# Environmental Assessment

**INITIAL ENVIRONMENTAL EXAMINATION**

Project No. 46351
November 2016

# TONGA: Climate Resilience Sector Project

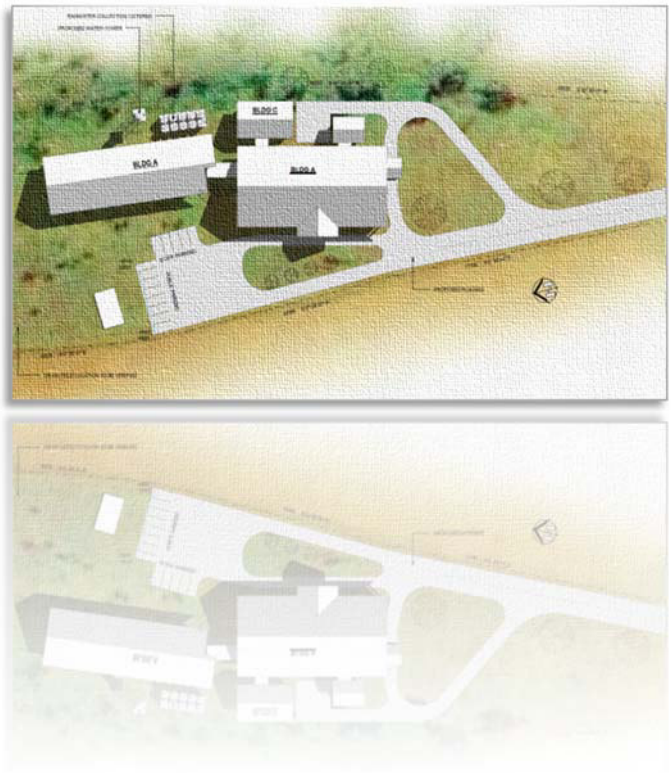
## Ha'apai Hospital Relocation and Construction Subproject

Prepared by the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications and the Ministry of Finance for the Asian Development Bank

# Initial Environmental Examination (IEE)

# Ha'apai Hospital Relocation and Construction Project

# Niu'ui Lifuka Island, Ha'apai Island, Kingdom of Tonga



Prepared by PMU Climate Resilient Sector Project (CRSP)
For

Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC)

Project Number: ADB Grant 378 - TON

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NOTES

In this report, "$" refers to US dollars unless otherwise stated.

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The preparation of this IEE took 2 months and included field trips to Ha'apai and laboratory analysis. Consultations were held with MOH, MOI, MET and the residents of Pangai to whom we extend our appreciation.

The IEE was prepared in accordance with Tongan Government EIA Regulations 2010 and ADB SPS 2009

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**ABBREVIATIONS**

ADB Asian Development Bank

APs Affected Persons

CCA Climate Change Adaptation

CIF Climate Investment Fund

DRM Disaster Risk Management

DRR Disaster Risk Reduction

EAC Environmental Assessment Committee

EARF Environmental Assessment Review Framework

EIA Environmental Impact Assessment

EMP Environmental Management Plan

ESU Environment and Social Unit

GFP Grievance Focal Point

GIS Geographic Information System

GoT Government of Tonga

GRM Grievance Redress Mechanism

IDF Rainfall Intensity Duration and Frequency curves

JNAP Joint National Action Plan On Climate Change Adaptation And Disaster Risk

JNAP-TWG Technical Working Group for JNAP coordinated by a Secretariat

MAFF Ministry of Agriculture And Food, Forests And Fisheries Management

MFNP Ministry of Finance and National Planning

MLNR Ministry of Lands and Natural Resources

MET Ministry of Education and Training

MOH Ministry of Health

MOI Ministry of Infrastructure

NEMO National Emergency Management Office

NGO Non Government Organization

NIIP National Infrastructure Investment Plan

PIU Project Implementation Unit

PMU Program Management Unit

PPCR Pilot Program for Climate Resilience

SPCR Strategic Program for Climate Resilience

SPS ADB Safeguard Policy Statement (2009)

TWG Technical Working Group on Climate Change (See JNAP-TWG)

## I. EXECUTIVE SUMMARY

1. The current hospital on the coast at Niu'ui on the island of Lifuka in the Ha'apai Island Group is deemed unsuitable as it will be impacted by climate change in the form of Sea Level Rise and more extreme weather events such as storm surges and tsunamis in the future

2. The Government of Tonga has received assistance from the Asian Development Bank through the Pilot Program for Climate Resilience to construct a hospital at a new site which is more protected from extreme weather events on land currently within the boundaries of the Ha'apai High School at Pangai.

3. The new hospital will link with the climate proofing upgrades carried out at the Ha'apai High School which is adjacent to the new hospital site.

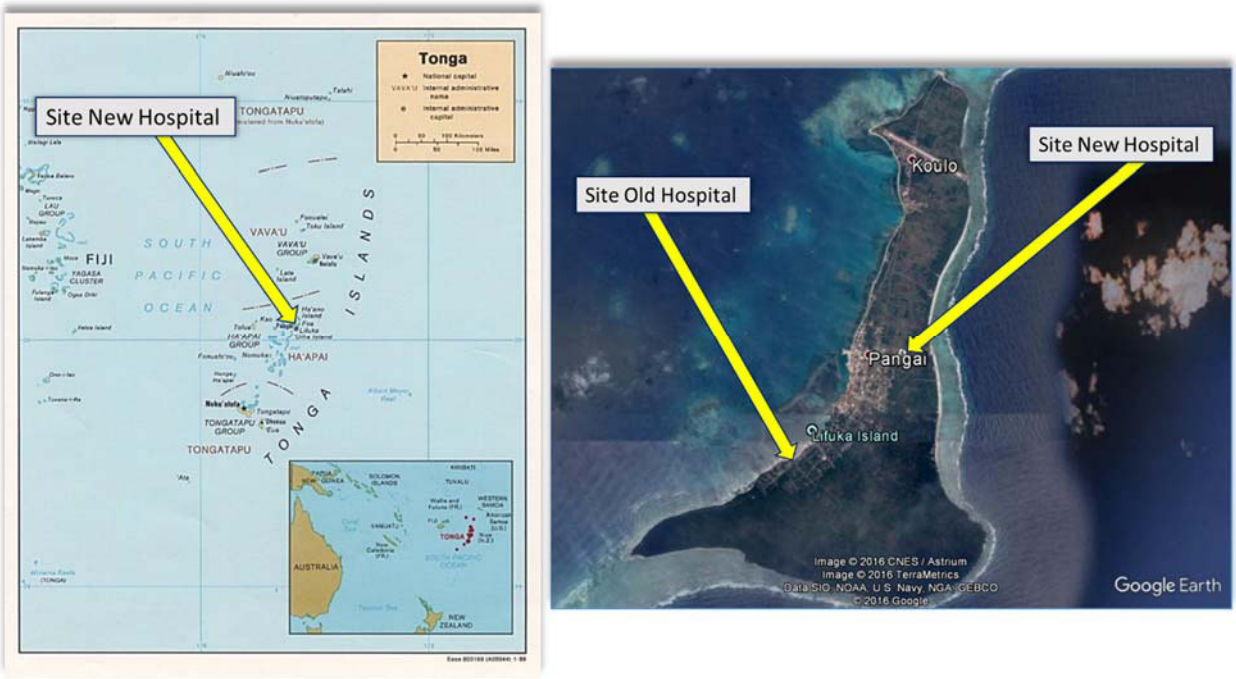



Figure I-I Relocated Hospital site in Ha'apai

4. The school hall at Ha'apai High School is currently used as one of Lifuka's designated disaster evacuation shelter during storm events so the location of the new hospital adjacent to the shelter complements this natural disaster response.

5. The new hospital will have a beneficial impact on approximately 6,600 residents in the Ha'apai Island Group.

6. An environmental baseline study has been carried out. The underlying aquifer has been found to be highly saline and unsuitable as a source of potable water. Most sources of drinking water on the island are obtained by rainwater capture.

7. The hospital design will incorporate waste water treatment measures that are more than sufficient to preclude contamination of the underlying aquifer.

8. There are no important habitats in close proximity to the new hospital site.

9. There are no historical or culturally significant sites nearby. The nearest sensitive location is the cemetery which is over 500metres away downhill east of the site by the coastline.

10. All medical waste will be treated on site in a new high temperature double chamber long residence time incinerator. Residual ash will be taken to the landfill.

11. The hospital will be separated from the school with a boundary fence. A new access will be constructed using an existing road so that there is no interference with traffic visiting the school or children being collected or dropped off.

12. The construction program will last 8 months. During this time there may be some temporary disturbances. The contractors will be required to follow the CEMP to minimise adverse environmental impacts. Construction activities and adherence to the CEMP will be monitored and supervised.

13. There are no international agreements or protocols that will be infringed by this project. (See Annex 1)

14. An EIA was prepared in accordance with Tongan Government EIA Regulations 2010 and submitted for approval. This approval was given by the EAC on November 30th 2016. (See Annex 2)

15. The Cabinet of the GoT has agreed to the transfer of 1.4 hectares from Ministry of Education and Training to the Ministry of Health for the construction of the new hospital. This was confirmed in a Cabinet Decision of November 25th 2016. (See Annex 3)

16. This IEE concludes that there are no outstanding environmental issues remaining and there is no environmental reason for this project not to proceed.

## II. POLICY AND LEGAL FRAMEWORK

### A. Policy Framework

#### 1. Tonga Strategic Development Framework 2011 - 2014 (TSDF1)

17. In 2011 the Tonga Ministry of Finance and National Planning issued the Tonga Strategic Development Framework (TSDF1) for 2011 – 2014. This stated the Government of Tonga's Vision which is *"To develop and promote a just, equitable and progressive society in which the people of Tonga enjoy good health, peace, harmony and prosperity, in meeting their aspirations in life"*.

