 26,552 |
| **Total** | **20,184,954** | **28,284,185** | **30,682,173** | **0** | **1,222,040** | **1,329,466** |

# E.3 Terminal – Revenue from Kiosk Rental

During the terminal design, commercial area was reserved for each terminal, and the number of kiosks for each terminal was calculated based on an assumed area of 3m x 3m for each kiosk. Based on the annual rent of each kiosk as stated in the Assumption, the Kiosks Rental Income is calculated as follows:

**Table E-5: Revenue from Kisok Rental**

| Terminal | Area for Retail / Kiosk (m2) | Number of Kiosks (number) | Annual Rental of Kiosks (US$) |
|---|---|---|---|
| Becora Terminal | 164 | 18 | 13,140 |
| Tibar | 412 | 45 | 32,850 |
| Manleuana Terminal | 249 | 27 | 19,170 |
| Dili Convention Center | 0 | 0 | 0 |
| Hera Terminal | 215 | 23 | 16,790 |
| Baucau | 104 | 11 | 8,030 |
| Lospalos | 0 | 0 | 0 |
| Viqueque | 0 | 0 | 0 |
| Suai | 0 | 0 | 0 |
| Maliana | 0 | 0 | 0 |
| **Total** | **1,144** | **124** | **90,520** |

# E.4 Terminal - Revenue from Shelter Advertisement

The shelter advertisement income will be based on the number of panels provided at buildings or bus shelters (depending on location and proposed facility type – terminals and on-street interchange). The advertisement fee differs by location, with that for Dili and Baucau assumed to be higher at US$3,650 annually (or US$10 / day), and that for other region assumed at US$ 1,460 annually (or US$4/day).

**Table E-6: Revenue from Shelter Advertisement**

| Terminal | Number of Shelter (number) | Advertisement Fee per Shelter by Region (US$) | Annual Advertisement Fee (US$) |
|---|---|---|---|
| Becora Terminal | 5 | 5,475 | 27,375 |
| Tibar | 14 | 5,475 | 76,650 |
| Manleuana Terminal | 8 | 5,475 | 43,800 |
| Dili Convention Center | 3 | 5,475 | 16,425 |
| Hera Terminal | 8 | 5,475 | 43,800 |
| Baucau | 8 | 5,475 | 43,800 |
| Lospalos | 2 | 2,190 | 4,380 |
| Viqueque | 2 | 2,190 | 4,380 |
| Suai | 2 | 2,190 | 4,380 |
| Maliana | 2 | 2,190 | 4,380 |
| **Total** | **54** | | **269,370** |

# E.5 Pilot Bus - Revenue Assumptions

**Table E-7: Pilot Bus Revenue Assumptions**

| Type of Revenues | Item | Amount | Unit |
|---|---|---|---|
| ***Farebox Revenues*** | | | |
| Fare of Pilot Bus | • Student Fare | 0.30 | US$ |
| | • Adult Fare | 0.50 | US$ |
| | • Elderly Fare | 0.50 | US$ |
| ***Advertisement*** | | | |
| Annual Advertisement Fee | • Total # of Advertising Panel on Bus (External) | 10 | number |
| | • Total # of Advertising Panel on Bus (Internal) | 10 | number |
| | • Total # of Advertising Panel for Bus Shelter | 118 | number |
| | • Annual Advertisement Fee per bus (External) | 6,083 | US$ |
| | • Annual Advertisement Fee per bus (Internal) | 4,106 | US$ |

| Type of Revenues | Item | Amount | Unit |
|---|---|---|---|
| ***Farebox Revenues*** | | | |
| | • Annual Advertisement Fee per Advertisement Panel for Bus Shelter | 3,650 | US$ |

**Table E-8: Pilot Bus Fare Revenue and Advertisement**

| | Year 2030 Revenue (US$) | Year 2035 Revenue (US$) |
|---|---|---|
| ***Pilot Bus Fare Revenue*** | | |
| Student Fare | 89,853 | 102,656 |
| Adult Fare | 389,364 | 444,844 |
| Elderly Fare | 59,902 | 68,438 |
| Total Fare Revenue | 539,119 | 615,938 |
| ***Pilot Bus Advertisement Revenue*** | | |
| Total Advertisement Revenue | 532,590 | 532,590 |
| **Total Revenue** | **1,071,709** | **1,148,528** |

# E.6 Traffic Management - Revenue Assumptions

**Table E-9: Pilot Bus Fare Revenue and Advertisement**

| Type of Revenues | Item | Amount | Unit |
|---|---|---|---|
| ***Parking Levy*** | | | |
| Parking Fee (On-street) | • Existing Parking Fee per hour per Space | 0.5 | US$ |
| | • On-street Parking Operation Hour | 10 | Hour |
| | • Utilization Rate per Space | 80% | % |
| | • On-Street Parking Daily Fee per Space | 4.0 | US$ |
| | • On-Street Parking Annal Fee per Space | 1,460 | US$ |
| Parking Fee (Off-street) | • Existing Parking Fee per hour per Space | 0.5 | US$ |
| | • Off-street Parking Operation Hour (daytime) | 14 | Hour |
| | • Utilization Rate per Space (daytime) | 80% | % |
| | • Off-street Parking Operation Hour (nighttime) | 10 | Hour |
| | • Utilization Rate per Space (nighttime) | 30% | % |
| | • Off-Street Parking Daily Fee per Space | 7 | US$ |
| | • Off-Street Parking Annal Fee per Space | 2,555 | US$ |
| Allocation percentage of Parking Fee to Terminal Operation | • Existing condition of allocation % of parking fee to terminal operation | 0% | % |
| | • Future condition of allocation % of parking fee to terminal operation | 20% | % |
| # of Estimated Parking Spots | • # of On-street Parking Spots | 759 | Number |
| | • # of Off-street Parking Spots | 400 | Number |

**Table E-10: Parking Levy Assumptions**

| Item | Parking Levy Income | Unit |
|---|---|---|
| Annual On-Street Parking Fee for Public Transport | 221,628 | US$ / year |
| Annual Off-Street Parking Revenue for Public Transport | 204,400 | US$ / year |
| Total Annual Parking Levy Income | 426,028 | US$ / year |

# E.7 Courier Service Model - Revenue

**Table E-11: Courier Service Model Revenue Assumptions**

| Type of Revenues | Item | Amount | Unit |
|---|---|---|---|
| ***Storage Facilities*** | | | |
| Gateway Storage Hub | • Number of facilities | 3 | Number |
| | • Average Size per Site | 300 | $m^2$ |
| | • Annual Rental per Site | 20,000 | US$ |
| | • Total Annual Rental | 60,000 | US$ |
| Regional Storage Hub | • Number of facilities | 3 | Number |
| | • Average Size per Site | 100 | $m^2$ |
| | • Annual Rental per Site | 5,000 | US$ |
| | • Total Annual Rental | 15,000 | US$ |
| **Total Annual Rental of Storage Facilities** | | **75,000** | **US$** |

# Appendix F

## Key Financial Model Assumptions

# F.1 REPEX Assumptions

**Table F-1: REPEX Assumptions**

| Capital Expenditure | Midlife Renewal | Full Replacements |
|---|---|---|
| **Bus Terminals** | | |
| Bus Facilities at Terminal | Year 15 at 25% initial CAPEX | Year 30 full replacement (i.e., after operating period ends). **Not included in financial assessment** assuming potential for partnerships with private sector or privatization in the future. |
| ITS at Terminal | None | Year 15 full replacement |
| Climate Resilient Facilities at Terminal | None | Year 30 full replacement (i.e., after operating period ends). **Not included in financial assessment** assuming potential for partnerships with private sector or privatization in the future. |
| Bus Facilities at On-Street Interchange | None | Year 10 full replacement |
| ITS at On-Street Interchange | None | None |
| Climate Resilience Facilities at Transit Hub | None | Year 30 full replacement (i.e., after operating period ends). **Not included in financial assessment** assuming potential for partnerships with private sector or privatization in the future. |
| **Pilot Bus Services** | | |
| 9m Diesel Bus | Year 7.5 and Year 22.5 at 20% initial CAPEX and at 20% full replacement REPEX, respectively | Year 15 full replacement |
| Bus Shelter | None | Year 10 and Year 20 full replacement |
| Bus Stop | None | Year 15 full replacement |
| Bus Lanes | Year 7.5 and Year 22.5 at 25% initial CAPEX and at 25% full replacement REPEX, respectively | Year 15 full replacement |
| Pedestrian and Crossing Improvements | None | Year 30 full replacement (i.e., after operating period ends). **Not included in financial assessment** assuming potential for partnerships with private sector or privatization in the future. |
| Depot | Year 15 at 25% initial CAPEX | Year 30 full replacement (i.e., after operating period ends). **Not included in financial assessment** assuming potential for partnerships with private sector or privatization in the future. |
| ITS | None | Year 15 full replacement |
| **Traffic Management** | | |
| Road Improvement | None | None |
| Junction Improvement | None | None |
| Parking Facilities | None | None |
| ITS | None | None |
| **Courier Service** | | |
| Storage Facilities | None | None |
| **Others** | | |
| Consulting Service | None | None |
| Capacity Building | None | None |
| Social Development Program | None | None |
| Contingency | None | None |
| **General assumptions** | | |
| • 24-month construction period from 1 July 2026 to 30 June 2028<br>• 3-month testing phase from 1 April 2028 to 30 June 2028 (i.e., within construction period)<br>• 30-year operational period starting from 1 July 2028 up to 30 June 2058 | | |

# F.2 Financial, Commercial, and Timeline Assumptions

**Table F-2: Financial, Commercial, and Timeline Assumptions**

| Assumptions | Values | Remarks |
|---|---|---|
| **Financial Assumptions** | | |
| Debt-to-Equity Ratio (DER) | 70:30 | Typical DER in infrastructure projects |
| Cost of Debt (i.e., Interest Rate) | 10.50% | Most recent lending rate, Banco Central de Timor-Leste |
| Cost of Equity | 10.38% | As Timor-Leste has never issued a treasury bill, Papua New Guinea's 10Y Treasury Bond has been used as proxy, Bank Papua New Guinea |
| Weighted Average Cost of Capital (WACC) | 9.73% | Based on DER, Cost of Debt, Cost of Equity and CIT Rate |
| Upfront Fee | 4.00% | Upfront fee explicitly announced in Timor-Leste, Banco Central de Timor-Leste |
| Commitment Fee | 0.15% | Due to data unavailability, inferred from ADB's Lending Policies and Rates, ADB |
| Grace Period | 2 years (during construction period) | Typical grace period assumption in infrastructure projects |
| Debt Repayment Period | 15 years | Typical project finance covenants |
| Minimum DSCR | 1.20 | |
| **Commercial Assumptions** | | |
| Consumer Price Index (CPI) Rate | 2.00% | Based on IMF World Economic Outlook for Timor-Leste, IMF |
| Corporate Income Tax (CIT) Rate | 10.00% | Based on Timor-Leste's existing corporate income tax rate, Trade Invest |
| Value-added Tax (VAT) Rate | 0.00% | Timor-Leste does not impose VAT charges |
| Maintenance Reserve Account | 6 years | Arup internal benchmarks |
| **Timeline Assumptions** | | |
| Construction Period | 2 years (1 July 2026 to 30 June 2028) | Arup technical team |
| Testing Period | 3 months (1 April 2028 to 30 June 2028, i.e., within construction period) | |
| Operation Period | 30 years (1 July 2028 to 30 June 2058) | |

