

GHD Samoa Sanitation and Drainage Project

SSDP

ADB Loan No. 2026 SAM (SF)

Project Implementation Assistance Consultant
Pacific Water Conference 2008

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Introduction

- GHD – Project Implementing Agent Consultant, in association with Samoan consultant Tinai Gordon and Associates.
- Implementing Agents – MWTI & SWA.
- Project Management Unit – Kew Consulting
- GHD have been involved with the project since 2006 – expected completion late 2009

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Presentation Overview

- Introduction – Need for Project and Project Objectives
- Sanitation Improvements
 - Pressure Sewer Scheme for CBA and SNAs
 - Wastewater and Sludge Treatment
 - Septic Tank Replacement
- Drainage and Floodway Improvements
 - Drainage Replacement in central Apia
 - Rehabilitating Gasegase, Asaga & Fugalei channels
- Conclusion - Design issues and the future requirements

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Background

- Apia, the economic centre of Samoa, is growing
- Sanitation & drainage systems have not kept pace
- Wastewater is inadequately treated
- Drainage cannot cope – flooding occurs
- Environment significantly degraded

Government of Samoa has obtained an ADB Loan

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SSDP Goals and Objectives

- Improving and rehabilitating existing drainage to reduce the magnitude and frequency of flooding.
- Upgrading sanitation through a combination of:
 - a piped sewerage scheme to service the highly built-up Central Business Area and key Special Needs Areas, and
 - improved on-site sanitation for other areas of the city, particularly the low-lying flood-prone land
- Building capacity within the MWTI & SWA to enable effective management of new infrastructure to ensure optimal operation and extended lifespan.



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Sanitation

Improving the Sanitation in Apia will:

- Improve water quality in streams and marine waterways,
- Reduce the potential for health impacts due to human contact with waste, and
- Minimise the cost of individual wastewater treatment and disposal in acceptable manner for businesses in Apia

This will be achieved through :

- Decommissioning inadequate septic tanks and treatment plants of businesses in CBA and SNAs;
- Connecting them to on-site grinder pumps which discharge into the pressure sewer system
- Treating wastewater to GoS designated standards at centralised WWTP
- Replacing residential septic tanks in flood prone areas

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Sanitation Issues

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Pressure Sewerage System

- Apia unsuitable for conventional gravity system due to high water table and very flat central business area
- A pressure sewer system is an alternative method for sewage collection and involves installing grinder pump stations at each site which discharge waste into small polyethylene transfer pipes

The benefits of a pressure sewer system in Apia include:

- Construction efficiency due to smaller pipes buried at shallower depths and option of trenchless installation;
- Lower infiltration of ground water;
- Lower Capital and O&M costs;
- Less chance of odour issues due to pipes flowing full and above sedimentation velocities; and
- Proven systems in flat coastal areas in Australia/New Zealand.

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Pressure Sewer System

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Wastewater Treatment Plant

- Located at Sogi – Away from residential area, government land, close to CBA, low lying.
- Sequence Batch Reactor (SBR) – small footprint (room for expansion), no odour, ease of operation.
- Treated waste discharged to mangroves and sludge collected and transported to Tafagata landfill.

Design Limitations

- Restricted Land Area – Limited type of plant and need for septage treatment and dewatering off-site
- Stringent Odour constraints – close proximity to Parliament
- High discharge effluent standards
- Limited O&M capacity for a complex treatment system

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Issues with Sanitation System

Current Issue	Impact on Project	Mitigation & Management
Very high water wastage from leaky cisterns & taps	High load on WWTP & increase pipe & pump size	Now: Replace leaking fixtures Future: Educate about water wastage, improve plumbing practices & ensure ongoing maintenance.
Infiltration from poorly installed and maintained plumbing.	Increases peak wet weather loads on treatment plant and pipes/pumps capacity increased.	Now: Replace poor plumbing, cover manholes. Future: ensure no stormwater connections, maintain on-site plumbing
No restrictions on what is put down the sink	Damage pumps, disrupt treatment process.	Now: Grease traps, community education, sewerage manual Future: Trade waste regulations

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Floodways and Drainage

The current drainage system in Apia does not sufficiently capture flows, is segmented, under capacity and in a poor condition due to inadequate maintenance and uncontrolled modifications.

Drainage Design Objectives

- Upgrade the street drainage of western Apia to reduce frequency and impact of flooding.
- Includes the flood prone areas of Fugalei Market, Fugalei Street and Convent Street near the cinemas.

Floodways Design Objectives

- Upgrading to the Gasegase, Asaga and Fugalei streams to improve conveyance and containment of small flood flows.
- Reviewing the impact of Tropicana bridge on flooding

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Drainage Issues

Polluted Waterways Filling mangroves floodplain

Inconvenience to community Safety risk for residents Property Damage

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Drainage Design

Designed to capture and convey the 1 in 5 year storm;
Using frequent kerbside gutters and open inlet culverts, pipes and some open channels; and
Discharge it into local streams and an outlet into the mangroves.

Design Issues:

- Very flat terrain (low flows and scour velocities),
- High water table,
- Influence of tidal water levels and storm surges,
- Tight road reserves
- Inadequate land for creating storage, and
- High rubbish and inadequate maintenance.

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Floodways Issues

Outcomes achieved in this project:

- Excavation of channels to remove sediment and debris and stabilising banks to improve conveyance and protect banks;
- Improve discharge and reduce backwater effects; and
- Improve drainage maintenance program and educate public/developers regarding polluting streams.

Outstanding Issues – To be addressed in future

- Inadequate regulation and monitoring of development in flood prone areas and the Gasegase floodplain,
- Filling of land and channels, particularly in flood prone areas and mangroves, which reduces natural flood storage
- Interference with drainage infrastructure, including filling of open drains, blocking drainage paths; and
- Providing sufficiently sized floodways and establishing floodplain areas that are free from development

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Future Floodway Improvements

Develop Gasegase Floodway

Reduce Pollution of Waterways

improve engineering of floodway and develop floodway reserve

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Conclusions

Issues that need to be addressed immediately

- ❖ Reduction in water wastage – fix leaky taps and educate public.
- ❖ Inadequate maintenance – of sanitation and drainage infrastructure.
- ❖ Prohibited modification of floodways- improve regulation and awareness.

SSDP – First Stage of Sanitation and Floodway Works

- ❖ Due to budget constraints only businesses and SNAs in Apia are serviced by pressure sewer scheme. This system will need to be augmented in future to service CBA expansion and low lying residential areas.
- ❖ Long term changes are required to better mitigate flooding in Apia. Including restriction of development in floodplains, realignment and expansion of major rivers and augmentation of drainage networks.



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Fa'afetai!