18. The Framework identified nine key outcome objectives, four enabling themes and a series of strategies to realise this vision. The objectives were :

- Strong inclusive communities, by engaging districts/villages/communities in meeting their prioritised service needs and ensuring equitable distribution of development benefits.
- Dynamic public and private sector partnership as the engine of growth, by promoting better collaboration between government and business, appropriate incentives and streamlining of rules and regulations.
- Appropriate, well planned and maintained infrastructure that improves the everyday lives of the people and lowers the cost of business, by the adequate funding and implementation of the National Infrastructure Investment Plan (NIIP).
- Sound education standards, by emphasising quality universal basic education.
- Appropriately skilled workforce to meet the available opportunities in Tonga and overseas, by delivering improved Technical and Vocational Education and Training.
- Improved health of the people, by promoting healthy lifestyle choices with particular focus on addressing non-communicable diseases, and providing quality, effective and sustainable health services.
- Cultural awareness, environmental sustainability, disaster risk management and climate change adaptation, integrated into all planning and implementation of programmes, by establishing and adhering to appropriate procedures and consultation mechanisms.
- Better governance, by adopting the qualities of good governance, accountability, transparency, anti-corruption and rule of law.
- Safe, secure and stable society, by maintaining law and order.

19. The delivery of the objectives was based on four enabling themes :

- Continuing progress to a more efficient and effective government by focussing on its core functions; improving coordination, service delivery and optimising use of resources.
- Improving the macroeconomic environment and fiscal management, including effective revenue services to ensure a level playing field and those services to the people can be appropriately funded.
- Ensuring Public Enterprises are sustainable and accountable, and where appropriate moved into the private sector.
- Ensuring a more coordinated whole of government approach in Tonga's partnership with development partners.

The TSDF highlighted three key strategies :

- The importance of education

- Good open governance
- the rule of law in providing a safe environment

The TSDF1 provides the foundation for future government planning.

### 2. Tonga Strategic Development Framework 2015-2025 (TSDF2)

20. In 2015 the Ministry of Finance and National Planning, with support from the Asian Development Bank, circulated the "Tonga Strategic Development Framework 2015-2025: *A more progressive Tonga: Enhancing Our Inheritance*." This is known as TSDF2.

Following the ending of TSDF 1 in December 2014, the formulation of TSDF2 built on lessons learned from TSDF1, feedback received during consultations with key sectors of the economy in October-December 2014 and consultation within Government ministries, departments and agencies.

It follows regional and international commitments and serves as a broad 10 year overarching national framework and guide to lower level plans and budgets at sector, district and corporate level where organizations outside of government have involvement in development initiatives.

TSDF2 seeks to provide "A progressive Tonga supporting higher quality of life for all." It consists of seven national outcomes and twenty-nine organizational outcomes to guide development over ten years. The national outcomes are :

A. a more inclusive, sustainable and dynamic knowledge-based economy

B. a more inclusive, sustainable and balanced urban and rural development across island groups

C. a more inclusive, sustainable and empowering human development with gender equality

D. a more inclusive, sustainable and responsive good-governance

E. a more inclusive, sustainable and successful provision and maintenance of infrastructure and technology

F. a more inclusive, sustainable and effective land and environment management, with resilience to climate change and risk

G. a more inclusive, sustainable and consistent advancement of our external interests, security and sovereignty

21. Organizational Outcomes have also been identified to support these National Outcomes and are grouped into five pillars.

Three Institutional Pillars:

1. Economic Institutions

2. Social Institutions

3. Political Institutions

Two Input Pillars:

4. Infrastructure and Technology Inputs

5. Natural Resource and Environment Inputs

The overall TSDF2 vision is shown in Figure II-I below.

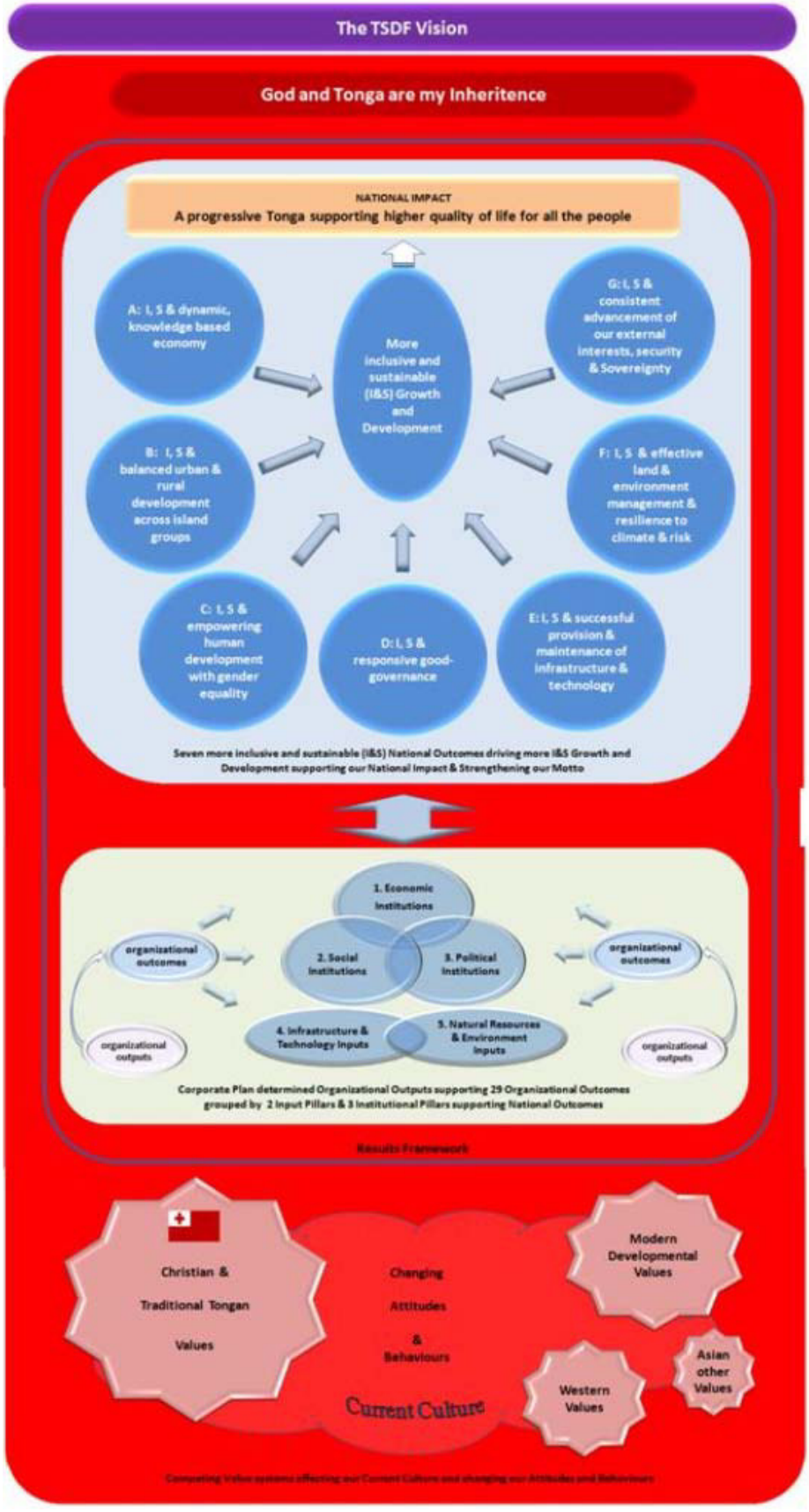



Figure II-I The TSDF Vision

22. Pillar Number 5 relates to environmental matters and Number 5.4 is of direct relevance to this project.

- Pillar 5: Natural Resources & Environment Inputs
  - 5.1 Improved land use planning & management for private & public spaces
  - 5.2 Improved use of natural resources for long term flow of benefits
  - 5.3 Cleaner environment with improved waste recycling
  - 5.4 Improved resilience to natural disasters and impact of climate change

TSDF2 states that "Tonga is one of the most vulnerable countries to natural disasters in the form of earthquakes, tsunamis, hurricanes and general flooding. Future climate change is only likely to make some of these events more serious. The potential for damage can be lessened by … more appropriate infrastructure as well as limiting building on more disaster prone areas. These services are particular important for more vulnerable and isolated groups."

23. The current hospital is located in a vulnerable site adjacent to the sea and its relocation to a new hilltop side will reduce this vulnerability to extreme weather events induced by climate change. The proposed project is in line with TSDF2.

24. TSDF2 has been approved in principle by the Government of Tonga.

### 3. National Infrastructure Investment Plan 2014-2018 (NIIP2)

25. The National Infrastructure Investment Plan (NIIP) is an integrated program for management of existing assets, new investments, supporting complementary measures, and linked projects. Complementary measures include the development of sector road maps, policy changes, institutional/regulatory/financial reforms, training and capacity building, and technical assistance in support of the Government policy to capitalise on existing infrastructure and obtain best value from new investments.

26. The National Infrastructure Investment Plan (NIIP2) outlines the Government of Tonga's priorities and plans for major infrastructure initiatives over the next 10 years. This is the second Plan and updates and builds on the first NIIP that was prepared in 2010 (NIIP 2010 or NIIP1).

Of the 12 priority investment projects proposed in NIIP1 most are now underway as are many reforms and capacity building initiatives.

27. NIIP2 covers major infrastructure initiatives with national, regional, or local significance. It looks at the next five years to 2018 in detail and the five years from 2018 to 2023 in terms of broad directions for infrastructure development. It is the result of extensive consultation with infrastructure managers, users, and funding partners.

28. This Plan focuses on economic infrastructure facilities such as energy supply, telecommunications, water and waste management and transportation. The NIIP includes priorities and plans for major initiatives in the following sectors:

- Energy (electricity, fuel)
- Telecommunications (telephone, internet, broadcasting)
- Water and waste related services (water supply, waste water, drainage, solid waste)
- Transport (airports, roads, sea ports)

Other categories of infrastructure such as education, healthcare, and correctional services, are not included in this Plan and have their own sector plans.

### 4. Joint National Action Plan Climate Change Adaptation Disaster Risk Management

29. The Tonga Joint Action Plan on Climate Change Adaptation and Disaster Risks Management complies with Tonga's National Strategic Development Framework 2009–2014, the Pacific Islands Framework of Action on Climate Change 2006–2015, the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005–2015, the International Decade for Natural Disaster Reduction (IDNDR), the Yokohama Plan for Action and the Hyogo Framework for Action 2005–2015, and the United Nations Framework Convention on Climate Change. The Plan comprises of six priority goals.

