Cook Islands National Waste Strategy

National Environment Service

November 2004

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Prepared for

National Environment Service

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Executive Summary

This National Waste Strategy consists of two main parts:

- The National Waste Policy
- Waste Management Plans

The relationship between the Strategy, Policy and Plans is shown in Table E1.1.

Table E1.1: Relationship Between Strategy, Policy and Plans

National Waste Management Strategy	
National Waste Policy	**Waste Management Plans**
Defines waste and sets out the general principles which guide how waste issues are dealt with in the Cook Islands.	Specific objectives and actions proposed to manage waste.

Waste Management Plans apply to specific waste streams. The following Waste Management Plans have been prepared:

- National Waste Management Plan;
- Rarotonga Solid Waste Management Plan;
- Aitutaki Solid Waste Management Plan;
- Outer Islands Solid Waste Management Plan; and
- National Septage Management Plan.

1.0 National Waste Policy

1.1 Purpose

The purpose of the National Waste Policy is to:

- Provide a definition of waste; and
- Set out the principles which will guide waste management in the Cook Islands.

1.2 Definition of Waste

The definition of Waste adopted in this Policy is as set out in Section 3 of the Public Health Act 2004.

"Waste" includes the following: a) Garbage, refuse, or litter; b) Hazardous waste; c) Wastewater; d) Building and demolition waste; e) Other discarded or superfluous things from open fires, incinerators, or industrial, commercial, mining, agricultural, community, or other activities; and f) Any other thing declared by the Queen's Representative by Order in Executive Council to be waste for the purposes of this Act."

"Litter" as defined in Part 7 of the Environment Act 2003 includes any refuse, rubbish, animal remains, glass, metal, garbage, debris, dirt, filth, rubble, ballast, stones, earth, sewage, or waste matter or any other thing of a like nature.

1.3 Definition of Hazardous Waste

The definition of hazardous waste adopted in this Policy is based on the definition as set out in Section 3 of the Public Health Act 2004. "Hazardous waste" means any waste that is likely to be a health hazard if released into the environment; and includes the following:

(i) Animal waste, medical waste, or sewage;

(ii) Sludge, other by-products, or other waste from devices, facilities, plants, or other systems that treat water, sewage, or pollution (for example, septic tanks, other sewage treatment facilities, water treatment plants, or sewage treatment plants);

(iii) Any other waste declared by the Queen's Representative by Order in Executive Council to be hazardous waste for the purposes of the Public Health Act 2004.

1.4 Definition of Cleanfill

A cleanfill is defined as a filling operation disposing of soil, rock, clay, and other inert materials such as concrete, glass or brick that are free of:

- combustible, putrescible, degradable or leachable components;
- hazardous substances;
- products or materials derived from hazardous waste treatment, hazardous waste stablisation or hazardous waste disposal practices;
- materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances; and

- liquid waste.

1.5 Principles of Waste Management in the Cook Islands

The following principles apply to the management of wastes in the Cook Islands.

Table 1-1 Waste Management Principles in the Cook Islands

Principle	Comment
1. Waste Minimisation	The following hierarchy will apply to the minimisation of wastes: (i) **Reduce** the quantity of waste produced in the first place through improved design of products and processes. (ii) **Reuse** wastes by repeated use of a product in the same or similar way (e.g. reuse containers). (iii) **Recover** materials to get back some residual value (e.g. use of waste oil as a supplementary fuel). (iv) **Recycle** – collect wastes and reconstitute into new products (e.g. aluminium cans).
2. Environmentally Sound	Waste management practices will not result in significant environmental degradation.
3. Economically Viable	Waste management practices will be the lowest cost means of achieving a sustainable outcome taking into account all external factors including environmental and social costs
4. User Pays	Where feasible and economic users will pay for the full costs of waste disposal including interest charges, operating costs, depreciation, aftercare, and monitoring.
5. Producer Responsibility	Parties that produce, or import goods to the Cook Islands retain a measure of responsibility for ensuring that the goods are safely disposed of at the end of their life cycle.
6. Socially Acceptable	The management of wastes will be undertaken in consultation with affected parties and in a manner that is supportive of communities. Traditional values are recognised and are drawn on to assist in developing appropriate and effective courses of action.
7. Private Sector Participation	Preference will be given to private sector carrying out waste management functions wherever this is feasible and economic.
8. Clear Definition of Regulatory and Service Delivery Roles	Parties responsible for regulating waste management activities will not play an active part in the service delivery of waste management activities.
9. Comply with Cook Islands Law	Management of wastes will be undertaken in compliance with all legal obligations under Cook Islands law.
10. International Obligations	The Cook Islands will comply with conventions or treaties that it has signed.

2.0 National Waste Management Plan

2.1 Purpose of Plan

The purpose of this plan is to set out objectives, targets and actions proposed to manage waste in the Cook Islands. The guiding principles for this plan are those set out in the National Waste Policy.

This plan has four main components:

- Description of Existing Solid Waste Management Activities and Opportunities;
- Description of Proposed Institutional Arrangements;
- Specific Objectives, Targets and Actions; and
- Controls on Waste Management Activities.

Septage waste is dealt with in a separate plan.

Map of the Cook Islands

Source: www.worldatlas.com

2.2 Background and Legal Status

This plan has been prepared for the National Environment Service with assistance from the Consultants and staff of the Project Management Unit for the Government of the Cook Islands and the Asian Development Bank co-funded Waste Management Project.

This plan has been prepared in accordance with the provisions of the Environment Act 2003 and as such has the legal status under that Act. Part 6 of the Act states that the Service may from time to time at the request of the Island Environment Authority for an island prepare a draft management plan for any area within the island for any of the following purposes: protection; conservation; management and control of Rarotonga waters and inland waters; foreshore areas; forests; soil erosion; pollution; and waste (Section 37(1)).

The draft management plan shall be prepared in consultation with the landowners and occupiers affected by the plan and the plan shall include a management committee comprising representatives of these landowners and occupiers (Section 37(2)).

The National Environment Service shall by public notice state that the plan has been prepared and the areas affected by the plan and will invite comment and representation in connection to the plan by a specified date. The draft management plan shall be submitted to the Island Environment Authority who may approve, decline approval or refer to the Service suggestions for further consideration and amendment to the draft management plan.

The management plan will take effect once it is approved by the relevant Island Environment Authority, State Government for Rarotonga (Vaka Council) (Section 38(a)). Any person who fails to comply with or acts in contravention of any provision of the management plan in force shall upon conviction be liable to a fine not exceeding $5,000.00 (Section 40).

Island Environment Authorities have been established for the islands Rarotonga and Aitutaki, by virtue of Section 11(1) and (2) of the Act. Those islands not listed in the Schedule to the Act, nevertheless, are able to do so pursuant to paragraph 6 which provides for the composition of the Island Environment Authority.

The Minister of Environment may by notice in the Gazette designate any Crown land as an area to be used by the public for the disposal of waste (Section 46). Occupiers of private land are to clear away, remove from the land, clean up, screen, cover or otherwise obscure from view such litter as may be specified in the notice, within such time as may be specified (Section 47).

Section 48 relates to offences regarding littering. Every person commits an offence who without reasonable excuse or lawful justification deposits any inorganic litter in or on any land other than land designated or approved for the disposal of waste under Section 46.

Pollution of Cook Islands waters and inland waters is an offence under Section 51. It provides against pollution of Cook Islands waters and inland waters by any person who throws discharges, disposes or deposits into any Cook Islands waters or inland waters, either from or out of any vessel, or from the shore or a wharf, manufacturing establishment or mill of any kind any refuse matter of any kind or description whatsoever.

Swimming in Avarua Harbour

However, consent may be granted subject to guidelines prescribed by regulations and conditions necessary to safeguard the environment. In granting the consent the activity must conform with environmental quality and waste water standards (if any) published by the permitting authority and must not result in undue pollution of such waters (Section 51(2)(ii)).

Remedial action may be imposed on the offender in addition to the penalties for offences committed under Section 50, 51, 57 and 58. Such offences would be against the protection of foreshore and Cook Islands waters, pollution of Cook Islands waters and inland waters, excavations on sloping land, and protection of wetlands.

Degradation of fresh water by hotels, resorts, industrial or other commercial establishment and its customers or guests would result in levies being imposed (Section 54).

Disposal of toxic chemicals or its waste in a manner likely to harm the environment is an offence under Section 56.

Section 70 provides that the Queen's Representative may by Order in Executive Council make such regulations for giving full effect to the provisions of the Act and they are, amongst others:

- providing for the protection, conservation and management of wildlife, protected species, regulating or prohibiting the pollution of air, water or land and the depositing, or dumping of litter, rubbish, or any substance of a dangerous noxious or offensive nature;
- regulating or prohibiting the exportation, importation, or transportation of hazardous wastes into or out of the Cook Islands, for the purposes of implementing any regional or international conventions, treaties, protocols, or agendas;
- prohibiting or regulating the importation or disposal of recyclable or non-recyclable products; and
- prescribing offences against the regulations, and prescribing fines for such offences not exceeding $50,000 and in the case of continuing offences, a fine not exceeding $1000 for every day on which the offence continues.

The Public Health Act 2004 s52(1) requires that "waste collection, treatment or disposal operators" obtain an Offensive Trades Permit and that the National Environment Service may be involved in the issuance of this permit. This may involve public consultation (refer to Schedule 1 of this Act).

2.3 Existing and Future Activities

2.3.1 General

Solid waste management activities vary slightly from island to island, but have many similarities. The activities and opportunities for improved solid waste management are summarised in Table 2-1 below.

2.3.2 Wastewater

Domestic wastewater in the Cook Islands is typically disposed of on the individual properties on which it is generated, by subsurface discharge and soakage to land, following primary treatment in septic tanks. Some larger premises such as hotels have more sophisticated wastewater treatment and disposal systems, but there is no publicly reticulated collection, treatment and disposal of sewage.

Similar, more sophisticated treatment and disposal systems are also available for small premises such as individual dwellings, as alternatives to the traditional septic-tank/soakage-bed arrangements. Those alternative systems can produce higher standards of effluent and more efficient means of dispersing effluent into the receiving soils. However, as distinct from the traditional septic tank and soakage field systems which, except for infrequent desludging, perform their functions passively, the alternative systems typically require more regular attention to operation and maintenance (with varying degrees of process knowledge and skill), and involve processes that consume electricity.

