

ASIAN DEVELOPMENT BANK

DRAFT FINAL REPORT

TA 4605-COO: STRENGTHENING DISASTER MANAGEMENT AND MITIGATION (COMPONENT 2: PREVENTIVE INFRASTRUCTURE MASTER PLAN)



VOLUME 7: DATA & BIBLIOGRAPHY

November 2006



The **MPC** Group International
MICROFINANCE • PLANNING • COMMUNITY

In association with



Fraser
Thomas



· I · G · C · I ·

CURRENCY EQUIVALENTS

(as of 2 November 2006)

Currency Unit	–	New Zealand Dollar (NZ\$)
NZ\$1.00	=	US\$0.67
US\$1.00	=	NZ\$1.48

ABBREVIATIONS

AADDT	Average annual daily traffic
AC	Asphalt concrete
ACC	Aid Coordinating Committee
ADB	Asian Development Bank
ADSL	Asymmetric Digital Subscriber Line
AMD	Aid Management Division
APS	Aitutaki Power Supply
AS/NZS	Australian Standard/New Zealand Standard
ATC	Air Traffic Control
AusAID	Australian Agency for International Development
AVG	Average
BOD	Biochemical oxygen demand
CAANZ	Civil Aviation Authority of New Zealand
CAPEX	Capital Expenditure
CBDAMPIC	Community Based Development of Adaptation Measures for Pacific Island Countries
CEA	Cyclone Emergency Assistance
CI	Cook Islands
CIAA	Cook Islands Airport Authority
CIANGO	Cook Islands Association of NGO's
CIGOV	Cook Islands Government
CIIC	Cook Islands Investment Corporation
CIMMRISP	Cook Islands Ministry of Marine Resources Institutional Strengthening Project
CIPA	Cook Islands Port Authority
CISD	Cook Islands Statistics Office
CITTC	Cook Islands Trade Training Center
CITV	Cook Islands Television
CLIMAP	ADB Climate Change Adaptation Program for the Pacific
COPED	Concrete coastal protection device
CROP	Council of Regional Organizations
CRRP	Cyclone Recovery and Reconstruction Program
CRP	Climate Risk Profile
DBST	Double Bituminous Surface Treatment
DME	Distance Measuring Equipment
DNHRD	Department of National Human Resource Development
DOH	Department of Health
DPA	Development Partnership Agreement
DRM	Disaster Risk Management
EC	Evacuation Center
ECIL	Express Cook Islands Agents

EIA	Environmental Impact Assessment
EMC	Evacuation Management Center
EMCI	Emergency Management Cook Islands
ENSO	El Niño/Southern Oscillation
FY	Financial Year
GCM	Global Climate Model
GDP	Gross Domestic Product
gensets	Generator sets
GHD	GHD Consultants
HRD	Human Resource Development
IA	Island Administration
IC	Island Council
ICAO	International Civil Aviation Organization
ICT	Information, Communications and Technology
IEE	Initial Environmental Examination
IGCI	International Global Change Institute
ILS	Instrument Landing System
IMP	Infrastructure Master Plan
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LBGES	Labor-based Government Equipment Supported
LPG	Liquefied Petroleum Gas
MC	Micro Shelter
MDG	Millennium Development Goals
MFEM	Ministry of Finance & Economic Management
MMR	Ministry of Marine Resources
MOH	Ministry of Health
MOT	Ministry of Transport
MOW	Ministry of Works
MSL	Mean Sea Level
NBC	National Building Code
NDB	Non-directional Beacon
NDMO	National Disaster Management Office
NDRMC	National Disaster Risk Management Council
NDRMP	National Disaster Risk Management Plan
NED	National Energy Division
NEDS	National Economic Development Strategy
NES	National Environment Service
NGO	Non Government Organization
NIWA	National Institute for Water and Atmospheric Research
NSDP	National Sustainable Development Plan
NWS	National Waste Strategy
NZ	New Zealand
NZAID	New Zealand Agency for International Development
O&M	Operations & Maintenance
OHRD	Office of Human Resources Development
OI	Outer Islands
OICDU	Outer Islands Infrastructure Development Unit
OIDP	Outer Islands Development Program
OMIA	Office of the Minister of Island Administration

OPM	Office of the Prime Minister
PAB	Project Adaptation Brief
PCC	Project Coordinating Committee
PD	Police Department
PDU	Project Development Unit
PERCA	Public Expenditure Review Committee and Audit
PFL	Pacific Forum Line
PICCAP	Pacific Islands Climate Change Assistance Program
PIU	Project Implementation Unit
PMG	Pitt Media Group
PPP	Public-Private Partnership
PPU	Policy and Planning Unit
PSC	Public Service Commission
REAP	Rarotonga Environmental Awareness Program
RIC	Rarotonga Island Council
ROW	Right-of-way
SBST	Single Bituminous Surface Treatment
SLIS	Survey and Land Information Service
SOE	State Owned Enterprises
SOPAC	Pacific Islands Applied Geoscience Commission
SPC	Secretariat to the Pacific Community
SPCZ	South Pacific Convergence Zone
SRES	Special Report on Emissions Scenarios
TA	Technical Assistance
TAU	Te Aponga Uira
TCI	Telecom Cook Islands
TEU	Twenty foot equivalent unit
TNZ	Telecom New Zealand
TOR	Terms of Reference
TVNZ	New Zealand Television
UNDP	United Nations Development Program
VASIS	Visual Approach Slope Indicator System
VOR	Variable Omni-range
WDC	Waste Disposal Center
WHO	World Health Organization
WMRU	Waste Management and Recycling Unit
WWD	Water Works Division

WEIGHTS AND MEASURES

g	gram
g/c.d	gram per capita per day (waste generation)
ha	hectares
kL	kiloliter
km	kilometer
km ²	square kilometers
L	liters
L/c.d	liters per capita per day (water use)
kbs	kilobytes per second

kg/c.d	kilogram per capita per day (waste generation)
m	metres
m ²	square metres
m ³	cubic metres
mg	milligram
mg/L	milligram per liter (concentration)
m/s	meters per second
mm	millimeters
°C	degrees centigrade

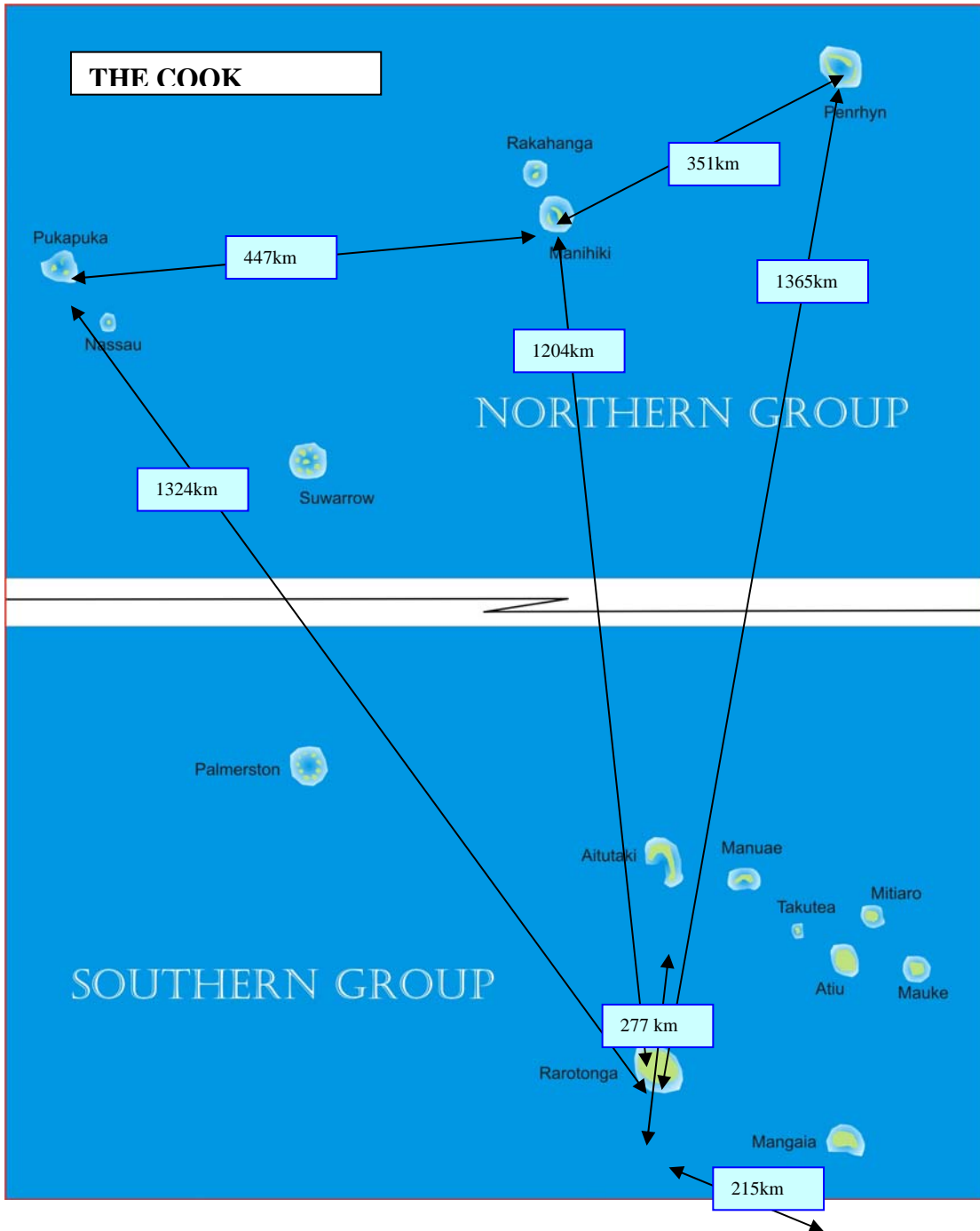
NOTES

- (i) The fiscal year (FY) of the Government of the Cook Islands ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2006/2007 ends on 30 June 2007.

CONTENTS

I.	REPORT ORGANIZATION	1
II.	INTRODUCTION	2

Map: Cook Islands location

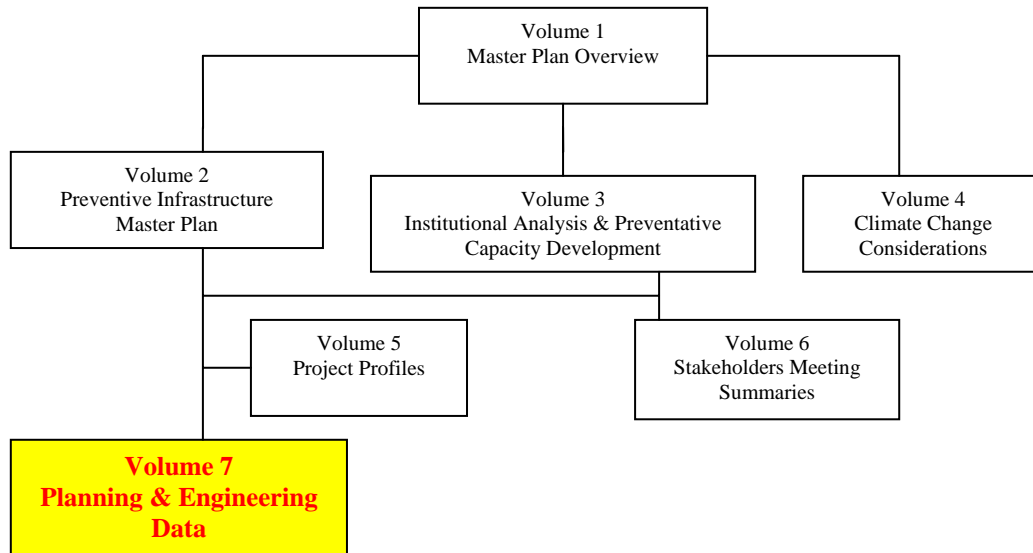


Source: <http://www.cook-island.maps-pacific.com/>

I. REPORT ORGANIZATION

1. The Final Report is organized into 7 volumes. As shown in Figure 1. Each volume is designed to be a stand-alone document, so that they can be used independently by each relevant agency.

Figure 1: Organization of Final Report



2. **Volume 1 – Master Plan Overview** – is an executive summary of the entire TA, and draws together key sections of the other volumes, and information from the Inception and Mid Term Reports. It attempts to address, in a single volume, the requirements of the Project TOR.

3. **Volume 2 – Preventative Infrastructure Master Plan** – is one of the main volumes of the project and provides the background and rationale for the proposed infrastructure in each of the sectors. It ends by proposing a comprehensive, phased infrastructure master plan across each of the designated sectors.

4. **Volume 3 - Institutional Analysis & Preventative Capacity Development** – forms the other key section of the project. It reviews existing institutional arrangements and considers alternatives for change that would enable new infrastructure initiatives to be more effective.

5. **Volume 4 - Climate Change Considerations** – The basis for the project has been the issue of climate change. This volume updates the Cook Islands Climate Risk Profile and examines the climate change implications on each of the proposed infrastructure projects in the Master Plan. A further section provides a consideration of changes that should be made to the building code of the Cook Islands.

6. **Volume 5 - Project Profiles** – This volume is an assembly of each of the proposed infrastructure project profiles together with tracking information.

7. **Volume 6 - Stakeholders Meeting Summaries** – This volume is a documentation of all key stakeholder meetings undertaken during the TA. It is included as a reference document to be used by future consultants (and CIGOV) as a supplement to their own investigations.

8. **Volume 7 - Planning & Engineering Data** – This volume contains all the cost and engineering data used by the team in the development of the Master Plan profiles.

II. INTRODUCTION

9. The objective of this volume is to provide all planning and engineering data that has been collected, collated, processed and adopted for technical designs for all projects identified within this Infrastructure Master Plan.

10. The aim is to present all the information in a format so that it is easy to use when it is required to clarify or verify figures, assumptions and projections in the design considerations for the respective project. It can also be can be utilized as a support and or reference document as and when required.

11. The Cost Data section, apart from providing a general cost breakdown for each project it also supports the project profiles and further highlights the scope of the project when sourcing funds to implement the project.

12. All the information relating to the engineering design for each projects are contained in the Engineering Data section. These included data on population, planning criteria, design assumptions and design parameters. Information on the effect of climate change adaptation is also included in this section.

13. Within this Volume, is also data collected from all islands, illustrating to the reader of the status existing infrastructure facilities and the reasons why projects on individual islands were proposed and developed.

14. A list of the published literature and reports consulted is contained in the Reference section.

15. The structure of Volume 7 – Planning and Engineering Data is as follows:

1. Introduction
2. Cost Data
3. Engineering Data
 - 3.1 Demographic
 - 3.2 Planning Criteria
 - 3.3 Climate Change Adaptation
4. Island Inventory
 - 4.1 Island
 - 4.2 Status of Utility Services
 - 4.3 Infrastructure Inventory
5. References

1. COST DATA

COST ESTIMATE CONSIDERATIONS									
Capital Costs									
- Base-cost is based on 2006 commercial rates									
- Engineering design, contract administration and supervision is					10.0%				
- Contingencies					15.0%				
Assumptions:									
- Engineering fees and contingencies are not compounded									
- Costs are rounded to the nearest \$10,000									
- VAT is included in the costs									
Running Costs									
Assumptions:									
- The following estimates are based on good practice procedures and regular servicing being carried out as per the supplier recommendations									
Maintenance									
- Civil and structural			0.5%		(Yr1, Yr2, thereafter annual increment of 0.5% up to maximum of 2% in Yr5)				
- Mechanical			7.0%		(Percentage of item in initial year)				
- Electrical			5.0%		(Percentage of item in initial year)				
- Field vehicles			10.0%						
Operations									
- Power for electrical equipment annual cost is based on power rating of equipment, hour of operation and the following full recovery (FCR) tariffs									
						Island		Tariff (\$/kWh)	
								FCR	
						Mangaia		0.60	
						Atiu		1.10	
						Mauke		1.19	
						Mitiamo		1.72	
Note:		FCR tariffs extracted from the "Power Sector/Feasibility Report by Bruce Clay/Herbert reports adjusted by 4% per annum since 2004 to convert to 2006 constant prices							
- Diesel fuel		Assume \$3.00/litre for the outer islands, \$2.50/litre for Rarotonga							

COST ESTIMATE CONSIDERATIONS									
Capital Costs									
- Base-cost is based on 2006 commercial rates									
- Engineering design, contract administration and supervision is					10.0%				
- Contingencies					15.0%				
Assumptions:									
- Engineering fees and contingencies are not compounded									
- Costs are rounded to the nearest \$10,000									
- VAT is included in the costs									
Running Costs									
Assumptions:									
- The following estimates are based on good practice procedures and regular servicing being carried out as per the supplier recommendations									
Maintenance									
- Civil and structural			0.5%		(Yr1, Yr2, thereafter annual increment of 0.5% up to maximum of 2% in Yr5)				
- Mechanical			7.0%		(Percentage of item in initial year)				
- Electrical			5.0%		(Percentage of item in initial year)				
- Field vehicles			10.0%						
Operations									
- Power for electrical equipment annual cost is based on power rating of equipment, hour of operation and the following full recovery (FCR) tariffs									
						Island		Tariff (\$/kWh)	
								FCR	
						Mangaia		0.60	
						Atiu		1.10 0.62	
						Mauke		1.19 0.58	
						Mitiaro		1.72 0.58	
Note:		FCR tariffs extracted from the "Power Sector/Feasibility Report by Bruce Clay/Herbert reports adjusted by 4% per annum since 2004 to convert to 2006 constant prices							
- Diesel fuel		Assume \$3.00/litre for the outer islands, \$2.50/litre for Rarotonga							

JWS Estimate for northern group					
	Pukapuka	Nassau	Manihiki	Manihiki	Rakahanga
Mobilisation, demobilisation, preliminaries	50000	50000	150000	150000	10000
Dredging channel	100000		100000	100000	
Drilling blasting reef		50000	50000	50000	
Demolition			20000		
Seawall			500000	500000	
Wharf wall		50000	80000		
Hardstand and ramp	50000	100000	200000		
Blasting headland					
Bollards, fenders and navigation items	15000	15000	15000	15000	15000
Subtotal Harbour Works	165,000	215,000	965,000	665,000	15,000
Subtotal Mobilisation and Harbour Works	215,000	265,000	1,115,000	815,000	25,000
Contingency 15%	32,250	39,750	167,250	122,250	3,750
Engineering and management 10%	21,500	26,500	111,500	81,500	2,500
Subtotal	268,750	331,250	1,393,750	1,018,750	31,250
GST					
Total	268,750	331,250	1,393,750	1,018,750	31,250
Transfer to master sheet \$million	0.27	0.33	1.40	1.00	0.03

Avatiu Container Facilities Development 3000 m2		
Mobilisation		50000
Demolition of LPG facilities		50000
Excavation, preparation, compaction	500	1500000
Concrete pavement	500	1500000
Fencing, lighting, misc		50000
Subtotal		3150000
Engineering and management		315000
GST		0
Total		3465000
Transfer		3.5

Aitutaki Improvement MOW-CIPA	
Plant, materials and works	3900000
Engineering and Mgt 10%	390000
Subtotal	4290000
Inflation 5% 3 years	4966211.25
Transfer	5.00

GHD			R AUS ARMY	
NZD	NZD	NZD	AUD	
Mangaia	Mauke	Mitiaro	Penrhyn	
172,000	144,000	168,000	45,000	
177,000	177,000	106,000	50,000	
310,000	52,000	37,000	25,000	
20,000	15,000	0	6,500	
519,600	501,000	1,005,000	11,400	
169,000	76,000	81,000	294,000	
273,000	205,000	183,500	21,200	
0	158,000	292,000		
14,000	13,500	18,100	54,000	
1,482,600	1,197,500	1,722,600	462,100	
1,654,600	1,341,500	1,890,600	507,100	
330,920	268,300	378,120	101,420	GHD 20% contingency retained
198,552	160,980	226,872	60,852	GHD 10% compounded retained
2,184,072	1,770,780	2,495,592	669,372	
2,184,072	1,770,780	2,495,592	756,390	1.13 NZ exrate inflation 5% 4 years
2.20	1.80	2.50	919,397	
			0.92	

Project ID: ATW01AIU					
Project Name: Atiu airport upgrade to Pt 139 standards					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	2,075,000

Project ID: ATW02MGS					
Project Name: Mangaia airport development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	3,562,500	3,562,500
	Climate change adaptation	1	nos	250,000	250,000
	Design and management	1	nos	475,000	475,000
	Contingencies	1	nos	712,500	712,500
				Subtotal:	5,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	5,075,000

Project ID: ATW03MUK					
Project Name: Mauke airport development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	547,500	547,500
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	73,000	73,000
	Contingencies	1	nos	109,500	109,500
				Subtotal:	750,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	825,000

Project ID: ATW04MOI					
Project Name: Mitiaro airport development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	547,500	547,500
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	73,000	73,000
	Contingencies	1	nos	109,500	109,500
				Subtotal:	750,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	825,000

Project ID: ATW05MHX					
Project Name: Manihiki airport improvement					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	2,075,000

Project ID: ATW06PYE					
Project Name: Penrhyn airport improvement					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	100,000	100,000
				Subtotal:	100,000
				TOTAL:	2,100,000

Project ID: ATW07PZK					
Project Name: Pukapuka airport improvement					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	2,075,000

Project ID: ATW08RAR					
Project Name: Rarotonga airport passenger terminal improvement					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,550,000	2,550,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	340,000	340,000
	Contingencies	1	nos	510,000	510,000
				Subtotal:	3,500,000
2	Operation and maintenance				
	Operation and maintenance in CIAA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	3,500,000

Project ID: ATW09RAR					
Project Name: Rarotonga airport cyclone protection works					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	7,312,500	7,312,500
	Climate change adaptation	1	nos	250,000	250,000
	Design and management	1	nos	975,000	975,000
	Contingencies	1	nos	1,462,500	1,462,500
				Subtotal:	10,000,000
2	Operation and maintenance				
	Operation and maintenance in CIAA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	10,000,000

Project ID: ATW10AIT					
Project Name: Aitutaki airport improvement for international operations					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	8,812,500	8,812,500
	Climate change adaptation	1	nos	250,000	250,000
	Design and management	1	nos	1,175,000	1,175,000
	Contingencies	1	nos	1,762,500	1,762,500
				Subtotal:	12,000,000
2	Operation and maintenance				
	Operation and maintenance in CIAA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	12,000,000

Project ID: MTW01AIU					
Project Name: Atiu harbour repairs					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	120,000	120,000
	Climate change adaptation	1	nos	0	0
	Design and management	1	nos	16,000	16,000
	Contingencies	1	nos	24,000	24,000
				Subtotal:	160,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	65,000	65,000
				Subtotal:	65,000
				TOTAL:	225,000

Project ID: MTW02MGS					
Project Name: Mangaia harbour reconstruction					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,575,000	1,575,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	210,000	210,000
	Contingencies	1	nos	315,000	315,000
				Subtotal:	2,200,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	65,000	65,000
				Subtotal:	65,000
				TOTAL:	2,265,000

Project ID: MTW03MUK					
Project Name: Mauke harbour reconstruction					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,275,000	1,275,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	170,000	170,000
	Contingencies	1	nos	255,000	255,000
				Subtotal:	1,800,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	65,000	65,000
				Subtotal:	65,000
				TOTAL:	1,865,000

Project ID: MTW04MOI					
Project Name: Mitiaro harbour reconstruction					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,800,000	1,800,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	240,000	240,000
	Contingencies	1	nos	360,000	360,000
				Subtotal:	2,500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	65,000	65,000
				Subtotal:	65,000
				TOTAL:	2,565,000

Project ID: MTW05MHX					
Project Name: Manihiki harbours reconstruction					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,725,000	1,725,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	230,000	230,000
	Contingencies	1	nos	345,000	345,000
				Subtotal:	2,400,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	105,000	105,000
				Subtotal:	105,000
				TOTAL:	2,505,000

Project ID: MTW06NAS					
Project Name: Nassau harbour development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	191,250	191,250
	Climate change adaptation	1	nos	75,000	75,000
	Design and management	1	nos	25,500	25,500
	Contingencies	1	nos	38,250	38,250
				Subtotal:	330,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	360,000

Project ID: MTW07PYE					
Project Name: Penrhyn harbour rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	633,750	633,750
	Climate change adaptation	1	nos	75,000	75,000
	Design and management	1	nos	84,500	84,500
	Contingencies	1	nos	126,750	126,750
				Subtotal:	920,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	995,000

Project ID: MTW08PZK					
Project Name: Pukapuka jetty development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	146,250	146,250
	Climate change adaptation	1	nos	75,000	75,000
	Design and management	1	nos	19,500	19,500
	Contingencies	1	nos	29,250	29,250
				Subtotal:	270,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	60,000	60,000
				Subtotal:	60,000
				TOTAL:	330,000

Project ID: MTW09RAK					
Project Name: Rakahanga harbour improvement					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	22,500	22,500
	Climate change adaptation	1	nos	0	0
	Design and management	1	nos	3,000	3,000
	Contingencies	1	nos	4,500	4,500
				Subtotal:	30,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	70,000