- Goal 1: Improved good governance for climate change adaptation and disaster risk management (mainstreaming, decision making, organizational and institutional policy frameworks).
- Goal 2: Enhanced technical knowledge base, information, education and understanding of climate change adaptation and effective disaster risk management
- Goal 3: Analysis and assessments of vulnerability to climate change impacts and disaster risks
- Goal 4: Enhanced community preparedness and resilience to impacts of all disasters
- Goal 5: Technically reliable, economically affordable and environmentally sound energy to support the sustainable development of the Kingdom
- Goal 6: Strong partnerships, cooperation and collaboration within government agencies and with civil societies and NGOs

The coordination of JNAP implementation is centred on the JNAP Secretariat and its Technical Working Group which works in close collaboration with JNAP's relevant stakeholders.

### 5. Climate Change Policy 2016 and JNAP2

30. The Tonga "Climate Change Policy - *A Resilient Tonga by 2035*" was issued by the Department of Climate Change MEIDECC in February 2016. It aligns with the Tonga Climate Change Policy Objectives and Strategies (2006) and JNAP Goals and Objectives (2010-2015)

31. The policy provides a supporting framework that is aligned with the TSDF 2015-2025 and encourages alignment with all relevant sector policies and plans to ensure that proactive measures are taken to build a resilient Tonga. This emphasises strong engagement with and ownership from the community, with resilience an integral part of all community development plans (CDPs) and Island Strategic Development Plans.

32. The ultimate objective is a "Resilient Tonga" and the Climate Change Policy identifies the extent to which current legislation, policies and plans aligns with this concept. (See Table II-I

Table II-1 Legislation and Policies aligned with a Resilient Tonga

| | Legislation | Policy | Plan |
|---|---|---|---|
| **Sector/focal area** | Fully aligned with a Resilient Tonga | | |
| | Partially aligned with a Resilient Tonga | | |
| | Not aligned with a Resilient Tonga | | |
| | A priority for completion/development; and to be fully aligned with A Resilient Tonga | | |
| | Needs to be reviewed | | |
| **Finance and Planning** | TSDF | | |
| | Public Financial Management Act | | National Infrastructure and Investment Plan |
| | | | CFRGA |
| **Climate Change** | Climate Change Fund Bill<br>Ozone Layer Protection Act | Climate Change Policy | Revised JNAP |
| **Environment** | Environment Management Act and EIA Act | | Revised National Biodiversity Strategy and Action Plan |
| **Energy** | Renewable Energy Act | Renewable Energy Policy | Tonga Energy Roadmap |
| | Energy Bill | | |
| **Meteorology** | National Emergency Management Act | | |
| **DRM** | National Emergency Management Act | | JNAP, National Emergency Management Plan |
| **Internal Affairs** | District & Town Officers Act<br>Fono's Act | | Community Development Plans and Island Strategic Development Plans |
| **Infrastructure** | National Spatial Management Act<br>Building Control and Standards Act | | Building Code<br>Urban Infrastructure Development Plan |
| **Lands and Natural Resources** | Land Act | Land Use Policy | Land Use Plan |
| **Women** | Family Protection Act | National Policy on Gender and Development | Strategic Plan |
| **Culture and Youth** | Parks and Reserves Act<br>Polynesian Heritage Trust Act | National Youth Policy | Tonga National Youth Strategy and Action Plan |

| | Preservation of Objects of Archealogical Interests Act | National Cultural Policy | National Cultural Plan |
|---|---|---|---|
| **Health** | Public Health Act 2008<br>Health Services Act 1991<br>Health Promotion Act 2007 | | Tonga National Strategy to Prevent and Control Non Communicable Diseases |
| **Agriculture** | | Agriculture Policy | Agriculture Sector Plan |
| **Fisheries** | Fisheries Management Act<br>SMA Act | | Fisheries Sector Plan |
| **Forestry** | Forests Bill 2015 | Forestry Policy | Forestry Plan |
| **Tourism** | Tourism Act 1976 | | Tonga Roadmap |
| **Water** | Water Resources Bill | National Water Policy | Water Plan |
| **Education** | Education Act 2014 | Education Policies | |
| **Chamber of Commerce and Industries** | | | Public Private Sector Plans |

33. To ensure that the objective of "A Resilient Tonga by 2035" is met a revised Joint National Action Plan on Climate Change and Disaster Risk Management (JNAP 2) is being developed.

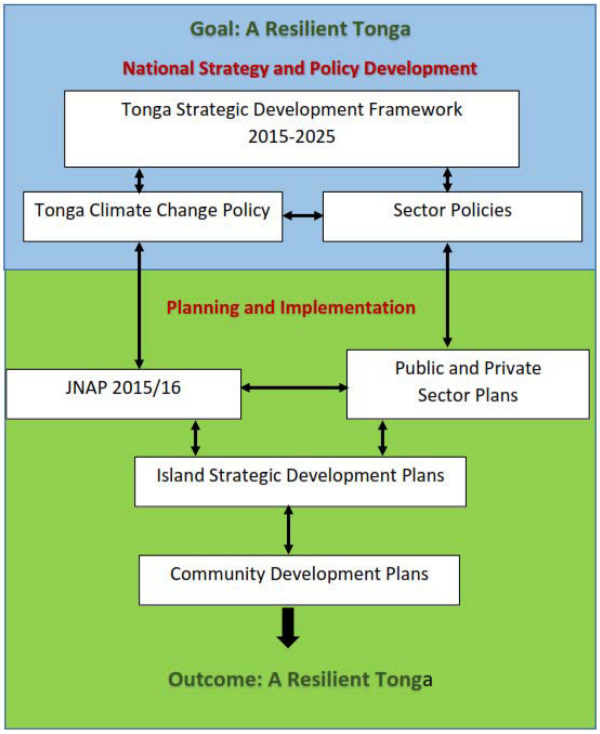



Figure II-II Resilient Tonga Vision

34. All relevant sector policies, community development plans and island strategic development plans will be aligned with this policy and a revised JNAP2.

### 6. MEIDECC Corporate Plan (2014 – 2016)

35. MEIDECC has a Corporate Plan 2014 – 2016 which is in line with the Tonga Strategic Development Framework (TSDF). The Environment Division of MEIDECC is tasked with achieving Strategic Outcome 7 "*to ensure environmental sustainability, disaster risk management and climate change adaptation is integrated into all planning and implementation of programmes, by establishing and adhering to appropriate procedures and consultation mechanisms*".

## B. Legal Framework

### 1. International Conventions and Protocols

36. Tonga is signatory to the following 15 international agreements.

- United Nations Framework Convention on Climate Change
- Kyoto Protocol to the UNFCCC
- Convention on Protection of Biological Diversity
- Cartagena Protocol on Biosafety
- Paris Agreement
- Vienna Convention for the Protection of the Ozone Layer
- Montreal Protocol on Substance that deplete Ozone Layer
- Nagoya Protocol on Access and Benefit sharing of Genetic Resources
- United Nations Convention to Combat Desertification
- Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Waste and to Control the Tran boundary Movement and Management of Hazardous Waste within the South Pacific Region
- Convention for the Protection of the World Cultural and Natural Heritage
- Stockholm Convention on Persistent Organic Pollutants
- Basel Convention on the Control of Tran boundary Movements of Hazardous Wastes and their Disposal
- Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade
- United Nations Convention on the Law of the Sea

A full list with details is given in Annex 1.

### 2. Paris Agreement on Climate Change 2016

37. The Paris Agreement is the United Nations Framework Convention on Climate Change that 195 countries agreed to adopt on 12 December 2015 at the COP 21UN climate summit in Paris.

Tonga was among 12 Pacific Islands Forum countries that signed the Paris Agreement in New York on 22 April 2016. Tonga ratified the Paris Agreement in August 2016 and deposited Tonga's instrument of ratification of the agreement with the U.N. on 21 September 2016.

Tonga has made a commitment to reduce reliance on fossil fuel for power generation by 50% by 2020, and 70% by 2030. The Government has also made a commitment to double Tonga's marine protected areas by 2030, and increase efforts in reforestation, as these are a carbon sink.

38. For the agreement to become an international law, it must be signed and ratified by at least 55 countries, representing at least 55% of global greenhouse gas emissions. The Paris Accord became effective on November 7th 2016 when the threshold of signatories was passed.

### 3. Tongan Laws on Environment

39. The following laws which are relevant to environmental issues have been enacted in Tonga.

| | |
|---|---|
| Constitutional Law | • Constitution of Tonga 1875<br>• Act of Constitution of Tonga 1988 |
| Law Sources | • Ministry of Civil Aviation<br>• Ministry of Education<br>• Ministry of Finance and National Planning<br>• Ministry of Health<br>• Ministry of Justice<br>• Ministry of Lands, Survey and Natural Resources<br>• Tonga Legal Gazette<br>• Tongan Government |
| Transport And Maritime Law | • Fisheries Management Act 2002<br>• Fisheries Regulations 1992<br>• Harbours Act 1903 / 2010<br>• Ports Authority Act 1998<br>• Ports Management Act 2001<br>• Roads Act 1909 / 1970<br>• Shipping (STCW Convention) Regulations 1998<br>• Shipping Act 1972 |
| Environmental Law | • Animal Diseases Act 2010<br>• Aquaculture Management (Amendment) Act 2009<br>• Aquaculture Management Act 2003<br>• Birds and Fish Preservation Act 1989 / 2007<br>• Environmental Impact Assessment Act 2003<br>• Environment Management Act 2010<br>• Environmental Impact Assessment Regulations 2010<br>• Environment Management (Amendment) Act (Infringements) 2015<br>• Environment Management (Litter And Waste Control) Regulations 2016<br>• Fisheries Management (Conservation) Regulations 2008<br>• Fisheries Management (Amendment) Act 2009<br>• Forests Act 2010 |

| | |
|---|---|
| | • Hazardous Wastes And Chemicals Act 2010<br>• Marine Pollution Prevention (Amendment) Act 2009<br>• Marine Pollution Prevention Act 2002<br>• Ozone Layer Protection Act 2010<br>• Parks and Reserves Act 1992 / 2007<br>• Plant Quarantine (Amendment) Act 2009<br>• Preservation of Objects of Archaeological Interest Act 1969 /2007<br>• Public Health (Amendment) Act 2009<br>• Tonga Water Board Act 2000<br>• Waste Management Act 2005<br>• Waste Management (Amendment) Act 2009<br>• Waste Management (Amendment) Act 2014<br>• Waste Management (Plastic Levy) Regulations 2013 |
| Construction Law | • Building Control and Standards Act 2002<br>• Building Code Regulations 2007 |
| Agriculture Law | • Agricultural Commodities Export Act 2002<br>• Biosafety Act 2009<br>• Noxious Weeds Act 2010<br>• Pesticides Act 2002 |

Of direct relevance to this project are the following:

- Environmental Impact Assessment Act 2003
- Environment Management Act 2010
- Environmental Impact Assessment Regulations 2010
- Environment Management (Amendment) Act (Infringements) 2015
- Environment Management (Litter And Waste Control) Regulations 2016

40. The Environment Management Regulation on Litter and Waste Control and that was passed in May 2016 lists a range of waste dumping and burning offenses and their penalties. The fines range from Tongan $500 to $10,000.