# Appendix G

## Economic Benefits

# G.1 Key Assumptions

## Table G-1: Economic Benefit Assumptions

| Item | | Amount | Unit | Note/Assumptions |
|---|---|---|---|---|
| **General Assumptions** | | | | |
| Job Opportunity per Kiosk | | 2 | Person/Kiosk | Kiosk Size (3m x 3m) |
| Existing Waiting Time at Terminal | | 30 | min | Assumed waiting time based on survey results and field observations |
| Reduction Factor for Perceived Waiting Time after the Improvement | | 20% | % | Average reduction in perceived waiting time of 20% for non-priority customers |
| Assumed Peak Hour Factor | | 10% | % | Typical peak hour factor in similar public transport projects |
| Annual Days | | 365 | Days | Based on number of days in a year |
| Assumed Mode Shift from Private can and Motorcycle to Public Transport | | 5% | % | Assumed modal shift expected due to facility improvements |
| **Assumed PCU Factor by Mode** | | | | |
| Microlet | | 1.5 | PCU/vehicle | Based on survey results |
| Bus | | 3 | PCU/vehicle | |
| Car | | 1 | PCU/vehicle | |
| Motorcycle | | 0.5 | PCU/vehicle | |
| Goods Vehicle | | 2 | PCU/vehicle | |
| Microlet | | 1.5 | PCU/vehicle | |
| **Assumed Passenger Capacity by Mode** | | | | |
| Microlet | | 14 | People/vehicle | Based on survey results |
| Bus | | 30 | People/vehicle | |
| Car | | 2.5 | People/vehicle | |
| Motorcycle | | 1.5 | People/vehicle | |
| Goods Vehicle | | 2 | People/vehicle | |
| **Average Travel Distance by Mode** | | | | |
| Microlet | | 20 | km | Based on survey results |
| Bus | | 77 | km | |
| Car | | 104 | km | |
| Motorcycle | | 89 | km | |
| Goods Vehicle | | 35 | km | |
| **GHG Emission Factor by Mode** | | | | |
| Microlet | | 0.000269 | ton CO2 / km | Based on regional experience (Indonesia) |
| Bus | | 0.001350 | ton CO2 / km | |
| Car | | 0.000269 | ton CO2 / km | |
| Motorcycle | | 0.000082 | ton CO2 / km | |
| Goods Vehicle | | 0.001350 | ton CO2 / km | |
| **Annual Traffic Growth Rate by Terminal Site** | | | | |
| Dili Convention Center | | 0.50% | % | Referenced Region - Nain Feto |
| Becora | | 0.60% | % | Referenced Region - Cristo Rei |
| Manleuana Market | | 2.00% | % | Referenced Region - Dom Aleixo |
| Tibar | | 2.00% | % | Referenced Region - Dom Aleixo |
| Hera | | 0.60% | % | Referenced Region - Cristo Rei |
| Baucau and Others | | 2.20% | % | Referenced Region - Baucau |
| **Operation Efficiency Improvement by Terminal Site** | | | | |
| Time Reduction Factor of Each Movements (Entry-Unloading-Layover-Loading-Exit ) | Dili Convention Center | 30% | % | Assume to be same as Becora as no existing facility |
| | Becora | 30% | % | |
| | Manleuana Market | 30% | % | |
| | Tibar | 0% | % | No circulation as similar to bus stop |
| | Hera | 30% | % | Assume to be same as Becora as no existing facility |
| | Baucau | 30% | % | |
| | Others | 0% | % | No circulation as similar to bus stop |
| Time Reduction Factor of Each Activity (Unloading, Layover and Loading ) | Dili Convention Center | 20% | % | Assume to be same as Becora as no existing facility |
| | Becora | 20% | % | |
| | Manleuana Market | 20% | % | |
| | Tibar | 0% | % | No circulation as similar to bus stop |
| | Hera | 20% | % | Assume to be same as Becora as no existing facility |
| | Baucau | 20% | % | |
| | Others | 0% | % | No circulation as similar to bus stop |
| **Number of Kiosks Proposed by Terminal Site Based on Design** | | | | |
| Dili Convention Center | | 0 | Number | Based on terminal preliminary design |
| Becora | | 18 | Number | |
| Manleuana Market | | 27 | Number | |
| Tibar | | 45 | Number | |
| Hera | | 23 | Number | |
| Baucau | | 11 | Number | |
| Others | | 0 | Number | |
| **Accident Rate per 100,000,000km for Non-Public Transport** | | | | |
| Light Injury | | 62.695 | Number | |

| Item | Amount | Unit | Note/Assumptions |
|---|---|---|---|
| Heavy Injury | 10.101 | Number | Based on historical traffic accident data in Dili and total vehicle-km travelled in Dili |
| Death | 1.733 | Number | |
| **Accident Rate per 100,000,000km for Public Transport** | | | |
| Improvement Factor for Public Transport | 35% | % | Reduction ratio in fatalities based on drivers/passenger of bus in Indonesia |
| Light Injury | 21.943 | Number | |
| Heavy Injury | 3.535 | Number | |
| Death | 0.607 | Number | |

# G.2 Summary of Annualized Economic Benefits

| Program | Type of Economic Benefits | Unit | After improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Bus Terminal FS | Travel Time Savings for Vehicle (Within 1 km) | Annualized Hours | 265,664 | 535,218 | 539,146 | 543,114 | 547,122 | 551,169 | 555,258 | 559,388 | 563,559 | 567,773 | 572,031 | 576,332 | 580,677 | 585,068 | 589,504 | 593,987 | 598,517 | 603,094 | 607,720 | 612,395 | 617,120 | 621,895 | 626,722 | 631,602 | 636,534 | 641,520 | 646,560 | 651,656 | 656,808 | 662,017 | 333,642 |
| Bus Terminal FS | Travel Time Savings for Passengers (Within 1 km) | Annualized Hours | 842,648 | 1,698,323 | 1,711,488 | 1,724,796 | 1,738,246 | 1,751,843 | 1,765,587 | 1,779,481 | 1,793,527 | 1,807,728 | 1,822,086 | 1,836,604 | 1,851,283 | 1,866,126 | 1,881,137 | 1,896,316 | 1,911,668 | 1,927,194 | 1,942,898 | 1,958,782 | 1,974,850 | 1,991,103 | 2,007,545 | 2,024,178 | 2,041,007 | 2,058,034 | 2,075,262 | 2,092,694 | 2,110,334 | 2,128,185 | 1,073,125 |
| Bus Terminal FS | Travel Time Savings for People Using Sidewalk (Within 1 km) | Annualized Hours | 177,676 | 358,901 | 362,499 | 366,148 | 369,849 | 373,601 | 377,407 | 381,267 | 385,182 | 389,153 | 393,182 | 397,268 | 401,413 | 405,619 | 409,885 | 414,214 | 418,606 | 423,063 | 427,586 | 432,175 | 436,832 | 441,559 | 446,356 | 451,225 | 456,167 | 461,184 | 466,276 | 471,445 | 476,693 | 482,021 | 243,715 |
| Bus Terminal FS | Direct Waiting Time Savings for People at Terminal | Annualized Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bus Terminal FS | Perceived Waiting Time Savings for People at Terminal | Annualized Hours | 188 | 381 | 387 | 393 | 400 | 406 | 413 | 419 | 426 | 433 | 440 | 447 | 455 | 462 | 470 | 478 | 485 | 493 | 502 | 510 | 519 | 527 | 536 | 545 | 554 | 564 | 573 | 583 | 593 | 603 | 306 |
| Bus Terminal FS | Operation Time Savings for Public Transport Vehicles at Terminal | Annualized Hours | 20,027 | 40,505 | 40,962 | 41,428 | 41,900 | 42,381 | 42,869 | 43,365 | 43,861 | 44,365 | 44,877 | 45,398 | 45,927 | 46,465 | 47,011 | 47,567 | 48,131 | 48,705 | 49,288 | 49,881 | 50,484 | 51,097 | 51,720 | 52,353 | 52,997 | 53,652 | 54,318 | 54,995 | 55,683 | 56,383 | 28,548 |
| Bus Terminal FS | Employment Opportunities at Terminal | Annualized job # | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 | 248 |
| Pilot Bus Services | Direct Travel Time Savings for Pilot Bus Passengers | Annualized Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pilot Bus Services | Perceived Travel Time Savings for Pilot Bus Passengers | Annualized Hours | 72,557 | 149,032 | 153,056 | 157,188 | 161,432 | 165,791 | 170,268 | 174,865 | 179,586 | 184,435 | 189,415 | 194,529 | 199,781 | 205,175 | 210,715 | 216,404 | 222,247 | 228,248 | 234,410 | 240,740 | 247,239 | 253,915 | 260,771 | 267,811 | 275,042 | 282,468 | 290,095 | 297,928 | 305,972 | 314,233 | 161,359 |
| Pilot Bus Services | Waiting Time Savings for Pilot Bus Passengers at Stops | Annualized Hours | 14,198 | 29,164 | 29,951 | 30,760 | 31,590 | 32,443 | 33,319 | 34,219 | 35,143 | 36,092 | 37,066 | 38,067 | 39,095 | 40,150 | 41,234 | 42,348 | 43,491 | 44,665 | 45,871 | 47,110 | 48,382 | 49,688 | 51,029 | 52,407 | 53,822 | 55,275 | 56,768 | 58,301 | 59,875 | 61,491 | 31,576 |
| Pilot Bus Services | Reduced Incidents of Sexual Harassment Against Women | Annualized #s | 70,351 | 144,501 | 148,403 | 152,410 | 156,525 | 160,750 | 165,091 | 169,549 | 174,127 | 178,827 | 183,656 | 188,614 | 193,707 | 198,938 | 204,308 | 209,825 | 215,491 | 221,309 | 227,284 | 233,420 | 239,723 | 246,196 | 252,842 | 259,670 | 266,681 | 273,881 | 281,275 | 288,870 | 296,669 | 304,679 | 156,453 |
| City Level Traffic System | Travel Time Savings for Vehicles at City Level | Annualized Hours | 5,446,555 | 10,947,577 | 11,002,314 | 11,057,326 | 11,112,613 | 11,168,176 | 11,224,017 | 11,280,137 | 11,336,537 | 11,393,220 | 11,450,186 | 11,507,437 | 11,564,974 | 11,622,799 | 11,680,913 | 11,739,318 | 11,798,014 | 11,857,004 | 11,916,289 | 11,975,871 | 12,035,750 | 12,095,929 | 12,156,409 | 12,217,191 | 12,278,277 | 12,339,668 | 12,401,366 | 12,463,373 | 12,525,690 | 12,588,318 | 6,325,630 |
| City Level Traffic System | GHG Reduction from Mode Shift (Private Vehicle to Public Transport) | Annualized CO2 tons | 3,634 | 7,354 | 7,442 | 7,530 | 7,620 | 7,711 | 7,802 | 7,895 | 7,989 | 8,085 | 8,181 | 8,278 | 8,377 | 8,477 | 8,578 | 8,680 | 8,783 | 8,888 | 8,993 | 9,101 | 9,209 | 9,319 | 9,430 | 9,542 | 9,656 | 9,771 | 9,887 | 10,005 | 10,124 | 10,244 | 5,183 |
| City Level Traffic System | Reduction of Light Injury | Annualized Accident #s | 24 | 49 | 50 | 51 | 52 | 52 | 52 | 52 | 52 | 53 | 54 | 55 | 56 | 56 | 56 | 56 | 57 | 58 | 59 | 60 | 60 | 60 | 61 | 62 | 63 | 64 | 65 | 65 | 66 | 68 | 35 |
| City Level Traffic System | Reduction of Heavy Injury | Annualized Accident #s | 5 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 5 |
| City Level Traffic System | Reduction of Fatalities | Annualized Accident #s | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Emission Standard | GHG Reduction from Microlet Fleet Renewal | Annualized CO2 tons | 43 | 88 | 90 | 93 | 95 | 98 | 101 | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 125 | 128 | 131 | 135 | 139 | 142 | 146 | 150 | 154 | 158 | 163 | 167 | 171 | 176 | 181 | 186 | 95 |
| Courier Service | Employment Opportunities from Courier Service | Annualized job # | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |

Note: 2028 and 2058 values are halved as half-year operations are assumed for these two years which represent the opening and ending of the project cycle (thus a 50% reduction factor applied to relevant benefits except number of employment)