Project ID: MTW10RAR					
Project Name: Avatiu western basin development completion					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,062,500	2,062,500
	Climate change adaptation	1	nos	250,000	250,000
	Design and management	1	nos	275,000	275,000
	Contingencies	1	nos	412,500	412,500
				Subtotal:	3,000,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	3,000,000

Project ID: MTW11RAR					
Project Name: Avatiu container facilities development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,550,000	2,550,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	340,000	340,000
	Contingencies	1	nos	510,000	510,000
				Subtotal:	3,500,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	3,500,000

Project ID: MTW12RAR					
Project Name: Avatiu harbour waterfront development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,050,000	1,050,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	140,000	140,000
	Contingencies	1	nos	210,000	210,000
				Subtotal:	1,500,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	1,500,000

Project ID: MTW13RAR					
Project Name: Avatiu harbour expansion					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	14,850,000	14,850,000
	Climate change adaptation	1	nos	200,000	200,000
	Design and management	1	nos	1,980,000	1,980,000
	Contingencies	1	nos	2,970,000	2,970,000
				Subtotal:	20,000,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	20,000,000

Project ID: MTW14RAR					
Project Name: Rarotonga north coast protection					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	96,750,000	96,750,000
	Climate change adaptation	1	nos	6,000,000	6,000,000
	Design and management	1	nos	12,900,000	12,900,000
	Contingencies	1	nos	19,350,000	19,350,000
				Subtotal:	135,000,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	135,000,000

Project ID: MTW15AIT					
Project Name: Aitutaki harbour development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	3,525,000	3,525,000
	Climate change adaptation	1	nos	300,000	300,000
	Design and management	1	nos	470,000	470,000
	Contingencies	1	nos	705,000	705,000
				Subtotal:	5,000,000
2	Operation and maintenance				
	Operation and maintenance included in CIPA budget	1	nos	0	0
				Subtotal:	0
				TOTAL:	5,000,000

Project ID: RT01RAR					
Project Name: Rarotonga road safety program					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	637,500	637,500
	Climate change adaptation	1	nos	0	0
	Design and management	1	nos	85,000	85,000
	Contingencies	1	nos	127,500	127,500
				Subtotal:	850,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	75,000	75,000
				Subtotal:	75,000
				TOTAL:	925,000

Project ID: RT02RAR					
Project Name: Rarotonga traffic management improvements					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	210,000	210,000
	Climate change adaptation	1	nos	0	0
	Design and management	1	nos	28,000	28,000
	Contingencies	1	nos	42,000	42,000
				Subtotal:	280,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	50,000	50,000
				Subtotal:	50,000
				TOTAL:	330,000

Project ID: RT03RAR					
Project Name: Rarotonga main ring road rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	22,312,500	22,312,500
	Climate change adaptation	1	nos	250,000	250,000
	Design and management	1	nos	2,975,000	2,975,000
	Contingencies	1	nos	4,462,500	4,462,500
				Subtotal:	30,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	310,000	310,000
				Subtotal:	310,000
				TOTAL:	30,310,000

Project ID: RT04RAR					
Project Name: Rarotonga inner ring road development					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	8,850,000	8,850,000
	Climate change adaptation	1	nos	200,000	200,000
	Design and management	1	nos	1,180,000	1,180,000
	Contingencies	1	nos	1,770,000	1,770,000
				Subtotal:	12,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	35,000	35,000
				Subtotal:	35,000
				TOTAL:	12,035,000

Project ID: RT05AIT					
Project Name: Aitutaki road improvements					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,325,000	2,325,000
	Climate change adaptation	1	nos	200,000	200,000
	Design and management	1	nos	310,000	310,000
	Contingencies	1	nos	465,000	465,000
				Subtotal:	3,300,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	200,000	200,000
				Subtotal:	200,000
				TOTAL:	3,500,000

Project ID: RT06NAT					
Project Name: Outer islands road improvement program					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,687,500	1,687,500
	Climate change adaptation	1	nos	150,000	150,000
	Design and management	1	nos	225,000	225,000
	Contingencies	1	nos	337,500	337,500
				Subtotal:	2,400,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	100,000	100,000
				Subtotal:	100,000
				TOTAL:	2,500,000

Project ID: RT07RAR					
Project Name: Inner ring road improvement Nikao to Takuvaine					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	5,025,000	5,025,000
	Climate change adaptation	1	nos	300,000	300,000
	Design and management	1	nos	670,000	670,000
	Contingencies	1	nos	1,005,000	1,005,000
				Subtotal:	7,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	15,000	15,000
				Subtotal:	15,000
				TOTAL:	7,015,000

Project ID: WSW01RAR					
Project Name: Rarotonga distribution mains network rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	750,000	750,000
	Design and management	1	nos	5,000	5,000
	Contingencies	1	nos	37,500	37,500
				Subtotal:	3,000,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	150,000	150,000
				Subtotal:	150,000
				TOTAL:	3,150,000

Project ID: WSW02RAR					
Project Name: Installation of distribution system water meters on Rarotonga					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Capital items	1	nos	170,000	170,000
	Contingencies	1	nos	30,000	30,000
				Subtotal:	200,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	10,000	10,000
				Subtotal:	10,000
				TOTAL:	210,000

Project ID: WSW03RAR					
Project Name: Construction of Rarotonga water treatment facilities					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	5,175,000	5,175,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	690,000	690,000
	Contingencies	1	nos	1,035,000	1,035,000
				Subtotal:	7,000,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	400,000	400,000
				Subtotal:	400,000
				TOTAL:	7,400,000

Project ID: WSW04RAR					
Project Name: Supply and installation of property connection meters on Rarotonga					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Capital items	1	nos	1,020,000	1,020,000
	Contingencies	1	nos	180,000	180,000
				Subtotal:	1,200,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	1,240,000

Project ID: WSW05RAR					
Project Name: Rarotonga water loss reduction program					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Capital items	1	nos	425,000	425,000
	Contingencies	1	nos	75,000	75,000
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	540,000

Project ID: WSW06SGI					
Project Name: Southern Islands EMC water storages rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	67,500	67,500
	Climate change adaptation	1	nos	10,000	10,000
	Design and management	1	nos	9,000	9,000
	Contingencies	1	nos	13,500	13,500
				Subtotal:	100,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	120,000

Project ID: WSW07AIT					
Project Name: Aitutaki water supply headworks upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	255,000	255,000
	Climate change adaptation	1	nos	10,000	10,000
	Design and management	1	nos	34,000	34,000
	Contingencies	1	nos	51,000	51,000
				Subtotal:	350,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	10,000	10,000
				Subtotal:	10,000
				TOTAL:	360,000

Project ID: WSW08AIT					
Project Name: Construction of Aitutaki water treatment plants					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,102,500	1,102,500
	Climate change adaptation	1	nos	30,000	30,000
	Design and management	1	nos	147,000	147,000
	Contingencies	1	nos	220,500	220,500
				Subtotal:	1,500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	200,000	200,000
				Subtotal:	200,000
				TOTAL:	1,700,000

Project ID: WSW09SGI					
Project Name: Construction of disiffection facilities on the Southern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	142,500	142,500
	Climate change adaptation	1	nos	10,000	10,000
	Design and management	1	nos	19,000	19,000
	Contingencies	1	nos	28,500	28,500
				Subtotal:	200,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	220,000

Project ID: WSW10SGI					
Project Name: Installation of water meters in distribution systems on the Southern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Capital items	1	nos	425,000	425,000
	Contingencies	1	nos	75,000	75,000
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, capital items	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	540,000

Project ID: WSW11NGI					
Project Name: Northern islands EMC water storages rehabilitation or construction					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	67,500	67,500
	Climate change adaptation	1	nos	10,000	10,000
	Design and management	1	nos	9,000	9,000
	Contingencies	1	nos	13,500	13,500
				Subtotal:	100,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	130,000

Project ID: WSW12NGI					
Project Name: Northern islands community rainwater catchments and storage refurbishment					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	135,000	135,000
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	18,000	18,000
	Contingencies	1	nos	27,000	27,000
				Subtotal:	200,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	10,000	10,000
				Subtotal:	10,000
				TOTAL:	210,000

Project ID: WSW13NGI					
Project Name: Supply and installation of household rainwater systems for the Northern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	900,000	900,000
	Climate change adaptation	1	nos	0	0
	Design and management	1	nos	120,000	120,000
	Contingencies	1	nos	178,500	178,500
				Subtotal:	1,198,500
2	Operation and maintenance				
	Onus in on households	1	nos	0	0
				Subtotal:	0
				TOTAL:	1,198,500

Project ID: WSW14MGS					
Project Name: Mangaia water supply system upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,282,500	1,282,500
	Climate change adaptation	1	nos	90,000	90,000
	Design and management	1	nos	171,000	171,000
	Contingencies	1	nos	256,500	256,500
				Subtotal:	1,800,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	1,840,000

Project ID: WSW15AIU					
Project Name: Atiu water supply distribution system upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	360,000	360,000
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	48,000	48,000
	Contingencies	1	nos	72,000	72,000
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	520,000

Project ID: WSW16MUK					
Project Name: Mauke water supply distribution system upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	765,000	765,000
	Climate change adaptation	1	nos	80,000	80,000
	Design and management	1	nos	102,000	102,000
	Contingencies	1	nos	153,000	153,000
				Subtotal:	1,100,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	1,120,000

Project ID: WSW17MOI					
Project Name: Mitiaro water supply system upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	562,500	562,500
	Climate change adaptation	1	nos	50,000	50,000
	Design and management	1	nos	75,000	75,000
	Contingencies	1	nos	112,500	112,500
				Subtotal:	800,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	820,000

Project ID: SNW01RAR					
Project Name: Rarotonga village sewerage schemes - Stage 1					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,137,500	2,137,500
	Climate change adaptation	1	nos	150,000	150,000
	Design and management	1	nos	285,000	285,000
	Contingencies	1	nos	427,500	427,500
				Subtotal:	3,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	160,000	160,000
				Subtotal:	160,000
				TOTAL:	3,160,000

Project ID: SNW02RAR					
Project Name: Rarotonga village sewerage schemes - Stage 2					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	90,000	90,000
				Subtotal:	90,000
				TOTAL:	2,090,000

Project ID: SNW03RAR					
Project Name: Rehabilitation of Tereora/Tepuka neighbourhood sewerage system					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	225,000	225,000
	Design and management	1	nos	30,000	30,000
	Contingencies	1	nos	45,000	45,000
				Subtotal:	300,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	330,000

Project ID: SNW06AIT					
Project Name: Construction of Aitutaki village sewerage networks					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,065,000	1,065,000
	Climate change adaptation	1	nos	80,000	80,000
	Design and management	1	nos	142,000	142,000
	Contingencies	1	nos	213,000	213,000
				Subtotal:	1,500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	80,000	80,000
				Subtotal:	80,000
				TOTAL:	1,580,000

Project ID: SNW08SGI					
Project Name: Review of adequacy and upgrade of sanitation facilities at EMCs for SGI					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	165,000	165,000
	Climate change adaptation	1	nos	30,000	30,000
	Design and management	1	nos	22,000	22,000
	Contingencies	1	nos	33,000	33,000
				Subtotal:	250,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	270,000

Project ID: SNW09SGI					
Project Name: Construction of septage treatment facilities on the southern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	78,750	78,750
	Climate change adaptation	1	nos	15,000	15,000
	Design and management	1	nos	10,500	10,500
	Contingencies	1	nos	15,750	15,750
				Subtotal:	120,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	140,000

Project ID: SNW12NGI					
Project Name: Construction of septage treatment facilities on the northern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	97,500	97,500
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	13,000	13,000
	Contingencies	1	nos	19,500	19,500
				Subtotal:	150,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	180,000

Project ID: SNW01RAR					
Project Name: Rarotonga village sewerage schemes - Stage 1					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	2,137,500	2,137,500
	Climate change adaptation	1	nos	150,000	150,000
	Design and management	1	nos	285,000	285,000
	Contingencies	1	nos	427,500	427,500
				Subtotal:	3,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	160,000	160,000
				Subtotal:	160,000
				TOTAL:	3,160,000

Project ID: SNW02RAR					
Project Name: Rarotonga village sewerage schemes - Stage 2					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,425,000	1,425,000
	Climate change adaptation	1	nos	100,000	100,000
	Design and management	1	nos	190,000	190,000
	Contingencies	1	nos	285,000	285,000
				Subtotal:	2,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	90,000	90,000
				Subtotal:	90,000
				TOTAL:	2,090,000

Project ID: SNW03RAR					
Project Name: Rehabilitation of Tereora/Tepuka neighbourhood sewerage system					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	225,000	225,000
	Design and management	1	nos	30,000	30,000
	Contingencies	1	nos	45,000	45,000
				Subtotal:	300,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	330,000

Project ID: SNW06AIT					
Project Name: Construction of Aitutaki village sewerage networks					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,065,000	1,065,000
	Climate change adaptation	1	nos	80,000	80,000
	Design and management	1	nos	142,000	142,000
	Contingencies	1	nos	213,000	213,000
				Subtotal:	1,500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	80,000	80,000
				Subtotal:	80,000
				TOTAL:	1,580,000

Project ID: SNW08SGI					
Project Name: Review of adequacy and upgrade of sanitation facilities at EMCs for SGI					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	165,000	165,000
	Climate change adaptation	1	nos	30,000	30,000
	Design and management	1	nos	22,000	22,000
	Contingencies	1	nos	33,000	33,000
				Subtotal:	250,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	270,000

Project ID: SNW09SGI					
Project Name: Construction of septage treatment facilities on the southern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	78,750	78,750
	Climate change adaptation	1	nos	15,000	15,000
	Design and management	1	nos	10,500	10,500
	Contingencies	1	nos	15,750	15,750
				Subtotal:	120,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	20,000	20,000
				Subtotal:	20,000
				TOTAL:	140,000

Project ID: SNW12NGI					
Project Name: Construction of septage treatment facilities on the northern islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	97,500	97,500
	Climate change adaptation	1	nos	20,000	20,000
	Design and management	1	nos	13,000	13,000
	Contingencies	1	nos	19,500	19,500
				Subtotal:	150,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	180,000

Project ID: SWW01RAR					
Project Name: Construction of Rarotonga solid waste transfer station					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	337,500	337,500
	Climate change adaptation	1	nos	50,000	50,000
	Design and management	1	nos	45,000	45,000
	Contingencies	1	nos	67,500	67,500
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	30,000	30,000
				Subtotal:	30,000
				TOTAL:	530,000

Project ID: SWW02RAR					
Project Name: Rarotonga hazardous waste handling facilities upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	375,000	375,000
	Design and management	1	nos	50,000	50,000
	Contingencies	1	nos	75,000	75,000
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	50,000	50,000
				Subtotal:	50,000
				TOTAL:	550,000

Project ID: SWW03RAR					
Project Name: Construction of Rarotonga compost facilities					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	375,000	375,000
	Design and management	1	nos	50,000	50,000
	Contingencies	1	nos	75,000	75,000
				Subtotal:	500,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	50,000	50,000
				Subtotal:	50,000
				TOTAL:	550,000

Project ID: SWW05SGI					
Project Name: Construction of new landfill sites on the Southern Group islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	450,000	450,000
	Design and management	1	nos	60,000	60,000
	Contingencies	1	nos	90,000	90,000
				Subtotal:	600,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	40,000	40,000
				Subtotal:	40,000
				TOTAL:	640,000

Project ID: SWW09NGI					
Project Name: Construction of new landfill sites on the Northern Group islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	600,000	600,000
	Design and management	1	nos	80,000	80,000
	Contingencies	1	nos	120,000	120,000
				Subtotal:	800,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	60,000	60,000
				Subtotal:	60,000
				TOTAL:	860,000

Project ID: ENW01RAK					
Project Name: Repair standby genset					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Parts and repair works	1	set	25,000	25,000
				Subtotal:	25,000
				TOTAL:	25,000

Project ID: ENW02PYE					
Project Name: Replace Penrhyn Gensets					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Acquire replacement genset and repair if required	1	nos	30,000	30,000
	Also repair Penrhyn genset if required				
				Subtotal:	30,000
				TOTAL:	30,000

Project ID: ENW03NAT					
Project Name: Outer Islands electrical wiring standardisation program					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Procurement of materials	1	nos	50,000	50,000
				Subtotal:	50,000
				TOTAL:	50,000

Project ID: ENW04PZK					
Project Name: Pukapuka electricity power supply upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	1,875,000	1,875,000
	Design and management	1	nos	250,000	250,000
	Contingencies	1	nos	375,000	375,000
				Subtotal:	2,500,000
2	Operation and maintenance				
	Operation and maintenance costs by households	1	nos	0	0
				Subtotal:	0
				TOTAL:	2,500,000

Project ID: ENW05SGI					
Project Name: Southern islands power supply rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	900,000	900,000
	Design and management	1	nos	120,000	120,000
	Contingencies	1	nos	180,000	180,000
				Subtotal:	1,200,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	165,000	165,000
				Subtotal:	165,000
				TOTAL:	1,365,000

Project ID: ENW06NGI					
Project Name: Northern islands power supply rehabilitation					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	750,000	750,000
	Design and management	1	nos	100,000	100,000
	Contingencies	1	nos	150,000	150,000
				Subtotal:	1,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	180,000	180,000
				Subtotal:	180,000
				TOTAL:	1,180,000

Project ID: ENW07NGI					
Project Name: Electricity power supply system upgrade on Manihiki and Rakahanga					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	600,000	600,000
	Design and management	1	nos	80,000	80,000
	Contingencies	1	nos	120,000	120,000
				Subtotal:	800,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	110,000	110,000
				Subtotal:	110,000
				TOTAL:	910,000

Project ID: ENW08MGS					
Project Name: Electricity power supply system upgrade on Mangaia					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	300,000	300,000
	Design and management	1	nos	40,000	40,000
	Contingencies	1	nos	60,000	60,000
				Subtotal:	400,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	55,000	55,000
				Subtotal:	55,000
				TOTAL:	455,000

Project ID: ENW09AIU					
Project Name: Atiu power distribution upgrade					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	562,500	562,500
	Design and management	1	nos	75,000	75,000
	Contingencies	1	nos	112,500	112,500
				Subtotal:	750,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	150,000	150,000
				Subtotal:	150,000
				TOTAL:	900,000

Project ID: ENW16RAR					
Project Name: Construction of Rarotonga second power station					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Civil works	1	nos	24,937,500	24,937,500
	Climate change adaptation	1	nos	1,750,000	1,750,000
	Design and management	1	nos	3,325,000	3,325,000
	Contingencies	1	nos	4,987,500	4,987,500
				Subtotal:	35,000,000
2	Operation and maintenance				
	Staffing, consumables, fuel, civil works	1	nos	1,600,000	1,600,000
				Subtotal:	1,600,000
				TOTAL:	36,600,000

Project ID: MFW01SGI					
Project Name: Modify and refurbish facilities and supply tools on Mangaia, Mitiaro					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Workshop	192	sqm	400	76,800
	Shelter	192	sqm	250	48,000
	Water catchment/storage	2	set	3,000	6,000
	Tools and equipment	2	set	45,000	90,000
	Design and management	2	set	13,080	26,160
	Contingencies	2	set	19,620	39,240
				Subtotal:	286,200
3	Operation				
	Staffing	2	set	42,000	84,000
	Consumables	2	set	6,240	12,480
				Subtotal:	96,480
4	Maintenance				
	Building	2	set	624	1,248
	Tools and equipment	2	set	3,150	6,300
				Subtotal:	7,548
				TOTAL:	390,228

Project ID: MFW02NGI					
Project Name: Modify and refurbish facilities and supply tools on Pukapuka, Penrhyn					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Workshop	192	sqm	400	76,800
	Shelter	192	sqm	250	48,000
	Water catchment/storage	2	set	3,000	6,000
	Tools and equipment	2	set	45,000	90,000
	Design and management	2	set	13,080	26,160
	Contingencies	2	set	19,620	39,240
				Subtotal:	286,200
3	Operation				
	Staffing	2	set	42,000	84,000
	Consumables	2	set	6,240	12,480
				Subtotal:	96,480
4	Maintenance				
	Building	2	set	624	1,248
	Tools and equipment	2	set	3,150	6,300
				Subtotal:	7,548
				TOTAL:	390,228

Project ID: MFW03SGI					
Project Name: Build new facilities and supply tools on Aitutaki, Atiu, Mauke					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Workshop	318	sqm	650	206,700
	Shelter	318	sqm	250	79,500
	Water catchment/storage	3	set	3,000	9,000
	Tools and equipment	3	set	45,000	135,000
	Design and management (10%)	3	set	29,520	88,560
	Contingencies (15%)	3	set	44,280	132,840
				Subtotal:	651,600
3	Operation				
	Staffing	3	set	42,000	126,000
	Consumables (5%)	3	set	14,310	42,930
				Subtotal:	168,930
4	Maintenance				
	Building (0.5 to 5%)	3	set	1,431	4,293
	Tools and equipment (7%)	3	set	3,150	9,450
				Subtotal:	13,743
				TOTAL:	834,000

Project ID: MFW04NGI					
Project Name: Build new facilities and supply tools on Rakahanga, Palmerston, Nassau					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Workshop	288	sqm	650	187,200
	Shelter	192	sqm	250	48,000
	Water catchment/storage	3	set	3,000	9,000
	Tools and equipment	3	set	45,000	135,000
	Design and management (10%)	3	set	24,420	73,260
	Contingencies (15%)	3	set	36,630	109,890
				Subtotal:	562,350
3	Operation				
	Staffing	3	set	42,000	126,000
	Consumables (5%)	3	set	11,760	35,280
				Subtotal:	161,280
4	Maintenance				
	Building (0.5 to 5%)	3	set	1,176	3,528
	Tools and equipment (7%)	3	set	3,150	9,450
				Subtotal:	12,978
				TOTAL:	737,000

Project ID: MFW05NGI					
Project Name: Construct Northern Group regional facility for repair of machineries					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Workshop	130	sqm	650	84,500
	Shelter	106	sqm	250	26,500
	Water catchment/storage	1	set	3,000	3,000
	Tools and equipment	1	set	60,000	60,000
	Design and management (10%)	1	set	11,400	11,400
	Contingencies (15%)	1	set	17,100	17,100
				Subtotal:	202,500
3	Operation				
	Staffing	1	set	60,000	60,000
	Consumables (5%)	1	set	5,550	5,550
				Subtotal:	65,550
4	Maintenance				
	Building (0.5 to 5%)	1	set	555	555
	Tools and equipment (7%)	1	set	4,200	4,200
				Subtotal:	4,755
				TOTAL:	273,000

Project ID: EMW01RAR					
Project Name: Refurbish 11 EMCs on Rarotonga					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Building	160	sqm	250	40,000
	Water catchment/storage	1	set	3,000	3,000
	Equipment	1	set	30,000	30,000
	Design and management	1	set	4,300	4,300
	Contingencies	1	set	6,450	6,450
				Subtotal:	83,750
				Total for 11 EMCs	920,000
3	Operation and maintenance				
	Operation and maintenance by community	11	set	10,000	110,000
				Subtotal:	110,000
				TOTAL:	1,030,000

Project ID: EMW02SGI					
Project Name: Modify and refurbish 23 EMCs on Southern Group Islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Building	160	sqm	250	40,000
	Water catchment/storage	1	set	3,000	3,000
	Equipment	1	set	30,000	30,000
	Design and management	1	set	4,300	4,300
	Contingencies	1	set	6,450	6,450
				Subtotal:	83,750
	Total capital costs for 23 EMCs				1,926,250
3	Operation and maintenance				
	Operation and maintenance by community	23	set	10,000	230,000
				Subtotal:	230,000
				TOTAL:	2,156,250

Project ID: EMW03MHX					
Project Name: Complete repair works on Manihiki EMCs					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Building			291,000	291,000
	Equipment			30,000	30,000
	Contractor administration			29,100	29,100
	Contingencies			43,650	43,650
				Subtotal:	393,750
3	Operation and maintenance				
	Operation and maintenance by community	2	set	10,000	20,000
				Subtotal:	20,000
				TOTAL:	413,750

Project ID: EMW04NGI					
Project Name: Construct and furnish 5 new EMCs on Northern Group Islands					
Item	Description	Qty	Units	Rate	Amount
1	Capital				
	Building	600	sqm	1,500	900,000
	Equipment	1	set	30,000	30,000
	Design and management	1	set	90,000	90,000
	Contingencies	1	set	135,000	135,000
				Subtotal:	1,155,000
	Total capital for 5 EMCs				5,775,000
3	Operation and maintenance				
	Operation and maintenance by community	5	set	10,000	50,000
				Subtotal:	50,000
				TOTAL:	5,825,000