41. The regulations will not be enforced until 2017, as the ministry will first launch a public awareness campaign to further clarify the Regulation, and to remind the public of their responsibilities to secure a healthy environment.

### 4. Environmental Impact Assessment (EIA) Act

42. The Environmental Impact Assessment (EIA) Act was passed in 2003. Regulations to support the Act have been enacted under the Environmental Impact Assessment Regulations 2010. MEIDECC is the coordinating agency.

43. Under this regulatory framework, all development activities must be referred to the Minister of MEIDECC, either directly or through the Determining Authority (designated ministry). With this notification, the proponent must complete a Determination of Category of Assessment form, providing an overview of the proposed development and a number of details in relation to the existing environment, potential environmental impacts and mitigation measures. The schedule outlining major projects as per the EIA Act 2003 is given in Table II-2 below.

Table II-2 Schedule of Major Projects EIA Act 2003

| **Schedule of Major Projects as given in EIA Act 2003 Annex 2** |
|---|
| Any of the following activities shall be deemed to be major projects: |
| (a) abattoirs |
| (b) brewery works |
| (c) buildings, works, or land associated with the landing, take-off, parking or servicing of aircraft or helicopters |
| (d) canning and bottling works in excess of floor space 2000 square metres |
| (e) cattle feedlots or intensive piggeries with excess of 50 animals |
| (f) cement works or concrete batching works in which more than 2,000 tonnes per annum are manufactured |
| (g) ceramic works, being works in which excess of 200 tonnes per annum are produced of bricks, tiles, pipes, glass are manufactured in furnaces or kilns |
| (h) chemical factories, or chemical storage areas in excess of 1,000 square metres |
| (i) electricity generating stations |
| (j) marinas (comprising pontoons, jetties, piers, dry storage, moorings) for more than 20 |
| vessels primarily for pleasure or recreation |
| (k) mining, being an activity that disturbs the surface of the land in excess of one hectare |
| (l) sand or gravel extraction from any beach within 50 metres of the high tide mark |
| (m) liquid, chemical, oil or petroleum refineries, storage or waste processing works |
| (n) farms for the propagation of marine, estuarine or freshwater organisms |
| (o) pre-mix bitumen works |
| (p) rubber or plastics works |
| (q) the removal of trees (including mangroves) or natural vegetation of any area in excess of half a hectare |
| (r) construction of roads, wharfs, barrages, embankments or levees which affect the flow of tidal waters |
| (s) any facility involving the use, storage or dumping of nuclear materials |
| (t) sawmills where more than 2,000 cubic metres per annum of timber is sawn, milled or machined in any way |
| (u) tourism or recreational resorts, buildings or facilities, involving a total building floor area of greater than 1,000 square metres or a potential total overnight accommodation level (visitors and staff combined) in excess of 20 persons. |

44. The Minister determines whether the proposed development is a minor or major project, and advises the proponent within 30 days. If it is a major project, the proponent then submits a full EIA for review by the Environmental Assessment Committee (EAC). The Minister receives an assessment report and issues an approval (with or without conditions), a request for further information, or a rejection. However, under the regulations, a development proposal not reflected in this schedule may still be deemed as a major project through the determination of category process.

### C. Conservation and Protected Areas

45. There are 22 protected areas recorded for Tonga. All are national-level protected areas. Of the 22 protected areas, 19 (86%) include a marine component. These protected areas may be either partially or completely within the marine environment. There are no protected areas designated under international or regional conventions.

Table II-3 Protected Areas

| Designation & Name of Protected Areas | Year of designation | Area ($km^2$) | IUCN category |
|---|---|---|---|
| National | | | |
| Marine Reserve | | | |
| Fanga'uta and Fanga Kakau Lagoons | 1974 | 28.35 | VI |
| Multi/Multiple Use Conservation Area | | | |
| Atata | 2008 | 6.18 | Not Reported |
| Eueiki | 2008 | 2.18 | Not Reported |
| Felemea | 2008 | 16.27 | Not Reported |
| Ha'afeva | 2007 | 11.28 | Not Reported |
| Ha'apai | 1994 | 10,000.00 | V |
| O'ua | 2006 | 48.75 | VI |
| Ovaka | 2008 | 9.56 | Not Reported |
| National Park | | | |
| Eua | 1992 | 4.50 | II |
| Kao | 2001 | 12.50 | II |
| Tofua | 2001 | 49.90 | II |
| Nature Reserve | | | |
| Vaomopa | Not Reported | 0.20 | Not Reported |
| Not Reported | | | |
| Falevai | Not Reported | 5.00 | VI |
| Nukuhetulu | Not Reported | 3.00 | Not Reported |
| Other Area | | | |
| Neiafu Harbour Wreck | Not Reported | 0.00 | Not Reported |
| Reserve | | | |
| Ha'atafu Beach | 1979 | 0.71 | IV |

| | | | |
|---|---|---|---|
| Hakaumama'o Reef | 1979 | 2.60 | IV |
| Malinoa Island Park and Reef | 1979 | 0.91 | IV |
| Monuafe Island Park and Reef | 1979 | 0.50 | IV |
| Mui Hopo Hoponga Coastal Reserve | 1972 | 0.89 | V |
| Pangaimotu Reef | 1979 | 0.49 | IV |

### D. Historical Sites

Tongoleleka on Lifuka Island, Ha'apai is the site of an ancient settlement from the Lapita period (850 BC) where shards of decorated Lapita ceramics have been found. The site also has remnants of extinct reptiles such as the large iguana *Brachxylophus gibbonsi*. There are no legally protected historical sites on Ha'apai.

### E. Protection of Birds

The following birds are protected by law.

Table II-4 Birds Having Legal Protection in Tonga

| Local Name | English Name | Scientific Name | Period for which protected |
|---|---|---|---|
| 1. Pekepeka | Edible Swiftlet | *Collocalia francica (Gmel.)* | |
| 2. Fuleheu | Land Bird | — | |
| 3. Henga | Samoan blue Lory | *Vini Australis (Gmel.)* | |
| 4. Kaka | Parrot (peculiar to 'Eua) | — | 1st January to 31st December |
| 5. Kaleva | Small Land Bird | — | |
| 6. Kulukulu | Purple crowned Dove | *Ptilopus porphyraceus (Forster)* | |
| 7. Malau | Megapod | — | |
| 8. Misi | Savage Island Starling | *Aplonis Tabuensis (Gmel.)* | |
| 9. Moho | Tongan Rail | *Porzana Tabuensis* | |
| 10. Tu | Land Bird | - | |
| 11. Lupe | Wild Pigeon | - | 1st May to 31st January |

46. An Important Bird Area (IBA) is an area recognized as being a globally important habitat for the conservation of bird populations. These sites are small enough to be entirely conserved and differ in their character, habitat or ornithological importance from the surrounding habitat. The program was developed and sites are identified by Bird Life International which is the official IUCN Authority for the Red List for birds. Currently there are over 10,000 IBAs worldwide.

47. Often IBAs form part of a country's existing protected area network, and so are protected under national legislation. There are no reported Important Bird Areas in Tonga.

### F. Fisheries Special Management Areas (SMAs)

48. In Tonga there are currently 12 Special Management Areas which have been legally established under the Fisheries (Coastal Communities)(Amendment) Regulations 2016 by gazetting and there are another 27 under consideration.

Table II-5 SMA list updated October 2016

| Island Group | Existing SMAs | Interested community | Year requested by the community | Propose donors / Funding sources |
|---|---|---|---|---|
| Vava'u | Ovaka (2008) | Hunga | 2007 | ADB |
| | Taunga (2013) | 'Utungake | 2009 | |
| | | Falevai | 2010 | |
| | | Talihau | 2011 | |
| | | Lape | 2011 | |
| | | Útulei | 2012 | |
| | | Ofu | 2015 | |
| | | Eueiki | 2015 | MoF |
| | | Kapa | 2016 | MoF |
| | | Vaipua | 2016 | MoF |
| | | Makave | 2016 | MoF |
| | | Koloa | 2016 | MoF |
| Sub-Total | 2 | 12 | | |
| Ha'apai | 'O'ua (2006) | Mo'unga'one | 2009 | Civil Society |
| | Felemea (2008) | Uiha | 2011 | |
| | Ha'afeva (2007) | Ha'ano | 2011 | |
| | Nomuka (Kelefesia & Tonumea) (2011) | Fakakai | 2011 | |
| | Kotu (2015) | Pukotala | 2012 | |
| | | Muitoa | 2012 | |
| | | Faleloa | | MoF |
| | | Tungua | 2012 | |
| | | Fonoi | 2012 | Tonga Health |
| | | Mango | 2012 | |
| | | Matuku | 2016 | |
| | | Lofanga | 2013 | MoF |
| Sub-Total | 6 | 12 | | |
| Tongatapu | 'Atata (2008) | Navutoka | 2010 | Tonga Health |
| | 'Eueiki (2008) | Ha'atafu | 2016 | |
| | | Pangaimotu | 2013 | MoF |
| | Fafa Island (2014) | Eua | 2014 | MoF |

| | | | | |
|---|---|---|---|---|
| | Kolonga (2015) | Holonga | 2015 | R2R<br>Ridge to Reef |
| | | Lapaha | 2015 | |
| | | Nukunukumotu | 2015 | |
| | | Nukuleka | 2015 | |
| Sub-Total | 4 | 8 | | |
| Total | 12 | 32 | | |

## III. Description of the Project

### A. Location

49. The island of Lifuka is part of the Ha'apai chain of islands in Tonga. It is intended to relocate the existing hospital in Lifuka to a new building in an elevated site which is more protected from extreme weather events.