# G.3 Peak Hour Time Consumption for Vehicle within 1 km (hour)

**Table 1.** **Peak Hour Time Consumption for Vehicle within 1 km (hour)**

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 260,451 | 524,027 | 527,171 | 530,334 | 533,516 | 536,717 | 539,938 | 543,177 | 546,436 | 549,715 | 553,013 | 556,331 | 559,669 | 563,027 | 566,405 | 569,804 | 573,223 | 576,662 | 580,122 | 583,603 | 587,104 | 590,627 | 594,171 | 597,736 | 601,322 | 604,930 | 608,560 | 612,211 | 615,884 | 619,580 | 311,649 |
| Without Improvement | Tibar | 145,907 | 297,651 | 303,604 | 309,676 | 315,869 | 322,187 | 328,630 | 335,203 | 341,907 | 348,745 | 355,720 | 362,834 | 370,091 | 377,493 | 385,043 | 392,744 | 400,599 | 408,611 | 416,783 | 425,118 | 433,621 | 442,293 | 451,139 | 460,162 | 469,365 | 478,752 | 488,327 | 498,094 | 508,056 | 518,217 | 264,291 |
| Without Improvement | Manleuana Terminal | 20,449 | 41,715 | 42,550 | 43,401 | 44,269 | 45,154 | 46,057 | 46,978 | 47,918 | 48,876 | 49,854 | 50,851 | 51,868 | 52,905 | 53,963 | 55,043 | 56,144 | 57,266 | 58,412 | 59,580 | 60,772 | 61,987 | 63,227 | 64,491 | 65,781 | 67,097 | 68,439 | 69,807 | 71,204 | 72,628 | 37,040 |
| Without Improvement | Dili Convention Center | 91,710 | 184,338 | 185,259 | 186,186 | 187,116 | 188,052 | 188,992 | 189,937 | 190,887 | 191,841 | 192,801 | 193,765 | 194,733 | 195,707 | 196,686 | 197,669 | 198,657 | 199,651 | 200,649 | 201,652 | 202,660 | 203,674 | 204,692 | 205,716 | 206,744 | 207,778 | 208,817 | 209,861 | 210,910 | 211,965 | 106,512 |
| Without Improvement | Hera Terminal | 37,397 | 75,244 | 75,695 | 76,149 | 76,606 | 77,066 | 77,528 | 77,993 | 78,461 | 78,932 | 79,406 | 79,882 | 80,361 | 80,844 | 81,329 | 81,817 | 82,307 | 82,801 | 83,298 | 83,798 | 84,301 | 84,807 | 85,315 | 85,827 | 86,342 | 86,860 | 87,381 | 87,906 | 88,433 | 88,964 | 44,749 |
| Without Improvement | Baucau | 38,348 | 78,384 | 80,108 | 81,871 | 83,672 | 85,513 | 87,394 | 89,317 | 91,282 | 93,290 | 95,342 | 97,440 | 99,583 | 101,774 | 104,013 | 106,301 | 108,640 | 111,030 | 113,473 | 115,969 | 118,521 | 121,128 | 123,793 | 126,516 | 129,300 | 132,144 | 135,051 | 138,023 | 141,059 | 144,162 | 73,667 |
| Without Improvement | Lospalos | 38,348 | 77,080 | 77,465 | 77,853 | 78,242 | 78,633 | 79,026 | 79,422 | 79,819 | 80,218 | 80,619 | 81,022 | 81,427 | 81,834 | 82,243 | 82,655 | 83,068 | 83,483 | 83,901 | 84,320 | 84,742 | 85,165 | 85,591 | 86,019 | 86,449 | 86,882 | 87,316 | 87,753 | 88,191 | 88,632 | 44,538 |
| Without Improvement | Viqueque | 38,348 | 77,770 | 78,859 | 79,963 | 81,083 | 82,218 | 83,369 | 84,536 | 85,719 | 86,920 | 88,136 | 89,370 | 90,622 | 91,890 | 93,177 | 94,481 | 95,804 | 97,145 | 98,505 | 99,884 | 101,283 | 102,701 | 104,138 | 105,596 | 107,075 | 108,574 | 110,094 | 111,635 | 113,198 | 114,783 | 58,195 |
| Without Improvement | Suai | 38,348 | 77,080 | 77,465 | 77,853 | 78,242 | 78,633 | 79,026 | 79,422 | 79,819 | 80,218 | 80,619 | 81,022 | 81,427 | 81,834 | 82,243 | 82,655 | 83,068 | 83,483 | 83,901 | 84,320 | 84,742 | 85,165 | 85,591 | 86,019 | 86,449 | 86,882 | 87,316 | 87,753 | 88,191 | 88,632 | 44,538 |
| Without Improvement | Maliana | 38,348 | 77,310 | 77,929 | 78,552 | 79,180 | 79,814 | 80,452 | 81,096 | 81,745 | 82,399 | 83,058 | 83,722 | 84,392 | 85,067 | 85,748 | 86,434 | 87,125 | 87,822 | 88,525 | 89,233 | 89,947 | 90,667 | 91,392 | 92,123 | 92,860 | 93,603 | 94,352 | 95,107 | 95,867 | 96,634 | 48,704 |
| With Improvement | Becora Terminal | 98,662 | 198,509 | 199,700 | 200,898 | 202,104 | 203,316 | 204,536 | 205,763 | 206,998 | 208,240 | 209,489 | 210,746 | 212,011 | 213,283 | 214,562 | 215,850 | 217,145 | 218,448 | 219,758 | 221,077 | 222,403 | 223,738 | 225,080 | 226,431 | 227,789 | 229,156 | 230,531 | 231,914 | 233,306 | 234,706 | 118,057 |
| With Improvement | Tibar | 135,847 | 277,128 | 282,670 | 288,324 | 294,090 | 299,972 | 305,971 | 312,091 | 318,332 | 324,699 | 331,193 | 337,817 | 344,573 | 351,465 | 358,494 | 365,664 | 372,977 | 380,437 | 388,046 | 395,806 | 403,723 | 411,797 | 420,033 | 428,434 | 437,002 | 445,742 | 454,657 | 463,750 | 473,025 | 482,486 | 246,068 |
| With Improvement | Manleuana Terminal | 15,887 | 32,409 | 33,057 | 33,718 | 34,393 | 35,080 | 35,782 | 36,498 | 37,228 | 37,972 | 38,732 | 39,506 | 40,296 | 41,102 | 41,924 | 42,763 | 43,618 | 44,491 | 45,380 | 46,288 | 47,214 | 48,158 | 49,121 | 50,104 | 51,106 | 52,128 | 53,170 | 54,234 | 55,318 | 56,425 | 28,777 |
| With Improvement | Dili Convention Center | 48,358 | 97,200 | 97,686 | 98,175 | 98,666 | 99,159 | 99,655 | 100,153 | 100,654 | 101,157 | 101,663 | 102,171 | 102,682 | 103,196 | 103,712 | 104,230 | 104,751 | 105,275 | 105,801 | 106,330 | 106,862 | 107,396 | 107,933 | 108,473 | 109,015 | 109,560 | 110,108 | 110,659 | 111,212 | 111,768 | 56,163 |
| With Improvement | Hera Terminal | 31,036 | 62,444 | 62,819 | 63,195 | 63,575 | 63,956 | 64,340 | 64,726 | 65,114 | 65,505 | 65,898 | 66,293 | 66,691 | 67,091 | 67,494 | 67,899 | 68,306 | 68,716 | 69,128 | 69,543 | 69,960 | 70,380 | 70,802 | 71,227 | 71,655 | 72,084 | 72,517 | 72,952 | 73,390 | 73,830 | 37,137 |
| With Improvement | Baucau | 30,440 | 62,220 | 63,589 | 64,988 | 66,418 | 67,879 | 69,372 | 70,898 | 72,458 | 74,052 | 75,681 | 77,346 | 79,048 | 80,787 | 82,564 | 84,381 | 86,237 | 88,134 | 90,073 | 92,055 | 94,080 | 96,150 | 98,265 | 100,427 | 102,636 | 104,894 | 107,202 | 109,561 | 111,971 | 114,434 | 58,476 |
| With Improvement | Lospalos | 30,440 | 61,185 | 61,491 | 61,799 | 62,108 | 62,418 | 62,730 | 63,044 | 63,359 | 63,676 | 63,994 | 64,314 | 64,636 | 64,959 | 65,284 | 65,610 | 65,938 | 66,268 | 66,599 | 66,932 | 67,267 | 67,603 | 67,941 | 68,281 | 68,622 | 68,965 | 69,310 | 69,657 | 70,005 | 70,355 | 35,353 |
| With Improvement | Viqueque | 30,440 | 61,733 | 62,597 | 63,474 | 64,362 | 65,263 | 66,177 | 67,104 | 68,043 | 68,996 | 69,962 | 70,941 | 71,934 | 72,941 | 73,962 | 74,998 | 76,048 | 77,113 | 78,192 | 79,287 | 80,397 | 81,522 | 82,664 | 83,821 | 84,995 | 86,184 | 87,391 | 88,615 | 89,855 | 91,113 | 46,194 |
| With Improvement | Suai | 30,440 | 61,185 | 61,491 | 61,799 | 62,108 | 62,418 | 62,730 | 63,044 | 63,359 | 63,676 | 63,994 | 64,314 | 64,636 | 64,959 | 65,284 | 65,610 | 65,938 | 66,268 | 66,599 | 66,932 | 67,267 | 67,603 | 67,941 | 68,281 | 68,622 | 68,965 | 69,310 | 69,657 | 70,005 | 70,355 | 35,353 |
| With Improvement | Maliana | 30,440 | 61,368 | 61,859 | 62,354 | 62,852 | 63,355 | 63,862 | 64,373 | 64,888 | 65,407 | 65,930 | 66,458 | 66,989 | 67,525 | 68,066 | 68,610 | 69,159 | 69,712 | 70,270 | 70,832 | 71,399 | 71,970 | 72,546 | 73,126 | 73,711 | 74,301 | 74,895 | 75,494 | 76,098 | 76,707 | 38,660 |

Note: For Manleuana Terminal, traffic data surveyed at Manleuana Market are used as a proxy