2. ENGINEERING DATA

2.1 DEMOGRAPHICS

Island	2006			2011			2016			2021			2026		
	Residential	Visitor	Total	Residential	Visitor	Total	Residential	Visitor	Total	Residential	Visitor	Total	Residential	Visitor	Total
Rarotonga	9,460	8,790	18,250	9,460	12,790	22,250	9,460	14,360	23,820	9,460	15,230	24,690	9,460	15,920	25,380
Southern Group	3,790	1,220	5,010	3,790	1,770	5,560	3,790	1,970	5,760	3,790	2,090	5,880	3,790	2,190	5,980
Aitutaki	1,750	1,010	2,760	1,750	1,470	3,220	1,750	1,650	3,400	1,750	1,750	3,500	1,750	1,830	3,580
Mangaia	740		740	740		740	740		740	740		740	740		740
Atiu	600	110	710	600	150	750	600	160	760	600	170	770	600	180	780
Mauke	470	100	570	470	150	620	470	160	630	470	170	640	470	180	650
Mitiaro	230		230	230		230	230		230	230		230	230		230
Manuae															
Takutea															
Northern Group	1,830	100	1,930	1,830	140	1,970	1,830	170	2,000	1,830	180	2,010	1,830	190	2,020
Palmerston	50		50	50		50	50		50	50		50	50		50
Pukapuka	670		670	670		670	670		670	670		670	670		670
Nassau	80		80	80		80	80		80	80		80	80		80
Manihiki	500	100	600	500	140	640	500	170	670	500	180	680	500	190	690
Rakahanga	160		160	160		160	160		160	160		160	160		160
Penrhyn	360		360	360		360	360		360	360		360	360		360
Suvarrow	10		10	10		10	10		10	10		10	10		10
Total Cook Islands	15,080	10,110	25,190	15,080	14,700	29,780	15,080	16,500	31,580	15,080	17,500	32,580	15,080	18,300	33,380

Table: Visitor Growth Rate Forecasts

Year	Average for Year	Growth since 1996 2000		Annual Increase
1991	0			
1996	851			
2000	1,125	7.2%		
2001	1,900	17.4%	69%	69%
2002	3,150	24.4%	67%	66%
2003	4,450	26.7%	58%	41%
2004	6,050	27.8%	52%	36%
2005	8,175	28.6%	49%	35%
2006	10,100	28.1%	44%	24%
2007	11,400	26.6%	39%	13%
2008	12,300	24.9%	35%	8%
2009	13,200	23.5%	31%	7%
2010	14,000	22.1%	29%	6%
2011	14,700	20.9%	26%	5%
2012	15,300	19.8%	24%	4%
2013	15,800	18.7%	23%	3%
2014	16,100	17.7%	21%	2%
2015	16,300	16.8%	20%	1%
2016	16,500	16.0%	18%	1%
2017	16,700	15.2%	17%	1%
2018	16,900	14.6%	16%	1%
2019	17,100	13.9%	15%	1%
2020	17,300	13.4%	15%	1%
2021	17,500	12.9%	14%	1%
2022	17,700	12.4%	13%	1%
2023	17,900	11.9%	13%	1%
2024	18,100	11.5%	12%	1%
2025	18,300	11.2%	12%	1%
2026	18,300	10.8%	11%	1%

Table: Population by Census Years 1976 - 2001

Islands	Area km ²	Population by Census Years					
		1976	1981	1986	1991	1996	2001
							12,188
Rarotonga	67.1	9,802	9,530	9,826	10,886	11,225	
Aitutaki	18.3	2,423	2,335	2,390	2,357	2,389	1,946
Mangaia	51.8	1,530	1,364	1,229	1,214	1,108	744
Atiu	26.9	1,312	1,225	957	1,006	956	623
Mauke	18.4	710	681	692	639	652	470
Mitiaro	22.3	305	256	273	247	319	230
Manuae	6.2	-	-	-	-	-	0
Manihiki	5.4	266	405	508	663	668	515
Penrhyn	9.8	531	608	497	503	606	357
Rakahanga	4.1	283	269	282	262	249	169
Pukapuka	1.3	785	797	761	670	779	664
Nassau	1.3	123	137	119	102	99	72
Palmerston	2.1	56	51	66	49	49	48
Suvarrow	0.4	-	6	4	10	4	1
Total	236.7	18,126	17,664	17,604	18,608	19,103	18,027

Source: Cook Islands Statistics Office

Table: Number and Size of Households

Island	Households			Households Size		
	1991	1996	2001	1991	1996	2001
Rarotonga	2,222	2,569	2,531	4.9	4.0	3.7
Southern Group	1,035	1,127	965	5.3	24	3.9
Aitutaki	440	496	435	5.4	4.6	4.0
Mangaia	228	237	197	5.3	4.6	3.8
Atiu	192	197	161	5.2	4.8	3.7
Mauke	120	133	110	5.3	4.8	4.3
Mitiaro	55	64	62	4.5	5.0	3.6
Manuae						
Takutea						
Northern Group	420	457	384	5.4	5.3	4.7
Palmerston	10	11	12	4.9	4.5	4.0
Pukapuka	112	120	124	6.0	6.5	5.3
Nassau	18	21	15	5.7	4.7	4.8
Manihiki	134	149	117	4.9	4.4	4.2
Rakahanga	44	42	32	6.0	5.9	4.9
Penrhyn	101	113	83	5.0	5.3	4.2
Suvarrow	1	1	1	10.0	4.0	1.0
Total Cook Islands	3,677	4,153	3,880	5.1	4.4	3.9

Table: Seasonal Variation in Population

Quarter	Population		
	Total	Resident	Visitor
2000			
Mar	15,100	14,000	1,100
Jun	14,600	14,000	600
Sep	15,400	14,000	1,400
Dec	14,800	13,400	1,400
2001			
Mar	15,000	13,500	1,500
Jun	14,600	13,300	1,300
Sep	15,400	13,400	2,000
Dec	17,800	15,000	2,800
2002			
Mar	17,700	15,000	2,700
Jun	17,200	14,600	2,600
Sep	18,300	14,600	3,700
Dec	17,700	14,100	3,600
2003			
Mar	17,700	13,800	3,900
Jun	17,200	13,300	3,900
Sep	18,500	13,600	4,900
Dec	18,600	13,500	5,100
2004			
Mar	18,600	13,500	5,100
Jun	18,600	13,100	5,500
Sep	20,100	13,100	7,000
Dec	19,500	12,900	6,600
2005			
Mar	19,200	12,500	6,700
Jun	18,900	12,100	6,800
Sep	20,500	12,100	8,400
Dec	18,300	12,000	6,300

2.2 PLANNING CRITERIA

WATER

Assumptions:

1. Per capita daily consumption 250 L/c.d on Rarotonga and 150 L/c.d on outer islands.
2. Including water loss allowance of 70% for existing piped systems, 20% in year 2016 on outer islands, 15% on Rarotonga
3. No reticulated system in the Northern Group Islands at present
4. Resident population estimated for 2016 is static at 1996 census figures
5. Production capacity data from Water Investigation Reports by Tony Falkland

Table: Water Demand Projections

Island	Population		Wastewater Generation (m ³ /d)		Production Needs (L/s)		Existing Production Capacity (L/s)
	2006	2016	2006	2016	2006	2016	
Rarotonga	18,250	23,820	4,563	5,955	132	81	150
Southern Group Islands							
Aitutaki	2,760	3,400	414	510	16.0	7.4	10.4
Mangaia	740	740	111	111	4.3	1.6	3.3
Atiu	710	760	107	114	4.1	1.6	1.7
Mauke	570	630	86	95	3.3	1.4	1.7
Mitiaro	230	230	35	35	1.3	0.5	1.2
Manuae							
Sub-total SGI	5,010	5,760	752	864	29.0	12.5	18.3
Northern Group Islands							
Palmerston	50	50	8	8	N/A*	0.1	
Pukapuka	670	670	101	101		1.5	
Nassau	80	80	12	12		0.2	
Manihiki	500	670	75	101		1.5	
Rakahanga	160	160	24	24		0.3	
Penrhyn	360	360	54	54		0.8	
Suvarrow	10	10	2	2		0.0	
Sub-total NGI	1,830	2,000	275	300		4.3	
Total	25,090	31,580	5,589	7,119	161.0	97.9	168.3

* Note no reticulated systems on the Northern Islands at present

WaterDemand	
Adapted per capita demand	
Rarotonga	250L / c.d
Outer Islands	150L / c.d
Minimum needed for portable use	10L / c.d
Water Losses - Reticulated Distribution System	
Most existing systems	70%
New Systems	
Rarotonga	15%
Outer Islands	20%

Source: Outer Islands Water Investigation Reports 1999-2004, By T Falkland

SANITATION

Island	Household Amenities							Lagoon
	Hot water system	Water Filter	Kitchen Sink	Bath/ Shower	Flush Toilet	Pour Flush	Pit Latrines	
Rarotonga	1,303	817	2,417	2,469	2,450	86	14	
Aitutaki	40	13	298	379	278	55	176	-
Mangaia	5	5	87	114	77	70	89	-
Atiu	10	6	72	118	58	52	100	-
Mauke	2	1	51	99	58	5	87	-
Mitiaro	1	2	20	21	23	36	7	-
Palmerston	1	-	10	11	11	5	5	-
Pukapuka	-	-	26	54	10	114	4	-
Nassau	-	-	14	8	1	9	6	-
Manihiki	3	7	78	93	80	25	2	12
Rakahanga	-	1	8	7	12	20	-	-
Penrhyn	1	1	56	56	44	29	-	14
Suwarrow	-	-	-	-	-	-	-	1
Total	1,366	853	3,137	3,429	3,102	506	490	27

Source: Cook Islands 2001 Census of Population & Dwelling, Main Report, Statistics Office

Sanitation	
Assumptions	
Waste Water / Water Supply Ratio	85%
Daily per capita BOD Generation	60g/c.d
Note: Assumptions based on standard 67g/c.d in New Zealand factored for local lifestyle	

SOLID WASTE

Table: Total Waste Composition, Rarotonga, 1999

Waste Component	Residential		Commercial		Total Combined Waste Composition
	% of Total Residential Waste	% of Total Waste - Residential plus all Commercial	% of Total Commercial Waste	% of Total Waste - Residential plus all Commercial	Combined Residential and Commercial Waste Composition (%)
Organic material	40.6	25.2	21.3	8.1	33.3
Plastic	8.1	5	13.6	5.2	10.2
Wood	Trace	Trace	Trace	Trace	Trace
Paper/cardboard	20.3	12.6	16	6.1	18.7
Textile/rubber	0.7	0.4	Trace	Trace	0.4
Glass/ceramics	17.7	11	21.9	8.3	19.3
Ferrous Metals	9.9	6.1	24.3	9.2	15.3
Non-ferrous metals	2.7	1.7	2.9	1.1	2.8
Total	100	62	100	38	100

Source: TA3085-COO Cook Islands Urban Infrastructure Project Preparatory Technical Assistance, 1999

Table: Waste Generation Rates for Rarotonga & Aitutaki, 1999

Island	Residential waste		Tourist hotel waste		Commercial waste		Annual Waste Generation - 1999 (tonnes)
	Daily per-capita Rate (kg)	Annual Waste (tonnes)	Nightly per-Tourist Rate (kg)	Annual Waste (tonnes)	Daily per-Establishment Rate (kg)	Annual Waste (tonnes)	
Rarotonga	0.25	910	0.4	144	2.07	409	1,463
Aitutaki	0.20	158	0.4	14	1.35	22	194

Source: TA3085-COO Cook Islands Urban Infrastructure Project Preparatory Technical Assistance, 1999

Assumptions:

Waste Stream	Rarotonga	Aitutaki	Other Islands
Compostable		33%	29% 20%
Hazardous Waste		18%	24% 20%
Landfill		49%	47% 60%

Assumptions:

1	Outer Islands Daily Per Capita Waste Generation Rate	0.15
2	Outer Islands Commercial Waste:Domestic Waste Ratio	5%
3	Annual Growth in Waste Generation (res & comm)	1%

Table: Projected Waste Generation								
Island	Population Projections		Annual Waste Generation (tonnes)		Annual Volume (m ³)		Cumulative Volume to (m ³)	
	2006	2016	2006	2016	2006	2016	2006	2016
Rarotonga	19,430	34,390	1,117	1,977	29.9	52.9		
Aitutaki	3,320	5,040	191	290	5.1	7.8		
Mangaia	1,090	1,090	63	63	1.7	1.7		
Atiu	1,060	1,230	61	71	1.6	1.9		
Mauke	750	920	43	53	1.2	1.4		
Mitiaro	320	320	18	18	0.5	0.5		
Manuae	0	0	0	0	0.0	0.0		
Manihiki	50	50	3	3	0.1	0.1		
Penrhyn	780	780	45	45	1.2	1.2		
Rakahanga	100	100	6	6	0.2	0.2		
Pukapuka	760	940	44	54	1.2	1.4		
Nassau	250	250	14	14	0.4	0.4		
Palmerston	610	610	35	35	0.9	0.9		
Suvarrow	10	10	1	1	0.0	0.0		
Total	28,530	45,730	1,640	2,629	44	70	-	-

ENERGY

Typical Power Usage				
Islands	Energy Generated (kWh)	Hours of operation	kWh per hour	Usage per capita
Rarotonga	22,292,000	24	1,465,775	86,590
Aitutaki	2,410,000	24	158,466	58,631
Mangaia	361,000	24	23,737	22,971
Atiu	353,000	24	23,211	26,825
Mauke	196,000	24	12,888	19,743
Mitiaro	82,000	19	4,268	10,578
Manuae	-	-	-	-
Manihiki	26,000	18	1,282	1,344
Penrhyn	78,000	18	3,847	5,818
Rakahanga	36,000	24	2,367	10,085
Pukapuka	-	-	-	-
Nassau	-	-	-	-
Palmerston	3,000	12	99	740
Suvarrow	-	-	-	-

Source: Cook Islands Statistics Office, 2001
Source: Outer Islands Power Feasibility Reports 2004, By B Clay

Energy Rates for all Islands			
Islands	Tariffs (\$ per kwh)		
	Domestic	Commercial	Full Cost Recovery
Rarotonga	0.44	0.55	
Aitutaki	0.45	0.60	
Mangaia	0.4	0.60	
Atiu	0.4	0.62	1.11
Mauke	0.36	0.58	1.19
Mitiaro	0.4	0.60	1.72
Manuae	-	-	-
Manihiki	0.36	0.58	
Penrhyn	0.36	0.58	
Rakahanga	0.36	0.58	
Pukapuka	0.36	0.58	
Nassau	0.36	0.58	
Palmerston	0.36	0.58	
Suvarrow	-	-	-

Source: Office of Island Administrations, 2006
Source: Outer Islands Power Feasibility Reports 2004

3.3 Climate Change Adaptation

Climate Change Adaptation

Accepted Level of Risk: Suggested (assumed) acceptable level of risk of major damage to various structures		
Infrastructure	Annual Recurents Interval (yrs)	Annual Exceedance Probability (%)
Hospitals	50	2%
Emergency Centres	50	2%
Roads - Strategic	20	5%
Roads - General	2	50%
Airports	10	10%
Harbours	20	5%
Water Supply	10	10%
Power Generators	10	10%
Telecom Stations	10	10%
Public Buildings	20	5%
Landfill	10	10%

RAINFALL STATISTICS

Island	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rarotonga													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Aitutaki													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mangaia													
Rainfall (1)	238.3	217.5	195.3	231.8	156.6	100.2	121	104.2	99.2	113.1	138	187.2	1,904
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	-238.3	-217.5	-195.3	-231.8	-156.6	-100.2	-121	-104.2	-99.2	-113.1	-138	-187.2	-1904
Atiu													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Mauke													
Rainfall (1)	210	225	196	151	152	82	83	101	92	111	159	209	1,873
Evaporation (2)	160	135	135	115	95	86	90	108	126	146	150	158	1504
Net Evaporation (3) = (2) - (1)	-50	-90	-61	-36	-57	4	7	7	34	35	-9	-51	-369
Mitiaro													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Palmerston													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Pukapuka													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Nassau													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Rakahanga													
Rainfall (1)													0
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	0	0	0	0	0	0	0	0	0	0	0	0	0
Penrhyn													
Rainfall (1)	234	257	250	169	155	154	147	161	129	156	190	234	2257
Evaporation (2)													0
Net Evaporation (3) = (2) - (1)	-234	-257	-250	-169	-155	-154	-147	-161	-129	-156	-190	-234	-2257

3. ISLAND INVENTORY

3.1 ISLAND PROFILES

ISLAND FACTS SHEET – AITUTAKI

Physical features	<p>Area: 18.3 km²</p> <p>Elevation: <121 m above MSL</p> <p>Island type: Low volcanic atoll situated on a "near" atoll</p> <p>Proximity: 277km from Rarotonga 210 km from nearest island (Atiu)</p> <p>Settlements: 8 villages divided into 4 districts Tautu, Vaipae-Avanui, Amuri-Ureia, Arutanga,</p>
Demographics	<ul style="list-style-type: none"> • Population 1743 (2001); declining • 452 households (approx 4 people/household) • Dependency ratio 94% • > 2002; 5 schools; 44% secondary; 49% primary; 7% pre-school ⇒ large unskilled labour force; however tertiary and vocational training available.
Environment	<ul style="list-style-type: none"> • flat topped terraces; fertile planting areas; extensive areas of coral • lagoon 66 sq km; average depth of 5m; no deep water passage into lagoon. • Raii (traditional conservation method) system in place at given times to re-establish native clam population as well as reef fish • Islets are also breeding grounds for lorikeet
Health	<ul style="list-style-type: none"> • 50 bed hospital; 2 full time doctors; senior reg. nurses; public health inspector; public health nurse; nurse aides; dentist; dental technician; pharmacist; hospital currently being renovated. • 5 child welfare clinics around the island; serves as a focal point for mother & child health & immunization. • Influenza & acute respiratory infections are problems; diarrhoea, conjunctivitis; fish poisoning and asthma cases are also a concern. Also an increase in NCD's.
Local economy	<ul style="list-style-type: none"> • Public Service (22%) Private (54%) Ad hoc (7%) Overseas Orgn (15%) Religious Orgn (2%) Self employed (1%) • Tourism driven. • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • 2 air strips of 1.8km and 1.4km long; • 3 flights/day, 6 days a week, & 1 flight on Sunday night
Sea transport	<ul style="list-style-type: none"> • 4 weekly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • 16km sealed road • Unsealed road length – 45km
Water supply	<ul style="list-style-type: none"> • Source: 433 households connected to public water main; brackish water; 43 communal tanks. • 470km of public water mains; water pumped from intake galleries and reservoirs • although there has been upgrades, all major new commercial users are required to install rain water collection tanks, or desalination systems and HH encouraged to private water tanks.
Sanitation	<ul style="list-style-type: none"> • All households have septic tanks to avoid negative effects on galleries • All 278 HH have flush toilets; 55 HH have pour flush; 176 HH have pit latrines

Solid waste	<ul style="list-style-type: none"> • No rubbish disposal program on island, making mosquito and fly control difficult. • A landfill/septage pond has been constructed with the recycling centre operational.
Electricity supply	<ul style="list-style-type: none"> • Source: 3 Generators 24 hrs/day; capacity 3000 kW • Total consumption/generation 2231 MWh in 2000 • Tariffs – \$0.42/kwH domestic \$0.60/kwH commercial; major user Pacific Resort have a concession rate of \$0.44/ kwH for the 1st 50,000 kwH and \$0.40 there after • Growth in use due to growth in tourism and increased use of electrical appliances
Telecommunications	<ul style="list-style-type: none"> • Standard telephone, fax & email/internet facilities available on Aitutaki • Cellular services are also available • No newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • There is a television service

KEY ISSUES – AITUTAKI

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need for disaster management plan • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Tourism is the main economic base for future developments in Aitutaki. It must be managed to ensure that it stays economically viable, socially acceptable, & environmentally sustainable • Private sector - Agriculture & fishing (2); mining, quarry & manufacturing (5) building & construction (2), trade, restaurants, accommodation (30); transport & communication (5); finance & business services (2); community & personal services (3) • All 3 major banks are available in Aitutaki • Local market on every day except Sunday offering local produce, clothing and handicraft. •

INFRASTRUCTURE REQUIREMENTS – AITUTAKI

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Adopt safe and environmentally liquid waste disposal systems • Upgrade power generation capacity to provide for future demand. • Upgrade transformers to a 500KVA; install/upgrade new transformers at commercial and domestic developments • Upgrade of airport to service international flights • Development of a recognised yacht marina • Ongoing maintenance of roads/tar sealing • Metal crusher plant to be established for the island • Improve and develop roads to farmlands; ensure water run off and drainage facilities are adequate • all major new commercial users are required to install rain water collection tanks, or desalination systems and HH encouraged to private water tanks.
----------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<ul style="list-style-type: none"> • Proposed new public toilets • Proposed new public administration centre • Proposed new fisherman's mooring facilities • Alternative sources of water/power for efficiency and effectiveness purposes
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Maintenance and monitoring of 30km water reticulation system • Six main water pumps are monitored and maintained • Maintenance and monitoring of six main storage water tanks on island • Maintenance and monitoring of the seven boreholes (water galleries) • Construction of 82,000 Water Tank in Takapora est \$20,000. • Liaison with the land owners and carry out feasibility study to construct a water gallery and drainage system in Vaimaru est at \$20,000 • 15 drainage systems constructed by June 2007 est \$20,000 • Excavation of lagoon mud to pave 15km of inland and coastal unsealed roads est \$20,000. • Road marking of 26km of roads with cat's eyes for sealed roads est \$20,000 • Development of Aitutaki Manea Games facilities for 2008 est at \$1m • 3 new public utilities for Orongo, Ootu & Te Koutu est 20,000 • Water catchments Building – Piraki est \$20,000.
Additional works since SP 2000-2005	

ISLAND FACTS SHEET – MANGAIA

Physical features	<p>Area: 26.9 km²</p> <p>Elevation: <169 m above MSL</p> <p>Island type: volcanic island surrounded by sharp coral line makatea cliffs.</p> <p>Proximity: 215km from Rarotonga 50 km from nearest island (Mitiaro)</p> <p>Settlements: 3 villages; Oneroa, Tamarua, Ivirua</p>
Demographics	<ul style="list-style-type: none"> • Population 739 (2001); declining • 237 households (approx 4 people/household) • Dependency ratio 101% • > 3 schools; 2001; 43% secondary; 43% primary; remainder pre-school⇒ large unskilled labour force; tertiary and vocational training available.
Environment	<ul style="list-style-type: none"> • red volcanic inland soils; heavily wooded with rolling hills • swamps used for taro production • Subsistence farming and fishing widely practiced
Health	<ul style="list-style-type: none"> • Main hospital with doctor, reg. nurses; dental services available. • Influenza & acute respiratory infections are problems; diarrhoea, conjunctivitis; fish poisoning and asthma cases are also a concern. Also an increase in NCD's.
Local economy	<ul style="list-style-type: none"> • Public Service (58%) Private (11%) Ad hoc (6%) Overseas Orgn (22%) Religious Orgn (3%) Self employed (0%) • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • airport constructed of makatea soil; 1.06km long • 1 flight/day, 6 days a week,
Sea transport	<ul style="list-style-type: none"> • 4 weekly service • 120 m channel • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • 2-3km sealed road • Unsealed road length – 55km
Water supply	<ul style="list-style-type: none"> • Source: 234 HH connected to public water main; 27 HH have private water tanks; 61 public water tanks; • HH water piped outside to dwelling; HH water pied inside; HH cart water. •
Sanitation	<ul style="list-style-type: none"> • All households have septic tanks to avoid negative effects on galleries • 77 HH , 48 community & public toilets, 10 Govt buildings & 10 commercial establishments have flush toilets; 70 HH have pour flush; 89 HH have pit latrines; 114 HH have bath/shower
Solid waste	<ul style="list-style-type: none"> • rubbish collection program on island; disposal in managed dumps • Waste management project to construct a land fill. A recycling centre is also operational
Electricity supply	<ul style="list-style-type: none"> • Source: 4 Deutz & 1 Lister generators 24 hrs/day; capacity kW; • Total consumption/generation 363 MWh in 2000 • Tariffs – \$. /kWh domestic \$. /kWh commercial; • Growth in use due to growth in tourism and increased use of electrical appliances
Telecommunications	<ul style="list-style-type: none"> • Standard telephone, fax & email/internet facilities available on Aitutaki • No formal newspaper; public notice boards used.

