Dili Sanitation, Drainage Master Plan and Wastewater Treatment Plan

16 October, 2017
Contents:

- National Sanitation Policy, Gov. Resolution No: 8 2012
- Project Scope, Objectives and Phasing;
- Sanitation;
- Urban Drainage;
- Wastewater & water security.
- Tibar Waste Water Treatment Plant
National Basic Sanitation Policy

Government Resolution No 8/2012, 14 March

16 October 2017
Experience Sharing Meeting with Solomon Islands Delegation
Background

Basic Sanitation is defined as access to adequate sanitation including (PNSB, 2012):

- toilet for defecation
- handwashing facility
- Safe solid waste disposal
- Drainage to eliminate standing water
Sanitation Situation in Timor-Leste (Census 2015)

Background

Sanitation Coverage

• +41% improved sanitation in Timor-Leste; 32% continue to open defecation
  ▶ 38% improved sanitation, 43% OD in rural TL
  ▶ 81% improved sanitation, 4% OD in urban Timor-Leste
• 25% households have handwashing facilities at their toilets
Background

- Drainage Systems and Solid Waste Management
  - Significant problems with drainage and contamination from rain drainage management in urban areas.
  - Sewage, solid waste contaminate drainage, rivers, and the ocean
  - Poor drainage results in sedimentation and blockages that result in considerable pollution issues in urban areas
National Basic Sanitation Policy

Policy Goal and Vision
Healthy Timorese living in a clean and hygienic environment.

Policy Objective
To reduce death and disease and bring about social, economic, educational and environmental gains for all through the safe elimination of harmful waste from the environment and the practice of healthy behaviours.
Outcome Focused Policy Framework

Category 1: No Sanitation

Category 2: Open Defecation Free Environment

Category 3: All people use: hygienic toilet, handwashing with soap, and ensure safe disposal of child and infant faeces

Category 4: All people and institutions practice safe management of solid waste

Category 5: All people and institutions practice safe management of liquid wastes
Sanitation Improvement Framework

Framework Pillars

a. Increased demand for sanitation goods and services
   a. ODF Initiative
   b. Demand creation campaigns
b. Strengthened supply of sanitation goods and services
   a. Support to markets to ensure community access to appropriate, low-cost facilities to poor, vulnerable households
c. Improved conditions to achieve sanitation for all
   a. Multi-year investment plans and budgeting (GdTL and donors)
   b. Capacity development of stakeholders
   c. Strengthen municipal authority ownership over commitment to improve sanitation
   d. Sanitation financing framework
Policy Implementation

b. Implementation guidelines to guide development of sustainable sanitation infrastructure
c. Policy socialization
d. Annual evaluations and strategy revision
e. Division of policy implementation between 9 different entities (changes in GdTL structure)
Policy Roles and Responsibilities

Ministry of Health:
- Leading coordination and strategy / guideline development at national and municipal levels.
- Demand creation and facilitation for building and use of household toilets.
- Vector Control
- Sanitation and Hygiene promotion campaigns

National Directorate of Basic Sanitation:
- Maintaining standards for improved sanitation
- Strengthening supply of sanitation goods and services
- Setting and collection of sanitation tariffs
- Planning and management in urban areas of:
  - Collection, disposal and treatment of excreta and wastewater from septic tanks
  - Operation of sewerage systems
  - Consultation with State Administration regarding solid waste
DILI DRAINAGE AND SANITATION MASTERPLAN

Project Scope, Objectives and Phasing
DILI DRAINAGE AND SANITATION MASTERPLAN

PROJECT PHASING

Approved Phases by the Council of Ministers:


PHASE 2: 2013-2017 – Short Term Improvements

PHASE 3: 2018-2025 – Medium and Long Term Improvements

PHASE 4: Beyond 2025 – Long Term Improvements
PROJECT PHASING

PHASE I

Background

Sanitation

Urban Drainage

Water Security

Objectives:

To ascertain the existing situation and to develop a master plan with focus on, but not limited to, feasibility studies, conceptual designs, budgeting and social impacts.

Results:

• Master Plan Phasing approved by the Council of Ministers;
• Initial assessment and identification of critical work to be developed;
• Initial cost estimation;
• Construction of 2 CSTS for pilot testing purposes.
PROJECT PHASING

PHASE II

Objectives:

To detail the engineering design for the critical interventions identified in Phase I to potentiate construction of short term improvements.

Synopsis:

- Data collected from equipment installed in Phase 1, showed that rainfall events were more significant than initially assumed increasing technical complexity and scope of Phase 2;
- Unregulated urban land occupation dictated a change in locations to implement the design.