# G.4 Peak Hour Time Consumption for Passenger within 1 km (hour)

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 729,253 | 1,467,257 | 1,476,061 | 1,484,917 | 1,493,827 | 1,502,790 | 1,511,806 | 1,520,877 | 1,530,003 | 1,539,183 | 1,548,418 | 1,557,708 | 1,567,054 | 1,576,457 | 1,585,915 | 1,595,431 | 1,605,004 | 1,614,634 | 1,624,321 | 1,634,067 | 1,643,872 | 1,653,735 | 1,663,657 | 1,673,639 | 1,683,681 | 1,693,783 | 1,703,946 | 1,714,170 | 1,724,455 | 1,734,801 | 872,605 |
| Without Improvement | Tibar | 408,535 | 833,411 | 850,080 | 867,081 | 884,423 | 902,111 | 920,154 | 938,557 | 957,328 | 976,474 | 996,004 | 1,015,924 | 1,036,242 | 1,056,967 | 1,078,107 | 1,099,669 | 1,121,662 | 1,144,095 | 1,166,977 | 1,190,317 | 1,214,123 | 1,238,405 | 1,263,174 | 1,288,437 | 1,314,206 | 1,340,490 | 1,367,300 | 1,394,646 | 1,422,539 | 1,450,989 | 740,005 |
| Without Improvement | Manleuana Terminal | 57,256 | 116,802 | 119,138 | 121,521 | 123,951 | 126,430 | 128,959 | 131,538 | 134,169 | 136,852 | 139,589 | 142,381 | 145,228 | 148,133 | 151,096 | 154,118 | 157,200 | 160,344 | 163,551 | 166,822 | 170,158 | 173,561 | 177,033 | 180,573 | 184,185 | 187,868 | 191,626 | 195,458 | 199,368 | 203,355 | 103,711 |
| Without Improvement | Dili Convention Center | 256,785 | 516,139 | 518,719 | 521,313 | 523,920 | 526,539 | 529,172 | 531,818 | 534,477 | 537,149 | 539,835 | 542,534 | 545,247 | 547,973 | 550,713 | 553,466 | 556,234 | 559,015 | 561,810 | 564,619 | 567,442 | 570,279 | 573,131 | 575,996 | 578,876 | 581,771 | 584,680 | 587,603 | 590,541 | 593,494 | 298,231 |
| Without Improvement | Hera Terminal | 104,711 | 210,679 | 211,944 | 213,215 | 214,495 | 215,781 | 217,076 | 218,379 | 219,689 | 221,007 | 222,333 | 223,667 | 225,009 | 226,359 | 227,717 | 229,084 | 230,458 | 231,841 | 233,232 | 234,631 | 236,039 | 237,455 | 238,880 | 240,313 | 241,755 | 243,206 | 244,665 | 246,133 | 247,610 | 249,095 | 125,295 |
| Without Improvement | Baucau | 203,196 | 415,333 | 424,471 | 433,809 | 443,353 | 453,107 | 463,075 | 473,263 | 483,674 | 494,315 | 505,190 | 516,304 | 527,663 | 539,272 | 551,136 | 563,261 | 575,652 | 588,317 | 601,260 | 614,487 | 628,006 | 641,822 | 655,942 | 670,373 | 685,121 | 700,194 | 715,598 | 731,341 | 747,431 | 763,874 | 390,340 |
| Without Improvement | Lospalos | 203,196 | 408,425 | 410,467 | 412,519 | 414,582 | 416,655 | 418,738 | 420,832 | 422,936 | 425,050 | 427,176 | 429,312 | 431,458 | 433,615 | 435,784 | 437,962 | 440,152 | 442,353 | 444,565 | 446,788 | 449,022 | 451,267 | 453,523 | 455,791 | 458,070 | 460,360 | 462,662 | 464,975 | 467,300 | 469,636 | 235,992 |
| Without Improvement | Viqueque | 203,196 | 412,082 | 417,851 | 423,701 | 429,633 | 435,648 | 441,747 | 447,932 | 454,203 | 460,561 | 467,009 | 473,547 | 480,177 | 486,900 | 493,716 | 500,628 | 507,637 | 514,744 | 521,950 | 529,258 | 536,667 | 544,181 | 551,799 | 559,524 | 567,358 | 575,301 | 583,355 | 591,522 | 599,803 | 608,200 | 308,358 |
| Without Improvement | Suai | 203,196 | 408,425 | 410,467 | 412,519 | 414,582 | 416,655 | 418,738 | 420,832 | 422,936 | 425,050 | 427,176 | 429,312 | 431,458 | 433,615 | 435,784 | 437,962 | 440,152 | 442,353 | 444,565 | 446,788 | 449,022 | 451,267 | 453,523 | 455,791 | 458,070 | 460,360 | 462,662 | 464,975 | 467,300 | 469,636 | 235,992 |
| Without Improvement | Maliana | 203,196 | 409,644 | 412,921 | 416,224 | 419,554 | 422,911 | 426,294 | 429,704 | 433,142 | 436,607 | 440,100 | 443,621 | 447,170 | 450,747 | 454,353 | 457,988 | 461,652 | 465,345 | 469,068 | 472,820 | 476,603 | 480,416 | 484,259 | 488,133 | 492,038 | 495,974 | 499,942 | 503,942 | 507,973 | 512,037 | 258,067 |
| With Improvement | Becora Terminal | 276,251 | 555,818 | 559,153 | 562,508 | 565,883 | 569,278 | 572,694 | 576,130 | 579,587 | 583,064 | 586,563 | 590,082 | 593,622 | 597,184 | 600,767 | 604,372 | 607,998 | 611,646 | 615,316 | 619,008 | 622,722 | 626,458 | 630,217 | 633,998 | 637,802 | 641,629 | 645,479 | 649,352 | 653,248 | 657,167 | 330,555 |
| With Improvement | Tibar | 380,366 | 775,948 | 791,467 | 807,296 | 823,442 | 839,911 | 856,709 | 873,843 | 891,320 | 909,146 | 927,329 | 945,876 | 964,793 | 984,089 | 1,003,771 | 1,023,846 | 1,044,323 | 1,065,210 | 1,086,514 | 1,108,244 | 1,130,409 | 1,153,017 | 1,176,078 | 1,199,599 | 1,223,591 | 1,248,063 | 1,273,024 | 1,298,485 | 1,324,454 | 1,350,944 | 688,981 |
| With Improvement | Manleuana Terminal | 44,482 | 90,744 | 92,559 | 94,410 | 96,298 | 98,224 | 100,189 | 102,192 | 104,236 | 106,321 | 108,447 | 110,616 | 112,829 | 115,085 | 117,387 | 119,735 | 122,129 | 124,572 | 127,063 | 129,605 | 132,197 | 134,841 | 137,537 | 140,288 | 143,094 | 145,956 | 148,875 | 151,852 | 154,889 | 157,987 | 80,573 |
| With Improvement | Dili Convention Center | 135,402 | 272,158 | 273,519 | 274,886 | 276,261 | 277,642 | 279,030 | 280,425 | 281,827 | 283,237 | 284,653 | 286,076 | 287,506 | 288,944 | 290,389 | 291,841 | 293,300 | 294,766 | 296,240 | 297,721 | 299,210 | 300,706 | 302,209 | 303,721 | 305,239 | 306,765 | 308,299 | 309,841 | 311,390 | 312,947 | 157,256 |
| With Improvement | Hera Terminal | 86,899 | 174,841 | 175,890 | 176,945 | 178,007 | 179,075 | 180,149 | 181,230 | 182,318 | 183,411 | 184,512 | 185,619 | 186,733 | 187,853 | 188,980 | 190,114 | 191,255 | 192,402 | 193,557 | 194,718 | 195,886 | 197,062 | 198,244 | 199,434 | 200,630 | 201,834 | 203,045 | 204,263 | 205,489 | 206,722 | 103,981 |
| With Improvement | Baucau | 161,295 | 329,686 | 336,940 | 344,352 | 351,928 | 359,670 | 367,583 | 375,670 | 383,935 | 392,381 | 401,014 | 409,836 | 418,852 | 428,067 | 437,485 | 447,109 | 456,946 | 466,998 | 477,272 | 487,772 | 498,503 | 509,470 | 520,679 | 532,134 | 543,841 | 555,805 | 568,033 | 580,530 | 593,301 | 606,354 | 309,847 |
| With Improvement | Lospalos | 161,295 | 324,202 | 325,823 | 327,453 | 329,090 | 330,735 | 332,389 | 334,051 | 335,721 | 337,400 | 339,087 | 340,782 | 342,486 | 344,199 | 345,920 | 347,649 | 349,387 | 351,134 | 352,890 | 354,654 | 356,428 | 358,210 | 360,001 | 361,801 | 363,610 | 365,428 | 367,255 | 369,091 | 370,937 | 372,791 | 187,328 |
| With Improvement | Viqueque | 161,295 | 327,106 | 331,685 | 336,329 | 341,037 | 345,812 | 350,653 | 355,562 | 360,540 | 365,588 | 370,706 | 375,896 | 381,159 | 386,495 | 391,906 | 397,392 | 402,956 | 408,597 | 414,318 | 420,118 | 426,000 | 431,964 | 438,011 | 444,143 | 450,361 | 456,666 | 463,060 | 469,543 | 476,116 | 482,782 | 244,770 |
| With Improvement | Suai | 161,295 | 324,202 | 325,823 | 327,453 | 329,090 | 330,735 | 332,389 | 334,051 | 335,721 | 337,400 | 339,087 | 340,782 | 342,486 | 344,199 | 345,920 | 347,649 | 349,387 | 351,134 | 352,890 | 354,654 | 356,428 | 358,210 | 360,001 | 361,801 | 363,610 | 365,428 | 367,255 | 369,091 | 370,937 | 372,791 | 187,328 |
| With Improvement | Maliana | 161,295 | 325,170 | 327,772 | 330,394 | 333,037 | 335,701 | 338,387 | 341,094 | 343,823 | 346,573 | 349,346 | 352,141 | 354,958 | 357,797 | 360,660 | 363,545 | 366,453 | 369,385 | 372,340 | 375,319 | 378,321 | 381,348 | 384,399 | 387,474 | 390,574 | 393,698 | 396,848 | 400,023 | 403,223 | 406,449 | 204,850 |

Note: For Manleuana Terminal, traffic data surveyed at Manleuana Market are used as a proxy