	<ul style="list-style-type: none"> • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • Email and internet facilities available through dial up modem. • Television station operates for \$5/mth
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

KEY ISSUES – MANGAIA

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need updated building code (include water tank, septic tank) • Machinery on island is unable to support major developments. • Crusher too small to cater for major roadwork • Lack of water storage facilities • Waste disposal is a problem
Environment preservation	<ul style="list-style-type: none"> • Need to create greater environment awareness in the community • Need to promote sustainable development practices • Lack of the development of a proper program to stop degradation has resulted in careless dumping of waste.
Economic development	<ul style="list-style-type: none"> • Agriculture is backbone of the island. Wandering animals are an issue. • 25 private businesses on Mangaia. (11) retail stores; (4) tourist accommodation; (2) bars/taverns; (2) restaurants; (1) handicraft outlet; (1) transport service; (2) banking service; (2) communication services; (1) mechanical service

INFRASTRUCTURE REQUIREMENTS – MANGAIA

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Redesign, deepen, widen and repair harbour and cargo shed. • Tar seal roads and on going maintenance • Investigate alternative sources of water & energy • Upgrade and improve airport run way and facilities • Improve energy sources (wind power) • Replace barge & other essential machineries • Maintenance of buildings and machineries on island • Upgrade water supply • Concrete water intakes; alternative sources • Airport realignment and extension • Slipway reconstruction • Treatment plant for forestry • New 100Kw turbo diesel engine • 50Kw engine to offset with wind power • 100KVA transformer and switch gear • High voltage cables; 3 phase 70m cables for low voltage • Replace old machineries and equipments
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Procure equipment for thinning and pruning of timber production sites with 14 hectares complete by June 2007 • Clearance of roads and firebreaks. • Ongoing maintenance of 4 water catchments • Reconstruction of pump station at Keia • Maintenance of coastal and inland roads including drainage system • Maintenance and tar sealing of 12km of sealed roads • Complete harbour reconstruction feasibility study by Dec. 2006

	<ul style="list-style-type: none"> • Procure crusher and implements for quarry operations - CIGOV • Construct a tar seal road from the airport to Oneroa and to the hospital, Mangaia school and power station (8km) • Procure the controlling unit for pilot wind power project – SOPAC/CIGOV • Purchase 2 x Electric pumps est \$40,000 • Replace old damaged power cables 1000metres est \$30,000 • Purchase tar sealing machine est \$15,000 • Purchase new HIAB Truck est \$150,000 • Purchase of tools and equipment for infrastructure unit est \$70,000 • Purchase parts for machineries est \$25,000 • Purchase Kubota slasher for road clearing est \$35,000 • Replace circuit breakers for power supply est \$4,000 •
<p>Additional works since SP 2000-2005</p>	

ISLAND FACTS SHEET – ATIU

Physical features	<p>Area: 26.9 km²</p> <p>Elevation: <72 m above MSL</p> <p>Island type: Raised volcanic island surrounded by steep makatea</p> <p>Proximity: 215km from Rarotonga 50 km from nearest island (Mitiaro)</p> <p>Settlements: 5 villages; Teenui, Ngatiarua; Areora; Tengtangi; Mapumai; Takutea is considered part of Atiu lying 21km off the coast; 122ha island.</p>
Demographics	<ul style="list-style-type: none"> • Population 623 (2001); declining • 161 households (approx 4 people/household) • Dependency ratio 106% • > 1 schools; 2001; 28% secondary; 61% primary; 10% pre-school ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • red volcanic inland soils; heavily wooded with rolling hills • settlements located on plateau surrounded by swamps & small lake • narrow fringing reef drops steeply to ocean floor 4,500 m below. • Subsistence farming and fishing widely practiced
Health	<ul style="list-style-type: none"> • Main hospital with doctor, reg. nurses; dental services available. • Influenza & acute respiratory infections are problems; diarrhoea, conjunctivitis; fish poisoning and asthma cases are also a concern. Also an increase in NCD's.
Local economy	<ul style="list-style-type: none"> • Public Service (55%) Private (27%) Ad hoc (2%) Overseas Orgn (15%) Religious Orgn (2%) Self employed (0%) • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • airport constructed of makatea soil; 1.7km long • Airport strip upgraded 2001/2002 and suitable for small crafts & Saab aeroplane • 1 flight/day, 6 days a week,
Sea transport	<ul style="list-style-type: none"> • 4 weekly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • 8.9km sealed road • Unsealed road length – n/a
Water supply	<ul style="list-style-type: none"> • Source: 171km of public water main; 20 public or communal water tanks; 111 private water tanks • Water main fed through 4 elevated tanks filled by pumping from water boreholes. • HH water piped outside to dwelling; HH water pied inside; HH cart water. •
Sanitation	<ul style="list-style-type: none"> • All households have septic tanks to avoid negative effects on galleries • 58 HH have flush toilets; 52 HH have pour flush; 100 HH have pit latrines; 118 HH have bath/shower
Solid waste	<ul style="list-style-type: none"> • rubbish collection program on island; disposal is via dumps • Waste management project to construct a land fill. A recycling centre is also operational
Electricity supply	<ul style="list-style-type: none"> • Source: 2 Lister generators 24 hrs/day; capacity 84 kW; 1 Hino generator 96kW • Total consumption/generation 359 MWh in 2000 • Tariffs – \$. /kWh domestic \$. /kWh commercial; • Growth in use due to growth in tourism and increased use of electrical

	appliances
Telecommunications	<ul style="list-style-type: none"> • Standard telephone, fax & email/internet facilities available on Aitutaki • No formal newspaper; public notice boards used. • Radio Atiu is run by the school for 3hrs on Sunday • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • Council contracts the programming and running of Atiu TV operating 4 nights/wk for 4.5 hrs/night. \$5/mth to access TV.

KEY ISSUES – ATIU

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need updated building code (include water tank, septic tank) • 8.9km main road serving the airport and villages require maintenance • no proper village and agriculture feeder roads to main road. Roads earmarked by ADB phase 2 program in 1989 but never completed. • Machinery on island is unable to support major developments. • Crusher too small to cater for major roadwork • Wharf fills with sand bars; requires maintenance. • Wharf shed requires maintenance. • Shortage of water because of lack of maintenance. • Lack of water storage facilities • Waste disposal is a problem • Lack of market outlet, processing & storage facilities
Environment preservation	<ul style="list-style-type: none"> • Need to create greater environment awareness in the community • Need to promote sustainable development practices • Lack of a proper program to stop degradation has resulted in careless dumping of waste.
Economic development	<ul style="list-style-type: none"> • Agriculture is backbone of the island. Wandering animals are an issue. • Tourism is the main economic base for future developments in Atiu must be managed to ensure that it stays economically viable, socially acceptable, & environmentally sustainable • 17 private businesses on Atiu. (1) commercial farmer/fishing operation; (6) mining, quarrying, manufacturing sector; (10) in trade, restaurants, accommodation. • 2 banking services offered. •

INFRASTRUCTURE REQUIREMENTS – ATIU

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Upgrade wharf facilities for storage and shipping • Harbour launching areas needs dredging and upgrading. • Improve water wells in the valley to increase water supply for irrigation • Upgrade airport runway and facilities • Upgrade static crane • Replace untreated wooden power poles • Complete reticulation of power supply including installation of substation
----------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<ul style="list-style-type: none"> • Improve adequate street lighting • Established dump site • Develop a Marine VHF telecommunications safety centre • Establish a new nursery to support seedlings and propagation of economic plants • Relocate one windmill to pump water for residents • Identify water wells in valleys and develop to support existing water supply. • Need for 5 ton tip truck for essential services on island. • Maintenance of buildings and machineries on island • Alternative water & energy sources
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Continue to develop Atiu Stadium for possible use in 2009 Mini Games • Maintenance and upgrade of roads and drainage system • Maintenance of water wells, community water tanks and water pumps • Reactivate water reticulation system • The need to redesign and rebuild power house • Install new fuel holding tanks • Purchase one 5-8 ton crane truck • Purchase one D4 Bulldozer • Purchase one land cruiser for fire fighting on Atiu • Purchase six manual water sprayers • Purchase one tip truck • Purchase one tractor town roller with 7-9 tonnes capacity • Purchase one forklift • Purchase two outboards engines for barge operations • Purchase two heavy duty chainsaws & two light duty chainsaws •
Additional works since SP 2000-2005	

ISLAND FACTS SHEET – MAUKE

Physical features	<p>Area: 18.4km²</p> <p>Elevation: <29 m above MSL</p> <p>Island type: volcanic reef island surrounded by makatea to 20m.</p> <p>Proximity: 278km from Rarotonga 59 km from nearest island</p> <p>Settlements: 3 villages; Kimiangatau, Ngatiarua, Areora/Makatea</p>
Demographics	<ul style="list-style-type: none"> • Population 469 (2001); declining • 110 households (approx 4 people/household) • Dependency ratio 96% • > 2 schools; 2002; 7% pre school; 17% primary; 76% secondary⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • 6.4km long, 4.0km wide; central plateau is low lying and flat with numerous swamps, making access to sea difficult • environment of caves, swamplands and makatea wildlife • Subsistence farming and fishing widely practiced
Health	<ul style="list-style-type: none"> • New hospital relocated and completed in 2004; resident doctor, reg. nurses; no dental services available. Use of mobile dentist unit. • Influenza & acute respiratory infections are problems; diarrhoea, conjunctivitis; fish poisoning and asthma cases are also a concern. Also an increase in NCD's.
Local economy	<ul style="list-style-type: none"> • Public Service (70%) Private (11%) Ad hoc (4%) Overseas Orgn (10%) Religious Orgn (7%) Self employed (0%) • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • airport constructed of makatea soil; upgraded in 2001/2002; now suitable for smaller aircrafts and the Saab. 1.06km long • 3 flight/week
Sea transport	<ul style="list-style-type: none"> • 4 weekly service • 120 m channel • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • no sealed road • Unsealed road length – 40km
Water supply	<ul style="list-style-type: none"> • Source: 109 HH connected to public water main; 1HH accessed a public water catchment; 31HH have private rainwater tanks; public water tanks; • 49HH water piped outside to dwelling; 61HH water pied inside; HH cart water. • Pumped from underground bores by one old windmill pump and a diesel pump. • The diesel engine pump supplies 4 10,000L holding tanks which gravity feeds the reticulation system; windmill pump requires repairs. • 2 communal water tanks that require repairs. Large water reservoir dam constructed in the 1980's to maintain water table.
Sanitation	<ul style="list-style-type: none"> • All households have septic tanks to avoid negative effects on galleries • 58HH have flush toilets; 5 HH have pour flush; 100HH have pit latrines; implying some dwellings had more than one type of facility.
Solid waste	<ul style="list-style-type: none"> • rubbish collection program on island is fortnightly; disposal in managed dumps
Electricity supply	<ul style="list-style-type: none"> • Source: 3 Lister generators 19 hrs/day; capacity 3000kW; • Total consumption/generation 189 MWh in 2000 • Tariffs – \$0.36 /kWh domestic \$058. /kWh commercial;

	<ul style="list-style-type: none"> • Growth due to the increased use of electrical appliances
Telecommunications	<ul style="list-style-type: none"> • Standard telephone, fax & email/internet facilities available on Mauke • No formal newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • Email and internet facilities available through dial up modem. • Television services available.

KEY ISSUES – MAUKE

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need updated building code (include water tank, septic tank) • Machinery on island is unable to support major developments. • Lack of water storage facilities; water supply is high priority • Waste disposal is a problem
Environment preservation	<ul style="list-style-type: none"> • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Agriculture along with tourism is the backbone of the island. Wandering animals are an issue. • 12 private businesses on Mauke. (4) retail stores; (1) tourist accommodation – 9 beds; (1) bar/tavern; (1) transport service; (1) banking service • Local market day selling local produce. • Potential Fruit processing plant to process fruits • Potential Abattoir • Potential to increase tourism accommodation

INFRASTRUCTURE REQUIREMENTS – MAUKE

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • rebuild and repair public water tank catchments and encourage HH to install private tanks. • Review & upgrade existing water reticulation & pumping systems • Renovate the windmill pumps • Upgrade and maintain power supply & network to provide 24hr power/day; provide new diesel generator LT1 • Maintain and repair airport runway and terminal facility • Further dredging of the harbour; purchase a dredging machine, 7ton tip truck, bulldozer, pickup vehicle • Ongoing maintenance of roads/tar seal roads • Construct loading/unloading area at wharf
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Road maintenance (10km) • Regular airport maintenance • Airport seawall reconstruction (Angataura Landing) est \$6,800 • Power reticulation maintenance • Upgrade high voltage system to Ngatiarua est \$9,396 • Airport fencing est \$10,820 • Purchase Tractor 4wd Daedong est \$80,000 • Purchase two new 4WD Utility pickup for Energy and Infrastructure unit est \$80,000(\$40,000 each) • Purchase Hiab 6 ton lifting capacity est \$80,000

Additional works since SP 2000-2005	
-------------------------------------	--

ISLAND FACTS SHEET – MITIARO

Physical features	<p>Area: 22.3km² Elevation: <12 m above MSL Island type: volcanic reef island surrounded by makatea to 20m. Proximity: 278km from Rarotonga 59 km from nearest island Settlements: 4 villages; Atai, Auta, Mangarei, Takaue</p>
Demographics	<ul style="list-style-type: none"> • Population 226 (2001); declining • 62 households (approx 4 people/household) • Dependency ratio 96% • > ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • 6.5km long, 4.5km wide; little fertile soil; central volcanic mass comprise of 4 low lying basalt islands in an area of swampland and lake. • There are 2 lakes rotonui & totoiti that farm mitiARO eel (itiki) • Limestone caves, large peat reserves and considerable makatea and swamp life. • Subsistence farming and fishing widely practiced
Health	<ul style="list-style-type: none"> • New hospital relocated and completed in 2004; resident doctor, reg. nurses; no dental services available. Use of mobile dentist unit. • Influenza & acute respiratory infections are problems; diarrhoea, conjunctivitis; fish poisoning and asthma cases are also a concern. Also an increase in NCD's.
Local economy	<ul style="list-style-type: none"> • Public Service (78%) Private (4%) Ad hoc (8%) Overseas Orgn (8%) Religious Orgn (3%) Self employed (0%) • Subsistence farming and fishing widely practiced • In some instances communal sharing of fish is carried out on island.
Air transport	<ul style="list-style-type: none"> • airport constructed of makatea soil; upgraded in 2001/2002; now suitable for smaller aircrafts and the Saab. 1.6km long • air strip constructed of crushed and compacted coral and rubble. • 3 flight/week
Sea transport	<ul style="list-style-type: none"> • Shipping services are infrequent; 4 weekly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • no sealed road • Unsealed road length – 21km
Water supply	<ul style="list-style-type: none"> • Source: 56 HH connected to public water main; 15HH accessed a public water catchment; 45HH have private rainwater tanks; public water tanks; • 35HH water piped outside the dwelling; 20HH water piped inside; 7 HH cart water. • Rain water is principal source of drinking water. A public reticulation system of 56km provides brackish water used for non drinking uses.
Sanitation	<ul style="list-style-type: none"> • Sanitation effective and well designed • 23HH have flush toilets; 36 HH have pour flush; 7HH have pit latrines;
Solid waste	<ul style="list-style-type: none"> • rubbish collection program on island; disposal in managed dumps; bottles are banned on island. A recycling program is in place to raise funds for the school.
Electricity supply	<ul style="list-style-type: none"> • Source: 3 Lister generators 19 hrs/day; capacity kW;

	<ul style="list-style-type: none"> • Total consumption/generation 83 MWh in 2000 • Tariffs – \$0.36 /kWh domestic \$058. /kWh commercial; • Growth due to the increased use of electrical appliances
Telecommunications	<ul style="list-style-type: none"> • Standard telephone, fax & email/internet facilities available on Mitiaro • No formal newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • Email and internet facilities available through dial up modem. • Television services available to HH at \$3/mth.40HH using this service.

KEY ISSUES – MITIARO

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need updated building code (include water tank, septic tank) • Machinery on island is unable to support major developments. • Lack of water storage facilities; water supply is high priority • Waste disposal is a problem
Environment preservation	<ul style="list-style-type: none"> • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Agriculture along with tourism is the backbone of the island. Wandering animals are an issue. • 6 private businesses on Mitiaro. (2) retail stores; (1) tourist accommodation – 3 beds; (1) carver; (1) women's handicraft centre; (1) banking service • ability to produce noni fruit/juice • Expand maire export initiative • Revive interest in handicraft cottage industry • Tourism promotion of natural and unique Mitiaro environment

INFRASTRUCTURE REQUIREMENTS – MITIARO

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Improve community and private water tank reservoirs • Extend water reticulation network to service new households • Install new water bores to support existing water bores • Upgrade Airport runway and purchase of roller. • Continue with upgrading of the harbour; upgrade harbour landing (Omutu) to improve transporting of cargo. • Transfer from low voltage cables to high voltage cables • Installation of a new generator • Investigate other sources of water/power
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Purchase grader • Purchase pick up truck
Additional works since SP 2000-2005	

ISLAND FACTS SHEET – PALMERSTON

Physical features	<p>Area: 2.1km² Elevation: <4 m above MSL Island type: atoll comprising 6 islets Proximity: 500 km from Rarotonga 367 km from nearest island (Aitutaki) Settlements: 1 village (Horne Islet) Reef comprises 6 islets</p>
Demographics	<ul style="list-style-type: none"> • Population 48 (2001); static • 12 household dwellings (approx 4 people/household) • Dependency ratio 123% • 90% primary school only ⇒ unskilled labour force
Environment	<ul style="list-style-type: none"> • Reef is infertile; people use “planting pits” for planting vegetables and crops • Indigenous trees on islets • Extensive fishing of parrot fish for Rarotonga market • Major nesting site for green turtle and rare sea birds
Health	<ul style="list-style-type: none"> • High prevalence of diarrhoea, and respiratory infections due to lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Public service (75%); commercial (25%) • Parrot fishing for Rarotonga market • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • None at present
Sea Transport	<ul style="list-style-type: none"> • Quarterly service • Access for canoes and light boats is limited to several reef passages to north of village
Road transport	<ul style="list-style-type: none"> • 2km island perimeter unsealed road
Water Supply	<ul style="list-style-type: none"> • Source: rainfall capture is the only source • 11 HH use own rainwater tanks; 5 HH use public water catchments • 8 HH has in-house plumbing; 2 HH have it piped outside dwelling; 2 HH have to cart.
Sanitation	<ul style="list-style-type: none"> • All on-site systems • 11 HH flush toilets; 5 HH pour-flush toilet; 5 HH pit latrine. In some instances some HH have more than one facility.
Solid Waste	<ul style="list-style-type: none"> • No collection. HH use landfill holes for waste.
Electricity Supply	<ul style="list-style-type: none"> • Source: diesel generators; supply is 12 hrs/day; single genset • 18-hour supply trialed in 2003 • Tariffs – \$0.36/kWh domestic
Telecommunications	<ul style="list-style-type: none"> • Telecom provides phone and fax service • No newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material. • E-mail & internet facilities accessible using dial up modems.

KEY ISSUES AND PLANNED INFRASTRUCTURE WORKS – PALMERSTON

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • Unloading of cargo during inclement weather is dangerous • Infrequent shipping and freight services is affecting growth • Unreliable power supply is hampering freezer operations for fishing industry • Water supply improvements – water catchments to be repaired; water tank repairs; re-establish groundwater wells; fix pumping equipment; formulate community water use policy document • Transport improvements – airport construction; upgrade access passage • Power supply improvements – repair building for generator, purchase a stand-by generator, provide 18 hour power supply to community. • Waste management – improve • Improve Human Resource Development on the island • Develop an asset resource management plan.
Environment preservation	<ul style="list-style-type: none"> • Over use of reef and near-shore environment • High risk of over population of shells ⇒ risk to lagoon ecology • Risk from over-fishing parrot fish, clam and crayfish stocks in lagoon • Need regular monitoring of lagoon water quality • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Develop the fishing industry, pearl farm industry, seaweed farming, trochus farming • Would like to see some tourism development, promote tourism potential of island • Lack of equipment to utilize coconut resources (copra, wood production) • Encourage private sector development • No hotel facilities on island for visitors. Home stay accommodation • Council to prepare economic development strategy plan for island

INFRASTRUCTURE REQUIREMENTS – PALMERSTON

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Develop island infrastructure – electricity, water, sea access • Airport Construction • Administration Centre/Cyclone Management Centre • Reef and lagoon passage improvement • Revise disaster management plan for Palmerston • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material. • E-mail & internet facilities accessible using dial up modems.
Additional works since SP 2000-2005	<ul style="list-style-type: none"> •

ISLAND FACTS SHEET – PUKAPUKA

Physical features	<p>Area: 5 km²</p> <p>Elevation: <5 m above MSL</p> <p>Island type: atoll comprising 3 islets</p> <p>Proximity: 1,324 km from Rarotonga 89 km from nearest island (Nassau)</p> <p>Settlements: 3 villages (Roto, Yato, Nake); 3 alternate sites Motu Ko, Motu Kotawa and Motu Rotu</p>
Demographics	<ul style="list-style-type: none"> • Population 662 (2001); declining • 124 households (approx 5.3 people/household) • Dependency ratio 119% • >70% primary school only ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • Island is vulnerable to cyclones • Significant ancient taro and puraka swamps • Atoll is nesting site for green and hawksbill turtles and sea birds • Land infertile; Indigenous trees grow on islets
Health	<ul style="list-style-type: none"> • High prevalence of scabies, skin sepsis and ringworm suggesting poor hygiene and lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Public sector (87%) • Small-scale cottage industry for pre-ordered products • Subsistence farming and fishing widely practiced; • 39% unemployment
Air transport	<ul style="list-style-type: none"> • 1,500 m long landing strip • Air service infrequent by charter
Sea transport	<ul style="list-style-type: none"> • No access passage into lagoon; flats between islets are shallow • Ex harbour facilities need upgrading
Road transport	<ul style="list-style-type: none"> • 9 km of unsealed road of acceptable standard • Yato-Walepia Causeway unfinished
Water supply	<ul style="list-style-type: none"> • Source: rainfall capture for potable use; shallow wells for washing • 58 HH use rainwater tanks; 81 HH use public water catchments; • 60 HH cart water to house; 68 HH pipe to front of house
Sanitation	<ul style="list-style-type: none"> • All on-site systems or none at all • 10 HH flush toilets; 114 pour flush; 4 pit latrine
Solid waste	<ul style="list-style-type: none"> • Regular rubbish collection in place – done when drums are full • No rubbish dump, but garbage is composted and reused • Households burn paper and plastics
Electricity supply	<ul style="list-style-type: none"> • For HH and street lights - solar cells, but near end of useful life; • For public buildings use a 21 kW genset provides power from 9am-3pm. • Tariffs – \$20/month to trust fund for upgrade works
Telecommunications	<ul style="list-style-type: none"> • No newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material. • E-mail & internet facilities accessible using dial up modems. • Telecom CI provides phone/fax services • Peacesat station used between Pukapuka, Nassau and Rarotonga

KEY ISSUES FROM STAKEHOLDER CONSULTATIONS – PUKAPUKA

Issues	<ul style="list-style-type: none"> • The public health and hygiene are a critical issue that needs addressing; • Land availability constrained ⇒ optimise use efficiency • Need upgrade of airport for larger planes from Rarotonga • No asset management plans • Need resource management plan for lagoon • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Over use of reef and near-shore environment • High risk of over population of shells ⇒ risk to lagoon ecology • Risk from over-development of foreshore areas • Need regular monitoring of lagoon water quality • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Economic development seen as no. 1 priority alongside I/S • Council wants to promote island as holiday resort – especially eco-tourism, but need to community attitude survey • People want small cottage industry based development • Promote tourism potential of island • No hotel facilities on island for visitors/home stay available • Council to prepare economic development strategy plan for island

INFRASTRUCTURE REQUIREMENTS – PUKAPUKA

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Improve harbour facilities • Construct cyclone shelters • Maintain and improve existing roads • Provide HH with 9,000 L tanks; build more public tanks • Study groundwater lens quality and adequacy • Procure diesel generator upgrade electricity distribution
Additional works since SP 2000-2005	<ul style="list-style-type: none"> •

ISLAND FACTS SHEET – NASSAU

Physical features	<p>Area: 1.3 km²</p> <p>Elevation: <4 m above MSL</p> <p>Island type: sandy cay</p> <p>Proximity: 1,204 km from Rarotonga 44 km from nearest island (Pukapuka)</p> <p>Settlements: 1 village</p>
Demographics	<ul style="list-style-type: none"> • Population 72 (2001); declining • 15 households (approx 4.8 people/household) • Dependency ratio 148% • >70% primary school only ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • Dense vegetation • Lagoon is a crucial marine resource • Extensive sea bird nesting on isolated islets • Land not suitable for annual or tree crops • Potential risk to lagoon ecology is from aquaculture activities
Health	<ul style="list-style-type: none"> • High prevalence of diarrhoea, and respiratory infections due to lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Subsistence farming and fishing widely practiced • Some fish sold for cash;
Air transport	<ul style="list-style-type: none"> • 1,300 m long landing strip; • Air service only when flight is full both ways and/or chartered • Fuel storage facility – 200L drums of aviation fuel
Sea transport	<ul style="list-style-type: none"> • 6 weekly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • No sealed road • Unsealed road length – n/a
Water supply	<ul style="list-style-type: none"> • Source: rainfall capture is the only source • 103 HH use rainwater tanks; 28 HH use public water catchments;
Sanitation	<ul style="list-style-type: none"> • All on-site systems or none at all. • 1 HH flush toilet; 9 pour flush; 6 pit latrine;
Solid waste	<ul style="list-style-type: none"> • no collection; rubbish disposal are problems; wandering pigs, flies a problem
Electricity supply	<ul style="list-style-type: none"> • Source: diesel generators; supply is 12 hrs/day; capacity 76 kW • Total consumption/generation 18 MWh in 2000
Telecommunications	<ul style="list-style-type: none"> • No newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material

KEY ISSUES AND PLANNED INFRASTRUCTURE WORKS – NASSAU

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • Need upgrade of airport for larger planes from Rarotonga • No asset management plans • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Over use of reef and near-shore environment • High risk of over population of shells ⇒ risk to lagoon ecology • Risk from over-development of foreshore areas • Need regular monitoring of lagoon water quality

	<ul style="list-style-type: none"> • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Economic development seen as no. 1 priority alongside I/S • Council wants to promote island as holiday resort – especially eco-tourism, but need to community attitude survey • People want small cottage industry based development • Promote tourism potential of island • No hotel facilities on island for visitors/home stay available • Council to prepare economic development strategy plan for island

INFRASTRUCTURE REQUIREMENTS – NASSAU

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • ongoing maintenance of roads • widen cause way • Construct cyclone shelter • build more water tanks and catchments
Additional works since SP 2000-2005	<ul style="list-style-type: none"> •

ISLAND FACTS SHEET – MANIHIKI

Physical features	<p>Area: 5.4 km² Elevation: <4 m above MSL Island type: atoll Proximity: 1,204 km from Rarotonga 44 km from nearest island (Rakahanga) Settlements: 2 villages (Tauhunu, Tukao)</p>
Demographics	<ul style="list-style-type: none"> • Population 498 (2001); declining • 118 households (approx 4.2 people/household) • Dependency ratio 38% • >70% primary school only ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • 41 km² lagoon area surrounding island • Lagoon is a crucial marine resource • Extensive sea bird nesting on isolated islets • Land not suitable for annual or tree crops • Potential risk to lagoon ecology is from aquaculture activities
Health	<ul style="list-style-type: none"> • Health clinic in Tukao completed 2004; reg nurse; Hospital in Tauhunu still under construction; doctor operates from child welfare clinic; nurse practitioner; • High prevalence of diarrhoea, and respiratory infections due to lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Black pearl aquaculture main employer (70%) • Public service (20%); cottage industries (7%); commercial (3%) • Subsistence farming and fishing widely practiced
Air transport	<ul style="list-style-type: none"> • 1,300 m long landing strip • Air service 1 flight/week • Fuel storage facility – 200L Drums of aircraft fuel in an open roofed storage facility
Sea transport	<ul style="list-style-type: none"> • Monthly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • No sealed roads • Unsealed road length – n/a • Number of vehicles: trucks, autos, motorbikes
Water supply	<ul style="list-style-type: none"> • Source: rainfall capture is the only source • 103 HH use rainwater tanks; 28 HH use public water catchments
Sanitation	<ul style="list-style-type: none"> • All on-site systems or none at all • 80 HH flush toilets; 25 pour flush; 2 pit latrine; 12 lagoon toilets
Solid waste	<ul style="list-style-type: none"> • Tukao – have regular collection; large landfill hole used as community dump • Tauhunu – no rubbish collection; rubbish and pearl shell disposal are problems; wandering pigs a problem
Electricity supply	<ul style="list-style-type: none"> • Source: diesel generators; supply is 18 hrs/day; capacity 76 kW. • Total consumption/generation 18 MWh in 2000 • Tariffs – \$0.58/kWh commercial; \$0.36/kWh domestic
Telecommunications	<ul style="list-style-type: none"> • No newspaper; public notice boards used. • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material. • Have 4-channel satellite TV • E-mail & internet facilities accessible using dial up modems.