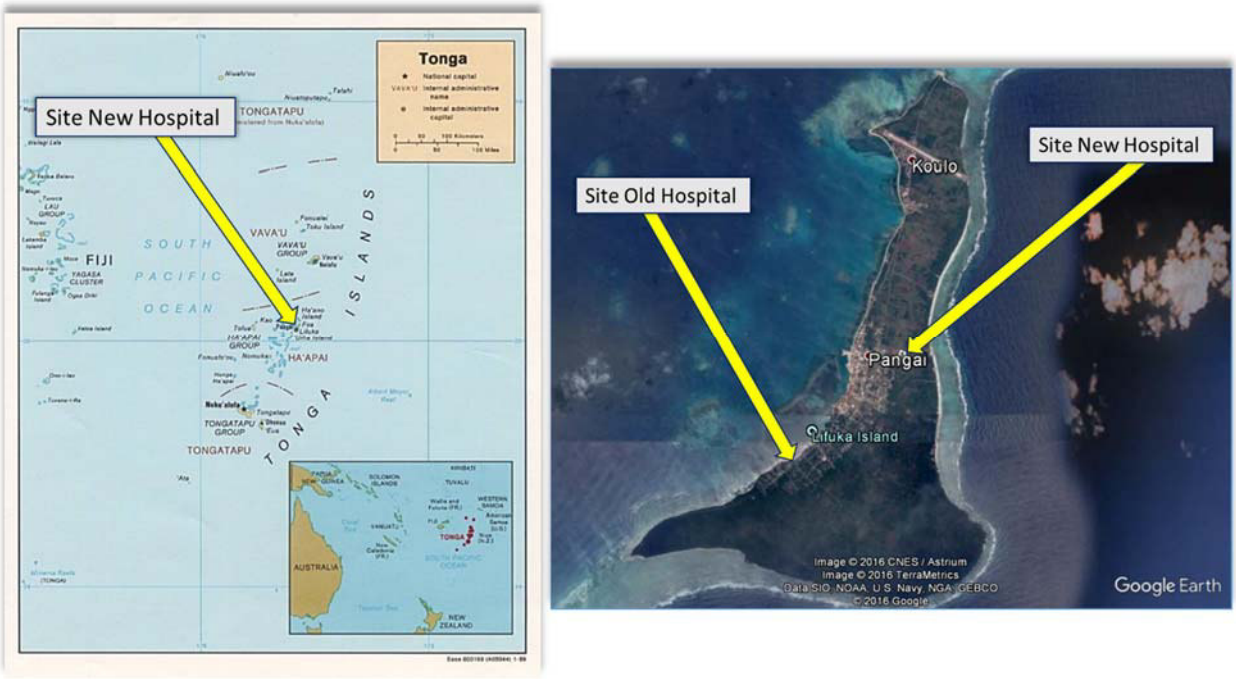



Figure III-I Relocated Hospital site in Ha'apai

The new building will primarily be a hospital with both in-patients and out-patients but will also serve as an emergency evacuation centre in the event of a natural disaster.

### B. Existing Hospital

50. The existing Niu'ui Hospital is located on the island of Lifuka in the Haa'pai island chain. The hospital was built in 1979 and is approximately 650m$^2$ in floor area. It contains 20 beds for in-patients and employs two doctors, 20 nurses and 15 ancillary staff.

Figure III-II Existing hospital and grounds

The existing hospital is located adjacent to the western coastline of Lifuka at only six meters from the sea at its closest point. On a king tide, the seawall is very close to overtopping.

Current projections for climate change and SLR indicate that the seawall will be overtopped within ten years with inundation of the hospital.

### C. Damage from Cyclone Ian 2014

51. On the afternoon of 11 January 2014, Category Five Cyclone Ian struck the Ha'apai Island Group. The cyclone caused significant damage across the Ha'apai Islands including the existing hospital which lost part of its roof. The cyclone struck Ha'apai at low tide which limited the impact from sea flooding. It is estimated that the storm surge was 0.6 meters which is considered low as Category Five cyclones can have much as a 2.5 meter storm surge.

### D. Flooding from Cyclone Kofi 2014

52. A Category 1 Cyclone (Kofi) impacted the Tonga on 1st through 4th March 2014. Winds gusting up to 50 knots were experienced. Sea flooding occurred during the extreme high tide on the evening of 2 March 2014. It is understood that the grounds of the existing hospital were inundated.

### E. Project Justification and Alternatives

53. MoH proposed to construct a new hospital at an alternate site. The new hospital would double up as Hurricane Proof Shelter during storm events. Alternatives are considered below.

#### 1. Do-Nothing Alternative

54. The "do nothing" alternative is to maintain the existing Niu'ui Hospital. This alternative would result in the continuation of potentially unsafe conditions for patients and staff as a result of both climate change impacts through Sea Level Rise and its proximity to the coast during storm and disaster events such as tsunamis. The proposed relocation will remove patients and staff from possible hazards. The "do nothing" alternative is not considered acceptable.

#### 2. First Adjacent Alternate Location

55. MoH proposed to construct a new building immediately across the coastal road from the current Niu'ui Hospital. The MoH originally described the proposed structure as a clinic and accommodation with the intention to use it in the event of needing to evacuate the hospital. In the longer term it was intended, under that plan, to relocate the hospital to the landward site across the road from the existing hospital.

56. The site is approximately 50m from the shoreline. Erosion rates are estimated at a coastal retreat of about one meter/year. Moving the hospital to the landward site would not be a satisfactory long-term solution unless substantial coastal protection measures were undertaken.

57. SOPAC scientific modelling of the potential inundation in Lifuka from storm surge and run-up associated with a severe one in a 100 years tropical cyclone event coupled with projected scenarios for SLR and rainfall that flooding of up to five meters above current average sea-level might be expected. The existing hospital location and the adjacent new location would be inundated.

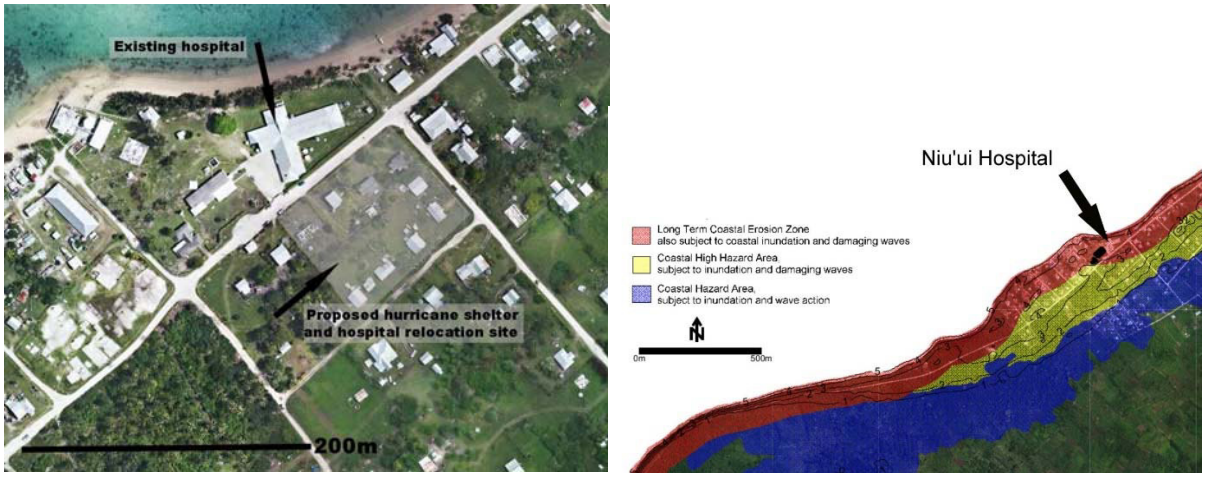



Figure III-III Existing Hospital Location and Potential Inundation

The relocation of the hospital to higher ground is therefore the only means of providing long term security.

### 3. Second Alternate Location and Linkage with Ha'apai High School

58. Ha'apai High School suffered no damage during Cyclone Ian as a result of its location on the highest point on the island of Lifuka. During storm events flying debris may cause damage and so storm shutters are being added to windows in the school under ADB financing.

59. The school hall has an open floor area of over 400m$^2$ and has previously been used as the designated evacuation center for the island during storm and natural disaster events. The proposed hospital site is within the boundaries of Ha'apai High School and adjacent to the hall. The school hall and the hospital would complement each other in the event of a natural disaster.

## F. New Hospital Proposed Site

60. In view of the close proximity to the sea and the vulnerability of the hospital and its patients to flooding as described above, it was determined that the existing location was unsatisfactory and GoT decided to move the hospital to a new location. As described above several sites were considered and Ha'apai High School was chosen as the optimal location. The school is approximately 2km from the existing hospital site and is situated on a large parcel of land at an elevation of 15 meters ASL. This is one of the highest points on Lifuka. The hospital is planned to be built on unused land beyond the existing rugby pitch and the school perimeter fence.

61. The new hospital site is currently accessed via a road passing through the school grounds. A fence will be constructed to restrict student access the hospital grounds. A new access route will be constructed linking the site to the existing minor road network. Unless there is an emergency, the road will not be heavily utilized.