A booklet, to guide owners of properties in un-sewered areas in the selection of onsite wastewater systems, was published in New Zealand in July 2004. A copy of that booklet, entitled “On-site Wastewater Systems – Selecting a System for Your Property”, is attached as Appendix C. Apart from domestic sewage, the other significant wastewater in the Cook Islands is piggery effluent, which is discussed below.

2.3.3 Specific Waste Streams

Table 2-1 contains reference to a recent document which investigated future waste minimisation and management options for nine specific waste streams in the Cook Islands. The full report is included in Appendix D and recommends future management options for the following waste streams:

- Automobile Scrap;
- Used Tyres;
- Lubrication Oils;
- Automotive Batteries;
- Asbestos;
- Whiteware;
- Fats & Greases;
- Green Waste; and

- Piggery Effluent.

These waste streams were given particular focus due to the following reasons:

- They have the potential to be hazardous to human health or the environment; and/or
- They are present in sufficient quantities to pose a significant risk if returned to the environment in an inappropriate manner; and/or
- They will either be banned from the new landfill or will require special disposal processes.

Table 2-1 Cook Islands - Waste Management Activities and Opportunities

	CURRENT PRACTICES		POSSIBLE FUTURE STRATEGIES		
	HOW	**WHO**	**HOW**	**WHO**	**PRIVATE**
Specific Wastes (refer Appendix D, Specific Wastes Report, Maunsell Ltd, September 2003)					
GREENWASTE (incl. tree trunks)	Burnt / Buried	Households	Home composting	Households	Yes – equipment.
	Dumped on empty sections	Households	Commercial composting, or shred for daily cover.	Business/ Landfill Contractor	Yes – capital investment. Likely to need ongoing support.
AUTOMOTIVE SCRAP	Dumped / Stored	Households / Panelbeaters	Disassembled, compacted and exported as scrap.	Scrap Dealer or Auto Dismantler	Yes – likely to need support to be viable.
LUBRICATING OILS	Burnt / dumped	Households and Business	Incinerate at high-temp. medical/ quarantine facilities	NES Contractor / Oil Companies	Yes – likely to need support to be viable.
USED TYRES	Dumped / Burnt / Stored	Households and Business	Reuse / Shred or quarter for landfill cover or disposal	Landfill Contractor	Yes – capital investment.
LEAD-ACID BATTERIES	Recycled / Stored / Dumped	Households and Business	Continue and expand recycling programme	NES	No – import income to cover programme costs.
WHITEWARE/ APPLIANCES	Dumped / Buried	Households and Business	Disassemble, de-gas, recycle, landfill or export scrap.	Recycling and Landfill Contractors	No
FATS/GREASE	Reuse / Pig Feed / Dumped / Buried	Business	Reuse / Pig Feed / Landfill Disposal	Businesses/ Landfill Contractor	Yes
ASBESTOS	Buried	Government and Business	Landfill Special Waste Disposal	Landfill Contractor	No
PIGGERY EFFLUENT	Discharged to land and water	Commercial Piggeries	On-site anaerobic digestion	Business / Government	Yes – capital investment.
Other waste streams					
ALUMINIUM CANS	Separation at source and crushed for export	Can crushers, REAP.	Continue and expand recycling scheme	Can Crushers, REAP and others	Yes
	Dumped at Tips or on Private Land	Households/ businesses	Separation at source and crushed for export	NGO's, Recycling Contractors.	Yes
FERROUS METALS (e.g. non aluminium cans)	Dumped at tips	Households	Cut, pressed and exported or landfilled	Scrap metal dealer / Landfill Contractor	Yes – likely to need support to be viable.
	Indiscriminate dumping	Households	Cut, pressed and stored for export	Landfill Contractor	Yes – needs support.
PLASTICS	Dumping, and limited reuse	Households and business	PET plastic collected, crushed and exported. Remainder landfilled.	Recycling contractor.	Yes – needs support.
GLASS	Dumping, and limited reuse	Households and business	Sort by colour-and export. Crush for landfill daily cover.	Recycling Contractor.	Yes – likely to need support to be viable
PAPER CARDBOARD	Dumping, and local reuse	Households and business	More reuse, composting, crushed and landfilled.	NGO, or other business	Maybe – likely to need support.
TEXTILES	Dumping	Households and business	Landfill.	Households and business	No
C & D (Construction and Demolition)	Burning, dumping and limited reuse	Households and business	More reuse. Shred wood for landfill daily cover.	Landfill contractor or other business	Yes

2.4 Institutional Arrangements

The proposed Institutional Framework for Waste management on Rarotonga is set out in Figure 2-1.

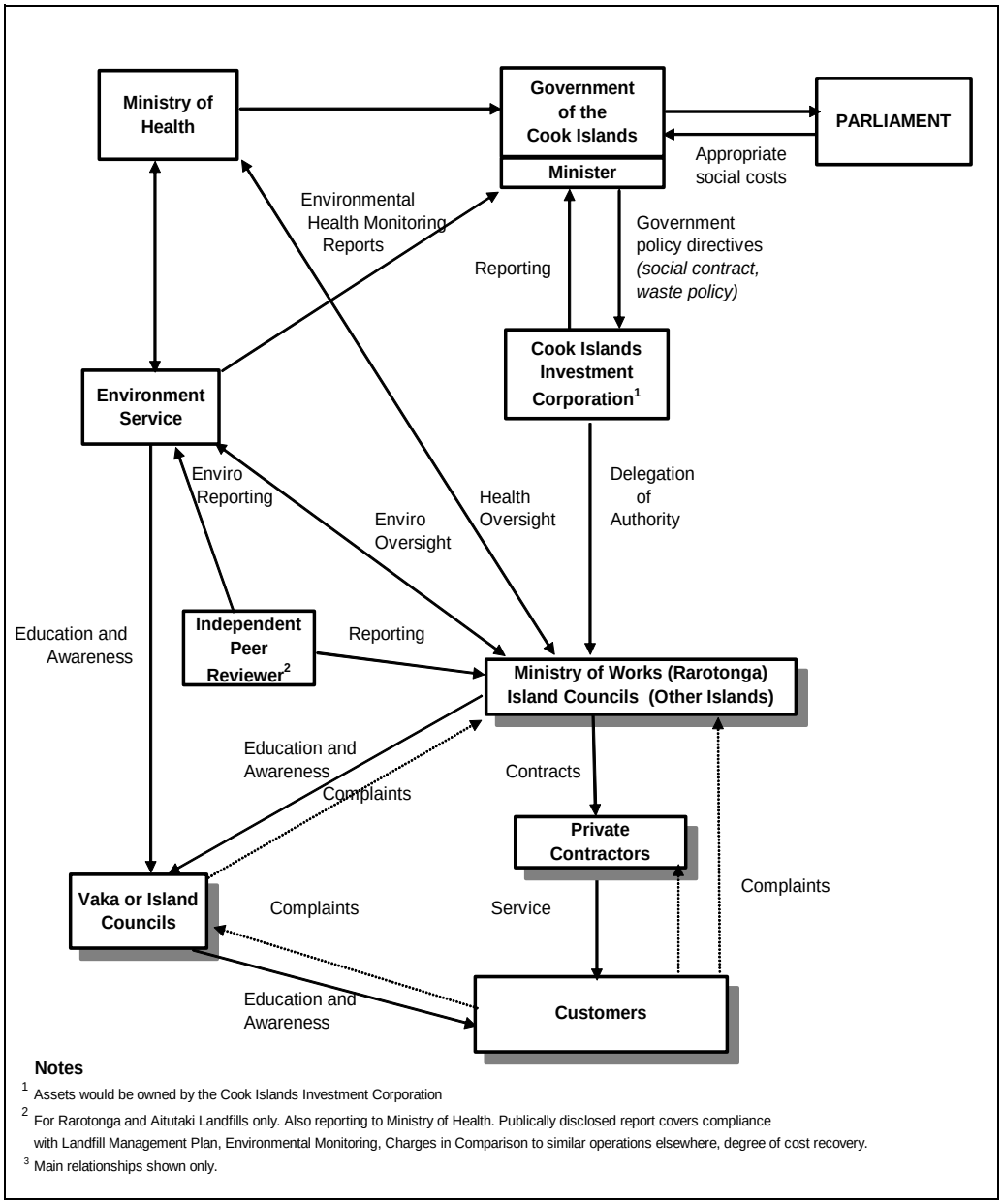


Figure 2-1 Proposed Institutional Arrangement for Waste Management – Cook Islands

Roles and responsibilities of the parties with respect to operation of Waste Facilities are set out in Table 2-2.

Table 2-2: Roles and Responsibilities of Parties for Waste Disposal Facilities

Actor	Responsibility
Operations Contractors	• Day to day compliance with operational procedures set out in Management Plan • Supply and maintain all mobile plant • Regular maintenance of any fixed plant (e.g. pumps) and notify the MOW of any fixed plant failure
Ministry of Works or Island Councils	• Secure funding and provide environmentally secure waste disposal facilities • Week to week oversight and management • Securing funding and letting operating and maintenance contracts with conditions that require compliance with Management Plan • Fund the inspection and repair of fixed plant. • Funding and carrying out monitoring in accordance with the Monitoring Plan • Receive Complaints • Monitor annual capacity usage and predict life of landfill • Annual reporting results of monitoring to ES and MOH including interpretation of monitoring data and complaints records • Maintaining the management plan. • Directing the contractors in an emergency. • Planning for future waste management actions
National Environment Service	• Ensure that landfill capacity is used wisely by providing effective programmes to divert materials from the landfill. • Promote awareness of need for good waste management. • Oversight of environmental compliance. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to Management Plans • Receive annual report and monitoring data • Direct MOW or Island Councils to attend to any matters of non-compliance with Management Plan or the project permits. • Take enforcement action if required. • Occasional direct monitoring of environmental effects to quality assure monitoring results.
Ministry of Health	• Oversight of compliance from Public Health Perspective. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to Management Plan • Receive annual report and monitoring data • Direct MOW or Island Council to attend to any matters of non-compliance with LMP or the project permits. • Take enforcement action if required. • Occasional direct monitoring of environmental effects to quality assure monitoring results.
Community and Interested Parties	• Complain to MOW or Island Council if operation is having off-site effects or is observed to be not operating correctly. • Participate in consultation regarding any significant proposed changes to the Management Plan • Encourage and participate in waste reduction initiatives

2.5 Solid Waste Management Objectives and Actions

The following waste management objectives, targets and actions are applicable to those islands which are governed by the Environment Act 2003. These same actions should also be extended to all islands in the Cook Islands so that a consistent, national approach to waste management can be implemented.

2.5.1 Effective Waste Minimisation Activities

Objective 1 – To encourage the reduction of waste to the minimum practicable level, using the principles of reduce, reuse, recover and recycle.