Cyclone shelters	<ul style="list-style-type: none"> • One cyclone shelter in each village
Maintenance facilities	<ul style="list-style-type: none"> • One workshop in Tauhunu that stores machinery but right next to the lagoon; none in Tukao. Current facility is in water tank shelters. • Construction equipment

KEY ISSUES – MANIHIKI

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • Need upgrade of airport for larger aircraft from Rarotonga • No asset management plans • Need resource management plan for lagoon • Need for Environment Protection Plan • Need for a Waste Management Plan • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Over-use of reef and near-shore environment • High risk of over-population of shells ⇒ risk to lagoon ecology • Risk from over-development of foreshore areas • Control fuel spills and storage on land and kaa • Need regular monitoring of lagoon water quality • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Economic development seen as no. 1 priority alongside Infrastructure • Council wants to promote island as holiday resort – especially eco-tourism, but need a community attitude survey • People want small cottage industry based development • Promote tourism potential of island • One motel/hotel facility (2 self contained bungalows) in Tauhunu & a Guest House in Tukao for visitors • Council to prepare economic development strategy plan for island

INFRASTRUCTURE REQUIREMENTS – MANIHIKI

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • airport runway upgrade; airport terminal • maintenance workshops • ongoing maintenance of roads • water tanks and catchments • harbour, port and marina upgrade • new rubbish tip for Tauhunu & Tukao • marina and lagoon jetty • foreshore and coastal reforestation
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Upgrade and maintain all roads in Manihiki • Maintenance and upgrade airport runway and clearance • Complete construction of airport terminal • Complete Tauhunu Harbour project • • Cyclone Management Centre Upgrade & Maintenance • Construction of Administration Building in Tukao Village • Renovate Administration Building in Tauhunu Village
Additional works since SP 2000-2005	<ul style="list-style-type: none"> •

ISLAND FACTS SHEET – RAKAHANGA

Physical features	<p>Area: 4.1 km² Elevation: <5 m above MSL Island type: raised coral atoll Proximity: 1248km from Rarotonga 44 km from nearest island (Manihiki) Settlements: 1 village at the southwest end of the atoll</p>
Demographics	<ul style="list-style-type: none"> • Population 169 (2001); declining • 32 households (approx 5 people/household) • Dependency ratio 93% • >2001; 1 school; 18% pre school; 65% primary; 18% secondary⇒ large unskilled labour force; vocational training available.
Environment	<ul style="list-style-type: none"> • Poor atoll soil • Green turtle nesting site • Lagoon is a crucial marine resource • Extensive sea bird nesting on isolated islets • Land not suitable for annual or tree crops • Potential risk to lagoon ecology is from aquaculture activities
Health	<ul style="list-style-type: none"> • Health clinic served by a Nurse Practitioner. In cases of emergency, Doctor from Manihiki travels to Rakahanga or patient is referred to Manihiki, and then on to Rarotonga • Dental Technician also on island to service dental care • High prevalence of diarrhoea, and respiratory infections due to lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Public Service (88%) Private (3%) Ad hoc (3%) Overseas Orgn (3%) Religious Orgn (3%) • Only two pearl farms one for the community & one owned by the church. No private farms. Approx (90%) of population operate a farm in Manihiki • Subsistence farming and fishing widely practiced • Production of tuna jerky for sale to Rarotonga Markets
Air transport	<ul style="list-style-type: none"> • 1.7km airstrip long landing strip not in use; • Those travelling to Rakahanga, fly into Manihiki and go by boat to Rakahanga
Sea transport	<ul style="list-style-type: none"> • 6-8 weekly service • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • No sealed road • Unsealed road length – 2km
Water supply	<ul style="list-style-type: none"> • Source: rainfall capture is the only source • 26 HH use rainwater tanks; 6 HH use public water catchments; • 16 HH had water piped outside the dwelling; 8 HH had piped inside; 8 HH had to cart water.
Sanitation	<ul style="list-style-type: none"> • All on-site systems or none at all. • 12 HH flush toilet; 20 pour flush; no pit or lagoon toilets in use;
Solid waste	<ul style="list-style-type: none"> • there is rubbish collection; community rubbish dump is in the form of a landfill hole; wandering pigs, flies a problem
Electricity supply	<ul style="list-style-type: none"> • Source: hybrid system supplies 24 hrs/day; capacity 76 kW • Total consumption/generation 18 MWh in 2000 • Tariffs – \$0.40/kWh domestic \$0.62/kWh commercial • Plan is to expand into wind turbine

Telecommunications	<ul style="list-style-type: none"> • No newspaper; public notice boards used. • Telecom provides telephone and fax services. • Email and internet facilities are accessible by dial up modem • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material
--------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

KEY ISSUES – RAKAHANGA

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No airport on Rakahanga. Air transport is accessed through Manihiki • No asset management plans • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Over use of reef and near-shore environment • High risk of over population of shells ⇒ risk to lagoon ecology • Need regular monitoring of lagoon water quality • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Economic development seen as no. 1 priority alongside I/S • Council wants to promote island as holiday resort – especially eco-tourism, but need to community attitude survey • Development of handicraft and find markets. • People want small cottage industry based development • No hotel facilities on island for visitors/home stay available • Council to prepare economic development strategy plan for island

INFRASTRUCTURE REQUIREMENTS – RAKAHANGA

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • construct a cargo shed and construct maintenance workshop • repair cause way • research alternative possible energy sources • ongoing maintenance of roads • Upgrade water catchments; build more water tanks and catchments • Develop maintenance plans for harbour • Construct cyclone shelter • basic infrastructure to support commercial fishing industry
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Upgrade all roads and community water tanks on Rakahanga • Construct a storage shed for hydroponics materials • Maintenance of all machineries on Rakahanga • Purchase new excavator est \$135,000 • Building extension of TV Station est \$18,000 • Complete renovation of Rakahanga Hospital est \$15,000 • Complete renovation of Government Representative's Residence est \$19,000 • Construct a fish processing plant est \$16,000
Additional works since SP 2000-2005	<ul style="list-style-type: none"> • Explore alternative water sources

ISLAND FACTS SHEET – PENRHYN

Physical features	<p>Area: 9.84 km²</p> <p>Elevation: <4 m above MSL</p> <p>Island type: raised coral atoll</p> <p>Proximity: 1365km from Rarotonga 354 km from nearest island (Rakahanga)</p> <p>Settlements: 2 villages Omoka & Tetautua separated by 10.5km of lagoon.</p>
Demographics	<ul style="list-style-type: none"> • Population 351 (2001); declining • 84 households (approx 4 people/household) • Dependency ratio 96% • >2002; 2 Schools. 12% pre school; 52% primary; 35% secondary ⇒ large unskilled labour force
Environment	<ul style="list-style-type: none"> • Poor atoll soil • Green turtle nesting site • Lagoon is a crucial marine resource • Extensive sea bird nesting on isolated islets • Land not suitable for annual or tree crops • Potential risk to lagoon ecology is from aquaculture activities
Health	<ul style="list-style-type: none"> • Hospital on Omoka is where the doctor is based. A nurse practitioner operates the clinic in Tetautua, and emergency cases from Tetautua are referred to Omoka, or on to Rarotonga • No dental services on island • High prevalence of diarrhoea, and respiratory infections due to lack of safe water supply
Local economy	<ul style="list-style-type: none"> • Public Service (47%) Private (28%) Ad hoc (9%) Overseas Orgn (14%) Religious Orgn (2%) • Fishing and Pearl farming are the mainstays of the island. • Private sector consists of the bank and 6 retail outlets of grocery items • Subsistence farming and fishing widely practiced • Attractive location from which to operate long lining for tuna.
Air transport	<ul style="list-style-type: none"> • 1.6km airstrip long landing; • 1 flight/week
Sea transport	<ul style="list-style-type: none"> • 6-8 weekly service • Omoka wharf built during the American occupation and has the capability of berthing medium to large vessels. • Penrhyn also a port of entry and has a fuel depot at the wharf constructed by AUS Government. • Loading/unloading via small boat or barges
Road transport	<ul style="list-style-type: none"> • No sealed road • Unsealed road length – 2km
Water supply	<ul style="list-style-type: none"> • Source: rainfall capture is the only source • 26 HH use rainwater tanks; 6 HH use public water catchments; • 16 HH had water piped outside the dwelling; 8 HH had piped inside; 8 HH had to cart water.
Sanitation	<ul style="list-style-type: none"> • All on-site systems or none at all. • 44 HH flush toilet; 29 pour flush; 14 lagoon toilets. • Water shortages can cause problems for all flush toilets
Solid waste	<ul style="list-style-type: none"> • there is no rubbish collection but there is a community rubbish dump in the form

	of a landfill hole; wandering pigs, flies a problem
Electricity supply	<ul style="list-style-type: none"> • Source: Generator 24 hrs/day; capacity 76 kW • Total consumption/generation 87 MWh in 2000 • Tariffs – \$0.48/kWh domestic \$0.48/kWh commercial • New generator & substation funded under AusAid completed in 2000
Telecommunications	<ul style="list-style-type: none"> • No newspaper; public notice boards used. • Telecom provides telephone and fax services. • Email and internet facilities are accessible by dial up modem • FM Radio station that can pick up AM Radio Station in Rarotonga, and is able to produce local material • There is a television station

KEY ISSUES – PENRHYN

Issues	<ul style="list-style-type: none"> • Land availability constrained ⇒ optimise use efficiency • No asset management plans • Need for disaster management plan • Need updated building code (include water tank, septic tank)
Environment preservation	<ul style="list-style-type: none"> • Over use of reef and near-shore environment • Only 1/16th of lagoon being used for farming. A hatchery operates to produce spats for farmers. • Need regular monitoring of lagoon water quality • Need for Lagoon Management Plan • Production and maintenance Strategy for Hatchery & Laboratory facility • No Environment Act to protect island • Need to create greater environment awareness in the community • Need to promote sustainable development practices
Economic development	<ul style="list-style-type: none"> • Economic development seen as no. 1 priority alongside I/S • Handicraft is a major cottage industry in Penrhyn utilising rito (bleached coconut leaves) fully supported by Council. An established market has been set with Rarotonga outlets & agents • Carving on pearl shells could also be a potential economic activity however limited tools & promotion hinder this activity. • No hotel facilities on island for visitors/home stay available • Community has expressed interest establishing a small scale operation for nono processing. • Tourism not considered a priority due to the distance factor & lack of accommodation facilities, regular air services, & the inability to provide support services.

INFRASTRUCTURE REQUIREMENTS – PENRHYN

Works identified in Strategic Plan 2000-2005	<ul style="list-style-type: none"> • Airport upgrade • Harbour upgrade • Port upgrade as a possibility of using Penrhyn as a “port of call” • Maintenance of hatchery & laboratory • Improve waste management systems • Improve water catchments; possibility of desalinator unit • Ongoing maintenance of public amenities & facilities • ongoing maintenance of roads • Construct maintenance workshop
----------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<ul style="list-style-type: none"> • Develop maintenance plans for harbour • Construct cyclone shelter • basic infrastructure to support commercial fishing industry
Works identified in Annual Business Plan 2006 - 2007	<ul style="list-style-type: none"> • Maintenance of community water reservoirs • Maintenance of roads and drainage systems • Maintenance and upgrade of airport runway and terminal • Maintenance of all Government buildings
Additional works since SP 2000-2005	

3.2 STATUS OF UTILITY SERVICES

Overview of Existing Water Supply Services – Southern Islands Group

Item	Rarotonga	Aitutaki	Mangaia	Atiu	Mauke	Mitiaro	Manuae	Takutea
Source	12 streams	Groundwater via 8 bores	3 streams; rainwater; groundwater	Groundwater via 2 wells	Groundwater via 5 boreholes	1 spring; rainwater	These two islands are uninhabited, so no permanent infrastructure present	
Distribution	Gravity pipe network	Pumped pipe network	Pumped pipe network to houses, public standpipes; domestic water tanks	Pumped pipe network coverage 86%; 14% rely on water carts and rainwater	Pumped pipe network to all houses	Pumped pipe network to houses, public standpipes; community water tanks		
Coverage	Over 97%	Over 97%	Over 97%	Over 97%	Over 97%	Over 97%		
Adequacy	Adequate quantity for now; however, water quality is not potable as there is no disinfection of the supply	Inadequate as need to apply rationing from time to time. Water quality does not meet micro-biological standards	Adequate for now where supplemented with rainwater; inadequate in areas where supply is augmented with groundwater due to frequent pump failure	Adequate for now, supplemented by rainwater	Adequate for now	Adequate for now with rainwater as supplementary source		
Issues	Finite resources; large seasonal flow variation; supply not disinfected; no metering; high losses; corroded	Groundwater depletion a concern; need continuous supply as island is a tourist destination;	Contamination of streams by animals; turbid after rain; water also used for agriculture; no metering; high leakage and wastage	Groundwater depletion a concern; supply inadequate in prolonged dry periods; water also used for	Groundwater depletion a concern; pump failures frequent; water also used for agriculture;	Groundwater brackish; not enough storage for prolonged dry periods; pumping failures; water		

	pipes; significant in-house losses; water also used for agriculture; no metering	supply not disinfected; no metering; no incentive to conserve water	losses; no incentive for conservation	agriculture; high losses due to leakage and wastage; no metering	high losses due to leakage and wastage; no metering	also used for agriculture; no metering; high losses due to leaks, wastage		
--	----------------------------------------------------------------------------------	---------------------------------------------------------------------	---------------------------------------	------------------------------------------------------------------	-----------------------------------------------------	---------------------------------------------------------------------------	--	--

Overview of Existing Wastewater Management Services – Southern Islands Group

Item	Rarotonga	Aitutaki	Mangaia	Atiu	Mauke	Mitiaro	Manuae	Takutea
Type of treatment	Septage treatment pond; package treatment plant for neighbourhood scheme; on-site systems	Septage treatment pond; On-site systems; big hotels have onsite package treatment plants;	On-site systems, pit latrines still being used	On-site systems; pit latrines still being used	On-site systems; pit latrines still being used	On-site systems; pit latrines still being used	These two islands are uninhabited, so no permanent infrastructure present	
Coverage	Onsite system covers 99%; neighbourhood scheme covers 30 households	Onsite system covers 98%;	On-site system coverage 98%; pit latrine usage 45%	On-site system coverage 98%; pit latrine usage 60%	On-site system coverage 98%; pit latrine usage 90%	On-site system coverage 98%; pit latrine usage 10%		
Adequacy	Ok for now;	Ok for now	Ok for now	Ok for now	Ok for now	Ok for now		
Issues	Effluent management is an emerging problem; algal blooms in lagoon; frequent fish poisoning; should review draft national sewage regulations	Risk of groundwater contamination; desludging of septic tanks not regular; nutrients in lagoon; water-borne diseases common; national sewage regulations	Risk of contaminating groundwater supply source; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Risk of contaminating groundwater supply source; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Risk of contaminating groundwater supply source; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	No desludging program for septic tanks, groundwater contamination		

Overview of Existing Wastewater Management Services – Northern Islands Group

Item	Palmerston	Pukapuka	Nassau	Manihiki	Rakahanga	Penrhyn	Suvarrow
Type of treatment	On-site systems, pit latrines	On-site systems, pit latrines, lagoon Practice	On-site systems, pit latrines	On-site systems, pit latrines; lagoon toilets	On-site systems, pit latrines	On-site systems, pit latrines	Island uninhabited, so no permanent infrastructure present
Coverage	Onsite systems 100%; plus 50% still have put latrines	Onsite systems coverage 98%; pit latrines 4%	Onsite systems coverage 98%; pit latrines 40%	On site system coverage 90%; pit latrines 2%; lagoon toilet 10%	On site system coverage 98%; pit latrines 12%;	98%	
Adequacy	Ok for now	Ok for now	Ok for now	Ok for now	Ok for now	Ok for now	
Issues	Contamination of freshwater lens beneath atoll is an emerging problem; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Contamination of freshwater lens beneath atoll is an emerging problem; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Contamination of freshwater lens beneath island is an emerging problem; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Risk of Contaminating groundwater; Risk of polluting lagoon; significant waterborne diseases on island; no septic tank desludging program; no septage treatment facilities	Contamination of freshwater lens beneath atoll is an emerging problem; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	Contamination of freshwater lens beneath atoll is an emerging problem; risk of polluting lagoon; no septic tank desludging program; no septage treatment facilities	

Overview of Existing Solid Waste Management Services – Southern Islands Group

Item	Rarotonga	Aitutaki	Mangaia	Atiu	Mauke	Mitiaro	Manuae	Takutea
Type of treatment and disposal	Municipal landfill; recycling centres	Municipal landfill	Municipal dumps; recycling centre	Municipal dumps;	Municipal dumps	Municipal dumps	These two islands are uninhabited, so no permanent infrastructure present	
Collection	Domestic collection 1-2 times per week; commercial at own cost as requested; separation at source practiced; recyclables shipped to NZ; metals collected separately and shipped to north east Asia	Fortnightly collection; otherwise as for Rarotonga	Weekly collection by Island Council; separation and recycling being practiced	Weekly collection by Island Council; recycling and separation slowly being introduced and practiced	Fortnightly collection by Island Council; recycling and separation slowly being introduced and practiced	Weekly collection by Island Council; bottles are banned; recycling and separation introduced and practiced; recycling programs used to raise funds for schools		
Adequacy	Adequate	Adequate	Adequate for now	Adequate for now	Adequate for now	Adequate for now		
Issues	separation at source needs improvement through more public awareness;	Contamination of aquifers if leachate not managed properly; as for Rarotonga	Groundwater contamination risks; separation at source needs improvement through more public	Groundwater contamination risks; need to raise public awareness for improving separation at	Groundwater contamination risks; need to raise public awareness for improving separation at	Contamination of groundwater risks; need to raise public awareness for improving separation at		

			awareness; no fees collected	source; no fees collected; disposal of old appliances	source; disposal of old appliances	source; disposal of old appliances		
--	--	--	------------------------------	-------------------------------------------------------	------------------------------------	------------------------------------	--	--

Overview of Existing Solid Waste Management Services – Northern Islands Group

Item	Palmerston	Pukapuka	Nassau	Manihiki	Rakahanga	Penrhyn	Suvarrow
Type of treatment and disposal	Rubbish is buried on site or communal pits	No municipal dump; have municipal compost site; composted material reused; households burn plastics, paper	Private pits	Private and municipal dumps	Private and municipal pits	Private and municipal pits	Island uninhabited, so no permanent infrastructure present
Collection	No collection; disposal by households	Regular collection by Island Council when household drums are full;	No collection; disposal by households	Weekly collection by Island Council in Tukao only; elsewhere disposal by households	Weekly collection by Island Council; disposal by households in communal pits is widely practiced	No collection; disposal by households	
Adequacy	Adequate for now	Adequate for now	Adequate for now	Inadequate; new dump site needed	Adequate for now	Adequate for now	
Issues	Groundwater contamination risks; disposal of old appliances and hazardous material	Groundwater contamination; potential health hazard from to households from burning plastics; customary land issues for landfill; disposal of old appliances and	Groundwater contamination risks; wandering pigs and flies a problem with open rubbish dump sites; composting and waste minimization program needed;	Groundwater contamination risks; in Tauhunu disposal pits pose health hazards and attract wandering pigs and flies; waste minimization and composting	Groundwater contamination risks; wandering pigs and flies a problem with open rubbish dump sites; composting and waste minimization program needed;	Groundwater contamination risks; wandering pigs and flies a problem with open rubbish dump sites; composting and waste minimization program needed;	

		hazardous material	disposal of old appliances and hazardous material	program needed; disposal of old appliances and hazardous material	disposal of old appliances and hazardous material	disposal of old appliances and hazardous material	
--	--	--------------------	---------------------------------------------------	-------------------------------------------------------------------	---------------------------------------------------	---------------------------------------------------	--

Overview of Existing Electricity Supply Services – Southern Islands Group

Item	Rarotonga	Aitutaki	Mangaia	Atiu	Mauke	Mitiaro	Manuae	Takutea
Electricity								
Source	Diesel gensets	Diesel gensets	Diesel gensets; 24 hrs/day supply; pilot wind power generation	Diesel gensets	Diesel gensets; 19 hrs/day supply	Diesel gensets; 19 hrs/day supply	These two islands are uninhabited, so no permanent infrastructure present	
Distribution	By TAU (state owned enterprise); overhead low and underground high voltage lines;	By APS (state owned enterprise); underground high and overhead low voltage lines;	By Island Council; overhead lines	By Island Council; overhead lines	By Island Council; overhead lines	By Island Council; both overhead and underground lines		
Coverage	All; over 97%	Over 97%	Over 95%	Over 95%	Over 95%	Over 95%		
Adequacy	Adequate	Adequate; some outages	Adequate; some outages	Some outages	Some outages	Inadequate; some outages		
Issues	Could put lines underground for better cyclone protection;	Security of supply; CIC overseeing its privatization;	High O&M costs, high user costs, limited technical capacity	Maintenance costs high; wooden power poles need replacement; genset failures; limited technical capacity	Maintenance costs high; distribution system needs better maintenance; genset failures; limited technical capacity; supply	Maintenance costs, genset failures; limited technical capacity; supply limitations; demand management		

					limitations			
--	--	--	--	--	-------------	--	--	--

Overview of Existing Electricity Supply Services – Northern Islands Group

Item	Palmerston	Pukapuka	Nassau	Manihiki	Rakahanga	Penrhyn	Suvarrow
Source	Diesel genset; supply 19 hrs/day	Diesel genset for public buildings (9 am – 3 pm) and as emergency back up; solar power used otherwise;	Diesel genset; supply 19 hrs/day	Diesel genset; supply 19 hrs/day	Diesel genset/battery bank (hybrid); supply 24 hrs/day	Diesel genset; supply 24 hrs/day	Island uninhabited, so no permanent infrastructure present
Distribution	Reticulated and private	Reticulated and private	Reticulated and private	Reticulated and private	Reticulated	Reticulated and private	
Coverage	Over 95%	Over 95%	Over 95%	Over 95%	Over 95%	Over 95%	
Adequacy	Adequate for now	Adequate for now	Adequate for now	Adequate for now	Adequate for now	Adequate for now	
Issues	Maintenance, lack of technical capacity	Solar batteries near end of useful life; high capital costs for solar units; converters for household appliances too expensive; maintenance of assets; lack of technical capacity	Maintenance, lack of technical capacity	Maintenance; lack of technical capacity	Maintenance; lack of technical capacity;	Maintenance; lack of technical capacity	