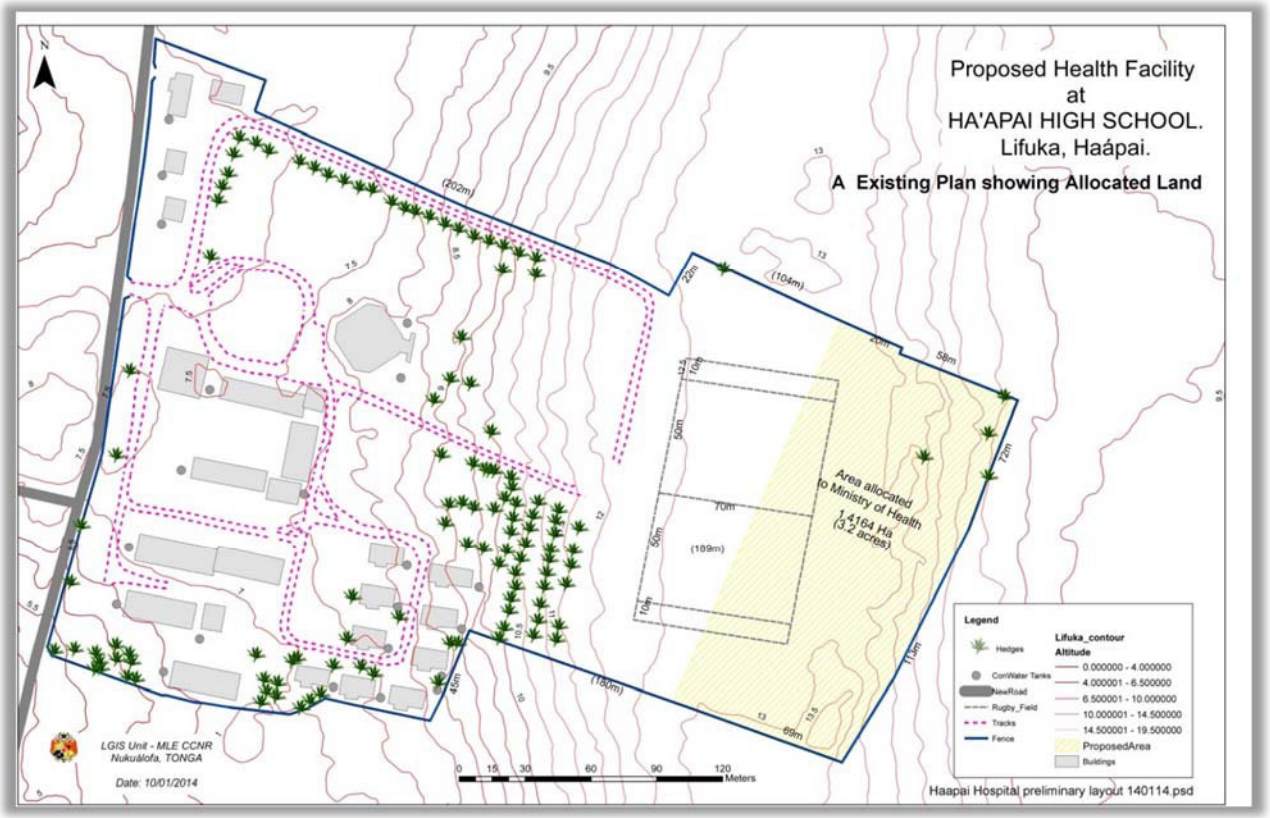



Figure III-IV Site Layout and Boundaries

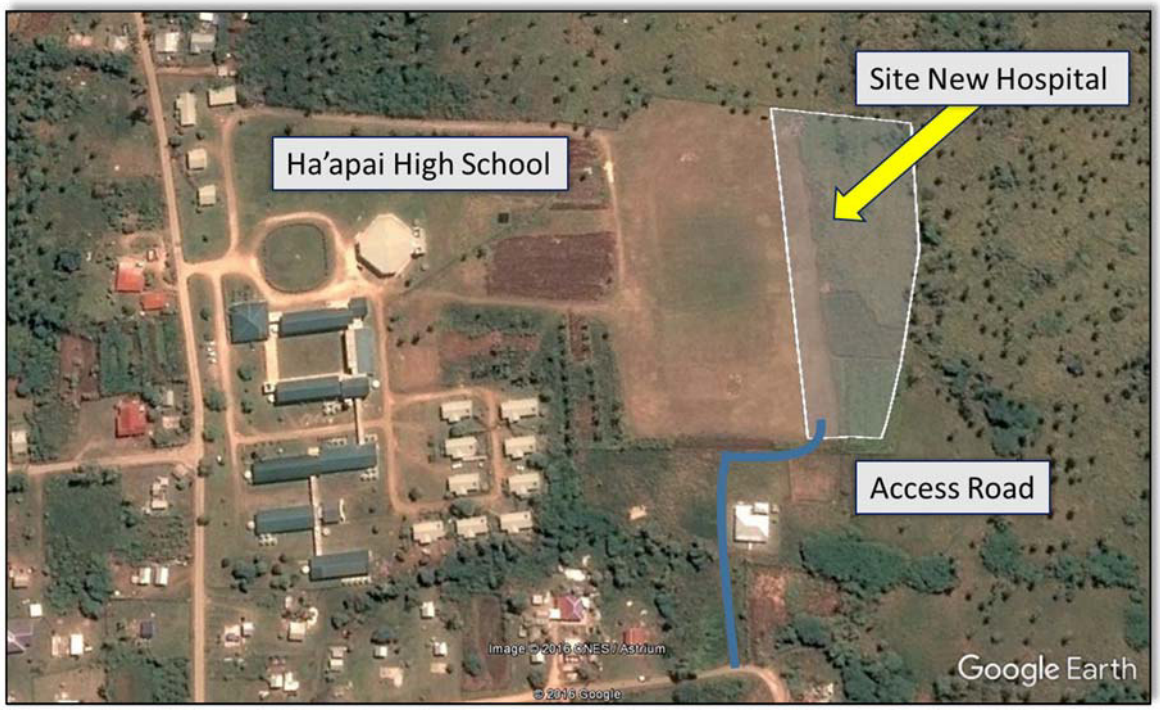
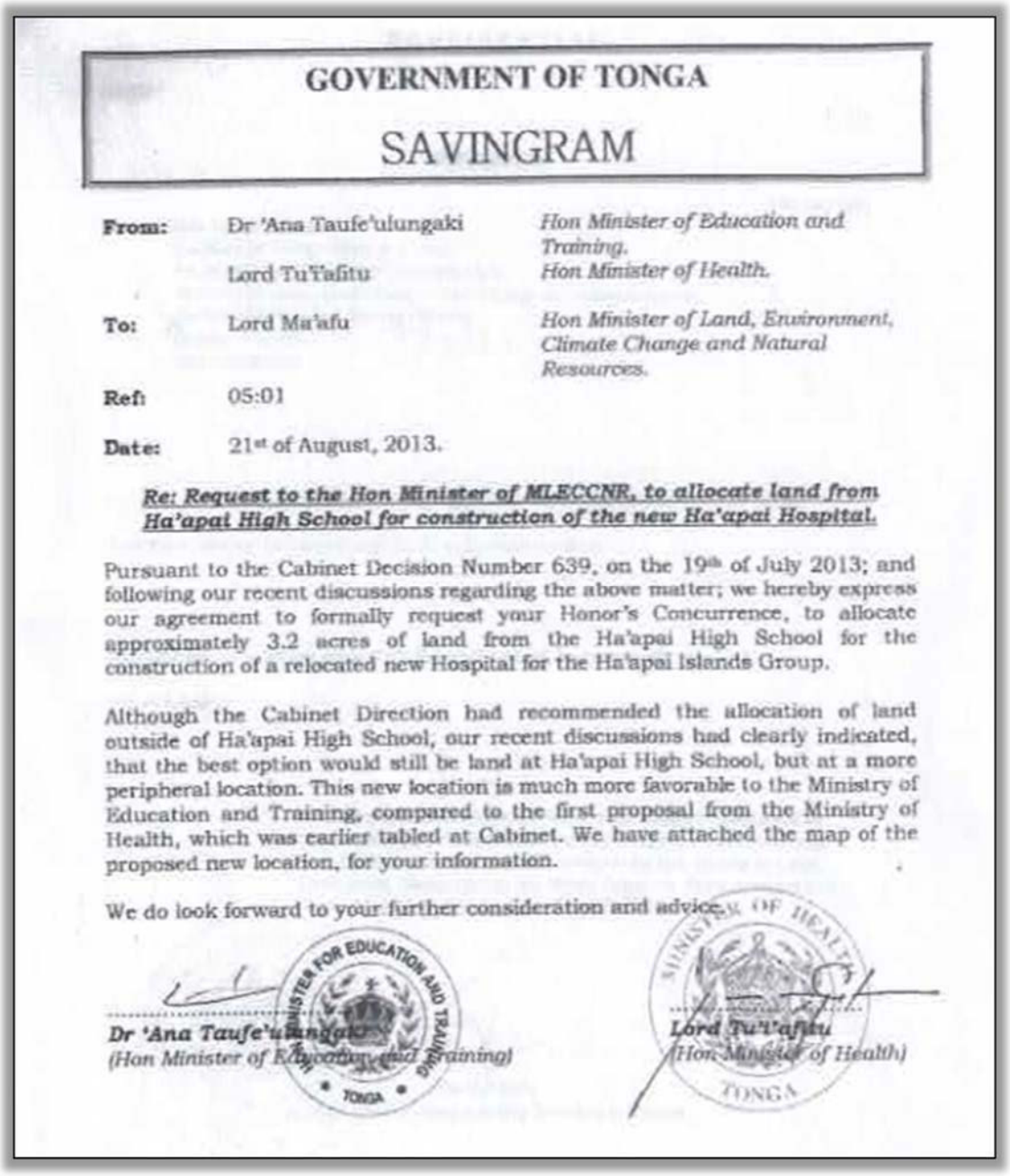



Figure III-V Ha'apai High School and Hospital Site

### G. Land Transfer

62. The school land is currently held under a Crown Lease by the Ministry of Education and Training (MoET). Under an agreement between MoET and MoH, the boundaries of land

of the school will be redrawn and an area of 3.2 acres (1.4 hectares) allocated to MoH for the hospital. This transfer of land has been confirmed by an agreement of the Government Cabinet. (Figure III-VI)



GOVERNMENT OF TONGA

SAVINGRAM

**From:** Dr 'Ana Taufe'ulungaki — *Hon Minister of Education and Training.*
Lord Tu'Ifafitu — *Hon Minister of Health.*

**To:** Lord Ma'afu — *Hon Minister of Land, Environment, Climate Change and Natural Resources.*

**Ref:** 05:01

**Date:** 21st of August, 2013.

***Re: Request to the Hon Minister of MLECCNR, to allocate land from Ha'apai High School for construction of the new Ha'apai Hospital.***

Pursuant to the Cabinet Decision Number 639, on the 19th of July 2013; and following our recent discussions regarding the above matter; we hereby express our agreement to formally request your Honor's Concurrence, to allocate approximately 3.2 acres of land from the Ha'apai High School for the construction of a relocated new Hospital for the Ha'apai Islands Group.