Results:

- Topographic LiDAR recognisance;
- Hydraulic modelling of the study area;
- Detailed Engineering design of 32km of drainage network and 2 retention basins;
- Detailed Engineering Design of 4 CSTS;
- Other (asset registry, capacity building; etc....).
Sanitation
SANITATION

PHASE I Preliminary Assessment

Preliminary assessment of critical areas to provide sanitation treatment services.
SANITATION

PHASE I Pilot Testing of CSTS

Construction of 2 Community Sewage Treatment Systems (CSTS) in Mascarenhas and Bidau Santana.
SANITATION

PHASE II Detailed Engineering Design of 4 CSTS

Development of 4 additional CSTS located in sensitive areas (schools and primary care facilities).

Development of 5 additional CSTS DED started in October 2017
SANITATION

PHASE II Integrated Sewage Collection and Treatment System

Development of preliminary assessment for an integrated sewage collection and treatment system started in October 2017.

Preliminary design of a new Wastewater Treatment works started in October 2017. Existing Tibar WwTW is being equated to be converted in sludge treatment facility.
Drainage
PHASE I Preliminary Assessment

Preliminary assessment of existing drainage condition and critical data do gather to allow future development of detailed engineering design.
DRAINAGE

PHASE II Topographic Data Gathering (LiDAR)

3D topographic data gathering to allow expedite catchment hydraulic modelling
DRAINAGE

PHASE II Catchment Delimitation

Catchment and sub catchment delimitation and drainage channel design to substantiate hydraulic modelling.
DRAINAGE

PHASE II Catchment Delimitation

Catchment and sub catchment delimitation and drainage channel design to substantiate hydraulic modelling.
Retention Basin
Bacia de Retenção
DRAINAGE

PHASE II Retention Basin

Detailed engineering design of 2 retention basins.
Ligação à Bacia Retenção

± 25 Casas afetada

Limite da área

Descarga de Fundo e de Superfície
Hidrograma de cheia de Bacia Hidrográfica B6.3 e do período T=25

<table>
<thead>
<tr>
<th>Area de Captação</th>
<th>Area de Superfície (km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6.3</td>
<td>0,058</td>
</tr>
<tr>
<td>B6.4</td>
<td>0,103</td>
</tr>
</tbody>
</table>
DRAINAGE
PHASE II Retention Basin

Social impact assessment of Retention Basin 3
Wastewater & Water Security
Possible Talking Points for the Group Sessions

The United Nations World Water Development Report 2017

WASTEWATER
THE UNTAPPED RESOURCE

“In a world where demands for freshwater are ever growing, and where limited water resources are increasingly stressed by over-abstraction, pollution and climate change, neglecting the opportunities arising from improved wastewater management is nothing less than unthinkable.”
Possible Talking Points for the Group Sessions

**Report main considerations:**
- 80% of all wastewater is discharged without treatment;
- Wastewater treatment to prevent degradation of aquatic ecosystems and waterborne illness from contaminated freshwater supplies;
- Wastewater as a reliable alternative source of water;
- Wastewater can also be a cost-efficient and sustainable source of energy, nutrients, organic matter and other useful by-products;

**Challenges:**
- Public awareness and social acceptance;
- Suitable legal and regulatory frameworks;
- Cost recovery and appropriate financing mechanisms.
Dili Waste Water Treatment Plant – Tibar
Liquiça, Municipality
**Dili Sewage Treatment Plan (DSTP)**

- **Facultative Ponds 1 and 2/Aerobic 01-02**
- **Discharging to SEA + 2000 m**
- **Soe ba Tasi Loron 2 = 2 l/s**

**Chlorination Process Tank**

**Final Sedimentation Tank**

**Aeration Tank**

**Effluent Tank**

**Volume massa bee x Cl 0,002 g**

Cl = 0,00/10.000gx10 Cl

H\(_2\)O = O\(_2\), Fe, Fe\(_2\), O\(_3\), Mg, MgO, Al, Al\(_2\), Al\(_2\)\(_6\)

**Charge $$$$$:**

- Tax for Government

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>Unit</th>
<th>Influent</th>
<th>Effluent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOD</td>
<td>ppm</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>COD</td>
<td>ppm</td>
<td>600</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>TSS</td>
<td>ppm</td>
<td>200</td>
<td>&lt; 50</td>
</tr>
<tr>
<td>4</td>
<td>PH</td>
<td></td>
<td>6.0 - 9</td>
<td>6.5 - 9</td>
</tr>
<tr>
<td>5</td>
<td>FOG</td>
<td>ppm</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

*Designed by: João de Piedade – 2008 - 2010*

---

**BANDA - SEA**
THANK YOU - OBRIGADO