Overview of Existing Telecommunication Services – Southern Islands Group

Item	Rarotonga	Aitutaki	Mangaia	Atiu	Mauke	Mitiaro	Manuae	Takutea
Network services	Underground land lines; GSM network; 56 kbs dial up Internet; 256 kbs ADSL broadband Internet	Land lines(u/g); GSM network; 56 kbs dial up Internet; 115 kbs IDSL broadband Internet	Land line (u/g); 28 kbs dial up Internet access	Land line (u/g); 28 kbs dial up Internet access	Land line (u/g); 28 kbs dial up Internet access	Land line (u/g); 28 kbs dial up Internet access	These two islands are uninhabited, so no permanent infrastructure present	
Coverage	84% dwellings	80% dwellings	84% dwellings	80% dwellings	84% dwellings	80% dwellings		
Cyclone warning	Broadcast on local FM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio		
Adequacy	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate		
Issues	Residents content with level of service; no issues; 2% broadband user target	As for Rarotonga	Residents content with level of service; no issues; 2% broadband user target	As for Rarotonga	Residents content with level of service; no issues; 2% broadband user target	As for Rarotonga		

Overview of Existing Telecommunication Services – Northern Islands Group

Item	Palmerston	Pukapuka	Nassau	Manihiki	Rakahanga	Penrhyn	Suvarrow
Network services	Only public phones/faxes; Internet centre	Land line u/g; Peacesat station link up with Rarotonga and Nassau; 28 kbs dial up Internet access	Only public phones/faxes; Peacesat station link up with Rarotonga and Pukapuka; Internet centre	Land line (u/g); 28 kbs dial up Internet access; 4-channel satellite television	Land line (u/g); 28 kbs dial up Internet access	Land line (u/g); 28 kbs dial up Internet access;	Island uninhabited, so no permanent infrastructure present
Coverage	80% dwellings;	80% dwellings;	80% dwellings;	80% dwellings;	80% dwellings;	80% dwellings;	
Cyclone warning	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	Broadcast on local AM radio; rebroadcast on HF radio	
Adequacy	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	
Issues	Maintenance;	Maintenance;	Maintenance;	Maintenance;	Maintenance;	Maintenance; no television service;	

Distribution Storages								
capacity	2.425 mega litres							
elevated/on-ground	On ground							
condition	Fair							
adequate cyclone protection	good							
Pump Stations								
	Pump Station #1	Pump Station #2	Pump Station #3					
no. of pumps	1 (Tereora)	1 (Tepuka)						
pump make	Grundfos	Helical						
pump model	Multi Stage							
pump power rating (kW)								
pump duty if known (flow, head)		50m						
condition of pumps	Fair	Fair						
year of installation	2001	2001						
power supply	Electrical	Electrical						
Isolating Valves								
number	Many							
diameter	Ranging from 50 - 250							
condition	Fair to Good							
TREATMENT								
communal source treatment	NA							
households boiling water? (Y/N)	nil							
	only when advised by Helath Department							
OPERATION AND MAINTENANCE								

no. of operators/technicians	14							
skill type and qualification of technicians	water engineers, water quality technicians, pipe fitters, plumbers							
how often are rainwater tanks cleaned								
plant and equipment used								
are headworks cyclone-proof?								
annual council operating costs (\$/year)								
USER CHARACTERISTICS	2001							
no. of people on island	12188							
no. of households on island	2556							
no. connections to piped network	2450							
no. properties not connected to network and have no rainwater tank								
no. dwellings relying on water vendors	19							
COMMUNITY WATER RELATED ISSUES								
<i>list any issues here:</i>								
1. turbid reticulated water when it rains								
2. takes a long time for leakages/breakages on the main to be fixed or repaired								
3. no reserve storage for emergencies, eg. drought, cyclones								

Wastewater Management Inventory
Island: Rarotonga

Date:

ON-SITE SYSTEMS				
Septic Tanks	Type #1	Type #2		
Treatment system				
quantity (no. of tanks)	3272			
capacity (L)	varies			
no. of chambers	1, 2, 3			
tank condition (typical)				
desludging frequency (years)	Depends			
Effluent disposal				
absorption trenches (if Yes length, m)				
soakage pits				
disposal to land or sea	nil			
get on-site water logging? (Y/N)	no			
Pit Latrines	NA			
quantity (installed in how many houses)				
typical capacity (m ³)				
condition (well maintained, flies etc)				
how often is it "moved"?				
get on-site water logging? (Y/N)				
Lagoon Toilets	NA			
quantity (used by how many houses)				
how often "move"				
Other				
description	Pour flush			
no. of households using this method	118			

In-house Wastewater Generation				
Toilets				
no. flush units	3272			
no. pour-flush units	118			
Wastewater sources*				
are black and grey waters separated (Y/N)	no			
if separated, where is greywater going?				
<i>*note: blackwater - toilet, kitchen wastes; greywater - wastewater from bath, laundry etc</i>				
Commercial Premises	Type #1	Type #2	Type #3	Type #4
Treatment plant				
type of process	biofilters			
capacity (m ³ /day)				
no. of such facilities on island	11			
to where is treated effluent discharged?	on site			
power source and usage (kWh)				
condition of plant				
year installed				
Waste management				
is effluent discharge monitored/recorded?	no			
effluent quality				
how is sludge treated and how often?				
SEPTAGE TREATMENT FACILITIES	NA			
type of system				
capacity (m ³ /day)				
to where is treated effluent discharged?				
power source and usage (kWh)				
condition of plant				
year installed				
OPERATION AND MAINTENANCE	NA			

no. of plumbers on the island	Private contractor - desludging			
skill level/qualification of technicians				
if have central plant, no. of operators				
plant and equipment used				
annual municipal operating costs (\$/year)				
ENVIRONMENTAL EFFECTS				
are there any algal blooms in lagoon?	some parts of the island			
lagoon water quality				
freshwater lens water quality				
HEALTH EFFECTS				
<i>collect annual statistics fro the past 3-5 years on water-borne diseases</i>				
Year	2005	2004	2003	2002
infant mortality				
diarrhea				
dysentery				
hepatitis				
worms				
fish poisoning				
COMMUNITY ATTITUDE				
1. Satisfaction with the current sanitation practices?				
2. Aware of the link between groundwater contamination and onsite waste disposal (septic tanks)?				
3. Is it better to discharge treated waste water into the sea (beyond the reef if possible) or to land?				
4. Is there any link between the waste discharge and the water quality in the lagoon?				
5. What is preferable, discharge of reclaimed water from waste plants to land or into the sea?				

6. Willing to make a small contribution towards operating a wastewater system if it eliminates waste problems around the house?	
COMMUNITY SANITATION ISSUES	
<i>list any issues here:</i>	

Solid Waste Management Inventory
Island: Rarotonga

Date:

WASTE DISPOSAL METHODS	
<i>Domestic Waste</i>	
indicative quantity (kg/household/week)	.21kg/p/d
any separation at source? (Y/N)	some, about 30%
how separated? (compostables, etc)	glass, plastics, aluminium, general refuse
how is rubbish stored at the house?	bins, containers, plastic bags, sacks, 40gal drums, boxes
means of disposal (council collection, self)	Contract (with MOW)
compostables	yes
plastics, paper	yes
frequency of disposal (days)	weekly
<i>Commercial Waste</i>	
no. people on premises	541 commercial establishments
indicative quantity (kg/premise. week)	2.07kg/premise/week
any separation at source? (Y/N)	Contractor charges extra if not separate at source
how separated (compostables, etc)	yes
means of disposal (council collection, self)	Contract
compostables	yes
plastics, paper	yes
frequency of disposal (days)	weekly
any fee paid? (\$/collection)	\$10/m3 at Rarotonga Landfill
<i>Metals and Hazardous Waste</i>	
type of material (metals, engine oil, etc)	
how often collected	as required
indicative quantity	

means of collection	
any fee paid? (\$/collection)	
MUNICIPAL DISPOSAL SITES	
<i>Municipal Landfill or Dump</i>	
capacity (m ³)	Rarotonga Landfill - 81500 Design life 15yrs
ex spare capacity (m ³ or %)	Nil
is there waste separation on site? (Y/N)	no
is site lined?	yes, HDPE membrane
is leachate intercepted for treatment?	yes
type and no. of mech plant, equipment	Hired from Contractor - ????
condition of site (management)	Depends on weather - Strong winds and heavy rainfall cause havoc at the site
year constructed	2004
<i>Recycling Depot</i>	
capacity (m ³)	
what materials are collected	plastic bottles, alluminium cans, glass bottles
recyclables packaging procedures	sorted, crushed into specified weight bales, strapped, sprayed and packed into shipment containers
where are recyclables shipped to?	Paper Reclaim, NZ
how often is shipment made?	6 containers/yr
cost per shipment	avg \$2000/container
<i>Hazardous Material Recycling Facility</i>	
what materials are collected	batteries
packaging procedures	
where are recyclables shipped to?	
how often is shipment made?	
cost per shipment	

OPERATION AND MAINTENANCE		
no. of council staff in solid waste section	2 staffs	
no. operators at council disposal site	same as above	
skill level of operators	practical experience	
no. staff at recycling depot	3 staffs	
no. staff involved in haz waste recycling		
annual council operating costs (\$/year)		
ENVIRONMENTAL EFFECTS		
are pigs, flies etc a nuisance problem?	only have problem with flies on warmer days	
are wind-blown plastic bags a problem?	yes	
any rubbish entering lagoon?	no	
COMMUNITY ATTITUDE		
1. Satisfaction with the current solid waste management practices?	it's a public perception that waste management is an entity responsibility	
2. Would prefer regular council collection of rubbish or disposal by self?	weekly is adequate but some areas require twice weekly	
3. Would do onsite composting if given the equipment and know-how?	yes	
4. Would be prepared to separate rubbish before disposal to save valuable land areas?	Need public awareness	
5. Willing to make a small contribution towards council operating a total waste management collection and treatment system?		
COMMUNITY SOLID WASTE ISSUES		
<i>list any issues here:</i>		

Electricity Supply Inventory				
Island: Rarotonga				Date:
ELECTRICITY GENERATION				
<i>Diesel Generators</i>				
no, of units	7 (excluding two hired), proposed to install two additional gensets in two yrs			
genset make	Duvant, Duvant, Mirless Blackstone, Lister Blackstone, Lister Blackstone, Blackstone, MAN B&W (2 Cummins-hired)			
genset model				
capacity (kWh)	2116, 2116, 1725, 600, 600, 1200, 2970, (2 x 800)			
year installed	1991, 1991, 1990, 1970, 2001, 2006, (2004)			
condition	all operational			
current generation rate (kWh/day)	82159 (avg)			
fuel storage capacity (L)	3 x 51000 litres (3 x 60000 litre tanks)			
fuel storage adequate for how many days	20000 litres per day, 7 days max.			
adequate cyclone protection for plant?	yes			
<i>Alternate Energy Sources</i>				
type (solar, wind)	solar - commonly used for hot water heating, very few households using solar PV for electricity			
generation capacity (kWh)				
year installed				
condition				
current generation rate (kWh/day)				
what proportion of demand met (%)				
reliability (%)				
adequate cyclone protection for plant?				
<i>Household Solar Panels (where applicable)</i>				
no. of households fitted with panels	less than 0.5% households with solar PV for electricity			
house electricity demand met (%)				
reliability (%)				
regular maintenance done? (if Yes, what)				

adequate cyclone protection for panels?				
DISTRIBUTION NETWORK				
network coverage (%)	100			
supply availability (hrs/day)	24			
length of cabling in network (m)	75km - HV, 170km - LV			
proportion of cables underground (%)				
electricity poles of what material?	concrete and timber			
any service transformers (no.)	73 total			
make and capacity of transformers	ABB, 75 - 750 kVA			
condition of system	OK			
year constructed	1950, upgrade 1990, continual replacement by age			
TARIFFS AND REVENUE				
current tariffs	Domestic: 0.39 - 0.65; Commercial: 0.65 = 5.00/mth; Demand: 0.54/unit, 20.00 - 25.00/kW			
frequency of billing	monthly			
annual revenue collected	14 million			
annual operating costs	12 million			
OPERATION AND MAINTENANCE				
no. of council staff in electricity section	41 total (power station = 21, distribution system = 11, Billing = 5, Administration = 4)			
no. technicians on island				
type and qualification of technicians	electrical/mechanical trades			
plant and equipment used	cherry pickers, pickup trucks, jinker, cable winch, handtools (elec/mech)			
any emergency spare parts in storage	for each genset: full set of spares for 12000hrs; distribution: use stock until minimum level then restock spares			
COMMUNITY ELECTRICITY ISSUES				
<i>list any issues here:</i>				
1. high tariff charge				
2. land issues (location of substations, street lights, tree/vegetation management - trimming, planting under aerial lines, no secondary road to power station)				
3. noise pollution at power station				

4. waste oil spills into stream at power station				
5. disposal of non-biodegradable wastes (cables offcuts, transformer oils, etc)				
6. aerial lines susceptible to cyclone damage				
7. some lines still live until turned off at substation (may not be able access substation during cyclone)				

Telecommunications Inventory
Island: Rarotonga

Date: 28/07/2006

SERVICES	
Telephone	
Landlines	
service coverage (% households)	86
individual house connections	5060
no. public access centers	15
system capacity	6956
total length of distribution network (m)	300km
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	24
individual house connections	4000
no. public access centers	6
system capacity	5000
Internet	
Dial-up access	
service coverage (% households)	5060
connection access speed (kbs)	56K
individual house connections	1650
no. public access centers	5
Broadband (ADSL)	
service coverage (% households)	5060
connection access speed (kbs)	256K
individual house connections	200
no. public access centers	5
Radio and Television	

no. of radio stations AM/FM	5
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	100
no. technicians on island	20
type and qualification of technicians	NZCE
transmission stations cyclone-proof?	3
any emergency spare parts in storage	5
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Road Inventory
Island: Rarotonga

Date:

ROAD INVENTORY				
<i>Length of Road</i>	Good condition	Fair condition	Poor condition	Total
Sealed Road Length (km)				
single bituminous surface treatment				
double bituminous surface treatment	59.7			
other (AC, concrete)				
subtotal				
Gravel/crushed limestone (km)		55.1		
Earth				
Total				
<i>Bridges and Culverts</i>	Good condition	Fair condition	Poor condition	Total
Bridges (no)				
concrete	43			
steel including Bailey				
timber				
other (masonry)				
Total	43			
Culverts (no)				
concrete box	2			
concrete pipe	36			
steel pipe				
masonry				
Total	38			
Causeways and swales (no)				
MOTOR VEHICLE REGISTRATIONS	2004	2005	2006 (to Mar)	
Cars and 4WD	293	350	91	
Trucks - vans and pickups	89	131	29	
Trucks - med trucks, buses	41	58	14	

Trucks - heavy (>2 axles)	2	35	4
Motorcycles	1151	1086	431
Total	3580	1660	569

Airport Inventory
Island: Rarotonga

Date:

AIRPORT INVENTORY		
<i>Airfield</i>	Data	Comment on condition
Runway name	Rarotonga	Runway specifications RWY 08/26
length (m)	2328	
width (m)	45	
pavement construction	reinforced concrete	OK
runway markings?	yes	OK
runway lighting?	yes	OK
Runway Strip		
length (m)	2368	
width (m)	213	
Taxiway if applicable	NA	
length (m)		
width (m)		
pavement construction		
markings?		
lighting?		
Apron		
length (m)	153	
width (m)	77	
pavement construction	reinforced concrete	OK
markings?	yes	OK
lighting?	yes	OK
Visual aids		
Windsock (lighted?)	yes/yes	OK
VASIS or PAPI?	T-VASIS	OK
other	NA	
Other airfield facilities		

drainage	yes	OK
fencing	yes	OK
Safety issues		
obstacle clearances - buildings, trees	no	compliance
livestock, vehicles, pedestrians in strip	no	none
erosion, flooding, sea surges	no	except sea surges at western end during cyclones
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?	yes	
Navaid?	yes	NDB, VOR, DME, ILS
NOTAM or weather report facility?	yes	
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage		
capacity (l)	2,653,244	3 nos tanks: RA1 - storage, RA2 - slop, RA3 - service
type of storage	steel tanks	structurally OK
frequency and reliability of resupply	2 months	
Fire and Rescue		
category and vehicle	ICAO Category 8	
Water supply		
storage capacity (l)	450,000	
storage type	reinforced concrete tank	
source	groundwater via well	
Power supply		
main power?	yes	
standby generator?	yes	
Telecommunications		
telephone	yes	
fax	yes	
internet	yes	
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)	4479	3085 international, 1394 domestic

construction, age and condition	steel, timber reinf concrete	built early 1970s, structurally OK	
passenger handling counter?	yes		
baggage handling?	yes		
water supply	yes		
toilets	yes		
power supply	yes		
telephone	yes		
Airport Maintenance	Data	Comment	
Maintenance equipment	AACI and Contractor		
Maintenance service	AACI and Contractor		
Airport Ownership	Data	Comment	
Airport land	Crown		
Terminal building	Crown		
Other buildings and facilities	Crown		
Landing charge?	yes	aircraft over 40 tonnes - \$20.48 per 1000kg MGTOW	
Terminal rental charge?	yes	\$8.15 per arriving pax	
AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type			
Flights by other than Air Rarotonga			
Annual or monthly aircraft movements		8108 (excl transit)	4311 (to June, excl transit)
Annual or monthly arriving and departing pax	94790, 94607:86177, 42799(D)	101275, 100739 (international)	
Annual or montly arriving and departing cargo	765t, 677t	917t, 746t	289t, 199t (to March)

Port and Harbour Inventory
Island: Rarotonga

Date:

PORT AND HARBOUR INVENTORY		
<i>Facilities</i>	Data	Comment on condition
Breakwater		
details	armour rocks (basalt)	western breakwater damaged by cyclone in 1987
Wharf or Jetty		
length (m)	500	
cargo loading/unloading area (sq m)	6000	
cargo storage area (sq m)	1500	
Slipway		
length (m)	30	
width (m)	10	
construction (concrete, other)	reinf concrete	
Barge	NA	
dimensions (m)		
capacity (t)		
engines (no. and hp)		
construction (aluminium, steel)		
age and condition		
Cargo handling		
crane type and capacity (t)	NA	
fork lift truck and capacity (t)	1 x 35t, 1 x 25t, 1 x 18t, 3 x 3t	
age and condition of each	1989 - good, 1986 - good, 1984 - good, 1989 - good	
Transit shed		

area (sq m)	1800		
construction type	conc floor, steel framing, corrugated claddings for roof & walls		
age and condition	over 20 yrs, good		
concrete floor	yes		
Breakwater details	armour rocks		
Navigation aids details	purple lead-in lights, VHF, tug boat		
Port Charges	Data	Comment	
Lighterage service (\$/tonne or \$/pallet)			
Berthing fee structure			
Cargo storage charge			
Ownership	Data	Comment	
Port land	Crown		
Transit shed	Crown		
Other buildings and facilities	Crown		
PORT TRAFFIC	2004	2005	2006
Shipping service frequency (indicate interval)			
indicate shipping line and vessel			
Annual ship arrivals			
indicate shipping line and vessel where possible			
cruise liners	22	26	28
container ships	32	34	42
indicate yacht, fishing, cruise ships where possible			
Boats based in port by number and type			
commerical fishing, diving, tourist			fishing = 18, diving = 3, others = 12
private boats			24

Annual port traffic			
passenger arrivals and departures	15600	16000	16800
containers (number and tonnage)	2168, 51756t	2229, 54311t	2243, 54701t
pallets (number and tonnage)			
diesel (number of tanks and litres)			
petrol (number of tanks and litres)	24428027	26474770	27142740
aviation fuel (number of tanks and litres)			
LPG (number of tanks and litres)			

Telecommunications Inventory

Island: Aitutaki

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	30
individual house connections	598
no. public access centers	5
system capacity	716
total length of distribution network (m)	100km
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	20
individual house connections	200
no. public access centers	2
system capacity	500
Internet	
Dial-up access	

service coverage (% households)	598
connection access speed (kbs)	56K
individual house connections	40
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	598
connection access speed (kbs)	115/256 K
individual house connections	15
no. public access centers	1
Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	5
no. technicians on island	2

type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Airport Inventory				
Island: Aitutaki			Date:	
AIRPORT INVENTORY				
Airfield	Data	Comment on condition		
Runway name	Aitutaki			
length (m)	1820			
width (m)	30			
pavement construction	bitumen chip sealing			
runway markings?	yes			
runway lighting?	yes			
Runway Strip				
length (m)	2100			
width (m)	150			
Taxiway if applicable				
length (m)				
width (m)				
pavement construction				
markings?				
lighting?				
Apron				
length (m)	66			
width (m)	49			

pavement construction	bitumen chip sealing			
markings?	yes			
lighting?	yes			
Visual aids				
Windsock (lighted?)	yes, yes			
VASIS or PAPI?	PAPI			
other	NA			
Other airfield facilities				
drainage	no			
fencing	yes	deterrent only		
Safety issues				
obstacle clearances - buildings, trees	no	compliance		
livestock, vehicles, pedestrians in strip	no			
erosion, flooding, sea surges	no	susceptible to sea surges during severe cyclones		
Telecommunications and Radio Nav aids	Data	Comment		
ATC facility/equipment?	yes	air traffic control via Rarotonga		
Navaid?	yes	NDB		
NOTAM or weather report facility?	yes	air traffic control via Rarotonga		
Aircraft Support and Utilities	Data	Comment		
Aircraft fuel storage				
capacity (l)				
type of storage				
frequency and reliability of resupply				
Fire and Rescue				
category and vehicle	ICAO Category 5?? or 4??			
Water supply				
storage capacity (l)	2 x 3000 litres			
storage type	plastic tanks			
source	groundwater well			
Power supply				

main power?	yes			
standby generator?	yes			
Telecommunications				
telephone	yes			
fax	yes			
internet	yes			
Passenger and Cargo Handling	Data	Comment		
Terminal building (sq m)	760			
construction, age and condition	timber framed	built 2000, structurally OK		
passenger handling counter?	yes			
baggage handling?	yes			
water supply	yes			
toilets	yes			
power supply	yes			
telephone	yes			
Airport Maintenance	Data	Comment		
Maintenance equipment	AACI			
Maintenance service	AACI/Contractor			
Airport Ownership	Data	Comment		
Airport land	Lease to Crown			
Terminal building	AACI			
Other buildings and facilities	AACI			
Landing charge?	yes, aircraft: < 5700kg MGTOW = \$29.40, < 40t MGTOW = \$5.30 per 1000kg, > 40t MGTOW - prior approval			
Terminal rental charge?	yes	\$5.00 per passenger		
AIRPORT TRAFFIC	2004	2005	2006	
Scheduled flights per week by aircraft type				
Flights by other than Air Rarotonga				

Annual or monthly aircraft movements	1591	1581		
Annual or monthly arriving and departing pax	31247, 33225	3117, 30555		
Annual or montly arriving and departing cargo				

Port and Harbour Inventory

Island: Aitutaki

Date:

PORT AND HARBOUR INVENTORY	
Facilities	Data Comment on condition
Breakwater details	NIL
Wharf or Jetty length (m)	100
cargo loading/unloading area (sq m)	2000
cargo storage area (sq m)	1400
Slipway length (m)	30
width (m)	12
construction (concrete, other)	reinf concrete
Barge dimensions (m)	2 nos 18 x 4.8m
capacity (t)	40t
engines (no. and hp)	2 nos 95HP outboard motors
construction (aluminium, steel)	steel
age and condition	6yrs - good, 15yrs - deteriorating
Cargo handling crane type and capacity (t)	2 nos P&H 30t, Coradini

	22t		
fork lift truck and capacity (t)	NIL		
age and condition of each	good, fair		
Transit shed			
area (sq m)	200		
construction type	conc floor, steel framing, corrugated iron claddings for roof & walls		
age and condition	over 20 yrs, good		
concrete floor	yes		
Breakwater details	NIL		
Navigation aids details	Lead-in light, VHF		
Port Charges	Data	Comment	
Lighterage service (\$/tonne or \$/pallet)			
Berthing fee structure			
Cargo storage charge			
Ownership	Data	Comment	
Port land	Crown		
Transit shed	Crown		
Other buildings and facilities	Crown		
PORT TRAFFIC	2004	2005	2006
Shipping service frequency (indicate interval)			
indicate shipping line and vessel			
cruise liners	26	28	32
container ships	32	36	38
indicate shipping line and vessel where possible			
indicate yacht, fishing, cruise ships where possible			