Target 1.1: NES to develop and establish targets for waste minimisation on islands to which the Environment Act 2003 applies by the end of 2005.

Target 1.2: NES to establish programmes for recycling at least aluminium cans on islands to which the Environment Act 2003 applies by end of 2006.

Aluminium Can Recycling in the Cook Islands

2.5.2 Suitable Waste Disposal Facilities Available

Objective 2 – To provide and maintain waste collection, treatment and disposal systems to an appropriate standard and level of service.

Target 2.1: New disposal sites/mechanisms in operation on Rarotonga and Aitutaki by end of 2004 to serve 100% demand for domestic and commercial refuse disposal (NES, MOW, MOH and AIC).

Target 2.2: Environmentally sound disposal sites/mechanisms in operation on all other islands to which the Environment Act 2003 applies by end of 2010 to serve 100% demand for domestic and commercial refuse disposal (NES, MOH, Island Councils).

Actions:

- Construct planned landfills at Rarotonga and Aitutaki (MOW) by end of 2004.
- Investigate feasibility of a centralised disposal facility with refuse barged from each island to which the Environment Act 2003 applies by mid 2005 (NES).
- Survey existing means of disposal on other islands to which the Environment Act 2003 applies and set priorities by mid 2005 (NES).
- Secure funding, design, and construct environmentally sound facilities for waste management on islands to which the Environment Act 2003 applies by end 2010 (Island Councils).

2.5.3 Well Operated Waste Disposal Facilities

Objective 3 – To minimize any adverse effects on residents living adjacent to new waste facilities (within 2km radius).

Target 3.1: No serious reservations about landfill operating practices expressed by regulatory agencies or peer reviewer.

Actions:

- Ensure that each waste disposal facility has a Management Plan setting out how to operate the facility in an environmentally sound manner (NES).
- Arrange for operation of collection system and disposal facilities to a high standard as each facility comes on line (Island Councils)
- Operating contracts to require that contractor conforms to the Management Plan (Island Councils).
- At least annual review performance of operations by NES or an independent peer reviewer (NES)

Closure of old dump site

2.5.4 Maximise Life of Landfills

Objective 4 – To maximise the value of the substantial investment in the landfills by ensuring that landfill volume is not wasted.

Target 4.1: Landfill volume used is as planned in the landfill design.

Actions:

- Ban disposal of vehicles, green wastes, rubble and whole tyres at engineered landfills unless shredded and used for daily cover (NES by end 2004).

- Ensure that landfill management plans call for minimum use of daily cover by using waste materials where possible, by applying the minimum amount required of daily cover, by keeping disposal area small, and by scraping back daily cover before placing new refuse (NES).
- Ensure that equipment used to compact refuse at landfills is heavy enough to compact refuse properly, provides compaction across the full width of the machine, and that an adequate number of compaction passes are provided to achieve or exceed the design density of placed refuse (MOW and Island Councils, Island Environment Authorities).
- Operate landfills to maximise landfill life (MOW and Island Councils).

2.5.5 Community Education

Objective 5 – Conduct waste minimization campaigns which will:

- Foster and improve awareness of waste collection systems;
- Improve and promote community understanding of and participation in 4R initiatives - reduce, reuse, recover and recycle;
- Increase public participation in keeping the island wide environment clean; and
- Get community "buy in" to achieving waste reduction targets.

Target 5.1: At least 3 initiatives run each year on Rarotonga to promote recycling, waste minimisation and litter control involving schools, NGO's, and a variety of communication methods (NES).

Target 5.2: At least 1 initiative run each year on each other island to which the Environment Act 2003 applies to promote recycling, waste minimisation and litter control involving schools, NGO's, and a variety of communication methods (NES in conjunction with Island Environment Authority and Island Councils).

Aluminium Can Recycling at Amuri School

2.5.6 Regulations

Objective 6 – Prepare and pass appropriate regulations under the Environment Act 2003 to manage solid waste (NES by end of 2005).

Target 6.1: Prepare and pass regulations by end of 2005 which address the following:

- Issuing of permits for activities
- Standards and performance measures for infrastructure facilities and operations
- Promotion of waste prevention and reduction through separation of materials at source
- Penalty structure to achieve compliance with the regulations in accordance with the Environment Act 2003 and Public Health Act 2004

2.5.7 Review

Objective 7 – To objectively review the effectiveness of waste management and waste minimisation initiatives so that appropriate improvements in programmes can be made.

Target 7.1: National Environment Service to review progress against National Waste Management Strategy on annual basis and to review this Waste Management Strategy by July 2008 (NES)

Aorangi Beach at Night

2.6 Controls on Waste Management Activities

Waste management activities are controlled as set out below.

2.6.1 Definitions

Section 2 of the Environment Act 2003 defines "pollution" as being the *"introduction either directly or indirectly of substances or energy into the environment, which results in:*

- *Deleterious effects that are harmful to living resources or marine life; or*
- *Hazards to human health; or*
- *Hindrance to marine activities including fishing and other legitimate uses of the sea; or*
- *Impairment of quality for use of water, air or soil; or*
- *Reduction of amenities; or*
- *The creation of a nuisance.*

"Discharge" is the release of contaminants into the environment and 'contaminant' is defined as:

"Any substance (including gases, liquids, solids and micro-organisms) or energy (excluding noise), or heat, that either by itself or in combination, with the same, or similar or other substances, energy, or heat –
(a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of water, or
(b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land, or air onto or into which it is discharged.

"Receiving water" is a body of water that receives contaminants, including contaminants that are discharged indirectly to that water body. Receiving waters includes:

- freshwater streams;
- coastal lagoons; and
- groundwater.

Lagoon Receiving Waters

Section 2 of the Environment Act 2003 defines "wetlands" as being:

a) areas of marsh, swamp or water, whether –
   i. natural or artificial;
   ii. permanent, seasonally flooded or temporary;
   iii. with water that is static or flowing, or fresh brackish or salty; and

b) includes water storage reservoirs, taro swamps and fish ponds.

According to Section 2 of the Environment Act 2003, "inland waters" means *"the waters and banks of any stream, river, or lake together with the bed (whether dry or not) of any system, river or lake (for the purposes of this definition "bank" shall include all that area of land extending away from the stream, river, or lake and measured at right angles to a distance of 5 meters from the bank of that stream, river and lake)".*

According to Section 2 of the Environment Act 2003, "Cook Islands waters" includes the following:

a) the internal waters of the Cook Islands as defined by Section 4 of the Territorial Sea and Exclusive Economic Zone Act 1977;
b) the territorial sea;
c) the exclusive economic zone.

2.6.2 Prohibition of Discharge of Untreated Wastes

The discharge of the following materials to land or water is prohibited unless the materials have been treated to the standards set out in this Plan.

- Solid waste
- Liquid waste
- Sludge
- Septage
- Animal Wastes
- Hospital Wastes

The level of waste treatment will be considered in the decision to issue Offensive Trade Permits under the Public Health Act 2004. Where there is an actual or potential danger to the environment, applications will require a project permit from National Environment Service, in accordance with the Environment Act 2003.

2.6.3 Standard of Containment and Treatment

Wastes shall be treated prior to discharge to either land or water so that after reasonable mixing any contaminant that is discharged is not likely to cause any of the following effects:

(a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
(b) any conspicuous change in colour or clarity;
(c) any emission of objectionable odour;
(d) undesirable biological growths;
(e) the rendering of fresh water unsuitable for consumption by farm animals;
(f) any significant adverse effects on aquatic life;
(g) the natural temperature of the water to change by more than 3°Celsius;
(h) the concentration of dissolved oxygen to fall below 80% of saturation concentration;
(i) the numbers of enterococci to exceed 33/100 ml (median of samples over bathing season);
(j) the water to be rendered unsuitable for bathing by the presence of contaminants; and

(k) shall not result in fish or other aquatic being rendered unsuitable for human consumption by the presence of contaminants.

2.6.4 Cleanfills

Any cleanfill operation in the Cook Islands which disposes of materials other than soil, rock, clay and coral will need to be licensed under Section 46 of the Environment Act 2003 and Sections 40 and 51 of the Public Health Act 2004. The purpose of this is to avoid "cleanfills" evolving over time into uncontrolled general refuse dumps which will pose a risk to public health and the environment.

2.6.5 Prohibited Discharges

No Permit will be issued for the following discharges:

- Solid waste or sludges to inland water or wetlands.
- Solid waste or sludges to Cook Islands waters.
- Solid waste or sludges to land upstream of a municipal water supply intake.

2.6.6 Prohibited Activities

The following activities are prohibited:

- Importation of wastes from other countries for disposal or processing.
- Burning wastes at land disposal sites.
- Open-air burning of waste materials to recover recyclable materials.
- Burning of industrial or commercial wastes.

2.6.7 Existing Activity Rights

Any existing activity may continue until 30 July 2006 provided that:

- There is an existing legal right to undertake the activity
- There is no significant increase in scale or adverse change in the character of the activity

Under the Public Health Act 2004 (s146), existing offensive trades (as listed in Schedule 1 of the Act) may continue to operate at the current level until 26 June 2005 or until an Offensive Trade Permit is issued.

2.6.8 Environmental Permit for Waste Management Facilities

Any facility that receives, handles, manages, disposes or recycles waste must have an Environmental Permit under Section 46 of the Environment Act 2003. As a condition of that Permit the National Environment Service may require:

- Annual reporting of waste quantities received, processed, and disposed of.
- Environmental monitoring of runoff and discharges from the site.

- Maintain a register of any complaints received and the actions taken regarding the complaints.
- A management plan is prepared to the approval of the National Environment Service.
- An annual report is prepared summarising compliance with the management plan.
- The facility has a safe means of disposing of any residual materials.

2.7 National Hazardous Waste Management Plan

The purpose of this National Hazardous Waste Management Plan is to focus on those hazardous wastes present in the Cook Islands which pose the greatest risk to human health or the environment taking into account their hazardous nature and quantities.

Appendix D contains a recent report that investigates future waste minimisation and management options for the following nine specific waste streams:

- Automobile Scrap;
- Used Tyres;
- Lubrication Oils;
- Automotive Batteries;
- Asbestos;
- Whiteware;
- Fats & Greases;
- Green Waste; and
- Piggery Effluent.

These particular waste streams were selected because they: a) have the potential to be hazardous to human health or the environment; and/or b) are present in sufficient quantities to pose a significant risk if returned to the environment in an inappropriate manner; and/or c) will either be banned from the new landfills or will require special disposal processes.