# G.5 Peak Hour Time Consumption for People Using Sidewalk within 1 km (hour)

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 247,578 | 498,126 | 501,115 | 504,121 | 507,146 | 510,189 | 513,250 | 516,330 | 519,428 | 522,544 | 525,679 | 528,834 | 532,007 | 535,199 | 538,410 | 541,640 | 544,890 | 548,159 | 551,448 | 554,757 | 558,086 | 561,434 | 564,803 | 568,192 | 571,601 | 575,030 | 578,480 | 581,951 | 585,443 | 588,956 | 296,245 |
| Without Improvement | Tibar | 76,042 | 155,125 | 158,228 | 161,392 | 164,620 | 167,912 | 171,271 | 174,696 | 178,190 | 181,754 | 185,389 | 189,097 | 192,878 | 196,736 | 200,671 | 204,684 | 208,778 | 212,953 | 217,212 | 221,557 | 225,988 | 230,508 | 235,118 | 239,820 | 244,616 | 249,509 | 254,499 | 259,589 | 264,781 | 270,076 | 137,739 |
| Without Improvement | Manleuana Terminal | 137,736 | 280,981 | 286,601 | 292,333 | 298,179 | 304,143 | 310,226 | 316,430 | 322,759 | 329,214 | 335,798 | 342,514 | 349,365 | 356,352 | 363,479 | 370,749 | 378,164 | 385,727 | 393,441 | 401,310 | 409,336 | 417,523 | 425,874 | 434,391 | 443,079 | 451,941 | 460,979 | 470,199 | 479,603 | 489,195 | 249,489 |
| Without Improvement | Dili Convention Center | 60,833 | 122,275 | 122,886 | 123,501 | 124,118 | 124,739 | 125,363 | 125,989 | 126,619 | 127,252 | 127,889 | 128,528 | 129,171 | 129,817 | 130,466 | 131,118 | 131,774 | 132,433 | 133,095 | 133,760 | 134,429 | 135,101 | 135,777 | 136,455 | 137,138 | 137,823 | 138,513 | 139,205 | 139,901 | 140,601 | 70,652 |
| Without Improvement | Hera Terminal | 35,486 | 71,398 | 71,826 | 72,257 | 72,691 | 73,127 | 73,566 | 74,007 | 74,451 | 74,898 | 75,347 | 75,799 | 76,254 | 76,712 | 77,172 | 77,635 | 78,101 | 78,570 | 79,041 | 79,515 | 79,992 | 80,472 | 80,955 | 81,441 | 81,929 | 82,421 | 82,916 | 83,413 | 83,914 | 84,417 | 42,462 |
| Without Improvement | Baucau | 68,175 | 139,350 | 142,416 | 145,549 | 148,751 | 152,024 | 155,368 | 158,786 | 162,280 | 165,850 | 169,499 | 173,227 | 177,039 | 180,933 | 184,914 | 188,982 | 193,140 | 197,389 | 201,731 | 206,169 | 210,705 | 215,341 | 220,078 | 224,920 | 229,868 | 234,925 | 240,093 | 245,375 | 250,774 | 256,291 | 130,965 |
| Without Improvement | Lospalos | 68,175 | 137,032 | 137,717 | 138,406 | 139,098 | 139,794 | 140,493 | 141,195 | 141,901 | 142,611 | 143,324 | 144,040 | 144,760 | 145,484 | 146,212 | 146,943 | 147,677 | 148,416 | 149,158 | 149,904 | 150,653 | 151,406 | 152,163 | 152,924 | 153,689 | 154,457 | 155,230 | 156,006 | 156,786 | 157,570 | 79,179 |
| Without Improvement | Viqueque | 68,175 | 138,259 | 140,195 | 142,158 | 144,148 | 146,166 | 148,212 | 150,287 | 152,391 | 154,525 | 156,688 | 158,882 | 161,106 | 163,362 | 165,649 | 167,968 | 170,319 | 172,704 | 175,122 | 177,573 | 180,060 | 182,580 | 185,136 | 187,728 | 190,357 | 193,022 | 195,724 | 198,464 | 201,243 | 204,060 | 103,458 |
| Without Improvement | Suai | 68,175 | 137,032 | 137,717 | 138,406 | 139,098 | 139,794 | 140,493 | 141,195 | 141,901 | 142,611 | 143,324 | 144,040 | 144,760 | 145,484 | 146,212 | 146,943 | 147,677 | 148,416 | 149,158 | 149,904 | 150,653 | 151,406 | 152,163 | 152,924 | 153,689 | 154,457 | 155,230 | 156,006 | 156,786 | 157,570 | 79,179 |
| Without Improvement | Maliana | 68,175 | 137,441 | 138,541 | 139,649 | 140,766 | 141,893 | 143,028 | 144,172 | 145,325 | 146,488 | 147,660 | 148,841 | 150,032 | 151,232 | 152,442 | 153,661 | 154,891 | 156,130 | 157,379 | 158,638 | 159,907 | 161,186 | 162,476 | 163,776 | 165,086 | 166,406 | 167,738 | 169,080 | 170,432 | 171,796 | 86,585 |
| With Improvement | Becora Terminal | 159,688 | 321,291 | 323,219 | 325,158 | 327,109 | 329,072 | 331,046 | 333,033 | 335,031 | 337,041 | 339,063 | 341,098 | 343,144 | 345,203 | 347,274 | 349,358 | 351,454 | 353,563 | 355,684 | 357,818 | 359,965 | 362,125 | 364,298 | 366,484 | 368,682 | 370,895 | 373,120 | 375,359 | 377,611 | 379,876 | 191,078 |
| With Improvement | Tibar | 68,438 | 139,613 | 142,405 | 145,253 | 148,158 | 151,121 | 154,143 | 157,226 | 160,371 | 163,578 | 166,850 | 170,187 | 173,591 | 177,062 | 180,604 | 184,216 | 187,900 | 191,658 | 195,491 | 199,401 | 203,389 | 207,457 | 211,606 | 215,838 | 220,155 | 224,558 | 229,049 | 233,630 | 238,303 | 243,069 | 123,965 |
| With Improvement | Manleuana Terminal | 109,500 | 223,380 | 227,848 | 232,405 | 237,053 | 241,794 | 246,630 | 251,562 | 256,593 | 261,725 | 266,960 | 272,299 | 277,745 | 283,300 | 288,966 | 294,745 | 300,640 | 306,653 | 312,786 | 319,042 | 325,422 | 331,931 | 338,570 | 345,341 | 352,248 | 359,293 | 366,479 | 373,808 | 381,284 | 388,910 | 198,344 |
| With Improvement | Dili Convention Center | 54,750 | 110,048 | 110,598 | 111,151 | 111,706 | 112,265 | 112,826 | 113,390 | 113,957 | 114,527 | 115,100 | 115,675 | 116,254 | 116,835 | 117,419 | 118,006 | 118,596 | 119,189 | 119,785 | 120,384 | 120,986 | 121,591 | 122,199 | 122,810 | 123,424 | 124,041 | 124,661 | 125,285 | 125,911 | 126,541 | 63,587 |
| With Improvement | Hera Terminal | 31,938 | 64,258 | 64,644 | 65,032 | 65,422 | 65,814 | 66,209 | 66,607 | 67,006 | 67,408 | 67,813 | 68,220 | 68,629 | 69,041 | 69,455 | 69,872 | 70,291 | 70,713 | 71,137 | 71,564 | 71,993 | 72,425 | 72,860 | 73,297 | 73,736 | 74,179 | 74,624 | 75,072 | 75,522 | 75,975 | 38,216 |
| With Improvement | Baucau | 59,313 | 121,235 | 123,902 | 126,628 | 129,414 | 132,261 | 135,170 | 138,144 | 141,183 | 144,289 | 147,464 | 150,708 | 154,023 | 157,412 | 160,875 | 164,414 | 168,031 | 171,728 | 175,506 | 179,367 | 183,313 | 187,346 | 191,468 | 195,680 | 199,985 | 204,385 | 208,881 | 213,477 | 218,173 | 222,973 | 113,939 |
| With Improvement | Lospalos | 59,313 | 119,218 | 119,814 | 120,413 | 121,015 | 121,620 | 122,229 | 122,840 | 123,454 | 124,071 | 124,691 | 125,315 | 125,942 | 126,571 | 127,204 | 127,840 | 128,479 | 129,122 | 129,767 | 130,416 | 131,068 | 131,724 | 132,382 | 133,044 | 133,709 | 134,378 | 135,050 | 135,725 | 136,404 | 137,086 | 68,886 |
| With Improvement | Viqueque | 59,313 | 120,286 | 121,970 | 123,677 | 125,409 | 127,165 | 128,945 | 130,750 | 132,581 | 134,437 | 136,319 | 138,227 | 140,162 | 142,125 | 144,114 | 146,132 | 148,178 | 150,252 | 152,356 | 154,489 | 156,652 | 158,845 | 161,069 | 163,324 | 165,610 | 167,929 | 170,280 | 172,664 | 175,081 | 177,532 | 90,009 |
| With Improvement | Suai | 59,313 | 119,218 | 119,814 | 120,413 | 121,015 | 121,620 | 122,229 | 122,840 | 123,454 | 124,071 | 124,691 | 125,315 | 125,942 | 126,571 | 127,204 | 127,840 | 128,479 | 129,122 | 129,767 | 130,416 | 131,068 | 131,724 | 132,382 | 133,044 | 133,709 | 134,378 | 135,050 | 135,725 | 136,404 | 137,086 | 68,886 |
| With Improvement | Maliana | 59,313 | 119,574 | 120,531 | 121,495 | 122,467 | 123,447 | 124,434 | 125,430 | 126,433 | 127,444 | 128,464 | 129,492 | 130,528 | 131,572 | 132,624 | 133,685 | 134,755 | 135,833 | 136,920 | 138,015 | 139,119 | 140,232 | 141,354 | 142,485 | 143,625 | 144,774 | 145,932 | 147,099 | 148,276 | 149,462 | 75,329 |

Note: For Manleuana Terminal, traffic data surveyed at Manleuana Market are used as a proxy

# G.6 Annual Direct Waiting Time for People at Terminal (hour)

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 162 | 327 | 329 | 331 | 333 | 335 | 337 | 339 | 341 | 343 | 345 | 347 | 349 | 351 | 353 | 355 | 358 | 360 | 362 | 364 | 366 | 368 | 371 | 373 | 375 | 377 | 380 | 382 | 384 | 387 | 194 |
| Without Improvement | Tibar | 290 | 592 | 604 | 616 | 628 | 641 | 654 | 667 | 680 | 694 | 708 | 722 | 736 | 751 | 766 | 781 | 797 | 813 | 829 | 846 | 862 | 880 | 897 | 915 | 934 | 952 | 971 | 991 | 1,011 | 1,031 | 526 |
| Without Improvement | Manleuana Terminal | 368 | 751 | 766 | 781 | 797 | 813 | 829 | 845 | 862 | 880 | 897 | 915 | 933 | 952 | 971 | 990 | 1,010 | 1,030 | 1,051 | 1,072 | 1,094 | 1,115 | 1,138 | 1,161 | 1,184 | 1,207 | 1,232 | 1,256 | 1,281 | 1,307 | 667 |
| Without Improvement | Dili Convention Center | 81 | 162 | 163 | 164 | 165 | 165 | 166 | 167 | 168 | 169 | 170 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 185 | 186 | 94 |
| Without Improvement | Hera Terminal | 17 | 33 | 34 | 34 | 34 | 34 | 34 | 35 | 35 | 35 | 35 | 35 | 36 | 36 | 36 | 36 | 37 | 37 | 37 | 37 | 37 | 38 | 38 | 38 | 38 | 39 | 39 | 39 | 39 | 39 | 20 |
| Without Improvement | Baucau | 10 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 32 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 39 | 20 |
| Without Improvement | Lospalos | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| Without Improvement | Viqueque | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 3 |
| Without Improvement | Suai | 3 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 |
| Without Improvement | Maliana | 3 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 |
| With Improvement | Becora Terminal | 162 | 327 | 329 | 331 | 333 | 335 | 337 | 339 | 341 | 343 | 345 | 347 | 349 | 351 | 353 | 355 | 358 | 360 | 362 | 364 | 366 | 368 | 371 | 373 | 375 | 377 | 380 | 382 | 384 | 387 | 194 |
| With Improvement | Tibar | 290 | 592 | 604 | 616 | 628 | 641 | 654 | 667 | 680 | 694 | 708 | 722 | 736 | 751 | 766 | 781 | 797 | 813 | 829 | 846 | 862 | 880 | 897 | 915 | 934 | 952 | 971 | 991 | 1,011 | 1,031 | 526 |
| With Improvement | Manleuana Terminal | 368 | 751 | 766 | 781 | 797 | 813 | 829 | 845 | 862 | 880 | 897 | 915 | 933 | 952 | 971 | 990 | 1,010 | 1,030 | 1,051 | 1,072 | 1,094 | 1,115 | 1,138 | 1,161 | 1,184 | 1,207 | 1,232 | 1,256 | 1,281 | 1,307 | 667 |
| With Improvement | Dili Convention Center | 81 | 162 | 163 | 164 | 165 | 165 | 166 | 167 | 168 | 169 | 170 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 185 | 186 | 94 |
| With Improvement | Hera Terminal | 17 | 33 | 34 | 34 | 34 | 34 | 34 | 35 | 35 | 35 | 35 | 35 | 36 | 36 | 36 | 36 | 37 | 37 | 37 | 37 | 37 | 38 | 38 | 38 | 38 | 39 | 39 | 39 | 39 | 39 | 20 |
| With Improvement | Baucau | 10 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 32 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 39 | 20 |
| With Improvement | Lospalos | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| With Improvement | Viqueque | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 3 |
| With Improvement | Suai | 3 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 |
| With Improvement | Maliana | 3 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 |

# G.7 Annual Perceived Waiting Time for People at Terminal (hour)

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 162 | 327 | 329 | 331 | 333 | 335 | 337 | 339 | 341 | 343 | 345 | 347 | 349 | 351 | 353 | 355 | 358 | 360 | 362 | 364 | 366 | 368 | 371 | 373 | 375 | 377 | 380 | 382 | 384 | 387 | 194 |
| Without Improvement | Tibar | 290 | 592 | 604 | 616 | 628 | 641 | 654 | 667 | 680 | 694 | 708 | 722 | 736 | 751 | 766 | 781 | 797 | 813 | 829 | 846 | 862 | 880 | 897 | 915 | 934 | 952 | 971 | 991 | 1,011 | 1,031 | 526 |
| Without Improvement | Manleuana Terminal | 368 | 751 | 766 | 781 | 797 | 813 | 829 | 845 | 862 | 880 | 897 | 915 | 933 | 952 | 971 | 990 | 1,010 | 1,030 | 1,051 | 1,072 | 1,094 | 1,115 | 1,138 | 1,161 | 1,184 | 1,207 | 1,232 | 1,256 | 1,281 | 1,307 | 667 |
| Without Improvement | Dili Convention Center | 81 | 162 | 163 | 164 | 165 | 165 | 166 | 167 | 168 | 169 | 170 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 185 | 186 | 94 |
| Without Improvement | Hera Terminal | 17 | 33 | 34 | 34 | 34 | 34 | 34 | 35 | 35 | 35 | 35 | 35 | 36 | 36 | 36 | 36 | 37 | 37 | 37 | 37 | 37 | 38 | 38 | 38 | 38 | 39 | 39 | 39 | 39 | 39 | 20 |
| Without Improvement | Baucau | 10 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 32 | 32 | 33 | 34 | 35 | 35 | 36 | 37 | 38 | 39 | 39 | 20 |
| Without Improvement | Lospalos | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| Without Improvement | Viqueque | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 3 |
| Without Improvement | Suai | 3 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 |
| Without Improvement | Maliana | 3 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 4 |
| With Improvement | Becora Terminal | 130 | 262 | 263 | 265 | 266 | 268 | 269 | 271 | 273 | 274 | 276 | 278 | 279 | 281 | 283 | 284 | 286 | 288 | 290 | 291 | 293 | 295 | 297 | 298 | 300 | 302 | 304 | 306 | 307 | 309 | 156 |
| With Improvement | Tibar | 232 | 474 | 483 | 493 | 503 | 513 | 523 | 533 | 544 | 555 | 566 | 577 | 589 | 601 | 613 | 625 | 637 | 650 | 663 | 676 | 690 | 704 | 718 | 732 | 747 | 762 | 777 | 793 | 808 | 825 | 421 |
| With Improvement | Manleuana Terminal | 294 | 601 | 613 | 625 | 637 | 650 | 663 | 676 | 690 | 704 | 718 | 732 | 747 | 762 | 777 | 792 | 808 | 824 | 841 | 858 | 875 | 892 | 910 | 928 | 947 | 966 | 985 | 1,005 | 1,025 | 1,046 | 533 |
| With Improvement | Dili Convention Center | 65 | 130 | 130 | 131 | 132 | 132 | 133 | 134 | 134 | 135 | 136 | 136 | 137 | 138 | 138 | 139 | 140 | 140 | 141 | 142 | 143 | 143 | 144 | 145 | 145 | 146 | 147 | 148 | 148 | 149 | 75 |
| With Improvement | Hera Terminal | 13 | 27 | 27 | 27 | 27 | 27 | 28 | 28 | 28 | 28 | 28 | 28 | 29 | 29 | 29 | 29 | 29 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 32 | 16 |
| With Improvement | Baucau | 8 | 17 | 17 | 18 | 18 | 19 | 19 | 20 | 20 | 20 | 21 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 16 |
| With Improvement | Lospalos | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| With Improvement | Viqueque | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 2 |
| With Improvement | Suai | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 3 |
| With Improvement | Maliana | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 3 |