Boats based in port by number and type	fishing = 3, private = 2		
commerical fishing, diving, tourist			
private boats			
Annual port traffic			
passenger arrivals and departures		300	400
containers (number and tonnage)	449, 8066t	407, 8119	480, 9120
pallets (number and tonnage)			
diesel (number of tanks and litres)			
petrol (number of tanks and litres)	1.5 million litres	1.5 million litres	1.7 million litres
aviation fuel (number of tanks and litres)			
LPG (number of tanks and litres)			

Telecommunications Inventory
Island:Atiu

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	87
individual house connections	188
no. public access centers	5
system capacity	216
total length of distribution network (m)	50k
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	188
connection access speed (kbs)	56K
individual house connections	5
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1

Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Airport Inventory
Island: Atiu

Date:

AIRPORT INVENTORY	
<i>Airfield</i>	Data Comment on condition
Runway name	Atiu Licensee: The Proprietary of the Enuamanu Airport Incorporated
length (m)	1300
width (m)	30
pavement construction	compacted coral sand and gravel
runway markings?	no
runway lighting?	no
Runway Strip	
length (m)	1300
width (m)	90
Taxiway if applicable	NA
length (m)	
width (m)	
pavement construction	
markings?	
lighting?	
Apron	
length (m)	
width (m)	
pavement construction	reinforced concrete
markings?	no
lighting?	no
Visual aids	
Windsock (lighted?)	yes (no)
VASIS or PAPI?	
other	
Other airfield facilities	

drainage	no	
fencing	deterrant only	
Safety issues		
obstacle clearances - buildings, trees	no	
livestock, vehicles, pedestrians in strip	yes	
erosion, flooding, sea surges	no	
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?		
Navaid?		
NOTAM or weather report facility?	via air traffic control in Rarotonga	
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage	NA	
capacity (l)		
type of storage		
frequency and reliability of resupply		
Fire and Rescue	NA	
category and vehicle		
Water supply		
storage capacity (l)	5000	
storage type	concrete tank	
source	rainwater catchment	
Power supply	NA	
main power?		
standby generator?		
Telecommunications	yes	
telephone	yes	operated by Air Raro
fax	yes	operated by Air Raro
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)		

construction, age and condition	reinforced concrete		
passenger handling counter?	yes		
baggage handling?	yes		
water supply	yes		
toilets	yes		
power supply	no		
telephone	yes		
Airport Maintenance	Data	Comment	
Maintenance equipment	Contract/AIA	Shared btwn PEAI and AIA	
Maintenance service	Contract/AIA	Shared btwn PEAI and AIA	
Airport Ownership	Data	Comment	
Airport land	The Proprietary of the Enuamanu Airport Incorporated		
Terminal building	The Proprietary of the Enuamanu Airport Incorporated		
Other buildings and facilities	The Proprietary of the Enuamanu Airport Incorporated		
Landing charge?	\$30		
Terminal rental charge?	no		
AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type			
Flights by other than Air Rarotonga			
Annual or monthly aircraft movements			
Annual or monthly arriving and departing pax			
Annual or montly arriving and departing cargo			
Telecommunications Inventory			
Island: Mangaia			Date: 28/07/2006
SERVICES			
Telephone			
Landlines			
service coverage (% households)	93		
individual house connections	213		

no. public access centers	1
system capacity	228
total length of distribution network (m)	50km
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	0
individual house connections	0
no. public access centers	0
system capacity	0
Internet	
Dial-up access	
service coverage (% households)	598
connection access speed (kbs)	56K
individual house connections	5
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1
Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
Describe procedure of issuing warnings	Radio/TV broadcasts

TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	2
type and qualification of technicians	CISC
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
list any issues here:	

Airport Inventory

Island: Mangaia

Date:

AIRPORT INVENTORY		
Airfield	Data	Comment on condition
Runway name	Mangaia	CIBE: Lat 21' 53' 57", Long 157' 54' 13" - Datum WGS84, 13m amsl
length (m)	1060	
width (m)	30	
pavement construction	compacted coral sand and gravel	
runway markings?	yes	painted tyre markers (rescue orange)
runway lighting?	no	
Runway Strip		

length (m)	1060	
width (m)	60	
Taxiway if applicable	NA	
length (m)		
width (m)		
pavement construction		
markings?		
lighting?		
Apron		
length (m)		
width (m)		
pavement construction	reinforced concrete	
markings?	no	
lighting?	no	
Visual aids		
Windssock (lighted?)	yes (no)	
VASIS or PAPI?		
other		
Other airfield facilities		
drainage		
fencing		
Safety issues		
obstacle clearances - buildings, trees	no	
livestock, vehicles, pedestrians in strip	yes	fence only a deterrant to vehicles and livestock
erosion, flooding, sea surges	yes	western end damaged by cyclone, yet to be repaired
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?		
Navaid?		
NOTAM or weather report facility?	yes	received via air traffic control in Rarotonga
Aircraft Support and Utilities	Data	Comment

Aircraft fuel storage	NA	
capacity (l)		
type of storage		
frequency and reliability of resupply		
Fire and Rescue	NA	
category and vehicle		
Water supply	Yes	
storage capacity (l)	6000	
storage type	plastic tank	
source	rainwater	
Power supply	NA	
main power?		
standby generator?		
Telecommunications	Yes	
telephone	yes	operated by Air Raro
fax		
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)		
construction, age and condition	1994	
passenger handling counter?	yes	
baggage handling?	yes	
water supply	yes	
toilets	yes	
power supply	no	
telephone	yes	operated by Air Raro
Airport Maintenance	Data	Comment
Maintenance equipment	MIA	
Maintenance service	MIA	
Airport Ownership	Data	Comment

Airport land	Numangatini	On behalf of Te Aronga Mana	
Terminal building	Numangatini	On behalf of Te Aronga Mana	
Other buildings and facilities	Numangatini	On behalf of Te Aronga Mana	
Landing charge?			
Terminal rental charge?			
AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type			
Flights by other than Air Rarotonga			
Annual or monthly aircraft movements			
Annual or monthly arriving and departing pax			
Annual or monthly arriving and departing cargo			

Airport Inventory

Island: Manihiki

Date:

AIRPORT INVENTORY	
Airfield	Data Comment on condition
Runway name	Manihiki
length (m)	1300 proposed 1800m
width (m)	30
pavement construction	compacted coral sand and gravel
runway markings?	no
runway lighting?	no
Runway Strip	
length (m)	1300
width (m)	90 upgraded
Taxiway if applicable	NA
length (m)	
width (m)	
pavement construction	

markings?		
lighting?		
Apron		
length (m)		
width (m)		
pavement construction	reinforced concrete	
markings?	no	
lighting?	no	
Visual aids		
Windsock (lighted?)	no	
VASIS or PAPI?		
other		
Other airfield facilities		
drainage		
fencing		
Safety issues		
obstacle clearances - buildings, trees	yes	most trees and some physical structure non-compliance
livestock, vehicles, pedestrians in strip	yes	no fence
erosion, flooding, sea surges	yes	susceptible to damage from sea surges during cyclones
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?		
Navaid?		
NOTAM or weather report facility?	yes	received via air traffic control in Rarotonga
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage	yes	operated by Air Raro
capacity (l)		capacity varies depending on frequency of boats to Manihiki
type of storage	200 litre drums	
frequency and reliability of resupply		once every 6 months, not reliable
Fire and Rescue	NA	
category and vehicle		

Water supply	NIL	
storage capacity (l)		
storage type		
source		
Power supply	NIL	
main power?		
standby generator?		
Telecommunications	Yes	
telephone	yes	operated by Air Raro
fax	nil	
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)	65	privately owned micro shelter
construction, age and condition	concrete floor, timber framed	
passenger handling counter?	yes	
baggage handling?	yes	
water supply	no	
toilets	no	
power supply	no	
telephone	yes	operated by Air Raro
Airport Maintenance	Data	Comment
Maintenance equipment	MIA	
Maintenance service	MIA	
Airport Ownership	Data	Comment
Airport land	Land owners	
Terminal building	Private	
Other buildings and facilities	nil	
Landing charge?	\$100	Collected by Manihiki landowners
Terminal rental charge?		

AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type			1
Flights by other than Air Rarotonga			nil
Annual or monthly aircraft movements			
Annual or monthly arriving and departing pax			
Annual or montly arriving and departing cargo			

Telecommunications Inventory
Island:Manihiki

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	60
individual house connections	114
no. public access centers	1
system capacity	192
total length of distribution network (m)	10k
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	60
connection access speed (kbs)	56K

individual house connections	3
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1
Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1

COMMUNITY TELECOMMUNICATION ISSUES
<i>list any issues here:</i>

Water Supply Inventory

Island:

Date:

SOURCES	Type #1	Type #2	Type #3	Type #4
Rainwater				
Number of domestic rainwater tanks				
capacity of tanks (L)				
typical catchment/roof area (m ²)				
first flush mechanism fitted (Y/N)				
tank condition				
water quality				
Number of communal rainwater tanks				
capacity of tanks (L)				
typical catchment area (m ²)				
first flush mechanism fitted (Y/N)				
tank condition				
water quality				
adequate cyclone protection for tanks				
Groundwater	Bore #1	Bore #2	Bore #3	Bore #4
bore diameter (mm)	100mm	100mm	100mm	100mm
depth to water table (m)	4.28m	9.0m	9.0m	9.5m
no. of pumps	1	1	1	1
pump make and model	Southern Cross	Southern Cross	Southern Cross	Southern Cross
pump model	HDE3	HDE3	HDE3	HDE3
pump duty if known (flow, head)				
bore/pump condition	fair	fair	fair	fair
water quality	good			

Groundwater	Bore #5	Bore #6	Bore #7	Bore #8
bore diameter (mm)	100mm	100mm	100mm	100mm
depth to water table (m)	9.0m	9.5m	9.0m	9.0m
no. of pumps	1	none	none	none
pump make	Southern Cross			
pump model	HDE3			
pump duty if known (flow, head)				
bore/pump condition	deteriorating			
water quality	good			
Springs	Source #1	Source #2	Source #3	Source #4
discharge rate (L/s)				
seasonal variation in flow (large-small)				
elevation above sea level (m)				
water quality				
Streams				
discharge rate (L/s)				
seasonal variation in flow (large-small)				
elevation above sea level (m)				
water quality				
DISTRIBUTION SYSTEM				
Pipelines	Type #1	Type #2	Type #3	Type #4
diameter (mm)	75mm	50mm	40mm	20mm
total length (m)	130	2500m, 300m	900m	300
material (GI, PVC, HDPE etc)	GI	GI, HDPE	GI	GI
condition				
year installed				
Distribution Storages	Kimiangatau	Oiretumu		
capacity (litres)	22500	22500		
elevated/on-ground	elevated	elevated		

condition	good	good		
adequate cyclone protection	good	good		
Pump Stations	Pump Station #1	Pump Station #2	Pump Station #3	Pump Station #4
no. of pumps				
pump make				
pump model				
pump power rating (kW)				
pump duty if known (flow, head)				
condition of pumps				
year of installation				
power supply				
Isolating Valves				
number	6	6		
diameter	50mm	50mm		
condition	good	good		
TREATMENT				
communal source treatment				
households boiling water? (Y/N)				
OPERATION AND MAINTENANCE				
no. of operators/technicians	2			
skill type and qualification of technicians	trade			
how often are rainwater tanks cleaned	community/MIA			
plant and equipment used				
are headworks cyclone-proof?	yes			
annual council operating costs (\$/year)				
USER CHARACTERISTICS				
no. of people on island	389			

no. of households on island	198			
no. connections to piped network	192			
no. properties not connected to network and have no rainwater tank	6			
no. dwellings relying on water vendors	nil			
Wastewater Management Inventory				
Island:				Date:
ON-SITE SYSTEMS				
Septic Tanks	Type #1		Type #2	
Treatment system	Flush		Pour flush	
quantity (no. of tanks)	134		5	
capacity (L)	5000		5000	
no. of chambers	2		2	
tank condition (typical)	good		good	
desludging frequency (years)	only when full (8-10 yrs)		only when full	
Effluent disposal				
absorption trenches (if Yes length, m)	nil		nil	
soakage pits	yes		yes	
disposal to land or sea	land		land	
get on-site water logging? (Y/N)	no		no	
Pit Latrines				
quantity (installed in how many houses)	51			
typical capacity (m3)	0.4			
condition (well maintained, flies etc)	fair			
how often is it "moved"?	4yrs			
get on-site water logging? (Y/N)	no			
Lagoon Toilets				
quantity (used by how many houses)				
how often "move"				

Other				
description				
no. of households using this method				
In-house Wastewater Generation				
Toilets				
no. flush units				
no. pour-flush units				
Wastewater sources*				
are black and grey waters separated (Y/N)				
if separated, where is greywater going?				
*note: blackwater - toilet, kitchen wastes; greywater - wastewater from bath, laundry etc				
Commercial Premises	Type #1	Type #2	Type #3	Type #4
Treatment plant				
type of process				
capacity (m3/day)				
no. of such facilities on island				
to where is treated effluent discharged?				
power source and usage (kWh)				
condition of plant				
year installed				
Waste management				
is effluent discharge monitored/recorded?				
effluent quality				
how is sludge treated and how often?				
SEPTAGE TREATMENT FACILITIES	Nil			
type of system				
capacity (m3/day)				
to where is treated effluent discharged?				

power source and usage (kWh)				
condition of plant				
year installed				
OPERATION AND MAINTENANCE	Nil			
no. of plumbers on the island				
skill level/qualification of technicians				
if have central plant, no. of operators				
plant and equipment used				
annual municipal operating costs (\$/year)				
ENVIRONMENTAL EFFECTS				
are there any algal blooms in lagoon?	no			
lagoon water quality	good			
freshwater lens water quality	good			
HEALTH EFFECTS				
collect annual statistics fro the past 3-5 years on water-borne diseases				
Year	2005	2004	2003	2002
infant mortality				
diarrhea				
dysentery				
hepatitis				
worms				
fish poisoning				
COMMUNITY ATTITUDE				
1. Satisfaction with the current sanitation practices?				
2. Aware of the link between groundwater contamination and onsite waste disposal (septic tanks)?				

3. Is it better to discharge treated waste water into the sea (beyond the reef if possible) or to land?				
4. Is there any link between the waste discharge and the water quality in the lagoon?				
5. What is preferable, discharge of reclaimed water from waste plants to land or into the sea?				
6. Willing to make a small contribution towards operating a wastewater system if it eliminates waste problems around the house?				
COMMUNITY SANITATION ISSUES				
list any issues here:				

Solid Waste Management Inventory

Island: MAUKE

Date:

13-Jul-06

WASTE DISPOSAL METHODS	
<i>Domestic Waste</i>	
indicative quantity (kg/household/week)	15
any separation at source? (Y/N)	N
how separated? (compostables, etc)	
how is rubbish stored at the house?	Bin
means of disposal (council collection, self)	MIA collection
compostables	Dump
plastics, paper	Dump
frequency of disposal (days)	14
<i>Commercial Waste</i>	
no. people on premises	10
indicative quantity (kg/premise. week)	20
any separation at source? (Y/N)	N
how separated (compostables, etc)	
means of disposal (council collection, self)	MIA collection
compostables	Dump
plastics, paper	Dump
frequency of disposal (days)	14
any fee paid? (\$/collection)	N
<i>Metals and Hazardous Waste</i>	
type of material (metals, engine oil, etc)	metals
how often collected	14 days
indicative quantity	25
means of collection	MIA collection
any fee paid? (\$/collection)	N

MUNICIPAL DISPOSAL SITES	
<i>Municipal Landfill or Dump</i>	
capacity (m ³)	
ex spare capacity (m ³ or %)	
is there waste separation on site? (Y/N)	
is site lined?	
is leachate intercepted for treatment?	
type and no. of mech plant, equipment	
condition of site (management)	
year constructed	
<i>Recycling Depot</i>	
capacity (m ³)	
what materials are collected	
recyclables packaging procedures	
where are recyclables shipped to?	
how often is shipment made?	
cost per shipment	
<i>Hazardous Material Recycling Facility</i>	
what materials are collected	
packaging procedures	
where are recyclables shipped to?	
how often is shipment made?	
cost per shipment	
OPERATION AND MAINTENANCE	
no. of council staff in solid waste section	2

no. operators at council disposal site		nil
skill level of operators		semi skilled
no. staff at recycling depot		nil
no. staff involved in haz waste recycling		2
annual council operating costs (\$/year)		
ENVIRONMENTAL EFFECTS		
are pigs, flies etc a nuisance problem?		yes
are wind-blown plastic bags a problem?		yes
any rubbish entering lagoon?		no
COMMUNITY ATTITUDE		
1. Satisfaction with the current solid waste management practices?		yes
2. Would prefer regular council collection of rubbish or disposal by self?		leave as is
3. Would do onsite composting if given the equipment and know-how?		yes
4. Would be prepared to separate rubbish before disposal to save valuable land areas?		yes
5. Willing to make a small contribution towards council operating a total waste management collection and treatment system?		yes
Electricity Supply Inventory		
Island: Mauke		Date:
ELECTRICITY GENERATION		
Diesel Generators		
no, of units	4	
genset make	Lister	
genset model	212 HR6 AM 20 161 HR6 20	459 HR6 A28 201 HR6 A24
capacity (kWh)	42 42	42 42
year installed	2002 2002	2006 2004
condition	good good	good good
current generation rate (kWh/day)	680	
fuel storage capacity (L)	16880	

fuel storage adequate for how many days	20		
adequate cyclone protection for plant?	yes		
Alternate Energy Sources	NA		
type (solar, wind)			
generation capacity (kWh)			
year installed			
condition			
current generation rate (kWh/day)			
what proportion of demand met (%)			
reliability (%)			
adequate cyclone protection for plant?			
Household Solar Panels (where applicable)			
no. of households fitted with panels			
house electricity demand met (%)			
reliability (%)			
regular maintenance done? (if Yes, what)			
adequate cyclone protection for panels?			
DISTRIBUTION NETWORK			
network coverage (%)	100		
supply availability (hrs/day)	24		
length of cabling in network (m)			
proportion of cables underground (%)			
electricity poles of what material?	timber and concrete		
any service transformers (no.)	5 nos Tyree		
make and capacity of transformers	3 x 30kva	1x50kva	1x100kva
condition of system	good		
year constructed	1986		

TARIFFS AND REVENUE		
current tariffs	commercial - \$0.58, domestic - \$0.36	
frequency of billing	mthly	
annual revenue collected	\$97,000	
annual operating costs	\$127,000	
OPERATION AND MAINTENANCE		
no. of council staff in electricity section	4	
no. technicians on island	2	
type and qualification of technicians	CINC	
plant and equipment used	Hiab crane truck	
any emergency spare parts in storage	nil	
COMMUNITY ELECTRICITY ISSUES		
list any issues here:		
1. low voltage experienced during peak hours at the end of the distribution network		
2		
Telecommunications Inventory		
Island:Mauke	Date:	28/07/2006
SERVICES		
Telephone		
Landlines		
service coverage (% households)	95	
individual house connections	133	
no. public access centers	1	
system capacity	140	
total length of distribution network (m)	50k	
lines underground (%)	100	
condition	excellent	

Mobile network coverage		
service coverage (% households)		
individual house connections		
no. public access centers		
system capacity		
Internet		
Dial-up access		
service coverage (% households)	95	
connection access speed (kbs)	56K	
individual house connections	5	
no. public access centers	1	
Broadband (ADSL)		
service coverage (% households)	0	
connection access speed (kbs)	256K	
individual house connections	0	
no. public access centers	1	
Radio and Television		
no. of radio stations AM/FM	1	
no of television channels	1	
EMERGENCY WARNINGS		
Describe procedure of issuing warnings	Radio/TV broadcasts	
TARIFFS AND REVENUE		
current tariffs		
telephone		
internet access		

frequency of billing		
annual revenue collected		
annual operating costs		
OPERATION AND MAINTENANCE		
no. of staff on island	2	
no. technicians on island	1	
type and qualification of technicians		
transmission stations cyclone-proof?	1	
any emergency spare parts in storage	1	
COMMUNITY TELECOMMUNICATION ISSUES		
list any issues here:		
high cost of telephone charges		
email/internet high cost		
tv channels not enough		
frequent telephone breakdowns, delays in tending to faults		
continuous/repeated same faults		
need mobile telecomm		
radio telephone - emergencies, ship to shore communications		

Road Inventory
Island: Mauke

Date:

ROAD INVENTORY				
<i>Length of Road</i>	Good condition	Fair condition	Poor condition	Total
Sealed Road Length (km)				
single bituminous surface treatment				
double bituminous surface treatment				
other (AC, concrete)				
subtotal				
Gravel/crushed limestone (km)				
Earth				
Total				
<i>Bridges and Culverts</i>	Good condition	Fair condition	Poor condition	Total
Bridges (no)				
concrete				
steel including Bailey				
timber				
other (masonry)				
Total				
Culverts (no)				
concrete box				
concrete pipe	2			
steel pipe				
masonry				
Total	2			
Causeways and swales (no)	nil			
MOTOR VEHICLE REGISTRATIONS				
2006 Registrations				
Cars and 4WD				
Buses				
Trucks - light and pickups				

Trucks – medium	
Trucks - heavy (>2 axles)	
Motorcycles	
Total	

Airport Inventory
Island: Mauke

Date: 13-Jul-06

AIRPORT INVENTORY	
<i>Airfield</i>	Data Comment on condition
Runway name	Mauke
length (m)	1800
width (m)	90
pavement construction	compacted coral sand/aggregates
runway markings?	car tyres
runway lighting?	nil
Runway Strip	
length (m)	
width (m)	
Taxiway if applicable	nil
length (m)	
width (m)	
pavement construction	
markings?	
lighting?	
Apron	
length (m)	
width (m)	
pavement construction	reinforced concrete
markings?	nil
lighting?	nil
Visual aids	
Windsock (lighted?)	yes (not lighted)
VASIS or PAPI?	nil
other	nil
Other airfield facilities	
drainage	nil

fencing	partly	
Safety issues		
obstacle clearances - buildings, trees		
livestock, vehicles, pedestrians in strip		
erosion, flooding, sea surges	nil, nil, once during cyclone	
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?	nil	
Navaid?	nil	
NOTAM or weather report facility?	radio telephone	received via air traffic control in Rarotonga
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage	nil	
capacity (l)		
type of storage		
frequency and reliability of resupply		
Fire and Rescue	nil	
category and vehicle		
Water supply		
storage capacity (l)	water tank	
storage type		
source	reticulated	
Power supply		
main power?	mains power	
standby generator?	nil	
Telecommunications		
telephone	yes	operated by Air Raro
fax	yes	operated by Air Raro
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)		
construction, age and condition		

passenger handling counter?	yes		
baggage handling?	yes		
water supply	yes		
toilets	yes		
power supply	yes		
telephone	no		
Airport Maintenance	Data	Comment	
Maintenance equipment	MIA	slasher, grass cutter, lawn movers	
Maintenance service	MIA		
Airport Ownership	Data	Comment	
Airport land	Land owners		
Terminal building	Land owners		
Other buildings and facilities	Land owners		
Landing charge?	\$20 (\$10 - MIA, \$10 - Landowners)		
Terminal rental charge?	nil		
AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type	3 x Banderante	3 x Banderante	3 x Banderante
Flights by other than Air Rarotonga	nil	nil	nil
Annual or monthly aircraft movements	12 monthly	12 monthly	12 monthly
Annual or monthly arr and dep pax			
Annual or monthly arr and dep cargo		Dep 28972kg	

Port and Harbour Inventory
Island: Mauke

Date: 13-Jul-06

PORT AND HARBOUR INVENTORY	
Facilities	Data Comment on condition
Breakwater	
details	southern side only
Wharf or Jetty	
length (m)	
cargo loading/unloading area (sq m)	
cargo storage area (sq m)	
Slipway	
length (m)	15
width (m)	6.8m
construction (concrete, other)	reinforced concrete
Barge	
dimensions (m)	2.4x5.4x.8
capacity (t)	8
engines (no. and hp)	40hp Yamaha 2-stroke
construction (aluminium, steel)	aluminium
age and condition	9yrs, OK
Cargo handling	
crane type and capacity (t)	Hiab crane truck, 5t, deteriorating
fork lift truck and capacity (t)	nil
age and condition of each	
Transit shed	
area (sq m)	
construction type	timeber framed

age and condition	20		
concrete floor	yes		
Breakwater details	reinforced concrete		
Navigation aids details	navigation lights		
Port Charges	Data	Comment	
Lighterage service (\$/tonne or \$/pallet)	\$30/pallet, \$30/m3		
Berthing fee structure	nil		
Cargo storage charge	nil		
Ownership	Data	Comment	
Port land	Crown		
Transit shed	Crown		
Other buildings and facilities	Crown		
PORT TRAFFIC	2004	2005	2006
Shipping service frequency (indicate interval)			
indicate shipping line and vessel	one per month	one per month	one per month
Annual ship arrivals			
indicate shipping line and vessel where possible	Taio Shipping		
indicate yacht, fishing, cruise ships where possible	nil		
Boats based in port by number and type	nil		
commercial fishing, diving, tourist			
private boats			
Annual port traffic			
passenger arrivals and departures	nil		

containers (number and tonnage)	nil
pallets (number and tonnage)	
diesel (number of tanks and litres)	
petrol (number of tanks and litres)	
aviation fuel (number of tanks and litres)	nil
LPG (number of tanks and litres)	

Electricity Supply Inventory
Island: Mitiaro

Date:

ELECTRICITY GENERATION				
<i>Diesel Generators</i>				
no, of units	4			
genset make	Lister			
genset model	212 HR6 AM 20			
capacity (kWh)	42			
year installed	2002			
condition	good			
current generation rate (kWh/day)	680			
fuel storage capacity (L)				
fuel storage adequate for how many days	20			
adequate cyclone protection for plant?	yes			
<i>Alternate Energy Sources</i>				
type (solar, wind)				
generation capacity (kWh)				
year installed				
condition				
current generation rate (kWh/day)				
what proportion of demand met (%)				
reliability (%)				
adequate cyclone protection for plant?				
<i>Household Solar Panels (where applicable)</i>				
no. of households fitted with panels				
house electricity demand met (%)				
reliability (%)				
regular maintenance done? (if Yes, what)				
adequate cyclone protection for panels?				