Of these nine waste streams the following three are considered to be hazardous:

- Lubrication Oils;
- Automotive Batteries; and
- Asbestos.

Recommended actions for their future management in the Cook Islands are presented below.

2.7.1 Lubrication Oils

1. An expert assessment of the quarantine and medical waste incinerators should be undertaken to investigate whether waste oil can be used to help fuel these facilities.

2. The use of waste oil as a fuel extender in diesel generators should be investigated further and promoted if found to be a viable reuse option.

3. Establish better programmes to collect and store used oils. Funding for improved collection and recovery options could come from levies imposed on the importation of lubricating engine oils and/or funds from oil companies.

4. Introduce a public education programme to promote responsible oil change practices

2.7.2 Automotive Batteries

1. The existing lead-acid battery collection and recycling programme should be further promoted under National Environment Service direction. The programme should aim to maximise the battery recycling rate and prohibit illegal dumping of lead-acid batteries. It is expected that income received for supply of lead will cover labour and freight costs

2. The existing lead-acid battery collection and recycling programme should be expanded to include the outer islands.

3. Battery acid shall be drained at the landfill sites under controlled conditions using the procedures specified in the document in Appendix D.

NES's lead-acid battery recycling programme

2.7.3 Asbestos

1. The current guideline documents produced by the National Environment Service regarding the removal, handling and disposal of asbestos should be promoted and enforced.

2. Asbestos is to be considered a 'controlled waste' and should be landfilled according to procedures specified in the Landfill Management Plans and summarised in the report in Appendix D.

2.7.4 Persistent Organic Pollutants

The Cook Islands was part of a SPREP (South Pacific Regional Environment Programme) investigation of Persistent Organic Pollutants (POPs) in the Pacific Islands in 1998 and 1999. The project was developed as an AusAID funded initiative.

This National Waste Management Plan adopts the recommendations that came from this study specific to the Cook Islands. Appendix E contains a copy of the summarised report on the Cook Islands that was included in the SPREP study. It includes the following recommendations:

- The Cook Islands be included in a regional programme to be developed by SPREP for the removal of PCB contaminated transformer oil;
- The Cook Islands be included in a regional programme under development by SPREP for the environmentally appropriate management of waste oil;
- The Cook Islands be included in a regional programme to be developed by WHO to upgrade capacity to manage medical wastes and chemicals;
- The Cook Islands to be included in a regional programme to be developed by SPREP to upgrade capacity to manage school laboratory chemicals;
- The Cook Islands to be included in a regional programme to be developed by SPREP to assess the extent of contamination that has resulted from inadequate management of solid waste disposal sites;
- Waste pesticides identified during the study's inspections be included in the regional programme under development by SPREP to dispose of hazardous materials in off-island treatment facilities;
- The Cook Islands be included in the international chemical management programmes of UNEP, WHO and FAO including those of the Intergovernmental Programme for Chemical Safety; and
- The Cook Islands participate in negotiations for a legally binding instrument for certain persistent organic pollutants.

3.0 Rarotonga Solid Waste Management Plan

3.1 Purpose of Plan

The purpose of this plan is to set out objectives, targets and actions proposed to manage waste on Rarotonga. The guiding principles for this plan are those set out in the National Waste Policy.

This plan has four main components:

- Description of Existing Solid Waste Management Activities and Opportunities;
- Description of Proposed Institutional Arrangements;
- Specific Objectives, Targets and Actions; and
- Controls on Waste Management Activities.

Septage and Hazardous wastes are dealt with in separate plans.

3.2 Background and Legal Status

This plan has been prepared for the National Environment Service with assistance from the Consultants and staff of the Project Management Unit for the Cook Islands Government and the Asian Development Bank funded Waste Management Project.

This plan has been prepared in accordance with the provisions of the Environment Act 2003 and as such has the legal status under that Act.

3.3 Existing Activities

Existing waste management data, waste minimisation activities, and opportunities to improve waste management are described in Appendix A and are summarised in Table 2-1 of the National Waste Management Plan.

3.4 Institutional Arrangements

The institutional framework for solid waste management on Rarotonga is set out in Figure 3-1

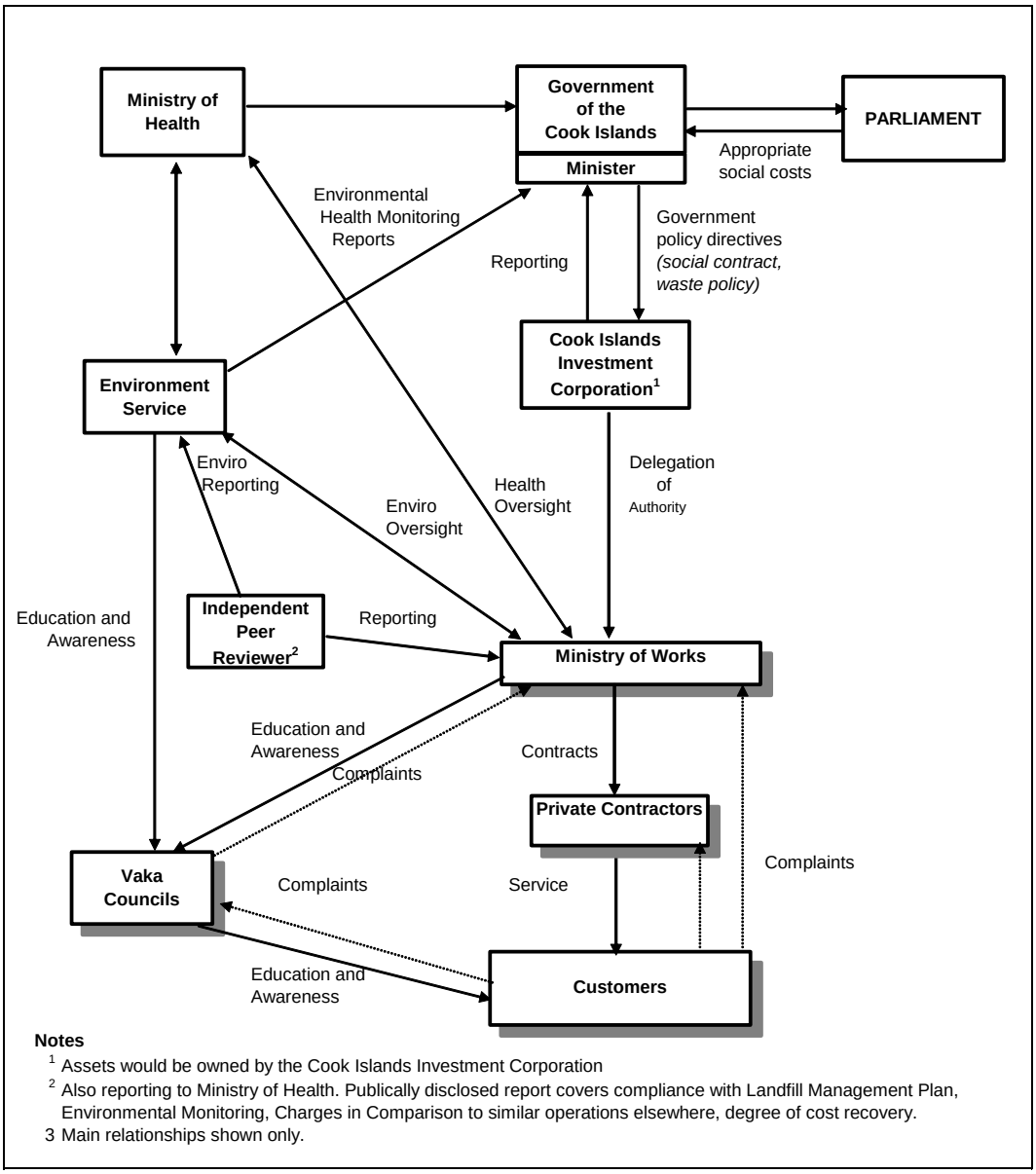


Figure 3-1 Proposed Institutional Arrangement for Waste Management – Rarotonga

Roles and responsibilities of the parties with respect to operation of the Rarotonga Landfill are set out in Table 3-1.

Table 3-1 Roles and Responsibilities of Parties for Rarotonga Landfill Operation

Actor	Responsibility
Operations Contractors	• Day to day compliance with operational procedures set out in Landfill Management Plan (LMP) • Supply and maintain all mobile plant • Regular maintenance of any fixed plant (e.g. pumps) and notify the MOW of any fixed plant failure
Ministry of Works	• Week to week oversight and management • Securing funding and letting operating and maintenance contracts with conditions that require compliance with LMP • Fund the inspection and repair of fixed plant. • Funding and carrying out monitoring in accordance with the Monitoring Plan • Secure funding and organize annual Peer Review • Receive Complaints • Monitor annual capacity usage and predict life of landfill • Annual reporting results of monitoring to ES and MOH including interpretation of monitoring data and complaints records • Maintaining the LMP • Directing the contractors in an emergency • Planning for future waste management actions.
National Environment Service	• Ensure that landfill capacity is used wisely by providing effective programmes to divert materials from the landfill. • Promote awareness of need for good waste management. • Oversight of environmental compliance. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to LMP • Receive annual report and monitoring data • Direct MOW to attend to any matters of non-compliance with LMP or the project permits. • Take enforcement action if required. Occasional direct monitoring of environmental effects to quality assure monitoring results.
Ministry of Health	• Oversight of compliance from Public Health Perspective. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to LMP • Receive annual report and monitoring data • Direct MOW to attend to any matters of non-compliance with LMP or the project permits. • Take enforcement action if required. • Occasional direct monitoring of environmental effects to quality assure monitoring results.
Community and Interested Parties	• Complain to MOW if operation is having off-site effects or is observed to be not operating correctly. • Participate in consultation regarding any significant proposed changes to the LMP. • Encourage and participate in waste reduction initiatives.

3.5 Solid Waste Management Objectives and Actions

3.5.1 Effective Waste Minimisation Activities

Objective 1 – To encourage the reduction of waste to the minimum practicable level, using the principles of reduce, reuse, recover and recycle.

Target 1.1: Source reduction efficiency of 60% of the waste stream in commercial establishments and 20% in residential households by the end of 2008.

Target 1.2: Develop programmes for the following waste streams including identifying capital and operating cost requirements and seek donor funding for capital items and government funding to support waste minimisation and recycling of the following:

- Automobile Scrap;
- Used Tyres;
- Lubrication Oils;
- Automotive Batteries;
- Asbestos;
- Whiteware;
- Fats & Greases;
- Green Waste; and
- Piggery Effluent.