Although the Cabinet Direction had recommended the allocation of land outside of Ha'apai High School, our recent discussions had clearly indicated, that the best option would still be land at Ha'apai High School, but at a more peripheral location. This new location is much more favorable to the Ministry of Education and Training, compared to the first proposal from the Ministry of Health, which was earlier tabled at Cabinet. We have attached the map of the proposed new location, for your information.

We do look forward to your further consideration and advice.

MINISTER FOR EDUCATION AND TRAINING TONGA

MINISTRY OF HEALTH TONGA

**Dr 'Ana Taufe'ulungaki**
*(Hon Minister of Education and Training)*

**Lord Tu'ifafitu**
*(Hon Minister of Health)*

Figure III-VI Cabinet Agreement on Land Transfer

Lands Department confirmed the layout by a survey and production of the cadastral map. (see Figure III-VII)

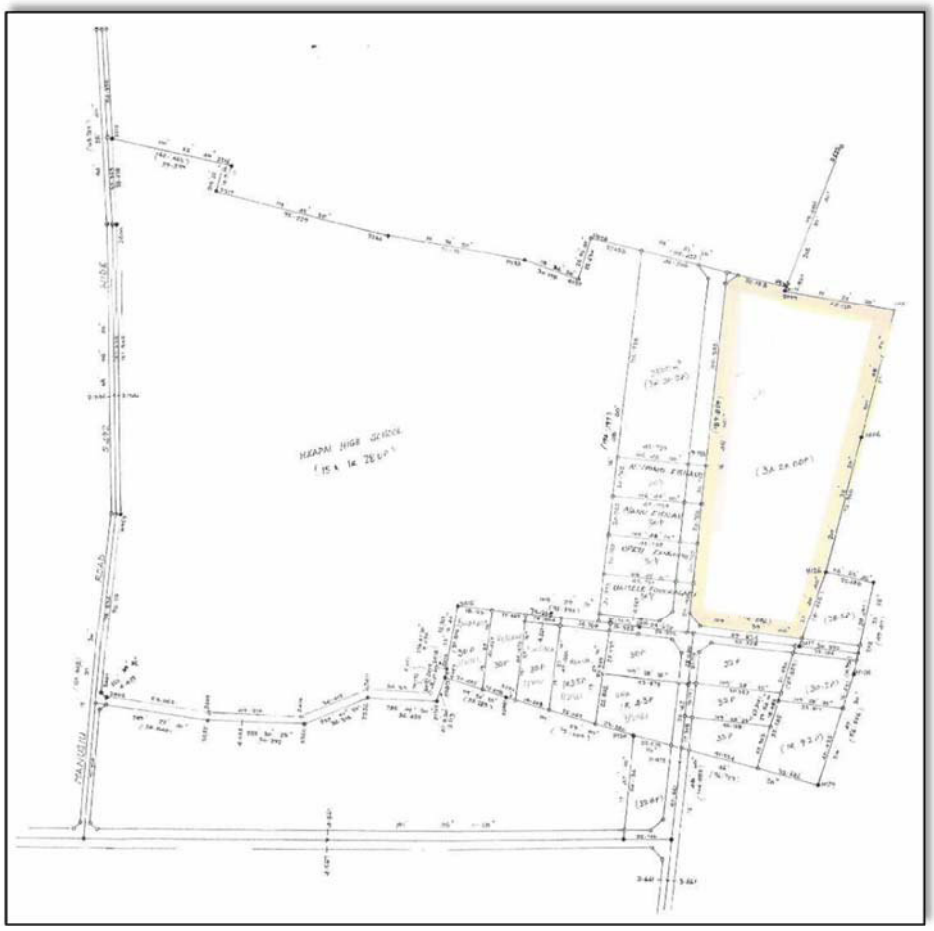


Figure III-VII Cadastral Map Ha'apai High School and Hospital Site

### H. Conceptual Layout and Design

A concept layout of the proposed hospital is included at Figure III-VIII.

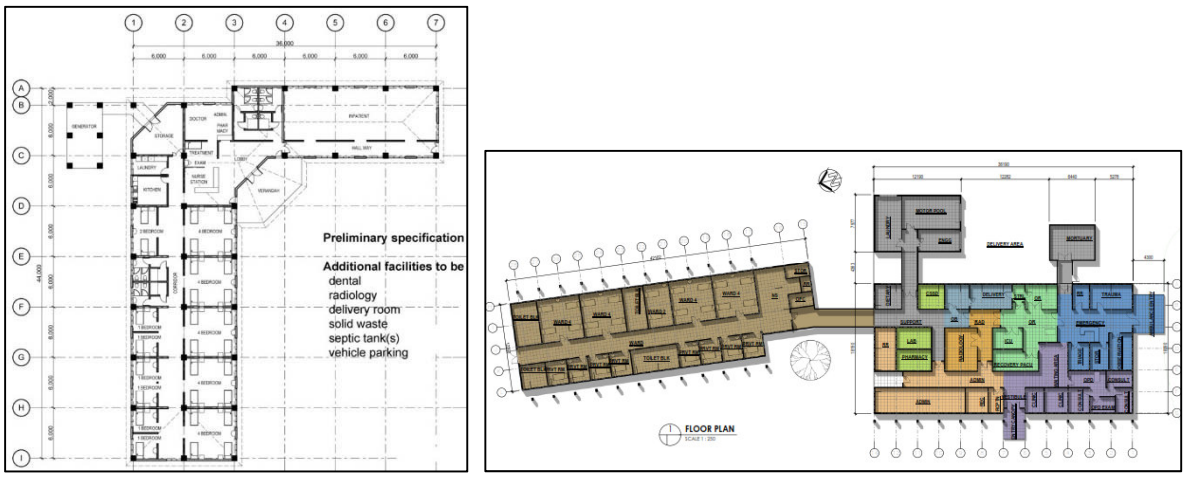



Figure III-VIII Original and Revised Layout of Hospital

The original layout was "L" shaped but to improve resilience to strong winds it was modified as shown.