DISTRIBUTION NETWORK				
network coverage (%)	100			
supply availability (hrs/day)	24			
length of cabling in network (m)				
proportion of cables underground (%)				
electricity poles of what material?	timber and concrete			
any service transformers (no.)	5 nos Tyree			
make and capacity of transformers	3 x 30kva	1x50kva	1x100kva	
condition of system	good			
year constructed	1986			
TARIFFS AND REVENUE				
current tariffs	commercial - \$0.58, domestic - \$0.36			
frequency of billing	mthly			
annual revenue collected	\$97,000			
annual operating costs	\$127,000			
OPERATION AND MAINTENANCE				
no. of council staff in electricity section	4			
no. technicians on island	2			
type and qualification of technicians	CINC			
plant and equipment used	Hiab crane truck			
any emergency spare parts in storage	nil			
COMMUNITY ELECTRICITY ISSUES				
<i>list any issues here:</i>				
1. low voltage experienced during peak hours at the end of the distribution network				
2				

Telecommunications Inventory

Island: Mitiaro

Date:

28/07/2006

SERVICES	
Telephone	
Landlines	
service coverage (% households)	78
individual house connections	79
no. public access centers	1
system capacity	92
total length of distribution network (m)	5k
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	78
connection access speed (kbs)	56K
individual house connections	0
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	78
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1
Radio and Television	

no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	1
no. technicians on island	1
type and qualification of technicians	CISC
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Airport Inventory
Island: Mitiaro
Date: 13-Jul-06

AIRPORT INVENTORY	
<i>Airfield</i>	Data Comment on condition
Runway name	Mitiaro
length (m)	1500
width (m)	30
pavement construction	compacted coral sand/aggregates
runway markings?	car tyres only for part of the runway
runway lighting?	nil
Runway Strip	
length (m)	1500
width (m)	90
Taxiway if applicable	nil
length (m)	
width (m)	
pavement construction	
markings?	
lighting?	
Apron	
length (m)	
width (m)	
pavement construction	reinforced concrete
markings?	nil
lighting?	nil
Visual aids	
Windsock (lighted?)	yes (not lighted)
VASIS or PAPI?	nil
other	nil
Other airfield facilities	
drainage	nil

fencing	partly	
Safety issues		
obstacle clearances - buildings, trees	no	
livestock, vehicles, pedestrians in strip	no	
erosion, flooding, sea surges	susceptible to sea surges during cyclones	
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?	nil	
Navaid?	nil	
NOTAM or weather report facility?	radio telephone	received via air traffic control in Rarotonga
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage	nil	
capacity (l)		
type of storage		
frequency and reliability of resupply		
Fire and Rescue	nil	
category and vehicle		
Water supply	NIL	
storage capacity (l)		
storage type		
source		
Power supply	NIL	
main power?		
standby generator?		
Telecommunications		
telephone	yes	operated by Air Raro
fax		
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)		
construction, age and condition	reinf concrete and timber framed, OK	

passenger handling counter?	yes		
baggage handling?	yes		
water supply	no		
toilets	yes		
power supply	no		
telephone	yes		
Airport Maintenance	Data	Comment	
Maintenance equipment	MIA	slasher, grass cutter, lawn movers	
Maintenance service	MIA		
Airport Ownership	Data	Comment	
Airport land	Land owners		
Terminal building	Land owners		
Other buildings and facilities	Land owners		
Landing charge?	\$20 (\$10 - MIA, \$10 - Landowners)		
Terminal rental charge?	nil		
AIRPORT TRAFFIC	2004	2005	2006
Scheduled flights per week by aircraft type	3 x Banderante	3 x Banderante	3 x Banderante
Flights by other than Air Rarotonga	nil	nil	nil
Annual or monthly aircraft movements	12 monthly	12 monthly	12 monthly
Annual or monthly arr and dep pax			
Annual or monthly arr and dep cargo			

Solid Waste Management Inventory
Island: MAUKE

Date: 13-Jul-06

WASTE DISPOSAL METHODS	
<i>Domestic Waste</i>	
indicative quantity (kg/household/week)	15
any separation at source? (Y/N)	N
how separated? (compostables, etc)	
how is rubbish stored at the house?	Bin
means of disposal (council collection, self)	MIA collection
compostables	Dump
plastics, paper	Dump
frequency of disposal (days)	14
<i>Commercial Waste</i>	
no. people on premises	10
indicative quantity (kg/premise. week)	20
any separation at source? (Y/N)	N
how separated (compostables, etc)	
means of disposal (council collection, self)	MIA collection
compostables	Dump
plastics, paper	Dump
frequency of disposal (days)	14
any fee paid? (\$/collection)	N
<i>Metals and Hazardous Waste</i>	
type of material (metals, engine oil, etc)	metals
how often collected	14 days
indicative quantity	25
means of collection	MIA collection
any fee paid? (\$/collection)	N

MUNICIPAL DISPOSAL SITES	
<i>Municipal Landfill or Dump</i>	
capacity (m ³)	
ex spare capacity (m ³ or %)	
is there waste separation on site? (Y/N)	
is site lined?	
is leachate intercepted for treatment?	
type and no. of mech plant, equipment	
condition of site (management)	
year constructed	
<i>Recycling Depot</i>	
capacity (m ³)	
what materials are collected	
recyclables packaging procedures	
where are recyclables shipped to?	
how often is shipment made?	
cost per shipment	
<i>Hazardous Material Recycling Facility</i>	
what materials are collected	
packaging procedures	
where are recyclables shipped to?	
how often is shipment made?	
cost per shipment	
OPERATION AND MAINTENANCE	
no. of council staff in solid waste section	2
no. operators at council disposal site	nil
skill level of operators	semi skilled
no. staff at recycling depot	nil

no. staff involved in haz waste recycling	2
annual council operating costs (\$/year)	
ENVIRONMENTAL EFFECTS	
are pigs, flies etc a nuisance problem?	yes
are wind-blown plastic bags a problem?	yes
any rubbish entering lagoon?	no
COMMUNITY ATTITUDE	
1. Satisfaction with the current solid waste management practices?	yes
2. Would prefer regular council collection of rubbish or disposal by self?	leave as is
3. Would do onsite composting if given the equipment and know-how?	yes
4. Would be prepared to separate rubbish before disposal to save valuable land areas?	yes
5. Willing to make a small contribution towards council operating a total waste management collection and treatment system?	yes
COMMUNITY SOLID WASTE ISSUES	
<i>list any issues here:</i>	

Telecommunications Inventory
Island:Penrhyn

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	82
individual house connections	95
no. public access centers	1
system capacity	116
total length of distribution network (m)	10k
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	82
connection access speed (kbs)	56K
individual house connections	3
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1

Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

**Airport Inventory
Island: Penrhyn**

Date:

AIRPORT INVENTORY	
<i>Airfield</i>	Data Comment on condition
Runway name	Penrhyn
length (m)	2286.5
width (m)	30
pavement construction	compacted coral sand and gravel
runway markings?	no
runway lighting?	no
Runway Strip	
length (m)	2286.5
width (m)	90
Taxiway if applicable	NA
length (m)	
width (m)	
pavement construction	
markings?	
lighting?	
Apron	
length (m)	
width (m)	
pavement construction	reinforced concrete
markings?	nil
lighting?	nil
Visual aids	
Windsock (lighted?)	yes (no)
VASIS or PAPI?	
other	
Other airfield facilities	
drainage	

fencing		
Safety issues		
obstacle clearances - buildings, trees		
livestock, vehicles, pedestrians in strip		
erosion, flooding, sea surges		
Telecommunications and Radio Nav aids	Data	Comment
ATC facility/equipment?		
Navaid?		
NOTAM or weather report facility?		
Aircraft Support and Utilities	Data	Comment
Aircraft fuel storage	yes	operated by Air Raro
capacity (l)	varies	capacity varies depending on frequency of boats to Manihiki
type of storage	200 litre drums	
frequency and reliability of resupply		once every 6 months, not reliable
Fire and Rescue	NA	
category and vehicle		
Water supply	NIL	
storage capacity (l)		
storage type		
source		
Power supply	NIL	
main power?		
standby generator?		
Telecommunications	Yes	
telephone	yes	operated by Air Raro
fax	nil	
Passenger and Cargo Handling	Data	Comment
Terminal building (sq m)		
construction, age and condition	concrete floor, timber framed	

passenger handling counter?	no
baggage handling?	yes
water supply	yes
toilets	yes
power supply	no
telephone	no
Airport Maintenance	Data Comment
Maintenance equipment	PIA
Maintenance service	PIA
Airport Ownership	Data Comment
Airport land	Penrhyn Airport Proprietors Incorporated
Terminal building	
Other buildings and facilities	
Landing charge?	
Terminal rental charge?	
AIRPORT TRAFFIC	2004 2005 2006
Scheduled flights per week by aircraft type	
Flights by other than Air Rarotonga	
Annual or monthly aircraft movements	
Annual or monthly arriving and departing pax	
Annual or montly arriving and departing cargo	

Telecommunications Inventory
Island:Pukapuka

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	94
individual house connections	83
no. public access centers	1
system capacity	88
total length of distribution network (m)	10k
lines underground (%)	100
condition	excellent
Mobile network coverage	NA
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	94
connection access speed (kbs)	56K
individual house connections	3
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1

Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Airport Inventory				
Island: Pukapuka			Date:	
AIRPORT INVENTORY				
Airfield	Data	Comment on condition		
Runway name				
length (m)	1500m, 1250m meqasured by GHD			
width (m)				
pavement construction	coral runway			
runway markings?	overgrown by grass in some areas, 1 winsock, 2 end markers			
runway lighting?				
Runway Strip	adequate for infrequent Banderrantte flights although lots of workers sent for maintenance - very little is done			
length (m)	GHD took measurements and will prepare improvement plan probably \$2m			
width (m)				
Taxiway if applicable	6 flights x 8 persons = 100 E-D pass per person			
length (m)				
width (m)				
pavement construction				
markings?				
lighting?				
Apron				
length (m)				
width (m)				
pavement construction				
markings?				
lighting?				
Visual aids				
Windsock (lighted?)				
VASIS or PAPI?				
other				
Other airfield facilities				

drainage				
fencing				
Safety issues				
obstacle clearances - buildings, trees				
livestock, vehicles, pedestrians in strip				
erosion, flooding, sea surges				
Telecommunications and Radio Nav aids	Data	Comment		
ATC facility/equipment?				
Navaid?				
NOTAM or weather report facility?				
Aircraft Support and Utilities	Data	Comment		
Aircraft fuel storage				
capacity (l)				
type of storage				
frequency and reliability of resupply				
Fire and Rescue				
category and vehicle				
Water supply				
storage capacity (l)				
storage type				
source				
Power supply				
main power?				
standby generator?				
Telecommunications				
telephone				
fax				
Passenger and Cargo Handling	Data	Comment		
Terminal building (sq m)	thatched hut			

construction, age and condition				
passenger handling counter?	no covered area at aircraft for cargo and equipment, fuel brought from nearby village			
baggage handling?				
water supply				
toilets				
power supply				
telephone				
Airport Maintenance	Data	Comment		
Maintenance equipment				
Maintenance service				
Airport Ownership	Data	Comment		
Airport land				
Terminal building				
Other buildings and facilities				
Landing charge?				
Terminal rental charge?				
AIRPORT TRAFFIC	2004	2005	2006	
Scheduled flights per week by aircraft type				
Flights by other than Air Rarotonga				
Annual or monthly aircraft movements				
Annual or monthly arriving and departing pax				
Annual or montly arriving and departing cargo				

Telecommunications Inventory
Island:Rakahanga

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	80
individual house connections	35
no. public access centers	1
system capacity	44
total length of distribution network (m)	5k
lines underground (%)	100
condition	excellent
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	80
connection access speed (kbs)	56K
individual house connections	1
no. public access centers	1
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1

Radio and Television	
no. of radio stations AM/FM	1
no of television channels	1
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio/TV broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	2
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	1
any emergency spare parts in storage	1
COMMUNITY TELECOMMUNICATION ISSUES	
<i>list any issues here:</i>	

Telecommunications Inventory
Island:Palmerston

Date: 28/07/200

6

SERVICES	
Telephone	
Landlines	
service coverage (% households)	0
individual house connections	0
no. public access centers	1
system capacity	5
total length of distribution network (m)	0
lines underground (%)	0
condition	0
Mobile network coverage	
service coverage (% households)	
individual house connections	
no. public access centers	
system capacity	
Internet	
Dial-up access	
service coverage (% households)	0
connection access speed (kbs)	0
individual house connections	0
no. public access centers	0
Broadband (ADSL)	
service coverage (% households)	0
connection access speed (kbs)	256K
individual house connections	0
no. public access centers	1

Radio and Television	
no. of radio stations AM/FM	1
no of television channels	0
EMERGENCY WARNINGS	
<i>Describe procedure of issuing warnings</i>	Radio broadcasts
TARIFFS AND REVENUE	
current tariffs	
telephone	
internet access	
frequency of billing	
annual revenue collected	
annual operating costs	
OPERATION AND MAINTENANCE	
no. of staff on island	1
no. technicians on island	1
type and qualification of technicians	
transmission stations cyclone-proof?	0
any emergency spare parts in storage	0

4. REFERENCES

Title	Date	Author	Funding Agency	Sector
A Partial Commentary on the National Building Code - Cook Islands	1990	Ministry of Works	CIGOV/AusAid	Infrastructure
Aerodrome Emergency Plan - Rarotonga International Airport		Airport Authority	Airport Authority	Air Transport
Aid Policy Statement	1998	Cook Islands Government	CIGOV	Multi-sector
Airport Authority Financial Statements 2005	Jun-05	Airport Authority	Airport Authority	Air Transport
Aitutaki Island Administration Business Plan 2006-2007	Apr-06	Mr Sabati Solomona, Is Secretary	CIGOV	Island Administration

Atiu Island Administration Business Plan 2006-2007	Apr-06	Mr Mann Unuia, Is Secretary	CIGOV	Island Administration
Atiu Power Sector Feasibility Report 2004	2004	UNDP/UNESCO Technical Assistance Project	UNDP/CIGOV	Energy
Avatiu Harbour Development for Fishing Industry - Proposed Quay Wall Berth	May-02	Ministry of Works	CIGOV	Marine Transport
	Apr-87		Australian Development Assistance Bureau	
Avatiu Harbour Western Side Development Study - Final Report	1991	Wilton & Bell Pty Ltd	CIGOV	Marine Transport
Building Controls & Standards		Cook Islands Government		Infrastructure
Cities, Seas, & Storms, Managing Change in Pacific Island Economies; Vol IV Adapting to Climate Change	Nov-00	PNG & PI Country Unit & World Bank	Aid Agencies	Environment
Climate Change Activites - Assisting non-Annex I Countries		International Global Change Institute - NZ		Environment
Climate Proofing: A Risk-based Approach to Adaptation	Oct-04	Maunsell-IGCI	ADB	Multi-sector
Coming in on a Jet Plane	1994	Colin Hall	Airport Authority	Air Transport
Condition Assessment of Existing Harbour - Atiu Harbour	Jul-06	GHD Consultants	NZAid/CIGOV	Marine Transport
Cook Is 2001 Census of Population & Dwelling - Main Report	2003	Statistics Office	CIGOV	Statistics
Cook Islands 2000 Census of Agriculture & Fisheries	2000	Cook Islands Government	CIGOV	Agriculture
Cook Islands Disaster Risk Management Plan 2006	Apr-06	Cook Islands Government	CIGOV	Disaster Management
Cook Islands Investment Corporation Annual Report 04/05	2005	Cook Islands Investment Corporation	CIIC	Buildings
Cook Islands National Energy Policy	2003	Cook Islands Government	CIGOV	Energy
Cook Islands Outer Island Aerodromes Audit Reports	31-Dec-02	George Cowan	CAANZ	Air
Cook Islands Ports Authority, Avatiu Western Basin Development Peer Review of Proposed Development, Comments upon the Draft Report by AC Consulting Group	Feb-03	Ata Herman - MOW	NZAid/CIGOV	Marine Transport
Cook Islands Ports Authority, Avatiu Western Basin Development Project Implementation Document	Nov-02	Tenga Epi Mana	AusAid/CIGOV	Marine Transport
Cook Islands Ports Authority, Avatiu Western Basin Development Stage 2, Project Implementation Document Rev 2,	April 2005	AC Consulting Group Ltd	NZAid/CIGOV	Marine Transport
Cook Islands Ports Authority, Avatiu Western Basin Development Stage 2, Concept Design Report Rev 1	Aug-04	AC Consulting Group Ltd	NZAid/CIGOV	Marine Transport
Cook Islands Ports Authority, Avatiu Western Basin Development Stage 1 Development Options & Cost Estimates	Jul-02	AC Consulting Group Ltd	NZAid/CIGOV	Marine Transport
Design Concept for Proposed Harbour Upgrade - Mitiaro Harbour	Jul-06	GHD Consultants	NZAid/CIGOV	Marine Transport

Development Investment Act	1995-96	Cook Islands Government		Foreign Investment
Development Partnership Arrangement between NZ/AUS/CIGOV for outer is development infrastructure construction & upgrade		OMIA/Aid Management	Govt NZAid/SOPAC/ CIGOV	Infrastructure Emergency Management
Disaster Risk Management Bill Draft 9	Jun-06	Crown Law/EMCI	IUCN	Environment
Environmental Law in the Pacific	1996	SPREP/IUCN Edited by Ben Boer	SOPAC/CIGOV	Marine Transport
Harbour Surveys Avatiu, Avarua, Avana, Arutanga	Mar-06	Robert Smith, SOPAC	Govt	Infrastructure
Home Building Manual for Cook Islands		Ministry of Works		
Hyogo Framework for Action 2005-2015; Building the resilience of nations and communities to disasters	Jan-05	United Nations International strategy for disaster reduction	UN	Disaster Management
Implementing the Yokohama Strategy & Plan of Action - Pacific Islands regional progress report (1994-2004)		SOPAC	SOPAC	Disaster Management
Initial Damage Assessment - Field Reference Guide		Office of US Foreign Disaster Assistance	USAID	Multi-sector
Initial Damage Assessment National Course		Geoff Mackley	SOPAC	Disaster Management
Island Government Bill/Ministry of Islands Development - Draft		Cook Islands Government	CIGOV	Multi-sector
Legal & Institutional Strengthening of Environment Management in the Cook Islands - Vol 1 - Review of Legal Institutional Frameworks		Environment Services/ADB/Crown Law	ADB	Environment
Legal & Institutional Strengthening of Environment Management in the Cook Islands - Vol 2 - Institutional Profiles		Environment Services/ADB/Crown Law	ADB	Environment
Managing Environmental Change		International Global Change Institute - NZ		Environment
Mangaia Island Administration Business Plan 2006-2007	Apr-06	Mrs Tuaine Tuara, Is Secretary	CIGOV	Island Administration
Manihiki Island Administration Business Plan 2006-2007	Apr-06	Mr Araipu Munokoatini, Is Secretary	CIGOV	Island Administration
	Apr-06			
Mauke Island Administration Business Plan 2006-2007		Mr Tai Tura, Is Secretary	CIGOV	Island Administration
Mauke Power Sector Feasibility Report 2004	2004	UNDP/UNESCO Technical Assistance Project	UNDP/CIGOV	Energy
Ministry of Works - Annual Report 03/04	2004	Ministry of Works	MOW	
Ministry of Works - Cyclone Emergency Assistance Programme - Recovery Activities	Mar-06	Ministry of Works	MOW	Infrastructure/Disaster Management
Mitiaro Island Administration Business Plan 2006-2007	Apr-06	Mr Tai Topa, Is Secretary	CIGOV	Island Administration
Mitiaro Power Sector Feasibility Report 2004	2004	UNDP/UNESCO Technical Assistance Project	UNDP/CIGOV	Energy
National Building Code for the Cook Islands		Ministry of Works	Govt	Infrastructure

National Disaster Management Plan	1997	Cook Islands Government	CIGOV	Disaster Management
	Dec-04		NZAid/AusAid/ UNDP/SPREP/	
National Environment Strategic Action Framework 2005-2009		National Environment Service	CIGOV	Environment
National Sustainable Development Plan 2006-2010	Apr-06	Office of the Prime Minister	CIGOV	Multi-sector
Nikao-Takuvaine Backroad Upgrading Project, Field Study Report (A condensed version)	Aug-06	China Highway Planning & Design Institute (HPDI) Consultant Inc	China/CIGOV	Road Transport
Peer Review of Proposed Harbour Upgrade - Mangaia Harbour	Jul-06	GHD Consultants	NZAid/CIGOV	Marine Transport
Peer Review of Proposed Harbour Upgrade - Mauke Harbour	Jul-06	GHD Consultants	NZAid/CIGOV	Marine Transport
Penrhyn Island Administration Business Plan 2006-2007	Apr-06	Mr Roland Long, Is Secretary	CIGOV	Island Administration
Pipeline Network Ugrading Project Proposal Document - Mauke		Ata Herman & Ben Parakoti- MOW	NZAid/CIGOV	Water
Ports Authority Annual Reports 2004 and 2005	15-Oct-05	Ports Authority		Marine
Public Health Act	2004	Cook Islands Government	CIGOV	Multi-sector
Pukapuka Power Sector Feasibility Report 2004	2004	UNDP/UNESCO Technical Assistance Project	UNDP/CIGOV	Energy
Rakahanga Island Administration Business Plan 2006-2007	Apr-06	Mr Taunga Tuteru, Is Secretary	CIGOV	Island Administration
Rarotonga Environment Act	2003	Cook Islands Government	CIGOV	Environment
Reconnaissance Report, Wharf Facility Shore Protection, Penrhyn Island	Jun-02	Strategic & International Policy Division, Department of Defence, Australia	AusAid	Marine Transport
Report on Tropical Cyclones in the Cook Islands		Arona Ngari	CIGOV	Disaster Management
Report on Water Investigations - Mauke	Feb-04	Tony Falkland, Ecowise Environmental for GHD Pty Ltd	AUSAid	Water
Socio Economic Profiles & Strategic Plans - Northern/Southern		OMIA/ADB	ADB	Multi-sector
Strengthening Disaster Management & Mitigation in the Cook Is	Oct-05	Alan Mearns	ADB/SOPAC	Disaster Management
Strengthening Disaster Management & Mitigation in the Cook Is - Component 1 - Interim Report	Oct-05	Alan Mearns	ADB/SOPAC	Disaster Management
Strengthening Disaster Management & Mitigation in the Cook Islands - Inception Report	Oct-05	Alan Mearns	ADB/SOPAC	Disaster Management
Te Aponga Uira Avatiu Valley Power Station Generation Capacity Augmentation Study	Aug-03	Russell Jorgensen	Te Aponga Uira	Energy
Te Aponga Uira Corporate Plan 01 July 2005 - 30 June 2010	Apr-05	Kevin Bruce	Te Aponga Uira	Energy
Te Aponga Uira Operating & Capital Budget 05/06	Jun-05	Te Aponga Uira	Te Aponga Uira	Energy
Te Aponga Uira Tarriff Review	Apr-05	Kevin Bruce	Te Aponga Uira	Energy

Telecom Cook Islands Hurricane Safety Instructions 04/05		TCI	TCI	Disaster Management
Tender documents for the Avatiu Harbour Western Basin Development Stage 1	Aug-02	Miro Consultants	NZAid/CIGOV	Marine Transport
The additional study on coastal protection and port improvement in the Cook Islands	Mar-94	Pacific Consultants International	Overseas Coastal Area Development Institute of Japan	Marine Transport