Draft programmes and a proposed prioritisation for the above nine specific waste streams are presented in Appendix D.

Actions:

- Implement reduce, reuse, recycle community education initiatives (refer Objective 5).
- Undertake annual waste audits to monitor commercial and residential waste quantities and composition.

Recycling in Rarotonga.

3.5.2 Suitable Waste Disposal Facilities Available

Objective 2 – To provide and maintain waste collection, treatment and disposal systems to an appropriate standard and level of service as defined in the operations contract.

Target 2.1: New disposal sites/mechanisms in operation on Rarotonga by mid 2004 to serve 100% demand for domestic and commercial refuse disposal.

Actions:

- Landfill designed and supervised by International consultant.
- Good supervision of landfill construction.
- High standard of construction required of international contractor.

Rarotonga Waste Disposal Facility Site

3.5.3 Well Operated Waste Disposal Facility

Objective 3 – To minimize any adverse effects on residents living adjacent to new waste facilities (within a 2km radius).

Target 3.1: No serious reservations about landfill operating practices expressed by regulatory agencies or peer reviewer.

Actions:

- Landfill designer to produce Landfill Management Plan setting out landfill operational procedures
- Landfill Operating contracts to require that contractor conforms to the Landfill Management Plan.
- Landfill designer to train operational and supervisory personnel.
- Peer reviewer to be engaged to review performance of operations within one year of the commencement of landfill operation.

Groundwater monitoring well

3.5.4 Maximise Life of Landfill

Objective 4 – To maximise the value of the substantial investment in the landfill by ensuring that landfill volume is not wasted.

Target 4.1: Landfill volume used is as planned in the landfill design.

Actions:

- Prohibit disposal of vehicles at landfill.
- Prohibit green wastes, rubble and whole tyres at the landfill unless shredded and used for daily cover.
- Minimise use of daily cover by using waste materials where possible, by applying the minimum amount required of daily cover, by keeping disposal area small, and by scraping back daily cover before placing new refuse.
- Compact bulky items (e.g. computer waste, motorcycles, whiteware etc) by crushing with a hydraulic excavator or other suitable machinery prior to disposal to reduce the volume of these wastes.

3.5.5 Community Education

Objective 5 – Island wide waste minimization campaign which will:

- Foster and improve awareness of collection systems;
- Improve and promote community understanding of and participation in 4R initiatives - reduce, reuse, recover and recycle;
- Increase public participation in keeping the island wide environment clean; and
- Get community “buy in” to achieving waste reduction targets.

Target 5.1: At least 3 initiatives run each year to promote recycling, waste minimisation and litter control involving schools, NGO’s, and a variety of communication methods.

Actions:

- Assemble information about all current and potential waste minimisation initiatives that the community and businesses can participate in.
- Create educational materials that can be used by businesses, schools, government offices, NGOs using a variety of communication methods (e.g. composting workshops for households, waste exchange database, information regarding local recycling schemes).
- Distribute information to community about waste collections, landfill charges and types of wastes accepted and functions of the recycling centre.

3.5.6 Regulations

Objective 6 –Prepare and pass appropriate regulations under the Environment Act 2003 to manage solid waste.

Target 6.1: Prepare and pass regulations by end of 2005 which address the following:

- Issuing of permits for activities.
- Standards and performance measures for infrastructure facilities and operations.
- Promotion of waste prevention and reduction through separation of materials at source.
- Penalty structure to achieve compliance with the regulations in accordance with the Environment Act 2003 and Public Health Act 2004.

3.5.7 Review

Objective 7 – To objectively review the effectiveness of waste management and waste minimisation initiatives so that appropriate improvements in programmes can be made.

Target 7.1: NES to review progress against waste management strategy on annual basis and to review this Waste Management Strategy by July 2008.

3.6 Controls on Waste Management Activities

Controls on waste management activities specific on Rarotonga are as set out below. All of the controls in the National Waste Management Plan apply to Rarotonga.

3.6.1 Prohibited Wastes at the Rarotonga Waste Disposal Facility

The disposal of the following wastes is prohibited at the Rarotonga Waste Disposal Facility.

- Whole tyres.
- Automotive batteries.
- Wood Waste.
- Lubricating Oil.
- Hazardous Wastes.
- Automotive scrap, except motorcycles.
- Green wastes, unless shredded and used as substitute for daily cover.
- Tree trunks and stumps, unless shredded and used as substitute for daily cover.

Wood waste is prohibited from the new landfills

4.0 Aitutaki Solid Waste Management Plan

4.1 Purpose of Plan

The purpose of this plan is to set out objectives, targets and actions proposed to manage waste on Aitutaki. The guiding principles for this plan are those set out in the National Waste Policy.

This plan has four main components:

- Description of Existing Solid Waste Management Activities and Opportunities;
- Description of Proposed Institutional Arrangements;
- Specific Objectives, Targets and Actions; and
- Controls on Waste Management Activities.

Septage and Hazardous wastes are dealt with in separate plans.

Map of Aitutaki

Source: NZ Mapping Services

4.2 Background and Legal Status

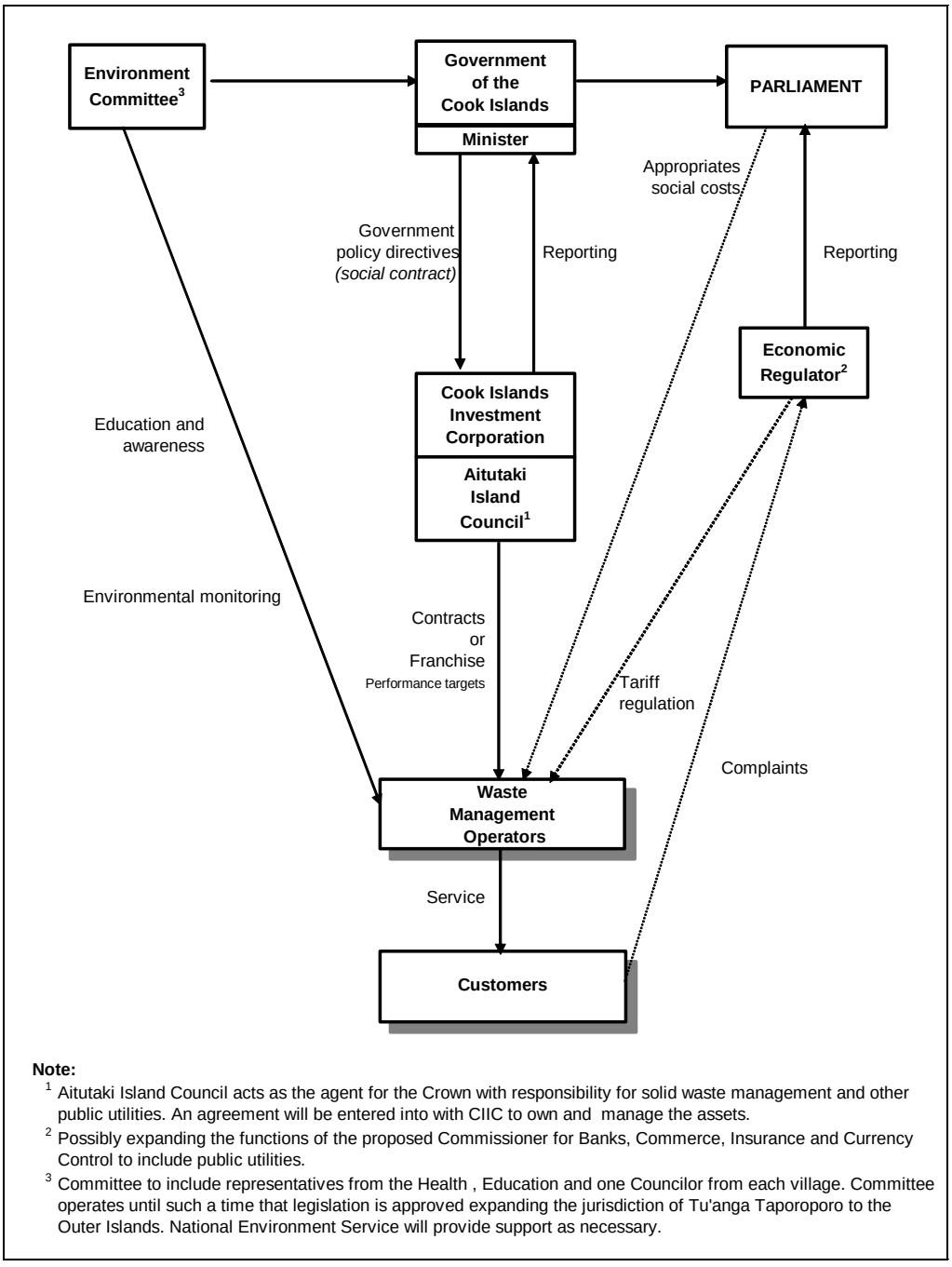
This plan has been prepared for the National Environment Service with assistance from the Consultants and staff of the Project Management Unit for the Cook Islands Government and the Asian Development Bank funded Waste Management Project. This plan has been prepared in accordance with the provisions of the Environment Act 2003 and as such has the legal status under that Act.

4.3 Existing Activities

Existing waste management data, waste minimisation activities, and opportunities to improve waste management are described in Appendix B and are summarised in Table 2-1 of the National Waste Management Plan.

4.4 Institutional Arrangements

The institutional framework for solid waste management on Aitutaki is set out in Figure 4-1.



Note:

[1] Aitutaki Island Council acts as the agent for the Crown with responsibility for solid waste management and other public utilities. An agreement will be entered into with CIIC to own and manage the assets.

[2] Possibly expanding the functions of the proposed Commissioner for Banks, Commerce, Insurance and Currency Control to include public utilities.

[3] Committee to include representatives from the Health , Education and one Councilor from each village. Committee operates until such a time that legislation is approved expanding the jurisdiction of Tu'anga Taporoporo to the Outer Islands. National Environment Service will provide support as necessary.

Figure 4-1 Proposed Institutional Arrangement for Waste Management – Aitutaki

Roles and responsibilities of the parties with respect to operation of the Aitutaki Landfill are set out in Table 4-1.