# G.8 Annual Operating Time for Public Transport Vehicles at Terminal (hour)

| Unit | Annualized Hours | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | 10,356 | 20,837 | 20,962 | 21,089 | 21,216 | 21,344 | 21,473 | 21,603 | 21,732 | 21,863 | 21,994 | 22,126 | 22,259 | 22,392 | 22,527 | 22,662 | 22,798 | 22,935 | 23,072 | 23,211 | 23,350 | 23,490 | 23,631 | 23,773 | 23,915 | 24,059 | 24,203 | 24,348 | 24,495 | 24,642 | 12,395 |
| Without Improvement | Tibar | 21,364 | 43,601 | 44,490 | 45,398 | 46,325 | 47,270 | 48,235 | 49,219 | 50,204 | 51,208 | 52,232 | 53,277 | 54,342 | 55,429 | 56,538 | 57,668 | 58,822 | 59,998 | 61,198 | 62,422 | 63,671 | 64,944 | 66,243 | 67,568 | 68,919 | 70,298 | 71,703 | 73,138 | 74,600 | 76,092 | 38,807 |
| Without Improvement | Manleuana Terminal | 21,196 | 43,257 | 44,139 | 45,040 | 45,959 | 46,897 | 47,854 | 48,831 | 49,808 | 50,804 | 51,820 | 52,856 | 53,913 | 54,992 | 56,091 | 57,213 | 58,358 | 59,525 | 60,715 | 61,930 | 63,168 | 64,432 | 65,720 | 67,035 | 68,375 | 69,743 | 71,138 | 72,560 | 74,012 | 75,492 | 38,501 |
| Without Improvement | Dili Convention Center | 39,124 | 78,641 | 79,036 | 79,433 | 79,832 | 80,234 | 80,637 | 81,042 | 81,447 | 81,854 | 82,264 | 82,675 | 83,088 | 83,504 | 83,921 | 84,341 | 84,763 | 85,186 | 85,612 | 86,040 | 86,471 | 86,903 | 87,338 | 87,774 | 88,213 | 88,654 | 89,098 | 89,543 | 89,991 | 90,441 | 45,446 |
| Without Improvement | Hera Terminal | 2,351 | 4,731 | 4,760 | 4,789 | 4,817 | 4,847 | 4,876 | 4,905 | 4,935 | 4,964 | 4,994 | 5,024 | 5,054 | 5,084 | 5,115 | 5,146 | 5,176 | 5,208 | 5,239 | 5,270 | 5,302 | 5,334 | 5,366 | 5,398 | 5,430 | 5,463 | 5,496 | 5,529 | 5,562 | 5,595 | 2,814 |
| Without Improvement | Baucau | 1,183 | 2,418 | 2,473 | 2,528 | 2,585 | 2,643 | 2,703 | 2,764 | 2,824 | 2,887 | 2,950 | 3,015 | 3,081 | 3,149 | 3,218 | 3,289 | 3,362 | 3,436 | 3,511 | 3,588 | 3,667 | 3,748 | 3,830 | 3,915 | 4,001 | 4,089 | 4,179 | 4,271 | 4,365 | 4,461 | 2,279 |
| Without Improvement | Lospalos | 58 | 117 | 118 | 119 | 119 | 120 | 120 | 121 | 122 | 122 | 123 | 123 | 124 | 125 | 125 | 126 | 127 | 127 | 128 | 129 | 129 | 130 | 130 | 131 | 132 | 132 | 133 | 134 | 134 | 135 | 68 |
| Without Improvement | Viqueque | 96 | 194 | 197 | 199 | 202 | 205 | 208 | 211 | 214 | 217 | 220 | 223 | 226 | 229 | 233 | 236 | 239 | 242 | 246 | 249 | 253 | 256 | 260 | 264 | 267 | 271 | 275 | 279 | 283 | 287 | 145 |
| Without Improvement | Suai | 76 | 154 | 154 | 155 | 156 | 157 | 157 | 158 | 159 | 160 | 161 | 161 | 162 | 163 | 164 | 165 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 89 |
| Without Improvement | Maliana | 93 | 188 | 189 | 191 | 192 | 194 | 195 | 197 | 199 | 200 | 202 | 203 | 205 | 207 | 208 | 210 | 212 | 213 | 215 | 217 | 219 | 220 | 222 | 224 | 226 | 228 | 229 | 231 | 233 | 235 | 118 |
| With Improvement | Becora Terminal | 7,939 | 15,975 | 16,071 | 16,168 | 16,266 | 16,364 | 16,463 | 16,562 | 16,661 | 16,761 | 16,862 | 16,963 | 17,065 | 17,167 | 17,270 | 17,374 | 17,478 | 17,583 | 17,689 | 17,795 | 17,902 | 18,009 | 18,117 | 18,226 | 18,335 | 18,445 | 18,556 | 18,667 | 18,779 | 18,892 | 9,503 |
| With Improvement | Tibar | 18,735 | 38,234 | 39,015 | 39,811 | 40,623 | 41,452 | 42,298 | 43,162 | 44,025 | 44,905 | 45,803 | 46,720 | 47,654 | 48,607 | 49,579 | 50,571 | 51,582 | 52,614 | 53,666 | 54,739 | 55,834 | 56,951 | 58,090 | 59,252 | 60,437 | 61,646 | 62,878 | 64,136 | 65,419 | 66,727 | 34,031 |
| With Improvement | Manleuana Terminal | 16,250 | 33,163 | 33,840 | 34,531 | 35,235 | 35,955 | 36,688 | 37,437 | 38,186 | 38,950 | 39,729 | 40,523 | 41,334 | 42,160 | 43,003 | 43,863 | 44,741 | 45,636 | 46,548 | 47,479 | 48,429 | 49,397 | 50,385 | 51,393 | 52,421 | 53,469 | 54,539 | 55,630 | 56,742 | 57,877 | 29,517 |
| With Improvement | Dili Convention Center | 29,995 | 60,291 | 60,594 | 60,899 | 61,205 | 61,512 | 61,822 | 62,132 | 62,443 | 62,755 | 63,069 | 63,384 | 63,701 | 64,020 | 64,340 | 64,661 | 64,985 | 65,310 | 65,636 | 65,964 | 66,294 | 66,626 | 66,959 | 67,294 | 67,630 | 67,968 | 68,308 | 68,650 | 68,993 | 69,338 | 34,842 |
| With Improvement | Hera Terminal | 1,764 | 3,548 | 3,570 | 3,591 | 3,613 | 3,635 | 3,657 | 3,679 | 3,701 | 3,723 | 3,745 | 3,768 | 3,791 | 3,813 | 3,836 | 3,859 | 3,882 | 3,906 | 3,929 | 3,953 | 3,976 | 4,000 | 4,024 | 4,048 | 4,073 | 4,097 | 4,122 | 4,146 | 4,171 | 4,196 | 2,111 |
| With Improvement | Baucau | 907 | 1,854 | 1,896 | 1,938 | 1,982 | 2,027 | 2,072 | 2,119 | 2,165 | 2,213 | 2,262 | 2,311 | 2,362 | 2,414 | 2,467 | 2,522 | 2,577 | 2,634 | 2,692 | 2,751 | 2,812 | 2,873 | 2,937 | 3,001 | 3,067 | 3,135 | 3,204 | 3,274 | 3,346 | 3,420 | 1,748 |
| With Improvement | Lospalos | 51 | 102 | 102 | 103 | 103 | 104 | 104 | 105 | 105 | 106 | 106 | 107 | 108 | 108 | 109 | 109 | 110 | 110 | 111 | 111 | 112 | 112 | 113 | 114 | 114 | 115 | 115 | 116 | 116 | 117 | 59 |
| With Improvement | Viqueque | 83 | 168 | 170 | 173 | 175 | 178 | 180 | 183 | 185 | 188 | 191 | 193 | 196 | 199 | 202 | 204 | 207 | 210 | 213 | 216 | 219 | 222 | 225 | 228 | 232 | 235 | 238 | 241 | 245 | 248 | 126 |
| With Improvement | Suai | 66 | 133 | 134 | 134 | 135 | 136 | 136 | 137 | 138 | 139 | 139 | 140 | 141 | 141 | 142 | 143 | 143 | 144 | 145 | 146 | 146 | 147 | 148 | 149 | 149 | 150 | 151 | 151 | 152 | 153 | 77 |
| With Improvement | Maliana | 81 | 163 | 164 | 165 | 167 | 168 | 169 | 171 | 172 | 174 | 175 | 176 | 178 | 179 | 181 | 182 | 184 | 185 | 186 | 188 | 189 | 191 | 192 | 194 | 196 | 197 | 199 | 200 | 202 | 204 | 103 |