Table 4-1 Roles and Responsibilities of Parties for Aitutaki Landfill Operation

Actor	Responsibility
Operations Contractors	• Day to day compliance with operational procedures set out in Landfill Management Plan (LMP) • Supply and maintain all mobile plant • Regular maintenance of any fixed plant (e.g. pumps) and notify the MOW of any fixed plant failure
Ministry of Works	• Week to week oversight and management • Securing funding and letting operating and maintenance contracts with conditions that require compliance with LMP • Fund the inspection and repair of fixed plant. • Funding and carrying out monitoring in accordance with the Monitoring Plan • Secure funding and organize annual Peer Review • Receive Complaints • Monitor annual capacity usage and predict life of landfill • Annual reporting results of monitoring to ES and MOH including interpretation of monitoring data and complaints records • Maintaining the LMP • Directing the contractors in an emergency • Planning for future waste management actions.
National Environment Service	• Ensure that landfill capacity is used wisely by providing effective programmes to divert materials from the landfill. • Promote awareness of need for good waste management. • Oversight of environmental compliance. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to LMP • Receive annual report and monitoring data • Direct MOW to attend to any matters of non-compliance with LMP or the project permits. • Take enforcement action if required. • Occasional direct monitoring of environmental effects to quality assure monitoring results.
Ministry of Health	• Oversight of compliance from Public Health Perspective. • Occasional field inspections of the operation (at least once per year) • Approval of any changes to LMP • Receive annual report and monitoring data • Direct MOW to attend to any matters of non-compliance with LMP or the project permits. • Take enforcement action if required. • Occasional direct monitoring of environmental effects to quality assure monitoring results.
Community and Interested Parties	• Complain to MOW if operation is having off-site effects or is observed to be not operating correctly. • Participate in consultation regarding any significant proposed changes to the LMP. • Encourage and participate in waste reduction initiatives.

4.5 Solid Waste Management Objectives and Actions

4.5.1 Effective Waste Minimisation Activities

Objective 1 – To encourage the reduction of waste to the minimum practicable level, using the principles of reduce, reuse, recover and recycle.

Target 1.1: Source reduction efficiency of 60% of the waste stream in commercial establishments and 20% in residential households by the end of 2008.

Target 1.2: Develop programmes for the following waste streams including identifying capital and operating cost requirements and seek donor funding for capital items and government funding to support waste minimisation and recycling of the following:

- Automobile Scrap;
- Used Tyres;
- Lubrication Oils;
- Automotive Batteries;
- Asbestos;
- Whiteware;
- Fats & Greases;
- Green Waste; and
- Piggery Effluent.

Draft programmes and a proposed prioritisation for the above nine specific waste streams are presented in Appendix D.

Actions:

- Implement reduce, reuse, recycle community education initiatives (refer Objective 5).
- Undertake annual waste audits to monitor commercial and residential waste quantities and composition.

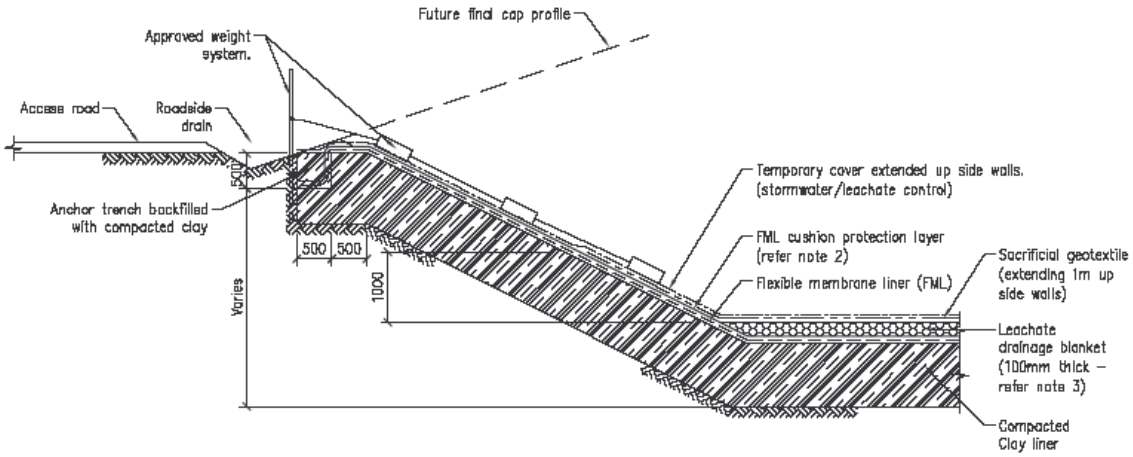
4.5.2 Suitable Waste Disposal Facilities Available

Objective 2 – To provide and maintain waste collection, treatment and disposal systems to an appropriate standard and level of service as defined in the operations contract

Target 2.1: New disposal sites/mechanisms in operation on Aitutaki by mid 2004 to serve 100% demand for domestic and commercial refuse disposal.

Actions :

- Landfill designed and supervised by International consultant.
- Good supervision of landfill construction.
- High standard of construction required of international contractor.



Schematic of Liner System at the Aitutaki Landfill

4.5.3 Well Operated Waste Disposal Facility

Objective 3 – To minimize any adverse effects on residents living adjacent to new waste facilities (within 2km radius).

Target 3.1: No serious reservations about landfill operating practices expressed by regulatory agencies or peer reviewer.

Actions:

- Landfill designer to produce Landfill Management Plan setting out landfill operational procedures
- Landfill Operating contracts to require that contractor conforms to the Landfill Management Plan.
- Landfill designer to train operational and supervisory personnel.
- Peer reviewer to be engaged to review performance of operations within one year of the commencement of landfill operation.

4.5.4 Maximise Life of Landfill

Objective 4 – To maximise the value of the substantial investment in the landfill by ensuring that landfill volume is not wasted.

Target 4.1: Landfill volume used is as planned in the landfill design.

Actions:

- Prohibit disposal of vehicles at landfill.
- Prohibit green wastes, rubble and whole tyres at the landfill unless shredded and used for daily cover
- Minimise use of daily cover by using waste materials where possible, by applying the minimum amount required of daily cover, by keeping disposal area small, and by scraping back daily cover before placing new refuse.
- Compact bulky items (e.g. computer waste, motorcycles, whiteware etc) by crushing with a hydraulic excavator or other suitable machinery prior to disposal to reduce the volume of these wastes.

4.5.5 Community Education

Objective 5 – Island wide waste minimization campaign which will:

- Foster and improve awareness of collection systems;
- Improve and promote community understanding of and participation in 4R initiatives - reduce, reuse, recover and recycle;
- Increase public participation in keeping the island wide environment clean; and
- Get community "buy in" to achieving waste reduction targets.

Target 5.1: At least 1 initiative run each year to promote recycling, waste minimisation and litter control involving schools, NGO's, and a variety of communication methods.

Actions:

- Assemble information about all current and potential waste minimisation initiatives that the community can participate in.
- Create educational materials that can be used by businesses, schools, government offices, NGOs using a variety of communication methods (e.g. composting workshops for households, waste exchange database, information regarding local recycling schemes).
- Distribute information to community about waste collections, landfill charges and types of wastes accepted and functions of the recycling centre.

Separating recyclable materials

4.5.6 Regulations

Objective 6 – Prepare and pass appropriate regulations under the Environment Act 2003 to manage solid waste.

Target 6.1: Prepare and pass regulations by end of 2005 which address the following:

- Issuing of permits for activities.
- Standards and performance measures for infrastructure facilities and operations.
- Promotion of waste prevention and reduction through separation of materials at source.
- Penalty structure to achieve compliance with the regulations in accordance with the Environment Act 2003.

4.5.7 Review

Objective 7 – To objectively review the effectiveness of waste management and waste minimisation initiatives so that appropriate improvements in programmes can be made.

Target 7.1: NES to review progress against waste management strategy on annual basis and to review this Waste Management Strategy by July 2008.

4.6 Controls on Waste Management Activities

Controls on waste management activities specific on Aitutaki are as set out below. All of the controls in the National Waste Management Plan apply to Aitutaki.

4.6.1 Prohibited Wastes at Aitutaki Waste Disposal Facility

The disposal of the following wastes is prohibited at the Aitutaki Waste Disposal Facility.

- Whole tyres.
- Automotive batteries.
- Wood Waste.
- Lubricating Oil.
- Hazardous Wastes.
- Automotive scrap, except motorcycles.
- Green wastes, unless shredded and used as substitute for daily cover.
- Tree trunks and stumps, unless shredded and used as substitute for daily cover.

5.0 Outer Islands Solid Waste Management Plan

5.1 Purpose of Plan

The purpose of this plan is to set out objectives, targets and actions proposed to manage waste on the Outer Islands. The guiding principles for this plan are those set out in the National Waste Policy.

A more thorough investigation of the current waste practices and problems on the Outer Islands needs to be made a priority before this plan can be finalised.

5.2 Background and Legal Status

This plan has been prepared for the National Environment Service with assistance from the Consultants and staff of the Project Management Unit for the Cook Islands Government and the Asian Development Bank funded Waste Management Project.

This plan is prepared in accordance with the provisions of the Environment Act 2003 and as such has the legal status under that Act.

5.3 Institutional Arrangements

The Institutional Framework for solid waste management on the Outer Islands will need to be developed following a more thorough investigation of the current waste disposal problems and practices on the islands.

5.4 Existing Activities

Anecdotal information suggests that dumping, burning or burying are the most common methods used on the Outer Islands to deal with various waste streams, including scrap vehicles, greenwaste, batteries, and lubricating oil.

A summary of the methods used to deal with such wastes is presented in Table 5-1.

Table 5-1 Current Methods for Dealing With Specific Wastes on the Outer Islands

Specific Waste	Method for Managing Waste
Motor Vehicles	• Left out in the open • Buried depending on affordability
Tyres	• Used to fuel large fires • Recreational uses (e.g. gardening, buffers for boats at wharfs)
Automotive Batteries	• Dumped or buried
Fats and Greases	• Fed to pigs • Buried
Whiteware	• Dumped or buried
Greenwaste	• Burnt • Dumped or buried

Source: R. Nooapii, MOW (2004)

5.5 Waste Management Priorities

It would be cost-intensive and impractical to construct and operate waste facilities on all of the Outer Islands.

Given that two new sanitary landfills will be constructed on Rarotonga and Aitutaki by the end of 2004, the option of collecting waste at centralised locations in the Outer Islands and barging these materials to one of two new landfills / recycling facilities needs further detailed investigation.

5.6 Solid Waste Management Objectives and Actions

5.6.1 Effective Waste Minimisation Activities

Objective 1 – To encourage the reduction of waste to the minimum practicable level, using the principles of reduce, reuse, recover and recycle.

Target 1.1: Establish programmes for recycling at least aluminium cans on all inhabited islands by end of 2006.

5.6.2 Suitable Waste Disposal Facilities Available

Objective 2 – To provide and maintain waste collection, treatment and disposal systems to an appropriate standard and level of service as defined in the operations contract.

Target 2.1: Environmentally sound disposal sites/mechanisms in operation on all inhabited islands by end of 2010 to serve 100% demand for domestic and commercial refuse disposal.

Actions:

- Survey existing means of disposal on Outer Islands and set priorities for waste minimisation and management by end of 2004.
- Investigate feasibility of a centralised disposal facility with refuse barged from each island by mid 2004.
- Secure funding, design and construct environmentally sound facilities by end of 2010.

5.6.3 Community Education

Objective 5 – Island wide waste minimization campaign which will:

- Foster and improve awareness of collection systems;
- Improve awareness of why and how to reduce, reuse and recycle;
- Increase public participation in keeping the island wide environment clean; and
- Get community "buy in" to achieving waste reduction targets.

Target 5.1: At least 1 initiative run each year to promote recycling, waste minimisation and litter control involving schools, NGO's, and a variety of communication methods.

5.6.4 Regulations

Objective 6 – Prepare and pass appropriate regulations under the Environment Act 2003 to manage solid waste.

Target 6.1: Prepare and pass regulations by end of 2005 which address the following:

- Issuing of permits for activities.
- Standards and performance measures for infrastructure facilities and operations.
- Promotion of waste prevention and reduction through separation of materials at source.
- Penalty structure to achieve compliance with the regulations in accordance with the Environment Act 2003.

5.6.5 Review

Objective 7 – To objectively review the effectiveness of waste management and waste minimisation initiatives so that appropriate improvements in programmes can be made.

Target 7.1: NES to review progress against waste management strategy on annual basis and to review this Waste Management Strategy by July 2008.

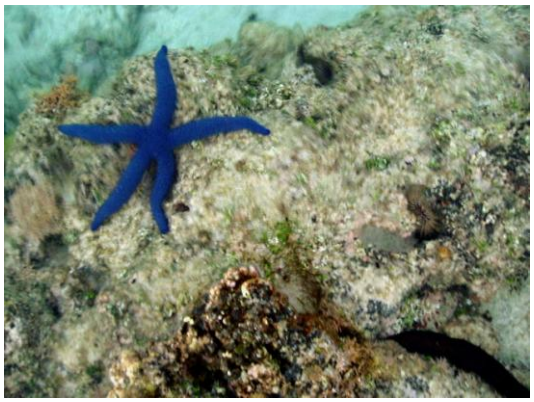
6.0 National Septage Management Plan

6.1 Purpose of the Cook Islands Septage Management Plan

The purposes of the Cook Islands Septage Management Plan are twofold, namely to:

a) Protect public health from the risks associated with pathogenic organisms and toxic substances that can be in human waste and other noxious materials disposed of in domestic wastewater, which risks become acute if excess septage is allowed to accumulate in septic tanks, causing their malfunction and the failure of their effluent disposal areas (e.g. soakage fields); and to

b) Protect the environment from the adverse effects that result if septage removed from septic tanks is not properly managed in its transportation, further treatment and ultimate disposal.



Protecting our recreational waters.

6.2 Background and Legal Status of Cook Islands Septage Management Plan

This Cook Islands Septage Management Plan is promulgated pursuant to Section 37 of the Environment Act 2003, and pursuant to the principles of Sections 39 and 41 of the Public Health Act 2004.

Inspections under the Septage Management Plan are able to be:

- Included in Tutaka inspections by Health Inspectors;
- Made under s97 of the Public Health Act 2004, in the event of there being reasonable suspicion of an offence; and
- Made under s136 of the Public Health Act 2004, in the event of a complaint being received.

Health Inspectors currently make Tutaka site inspections of all properties on Rarotonga biannually, and of properties on other islands at varying intervals (on Mangaia, for example, every two months). Inspection of septic tanks and their soakage disposal areas could be included in those Tutaka inspections.

6.3 Existing Cook Islands Septage Management Activities

There is currently (year 2004) no regular septic tank pump-out and inspection regime operating in the Cook Islands.

On Rarotonga, septage is currently pumped out by a private contractor on a commercial basis, engaged directly and paid by individual septic tank owners. This generally occurs when there is an obvious problem. The average frequency of clean-out is therefore lower than desirable. Collected septage is disposed of to land.

On other islands, there is no formal method of septage removal. As problems occur, they are dealt with locally on an ad hoc basis.

The Cook Islands National Environment Service has advertised its intention, in conjunction with the Ministry of Health, to establish regulations requiring the upgrading of septic tanks in coastal areas. As well as describing reasons for the regulations, the advertisement sets out various criteria and standards that are proposed.

6.4 Cook Islands Septage Management Objectives and Actions

6.4.1 Cook Islands Septic Tanks – General

Objective 6.4.1: The objective of management of the Cook Islands' communal inventory of septic tanks is to protect public health and the environment to the maximum degree that is practical by treating sewage and storing removed solids as efficiently as possible.

Comments: The sector of the environment that is most acutely affected by the community's wastewater is the marine foreshore, where seepage of groundwater polluted by septic tank discharges is degrading the aquatic ecosystem. A primary aspect of that degradation is the enrichment of the foreshore waters with nutrient residues from the sewage, causing change in the natural ecological balance including excess growth of algae and other marine flora.

With regard to Rarotonga, it is stressed that, even if all of the that islands' septic tanks and their effluent soakage/disposal systems conformed perfectly with recognised standards, the marine environment around the foreshore would probably be only little improved, because of the relatively low purification efficiency of even the best septic tanks, and the relatively rapid soakage (and minimal additional purification) that occurs in the highly porous soils of coral sand and gravel around the island margin. For that reason, any upgrading of Rarotonga's septic tanks and effluent soakage systems is likely to only mitigate and not cure the foreshore pollution. Curing instead of merely mitigating the foreshore pollution would require a much higher standard of purification than septic tanks provide, and possibly a different mode of effluent disposal from the current soakage fields ; detailed feasibility investigation being necessary to determine whether individual or collectively reticulated and treated wastewater systems would be the most cost effective.

The pollution of coastal waters will also include micro-organisms such as bacteria and viruses originating from the wastewater, with the attendant risk to public health.

The highly porous coral sands and gravels around Rarotonga, mentioned above, extend at least 100 metres (and often much further) inland from the shoreline, around virtually the entire coast (Wood BL and Hay RF; Geology of

the Cook Islands [Bulletin n.s.82]: 1970: NZ Geological Survey). Groundwater, including any that contains discharged effluent, drains rapidly through such soils, and quickly drains into adjacent surface waters such as streams and beaches. Wastewater is purified by passage through soils, by a variety of processes, but the purification occurs at a relatively slow rate and improvement in quality would be quite minor in the short time of travel that would occur in these sands and gravels. It is therefore considered there would be unlikely to be justifiable to designate a coastal "protection/sensitivity" margin as narrow as 30 metres, as has been suggested by others. In places where bedrock is shallow beneath the sands and gravels, the situation will be exacerbated by even more rapid lateral seepage (and less purification) of effluent, or by surface ponding of effluent, or both.

The above-mentioned purification through soil can, given the right conditions of vegetation, flow pattern, detention time, watertable depth relative to root zone, and other factors, be enhanced by the presence of wetland plants. However, the general conditions typical of soakage disposal areas in Rarotonga is not considered to be particularly favourable in this regard, and any benefits from natural wetland conditions are likely to be minor.

The circumstances of Aitutaki and other islands beyond Rarotonga are not known with the same degree of confidence but, given the generally similar coral geologies of their coastal margins, it is likely that there are similar situations of foreshore pollution by effluent seepages.

Target 6.4.1: The target for management of the Cook Islands' communal inventory of septic tanks is to have a continuous, year-by year reduction in the number of performance failures of tanks and their effluent disposal/soakage systems.

Action 6.4.1: The following actions will be necessary to achieve the target:

a) The environs of every septic tank and its soakage disposal area should be inspected at least once every two years, and preferably annually, for any sign of failure. Typical signs of failure are set out in Sections 3A.5.3 and 3A.5.4 of AS/NZS 1547:2000 and include:

a1) the absorption (soakage) field is wet or soggy, with wastewater ponding on the surface of the ground;
a2) there is a smell of "sewage" near the septic tank of absorption area;
a3) the drains and toilets run slowly; and/or
a4) the grease trap (if there is one) is full or blocked.

and, consequently

a5) spread of infectious diseases.
a6) breeding of mosquitoes and attraction of flies and rodents.
a7) nuisance and unpleasantness.
a8) pollution and infection of waterways, beaches, streams and shellfish beds.
a9) contamination of bores, wells and groundwater.
a10) alteration of the local ecology.

The location of failed septic tank systems, the nature of the evidence of the failure, the date of the inspection, and steps taken to remedy the situation, should be recorded on a register.

Comment: There are two main ways in which septic tanks can fail. Firstly, the absorption/soakage area can fail, due to infrequent removal of septage, due to an inadequate effluent distribution system, or due to hydraulic overloading. Hydraulic overloading can result from either excessive rates of wastewater discharge or, more commonly, from stormwater that has entered drains via flooded gully traps or has ponded over the tops of tanks. The second main failure mode is the structural collapse or deterioration of the septic tank chamber itself. Such collapse or deterioration might be due to mere age, or to poor quality of the original design or construction. Regardless, such circumstance might necessitate the replacement of an existing tank with a new one.

Also, if the absorption/soakage area has failed it is almost certain that it will be either because its soils have become clogged by solids discharged in effluent from an inadequately maintained septic tank, or because one or other of the absorption/soakage area or its effluent distribution system were inadequate in the first place, or some combination of those causes. The receiving soils are likely to be clogged beyond resurrection, and the absorption/soakage system is likely to require replacement.