# G.9 Job Creation (number)

| Unit | mber (Not Time Relate | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Site | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Becora Terminal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Tibar | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Manleuana Terminal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Dili Convention Center | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Hera Terminal | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Baucau | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Lospalos | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Viqueque | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Suai | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Maliana | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Becora Terminal | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |
| With Improvement | Tibar | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| With Improvement | Manleuana Terminal | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| With Improvement | Dili Convention Center | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Hera Terminal | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 | 46 |
| With Improvement | Baucau | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| With Improvement | Lospalos | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Viqueque | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Suai | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Maliana | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# G.10 GHG Emission (CO2) - System Level (ton)

| Unit | nualized CO2 Emissio | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 2,135.03 | 4,320.92 | 4,372.38 | 4,424.45 | 4,477.14 | 4,530.46 | 4,584.41 | 4,639.01 | 4,694.26 | 4,750.16 | 4,806.73 | 4,863.97 | 4,921.90 | 4,980.51 | 5,039.83 | 5,099.85 | 5,160.58 | 5,222.04 | 5,284.23 | 5,347.16 | 5,410.84 | 5,475.28 | 5,540.48 | 5,606.47 | 5,673.23 | 5,740.80 | 5,809.16 | 5,878.35 | 5,948.35 | 6,019.19 | 3,045.44 |
| Without Improvement | Bus | 16,502.34 | 33,397.73 | 33,795.47 | 34,197.94 | 34,605.21 | 35,017.32 | 35,434.35 | 35,856.34 | 36,283.35 | 36,715.46 | 37,152.70 | 37,595.16 | 38,042.88 | 38,495.94 | 38,954.39 | 39,418.30 | 39,887.74 | 40,362.76 | 40,843.45 | 41,329.86 | 41,822.06 | 42,320.12 | 42,824.11 | 43,334.11 | 43,850.18 | 44,372.40 | 44,900.83 | 45,435.56 | 45,976.66 | 46,524.20 | 23,539.13 |
| Without Improvement | Motorcycle | 58,211.01 | 117,808.51 | 119,211.50 | 120,631.20 | 122,067.81 | 123,521.53 | 124,992.56 | 126,481.10 | 127,987.38 | 129,511.59 | 131,053.96 | 132,614.69 | 134,194.01 | 135,792.14 | 137,409.30 | 139,045.72 | 140,701.63 | 142,377.26 | 144,072.84 | 145,788.62 | 147,524.83 | 149,281.71 | 151,059.52 | 152,858.51 | 154,678.91 | 156,521.00 | 158,385.02 | 160,271.24 | 162,179.93 | 164,111.34 | 83,032.88 |
| Without Improvement | Car | 32,914.85 | 66,613.67 | 67,406.97 | 68,209.73 | 69,022.05 | 69,844.04 | 70,675.81 | 71,517.50 | 72,369.21 | 73,231.06 | 74,103.17 | 74,985.68 | 75,878.69 | 76,782.33 | 77,696.74 | 78,622.04 | 79,558.36 | 80,505.82 | 81,464.57 | 82,434.74 | 83,416.47 | 84,409.88 | 85,415.13 | 86,432.34 | 87,461.67 | 88,503.26 | 89,557.26 | 90,623.80 | 91,703.05 | 92,795.15 | 46,950.13 |
| Without Improvement | Goods Vehicle | 35,895.20 | 72,645.35 | 73,510.49 | 74,385.93 | 75,271.80 | 76,168.22 | 77,075.31 | 77,993.21 | 78,922.04 | 79,861.93 | 80,813.01 | 81,775.42 | 82,749.29 | 83,734.76 | 84,731.97 | 85,741.05 | 86,762.14 | 87,795.40 | 88,840.97 | 89,898.98 | 90,969.60 | 92,052.96 | 93,149.23 | 94,258.55 | 95,381.08 | 96,516.99 | 97,666.42 | 98,829.53 | 100,006.50 | 101,197.49 | 51,201.33 |
| With Improvement | Microlet | 2,335.29 | 4,726.20 | 4,782.49 | 4,839.44 | 4,897.08 | 4,955.40 | 5,014.41 | 5,074.13 | 5,134.55 | 5,195.70 | 5,257.58 | 5,320.19 | 5,383.55 | 5,447.66 | 5,512.54 | 5,578.19 | 5,644.62 | 5,711.84 | 5,779.87 | 5,848.70 | 5,918.35 | 5,988.83 | 6,060.16 | 6,132.33 | 6,205.36 | 6,279.26 | 6,354.04 | 6,429.71 | 6,506.28 | 6,583.76 | 3,331.09 |
| With Improvement | Bus | 17,224.66 | 34,859.59 | 35,274.73 | 35,694.82 | 36,119.92 | 36,550.07 | 36,985.35 | 37,425.81 | 37,871.52 | 38,322.54 | 38,778.92 | 39,240.74 | 39,708.06 | 40,180.95 | 40,659.47 | 41,143.69 | 41,633.67 | 42,129.49 | 42,631.21 | 43,138.91 | 43,652.66 | 44,172.52 | 44,698.58 | 45,230.90 | 45,769.56 | 46,314.63 | 46,866.19 | 47,424.33 | 47,989.11 | 48,560.62 | 24,569.46 |
| With Improvement | Motorcycle | 55,300.46 | 111,918.08 | 113,250.93 | 114,599.64 | 115,964.42 | 117,345.45 | 118,742.93 | 120,157.05 | 121,588.01 | 123,036.01 | 124,501.26 | 125,983.96 | 127,484.31 | 129,002.53 | 130,538.84 | 132,093.43 | 133,666.55 | 135,258.39 | 136,869.20 | 138,499.19 | 140,148.59 | 141,817.63 | 143,506.55 | 145,215.58 | 146,944.97 | 148,694.95 | 150,465.77 | 152,257.68 | 154,070.93 | 155,905.77 | 78,881.23 |
| With Improvement | Car | 31,269.10 | 63,282.98 | 64,036.63 | 64,799.24 | 65,570.94 | 66,351.83 | 67,142.02 | 67,941.62 | 68,750.75 | 69,569.51 | 70,398.02 | 71,236.39 | 72,084.75 | 72,943.22 | 73,811.90 | 74,690.94 | 75,580.44 | 76,480.53 | 77,391.35 | 78,313.01 | 79,245.64 | 80,189.39 | 81,144.37 | 82,110.73 | 83,088.59 | 84,078.10 | 85,079.39 | 86,092.61 | 87,117.90 | 88,155.39 | 44,602.62 |
| With Improvement | Goods Vehicle | 35,895.20 | 72,645.35 | 73,510.49 | 74,385.93 | 75,271.80 | 76,168.22 | 77,075.31 | 77,993.21 | 78,922.04 | 79,861.93 | 80,813.01 | 81,775.42 | 82,749.29 | 83,734.76 | 84,731.97 | 85,741.05 | 86,762.14 | 87,795.40 | 88,840.97 | 89,898.98 | 90,969.60 | 92,052.96 | 93,149.23 | 94,258.55 | 95,381.08 | 96,516.99 | 97,666.42 | 98,829.53 | 100,006.50 | 101,197.49 | 51,201.33 |

Note: 2024 veh-km data was used as the base and an average growth rate from 2028-2058 was applied to derive GHG emissions for 30 years.
Results show that GHG emissions by public transport vehicles (microlet/bus) are higher than private modes after improvement. This is because 5% of private vehicle users are assumed to shift to public transport (thus increases in public transport trips and decrease in driving/motorbikes). Goods vehicle are assumed to be the same after improvement.

# G.11 Light Injury by Mode at System Level (number)

| Accident Factor | Non-PT | Accident Rate | 62.69 | Light Injury |
|---|---|---|---|---|
| Accident Factor | PT | Accident Rate | 21.94 | Light Injury |

| Unit | nnualized Accident #: | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| Without Improvement | Bus | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 |
| Without Improvement | Motorcycle | 442 | 895 | 906 | 917 | 928 | 939 | 950 | 961 | 972 | 984 | 996 | 1,008 | 1,020 | 1,032 | 1,044 | 1,056 | 1,069 | 1,082 | 1,095 | 1,108 | 1,121 | 1,134 | 1,148 | 1,162 | 1,176 | 1,190 | 1,204 | 1,218 | 1,233 | 1,248 | 632 |
| Without Improvement | Car | 77 | 156 | 158 | 160 | 162 | 164 | 166 | 168 | 170 | 172 | 174 | 176 | 178 | 180 | 182 | 184 | 186 | 188 | 190 | 192 | 194 | 196 | 198 | 200 | 202 | 204 | 206 | 208 | 210 | 213 | 108 |
| Without Improvement | Goods Vehicle | 16 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 16 |
| With Improvement | Microlet | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| With Improvement | Bus | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 |
| With Improvement | Motorcycle | 421 | 852 | 862 | 872 | 882 | 893 | 904 | 915 | 926 | 937 | 948 | 959 | 970 | 982 | 994 | 1,006 | 1,018 | 1,030 | 1,042 | 1,054 | 1,067 | 1,080 | 1,093 | 1,106 | 1,119 | 1,132 | 1,145 | 1,159 | 1,173 | 1,187 | 601 |
| With Improvement | Car | 74 | 149 | 151 | 153 | 155 | 157 | 159 | 161 | 163 | 165 | 167 | 169 | 171 | 173 | 175 | 177 | 179 | 181 | 183 | 185 | 187 | 189 | 191 | 193 | 195 | 197 | 199 | 201 | 203 | 205 | 104 |
| With Improvement | Goods Vehicle | 16 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 16 |

Note: 2024 veh-km data was used as the base and an average growth rate from 2028-2058 was applied to derive GHG emissions for 30 years.

# G.12 Heavy Injury by Mode at System Level (number)

| Accident Factor | Non-PT | Accident Rate | 10.10 | Heavy Injury |
|---|---|---|---|---|
| Accident Factor | PT | Accident Rate | 3.54 | Heavy Injury |
| Unit | Annualized Accident # | | | |

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Without Improvement | Bus | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Without Improvement | Motorcycle | 72 | 146 | 148 | 150 | 152 | 154 | 156 | 158 | 160 | 162 | 164 | 166 | 168 | 170 | 172 | 174 | 176 | 178 | 180 | 182 | 184 | 186 | 188 | 190 | 192 | 194 | 196 | 198 | 200 | 202 | 102 |
| Without Improvement | Car | 12 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 12 |
| Without Improvement | Goods Vehicle | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 |
| With Improvement | Microlet | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| With Improvement | Bus | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| With Improvement | Motorcycle | 69 | 139 | 141 | 143 | 145 | 147 | 149 | 151 | 153 | 155 | 157 | 159 | 161 | 163 | 165 | 167 | 169 | 171 | 173 | 175 | 177 | 179 | 181 | 183 | 185 | 187 | 189 | 191 | 193 | 195 | 99 |
| With Improvement | Car | 11 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 11 |
| With Improvement | Goods Vehicle | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 |

Note: 2024 veh-km data was used as the base and an average growth rate from 2028-2058 was applied to derive GHG emissions for 30 years.

# G.13 Fatalities by Mode at System Level (number)

| Accident Factor | Non-PT | Accident Rate | 1.73 | Death |
|---|---|---|---|---|
| Accident Factor | PT | Accident Rate | 0.61 | Death |
| Unit | Annualized Accident # | | | |

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Bus | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Without Improvement | Motorcycle | 12 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 12 |
| Without Improvement | Car | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| Without Improvement | Goods Vehicle | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| With Improvement | Microlet | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Bus | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | Motorcycle | 11 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 11 |
| With Improvement | Car | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 |
| With Improvement | Goods Vehicle | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Note: 2024 veh-km data was used as the base and an average growth rate from 2028-2058 was applied to derive GHG emissions for 30 years.

# G.14 Pilot Bus - Annual Direct Travel Time between Microlet and Pilot Bus (hour)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 725,569 | 1,490,320 | 1,530,557 | 1,571,882 | 1,614,324 | 1,657,911 | 1,702,675 | 1,748,647 | 1,795,861 | 1,844,349 | 1,894,145 | 1,945,288 | 1,997,810 | 2,051,752 | 2,107,149 | 2,164,042 | 2,222,471 | 2,282,477 | 2,344,104 | 2,407,396 | 2,472,394 | 2,539,149 | 2,607,706 | 2,678,114 | 2,750,423 | 2,824,685 | 2,900,952 | 2,979,276 | 3,059,718 | 3,142,330 | 1,613,586 |
| With Improvement | Pilot Bus | 725,569 | 1,490,320 | 1,530,557 | 1,571,882 | 1,614,324 | 1,657,911 | 1,702,675 | 1,748,647 | 1,795,861 | 1,844,349 | 1,894,145 | 1,945,288 | 1,997,810 | 2,051,752 | 2,107,149 | 2,164,042 | 2,222,471 | 2,282,477 | 2,344,104 | 2,407,396 | 2,472,394 | 2,539,149 | 2,607,706 | 2,678,114 | 2,750,423 | 2,824,685 | 2,900,952 | 2,979,276 | 3,059,718 | 3,142,330 | 1,613,586 |