Some of the issues listed in (a1) to (a10) above might well be evidence of contravention of s39(b) of the Public Health Act 2004, which requires waste to be removed "as frequently as necessary to avoid overflows".

b) The owners of failed septic tanks or their absorption/soakage systems must be required to have the cause of the failure immediately investigated, determined and remedied. Systems that are deemed to be unsatisfactory, albeit that there might be no major signs of failure, should be required to be remedied either when any new development occurs on the site, or by the year 2010, whichever is the sooner.

c) Any septic tank system found to have failed should be re-inspected at intervals of not more than four weeks, and fresh instructions issued as/if necessary, until the failure has been remedied. Premises or general locations that inspections or complaints indicate as being consistently or particularly problematic should be re-inspected at more frequent intervals than annually and, if the cause appears to be a generic one with the soils or other peculiarities of the area, professional advice should be obtained.

d) Garbage grinders discharging into wastewater drains should be discouraged. The large quantities of solids generated by garbage grinders, and the relative low biodegradability of the material, tend to cause septic tanks to fill with solids and require de-sludging prematurely.

e) New septic tanks and absorption/soakage systems, whether first-time installations or replacements of failed systems, should comply in all respects with the requirements of AS/NZS 1546.1:1998 and with Section 4.2 and Appendices 4.1A through 4.5D of AS/NZS 1547:2000. Septic tanks of twin-chamber configuration, as per Clause 3.4 2 and Figure 3.1 of AS/NZS 1546.1:1998, provide superior performance to the traditional single-chamber type and should mandatory for all new and replacement installations. For them to perform efficiently, it is important that the compartments of twin-chamber tanks are proportioned and sized correctly.

Filtering of effluent as it is discharged from a septic tank will intercept and prevent any (clump or floc) accumulations of suspended solids from being carried over to the receiving absorption/soakage area. An effluent filter thus protects the absorption/soakage area from clogging by such solids. Various forms of such filter are available, including proprietary devices that have come onto the market in recent years. These proprietary units are typically installed in place of the tee outlet pipes that have been traditional in septic tanks. Septic tank effluent filters, whether of proprietary design or otherwise, do themselves eventually clog with accumulated solids and therefore require regular maintenance. Subject to their design being assessed and approved by a suitably qualified professional (independent of any vendor), and subject to satisfactory arrangements being in place for ongoing regular maintenance, such effluent filters should be encouraged, notwithstanding they are not contemplated in either AS/NZS 1546.1 or AS/NZS 1547. Effluent filters of non-proprietary design, involving such filtering medium options as pea gravel and finely-apertured wire grille and typically installed in a separate chamber downstream of the tank outlet, have also been developed and are suitable, subject to the same provisos on professional approval and ongoing maintenance.

f) Any premises that generates greater quantities of grease and/or fat than a normal domestic household, should be required to install a grease trap to intercept that material upstream of the septic tank, and to have grease in the trap regularly removed and disposed of by an approved contractor. Material removed from grease traps on Rarotonga and Aitutaki should be disposed of as set out in those island's respective Waste Facility Management Plans. Those Plans allow grease trap waste to be co-disposed by burial with solid waste in the landfill but prohibit its discharge into the septage treatment ponds.

6.4.2 Cook Islands Septic Tank Management and Maintenance

(a) General:

Objective 6.4.2(a): The objectives of management and maintenance of individual septic tank are, as well as the broader communal ones of 4.5.1 above, to:

a1) Maintain conditions inside the tank that allow the highest practicable treatment efficiency, and

a2) Prevent the tank from becoming so over-full of sludge and scum that some is displaced by incoming flows and carried over in the discharged effluent, where it will tend to clog the distribution pipes and receiving soils in the absorption/ soakage area and cause the system to fail.

Target 6.4.2(a): The target of management and maintenance of Rarotonga's septic tanks will be to have a continuous, year-by year reduction in the number of failures of absorption/soakage systems.

Action 6.4.2(a): The following actions will be necessary to achieve the target:

a3) A public education programme should be instituted, and refresher notices published from time to time, advising the occupiers of premises of the following recommended practices by users of septic tank systems (cited from Sections 3A.5.1 and 3A.5.2 of AS/NZS 1547:2000):

To reduce the amount of solids building up in the tank:

i. scrape all dishes to remove fats, grease, etc, before washing
ii. keep all possible solids out of the system;
iii. Don't use garbage grinder unless the septic tank has been specifically designed for the extra solids load; and
iv. Don't put sanitary napkins other hygiene products down the toilet.

To keep the purifying bacteria and other micro-organisms working efficiently in the tank and in the receiving soil of the absorption/soakage area:

v. Use only soaps that are biodegradable.
vi. Minimise use of detergents that contain high amounts of phosphorus, which many traditional ones have done. *Comment: Many traditional detergents have contained high concentrations of phosphorus, which is one of the main problematic nutrients in wastewater effluents, eg. leading to algal blooms.*
vii. In areas where there are clay soils, don't use detergents that are high in sodium. *Comment: Sodium destroys the microscopic structure of clay particles, causing the soil to become seriously impervious. Moreover, the loss of porosity is irreversible; the soil will not recover.*
viii. Don't use detergents in greater dosages than are recommended by the manufacturers.
ix. Minimise the use powerful bleaches, whiteners, nappy soakers, spot removers or disinfectants *Comment: These products have anti-bacterial actions that can kill purifying microbes in the septic tank and in the soil of the absorption/soakage area.*
x. Don't put chemicals or paint down the toilet or drain. *Comment: Not only do they have the same anti-bacterial action as mentioned above, but some adversely effect the soil structure as also mentioned, and many chemicals are toxic and slow to break down and will pollute the groundwater and the lagoon or stream where the groundwater emerges (in its natural flow to the sea).*

To reduce the hydraulic load on the absorption/soakage area, thereby improving its performance and prolonging its life:

xi. Wherever affordable and possible, install taps, shower heads and other plumbing fixtures and appliances that are of water-saving types.
xii. Take showers rather than baths.
xiii. Delay washing clothes until there is a full load.
xiv. Delay using any automatic dishwasher until there is a full load
xv. Spread out the times of the wastewater discharges, especially for the larger discharges. For example, try not to discharge the bath at the same time as the washing machine and, if possible,

space the larger discharges out over different days of the week (e.g. don't do several loads of clothes washing on a single day).

Such an education programme is provided for under s135 of the Public Health Act 2004, which requires that an educational programme be established "as soon as practicable after commencement of this Act".

a4) inspection, remedying, re-inspection, replacement and grease trap requirements should be as set out under 4.5.1(a), (b), (c), (e) and (f) above.

(b) De-sludging of Septic Tanks (removal of Septage)

Objective 6.4.2(b): The objective of desludging of a septic tank is to remove the septage before the accumulations of (settled) sludge and (floating) scum dominate the contents of the tank to such an extent that excess suspended material is carried-over and discharged in the tank's effluent, where it will tend to clog pipes and receiving soils of the absorption/ soakage system. *Comment: In normal circumstances, the combined quantities of sludge and scum should not occupy more the about two thirds of the tank volume, i.e. at least the remaining one third should be occupied by the liquid from which the settled and floating fractions have separated.*

Target 6.4.2(b): The target of Septic Tank De-sludging on Rarotonga will be to have every septic tank de-sludged before it is overfull, such that the functional integrity of no absorption/soakage system at any septic tank installation on the island is compromised by carry-over of excess solid material in the effluent.

Action 6.4.2(b): Actions necessary to achieve the target will be:

b1) Consider as a government initiative and, if considered appropriate, institute a programme of publicly-operated septic tank de-sludging, whereby every septic tank on Rarotonga is compulsorily de-sludged at least once every three years, and more frequently if warranted by undersized tankage for the number of persons contributing wastes to the tank. *Comment: Such compulsory programmes have been instituted by a number of local authorities in New Zealand in recent years, as a response to historic neglect of responsibilities by some property owners.*
There are various formulae for estimating the rate of sludge and scum accumulation for a given number of people; the following is suggested:

Tank volume occupied by sludge and scum combined
= 80 litres per person-year of occupancy since last de-sludging
+ 60 litres per person in current occupancy

Determination of whether tankage is undersized or not will require estimation by site measurement of tank dimensions (eg. by probing or digging through overlying soil to establish plan dimensions of a tank, "dipping" to determine its depth, enquiry as to the number of current and past occupants of the premises served, and calculations using the above formula and the above-mentioned two-thirds/one-third parameters.

b2) If the publicly-operated de-sludging programme should not be instituted:

i. Every septic tank on Rarotonga should, unless it is de-sludged, instead be inspected at least once every two years and preferably annually, and have the levels of the top of the sludge and bottom of the (floating) scum determined, relative to the bottom of the outlet tee. *Comment: Guidelines for such inspection of septic tanks are provided in Section A1 of Appendix A to this document. See Figure A2 in that Appendix A.*

ii. Every owner of a septic tank should be compelled to have the tank de-sludged either at intervals not exceeding three years or whenever the annual inspection (as per (i)) indicates the need. Regulations to that effect are able to be promulgated under s39 of the Public Health Act 2004.

iii. The findings of all annual inspections and the dates of all tank de-sludgings should be recorded in a register of septic tanks in which every tank and its inspection and de-sludging details are readily retrievable by street address or similar clear and simple identification.

Comment: Guidelines on the de-sludging of septic tanks are provided in Section A2 of Appendix A to this document.

6.4.3 Disposal of Septage Removed from Cook Islands Septic Tanks

Objective 6.4.3: The objective of disposal of Rarotongs's and Aitutaki's septage will be to do so in a manner that will not cause any unacceptable adverse effects on public health or the environment.

Target 6.4.3: The target of septage disposal will be for the disposal arrangements, in the long as well as the short term, to cause no nuisance or significant adverse environmental effects.

Action 6.4.3: Actions necessary for achievement of the target will be:

a) Septic tank emptying and septage transportation operations being conducted by responsible operators, using efficient equipment and vehicles and employing responsible personnel who are trained in relevant occupational and public health and safety matters.

b) Licensing of such operators should be subject to their satisfying the licensing authority as to the appropriate standards of their equipment, vehicles and personnel, and to annual renewal of their licences on the same basis. Licences should be able to be withdrawn and operation prohibited, if an operator fails to maintain standards or contravenes rules such as those that prohibit unauthorised discharges to the septage ponds. Such licensing is provided for under s41(b) and (c) of the Public Health Act 2004.

c) Requiring all septage, but not prohibited wastes, to be delivered into the septage treatment pond reception facility, at the Rarotonga Waste Disposal Facility.

Appendix A: Current Legislation (MOW, 2002)

Appendix B: Existing Waste Management Activities and Opportunities on Rarotonga (MOW, 2002)

Appendix C: Onsite Wastewater Systems (Gunn, 2004)

Appendix D: Waste Management Plan for Nine Specific Waste Streams (Maunsell, 2004)

Appendix E: Management of Persistent Organic Pollutants in Pacific Island Countries (SPREP, 2000)

Appendix F: Analysis of Domestic and Commercial Waste Streams on Rarotonga and Aitutaki

(from Appendix 5, Cook Islands Urban Infrastructure Project, Volume 2, Brokman Tym, February 2000)

Appendix G: Rarotonga Solid Waste Study (NES, 2002)