# G.15 Pilot Bus - Annual Perceived Travel Time between Microlet and Pilot Bus (hour)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 725,569 | 1,490,320 | 1,530,557 | 1,571,882 | 1,614,324 | 1,657,911 | 1,702,675 | 1,748,647 | 1,795,861 | 1,844,349 | 1,894,145 | 1,945,288 | 1,997,810 | 2,051,752 | 2,107,149 | 2,164,042 | 2,222,471 | 2,282,477 | 2,344,104 | 2,407,396 | 2,472,394 | 2,539,149 | 2,607,706 | 2,678,114 | 2,750,423 | 2,824,685 | 2,900,952 | 2,979,276 | 3,059,718 | 3,142,330 | 1,613,586 |
| With Improvement | Pilot Bus | 653,012 | 1,341,288 | 1,377,502 | 1,414,694 | 1,452,891 | 1,492,120 | 1,532,408 | 1,573,782 | 1,616,275 | 1,659,914 | 1,704,731 | 1,750,760 | 1,798,029 | 1,846,577 | 1,896,434 | 1,947,638 | 2,000,224 | 2,054,229 | 2,109,693 | 2,166,656 | 2,225,155 | 2,285,234 | 2,346,935 | 2,410,303 | 2,475,381 | 2,542,216 | 2,610,857 | 2,681,348 | 2,753,746 | 2,828,097 | 1,452,227 |

# G.16 Pilot Bus - Annual Accumulated Passenger Waiting Time at Stop (hour)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 47,328 | 97,212 | 99,837 | 102,532 | 105,301 | 108,144 | 111,064 | 114,063 | 117,142 | 120,305 | 123,553 | 126,889 | 130,315 | 133,834 | 137,447 | 141,158 | 144,970 | 148,884 | 152,904 | 157,032 | 161,272 | 165,626 | 170,098 | 174,691 | 179,407 | 184,251 | 189,226 | 194,335 | 199,582 | 204,971 | 105,253 |
| With Improvement | Pilot Bus | 33,130 | 68,048 | 69,886 | 71,773 | 73,711 | 75,701 | 77,745 | 79,844 | 82,000 | 84,214 | 86,487 | 88,822 | 91,221 | 93,684 | 96,213 | 98,811 | 101,479 | 104,219 | 107,033 | 109,922 | 112,890 | 115,938 | 119,069 | 122,284 | 125,585 | 128,976 | 132,458 | 136,035 | 139,708 | 143,480 | 73,677 |

# G.17 Pilot Bus - Number of Harassment Incidents (number)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 140,702 | 289,002 | 296,805 | 304,819 | 313,049 | 321,501 | 330,182 | 339,097 | 348,253 | 357,655 | 367,312 | 377,229 | 387,414 | 397,875 | 408,617 | 419,650 | 430,981 | 442,617 | 454,568 | 466,841 | 479,446 | 492,391 | 505,685 | 519,339 | 533,361 | 547,762 | 562,551 | 577,740 | 593,339 | 609,359 | 312,906 |
| With Improvement | Pilot Bus | 70,351 | 144,501 | 148,402 | 152,409 | 156,524 | 160,751 | 165,091 | 169,548 | 174,126 | 178,828 | 183,656 | 188,615 | 193,707 | 198,937 | 204,309 | 209,825 | 215,490 | 221,308 | 227,284 | 233,421 | 239,723 | 246,195 | 252,843 | 259,669 | 266,680 | 273,881 | 281,276 | 288,870 | 296,670 | 304,680 | 156,453 |

# G.18 Traffic Management - Time Consumption at System Level (hour)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | System | 27,232,777 | 54,737,883 | 55,011,572 | 55,286,630 | 55,563,063 | 55,840,878 | 56,120,083 | 56,400,683 | 56,682,687 | 56,966,100 | 57,250,931 | 57,537,185 | 57,824,871 | 58,113,996 | 58,404,566 | 58,696,588 | 58,990,071 | 59,285,022 | 59,581,447 | 59,879,354 | 60,178,751 | 60,479,645 | 60,782,043 | 61,085,953 | 61,391,383 | 61,698,340 | 62,006,831 | 62,316,865 | 62,628,450 | 62,941,592 | 31,628,150 |
| With Improvement | System | 21,786,222 | 43,790,306 | 44,009,258 | 44,229,304 | 44,450,451 | 44,672,703 | 44,896,066 | 45,120,547 | 45,346,149 | 45,572,880 | 45,800,744 | 46,029,748 | 46,259,897 | 46,491,196 | 46,723,652 | 46,957,271 | 47,192,057 | 47,428,017 | 47,665,157 | 47,903,483 | 48,143,001 | 48,383,716 | 48,625,634 | 48,868,762 | 49,113,106 | 49,358,672 | 49,605,465 | 49,853,492 | 50,102,760 | 50,353,274 | 25,302,520 |

Note:Growth rate at Dili Convention Center (located at the center of Dili) is used as a proxy to project yearly travel time at Dili (system) level

# G.19 GHG Emissions Related to Microlet Fleet Renewal from Euro 2 to Euro 4 (ton)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | Microlet | 1,866 | 3,832 | 3,936 | 4,042 | 4,151 | 4,263 | 4,378 | 4,497 | 4,618 | 4,743 | 4,871 | 5,002 | 5,137 | 5,276 | 5,419 | 5,565 | 5,715 | 5,869 | 6,028 | 6,191 | 6,358 | 6,529 | 6,706 | 6,887 | 7,073 | 7,264 | 7,460 | 7,661 | 7,868 | 8,081 | 4,149 |
| With Improvement | Microlet | 1,823 | 3,744 | 3,845 | 3,949 | 4,056 | 4,165 | 4,278 | 4,393 | 4,512 | 4,634 | 4,759 | 4,887 | 5,019 | 5,155 | 5,294 | 5,437 | 5,584 | 5,735 | 5,889 | 6,048 | 6,212 | 6,379 | 6,552 | 6,729 | 6,910 | 7,097 | 7,288 | 7,485 | 7,687 | 7,895 | 4,054 |

Note:Growth rate at Dili Convention Center (located at the center of Dili) is used as a proxy to project yearly travel time at Dili (system) level

# G.20 Job Creation for Courier Service (number)

| | | After Improvement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Scenario | Mode | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 |
| Without Improvement | | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With Improvement | | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |

# Appendix H

## Standard Agreement Templates for Bus Terminal Operation, Maintenance and Management

A set of four standard agreement templates for bus terminal operation, maintenance, and management are provided in this Appendix. These include: (i) enhanced standard agreement template for bus terminal operation & management; (ii) service operation agreement; (iii) leasing agreement for commercial spaces; and (iv) public-private partnership agreement. These enhanced agreements provide a structured, professional, and financially sustainable approach to managing bus terminals efficiently while ensuring private sector engagement, service quality, and economic feasibility. Adjustments can be made based on feedback from stakeholders and regulatory authorities as warranted.

# H.1 Enhanced Standard Agreement Templates for Bus Terminal Operation & Management

1. **Facility Use Agreement**

   **Parties:**

   - Terminal Management Unit (TMU) (hereinafter referred to as "the Authority")
   - Bus Operator (hereinafter referred to as "the Operator")

   **Purpose**:

   This Agreement establishes the terms and conditions under which the Operator may use the bus terminal facilities managed by the Authority, ensuring efficient, safe, and high-quality services for passengers.

2. **Term and Renewal**

   - The initial term of this Agreement shall be for __ years, commencing on __ and ending on __.
   - Renewal is subject to compliance with all terms and conditions and at the discretion of the Authority, subject to an operational review.

3. **Usage Fees and Financial Obligations**

   - The Operator shall pay a monthly/quarterly fee of $___.
   - Additional charges may apply for special services, overnight parking, or additional amenities.
   - Late payments will incur a penalty of __% per month.

4. **Obligations of the Operator**

   - Ensure timely departures and adherence to the published schedule.
   - Maintain cleanliness of designated spaces and comply with waste disposal regulations.
   - Ensure vehicle safety compliance, including periodic maintenance checks and adherence to environmental regulations.
   - Pay all applicable fees and charges on time.

5. **Obligations of the Authority**

   - Provide a safe, secure, and well-maintained terminal environment.
   - Ensure the availability of essential terminal services, including lighting, security, sanitation, and customer assistance.
   - Conduct routine maintenance and repairs to sustain operational efficiency.
   - Implement performance monitoring and enforcement mechanisms.

6. **Compliance and Termination**

   - Violations of terminal regulations may result in fines, temporary suspension, or termination of this Agreement.
   - Either party may terminate this Agreement with __ days' written notice, subject to an exit review process.

# H.2 Service Operation Agreement

**Parties:**

- Terminal Management Unit (TMU) ("the Authority")
- Service Provider (hereinafter referred to as "the Provider")

**Purpose**:

This Agreement establishes the terms and conditions under which the operator will deliver service operations in compliance with standards and key performance indicators as defined by the Authority, as well as the terms and clause for compensation, financial, and termination between the parties.

1. **Scope of Work:**

   The Provider shall be responsible for delivering the following services:

   - Cleaning and maintenance
   - Security services
   - Facility management (electrical, plumbing, waste management)
   - Passenger assistance and customer service improvements

2. **Performance Standards & KPIs:**

   - Cleaning to be conducted daily, with deep cleaning scheduled weekly.
   - Security personnel to be stationed 24/7 with CCTV monitoring.
   - Facility inspections to be conducted monthly.
   - Service level reviews to be conducted quarterly with mandatory performance audits.

3. **Compensation & Financial Terms:**

   - The Authority shall pay the Provider a fixed monthly fee of $___.
   - Additional payments for emergency or special services may apply.
   - A performance-based incentive structure will be implemented for meeting or exceeding KPIs.

4. **Termination Clause:**

   - Failure to meet agreed performance standards may result in contract termination with __ days' notice.
   - The contract is subject to annual renewal based on performance evaluations and passenger feedback.

# H.3 Leasing Agreement for Commercial Spaces

**Parties:**

- Terminal Management Unit (TMU) ("the Lessor")
- Business Entity (hereinafter referred to as "the Lessee")

**Purpose**:

This Agreement establishes the terms and conditions under which the Lessee agrees to use and maintain the space as per lease terms and agreement in compliance with maintenance and operational responsibilities and termination/renewal clauses.

1. **Lease Terms:**
    - Lease duration: __ years, starting from __.
    - Rental fee: $___ per month, inclusive of basic utilities (except electricity and water).
    - Annual rent escalation of __% applies
2. **Use of Leased Space:**
    - The Lessee agrees to use the space exclusively for __ (e.g., retail, food services, office use).
    - Any modifications to the space require prior approval from the Lessor and compliance with terminal aesthetics and safety guidelines.
3. **Maintenance & Operational Responsibilities:**
    - The Lessee is responsible for the interior space maintenance, ensuring cleanliness and customer safety.
    - Common area maintenance will be handled by the Lessor.
    - Emergency repairs must be reported immediately, with resolution timescales defined in the lease terms.
4. **Termination and Renewal:**
    - The lease may be terminated by either party with __ days' written notice.
    - Renewal is subject to compliance with lease conditions and business performance within the terminal

## H.4 Public-Private Partnership (PPP) Agreement

**Parties:**

- Government of Timor-Leste, Ministry of Transport and Communications ("the Government")
- Private Entity ("the Concessionaire")

**Purpose**:

This Agreement establishes the terms under which the Concessionaire will finance, develop, operate, and maintain the bus terminal under a PPP model, ensuring economic sustainability and improved transport services.

1. **Responsibilities of the Concessionaire:**
    - Invest $___ in terminal infrastructure and upgrades.
    - Manage and operate the facility for a concession period of __ years.
    - Ensure service quality, safety, and financial sustainability.
    - Implement technological improvements, including automated ticketing, passenger information systems, and digital security monitoring
2. **Revenue Generation & Sharing Model:**

- The Concessionaire shall collect revenue from commercial leasing, advertising, parking, and passenger service fees.
- A revenue-sharing agreement shall be established, with __% of gross revenue remitted to the Government annually.

**3. Performance Metrics, Monitoring & Compliance:**

- Monthly operational and financial reports must be submitted to the Government.
- Annual audits and independent reviews will assess compliance and service quality.
- Performance penalties may apply for non-compliance with operational and maintenance standards.

**4. Exit Strategy & Contractual Safeguards:**

- At the end of the concession period, the facility and all related assets shall be transferred to the Government in a fully operational condition.
- Early termination conditions and penalties apply for breach of contract.
- Dispute resolution mechanisms, including mediation and arbitration, will be established to handle conflicts.