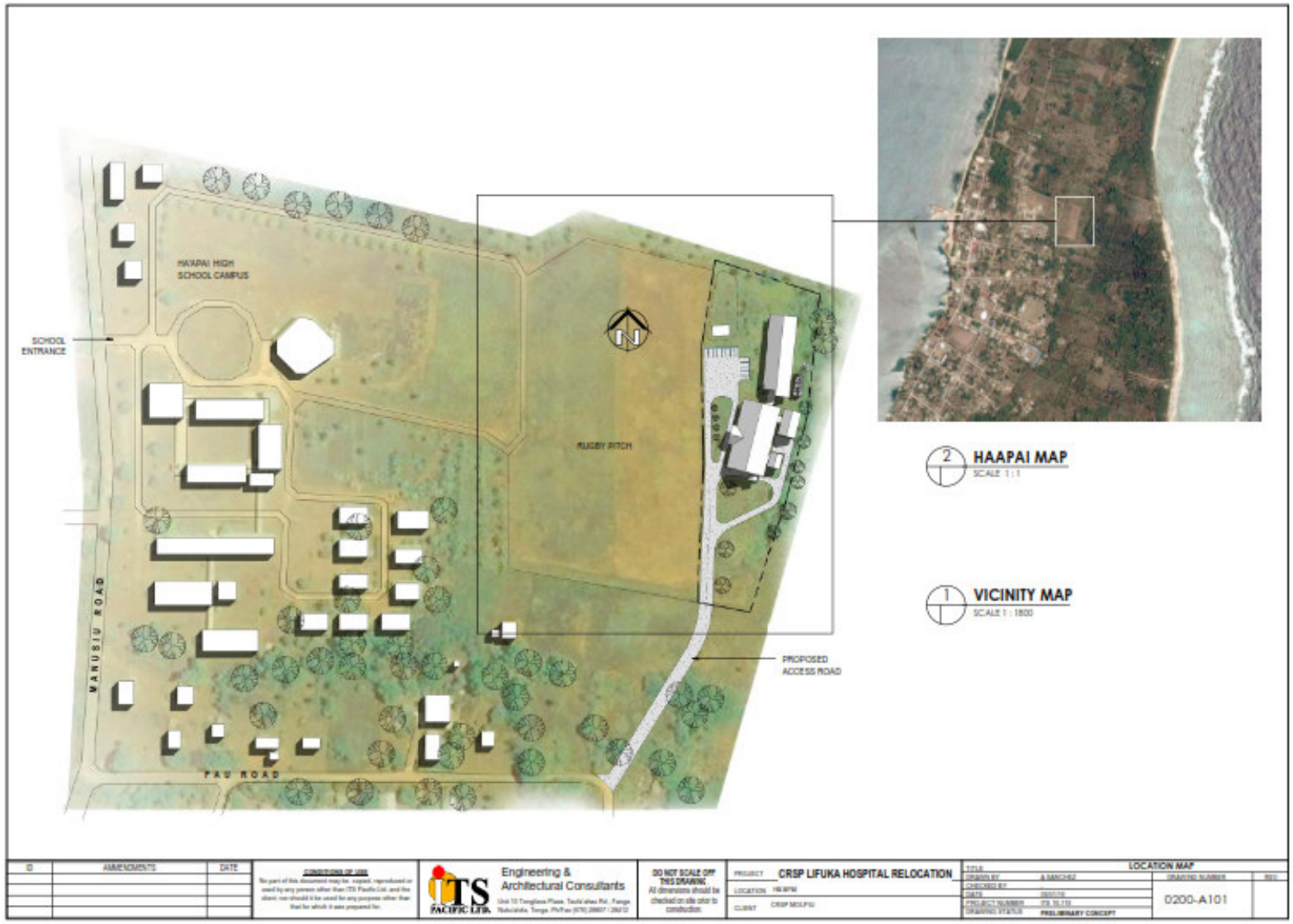
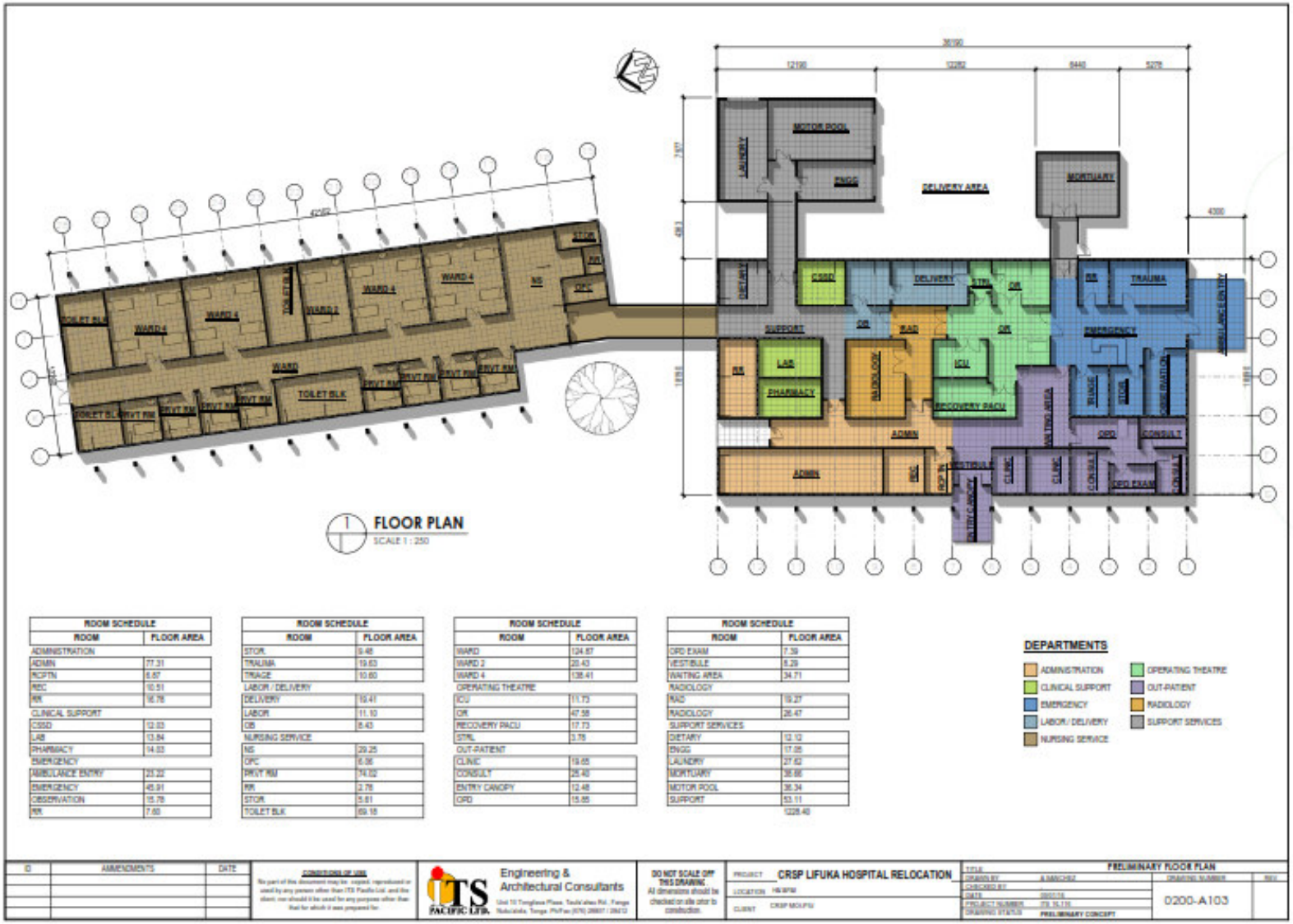



Figure III-IX Conceptual Layout of Hospital


Figure III-X Conceptual Layout of Hospital




| ROOM SCHEDULE | |
|---|---|
| ROOM | FLOOR AREA |
| ADMINISTRATION | |
| ADMIN | 77.31 |
| RCPTN | 6.67 |
| REC | 10.51 |
| RR | 16.78 |
| CLINICAL SUPPORT | |
| CSSD | 12.03 |
| LAB | 13.84 |
| PHARMACY | 14.03 |
| EMERGENCY | |
| AMBULANCE ENTRY | 23.22 |
| EMERGENCY | 45.91 |
| OBSERVATION | 15.78 |
| RR | 7.60 |

| ROOM SCHEDULE | |
|---|---|
| ROOM | FLOOR AREA |
| STOR | 9.48 |
| TRAUMA | 19.63 |
| TRIAGE | 10.60 |
| LABOR / DELIVERY | |
| DELIVERY | 19.41 |
| LABOR | 11.10 |
| OB | 8.43 |
| NURSING SERVICE | |
| NS | 29.25 |
| OPC | 6.36 |
| PRVT RM | 74.02 |
| RR | 2.78 |
| STOR | 5.61 |
| TOILET BLK | 69.18 |

| ROOM SCHEDULE | |
|---|---|
| ROOM | FLOOR AREA |
| WARD | 124.87 |
| WARD 2 | 20.43 |
| WARD 4 | 138.41 |
| OPERATING THEATRE | |
| ICU | 11.73 |
| OR | 47.58 |
| RECOVERY PACU | 17.73 |
| STRL | 3.78 |
| OUT-PATIENT | |
| CLINIC | 19.65 |
| CONSULT | 25.42 |
| ENTRY CANOPY | 12.48 |
| OPD | 15.65 |

| ROOM SCHEDULE | |
|---|---|
| ROOM | FLOOR AREA |
| OPD EXAM | 7.39 |
| VESTIBULE | 8.29 |
| WAITING AREA | 34.71 |
| RADIOLOGY | |
| RAD | 19.27 |
| RADIOLOGY | 26.47 |
| SUPPORT SERVICES | |
| DIETARY | 12.12 |
| ENGR | 17.08 |
| LAUNDRY | 27.62 |
| MORTUARY | 36.86 |
| MOTOR POOL | 36.34 |
| SUPPORT | 53.11 |
| | 1228.48 |

Figure III-XI Conceptual Layout of Hospital

### I. Existing Hospital Equipment

63. The maximum capacity if all beds and wards were full and all patients had relatives visiting them would be 50-70 people. All equipment from the existing hospital would be moved to the new hospital once construction was completed. The existing facilities adjacent to the current Hiu'ui Hospital will continue to be used as staff quarters as they are within 2km of the proposed hospital and construction of staff quarters is not part of this project.

### J. Utilities for New Site

#### 1. Hospital Environmental Checklist for Detailed Design Consultants

64. A checklist was provided to the architect of items of environmental significance to be incorporated into the design. (Table III-1)

Table III-1 Environmental Checklist for Hospital for Detailed Design Consultants

| | **Environmental Checklist for Hospital for Detailed Design Consultants** |
|---|---|
| 1) Water supply | • Amount of water to be supplied based on number of occupants: permanent (staff) and temporary (patients)<br>• Provision of distilled / pure water supply. Assume cationic exchange resins equipment supplied. Means of exchange of resins and return to manufacturers for regeneration |
| 2) Waste Water | • Septic tank / sewered system. Design Capacity or population equivalent |
| 3) Laboratory | • Storage of acids/ alkali / reagents<br>• Storage of radioactive tracer elements |
| 4) Medical facility | • Drugs/ medicines secure storage / refrigerated storage<br>• Poisons secure storage facility<br>• Radiation proof rooms for X-rays : lead lined partition |
| 5) Surgical Facility | • Disposal of surgical waste; bandages, blood contaminated wastes, body tissue, body parts |
| 6) Mortuary | • Disposal of surgical waste from autopsy<br>• Refrigeration provision |
| 7) Solid Waste | • Low level waste: paper, packing materials, plastics, glass – recycle if practical, if not give provision for removal to sanitary landfill<br>• High level waste – infected material to be sent to in-house hospital incinerator : > 800$^{o}$C and >2 seconds retention time.<br>• Sharps – scalpels and hypodermic needles – to be disposed to one way plastic containers and unopened container to be sent to in-house hospital incinerator |
| 8) Ventilation and Air conditioning | • Air conditioning system to patient's wards and offices<br>• Isolation unit- separate air conditioning system to general system |

#### 2. Potable Water

65. Water is a major requirement for the hospital. Water use is divided fairly equally among potable requirements for drinking and bathing and non-potable use such as showers, toilets

and laundry use. According to Tonga Water Board a figure of 100 liters per person per day is appropriate of which 40% is assumed to be for potable use.

66. For the hospital, assuming maximum patient capacity of 24 and a total 22 staff working shifts which is equivalent to 16 persons full time a demand of 40 x 100 liters = 4000 liters per day has been identified. Of this 1,600 liters / day is a potable requirement. Accordingly, the water demand that could be required during a drought year might be as high as 500,000 liters/year of potable water. On this basis, it is anticipated that at least two 250,000 liter rainwater tanks will be used, although to minimize the use of groundwater, it is recommended (particularly given the relatively low cost) that four 250,000 liter rainwater tanks be installed with appropriate pumps for header tanks and treatment filters to reduce the need to use the existing groundwater. Calculations suggest that in a normal year, these tanks would remain fairly full.

67. As alternative, water could be extracted from the groundwater aquifers although it is known that the underlying groundwater is highly saline. In order to improve the availability of fresh water it is recommended to improve rainwater collection and storage both in the new hospital and at Ha'apai High School to reduce the need for groundwater use where possible.

### 3. Existing Water Resources

68. The school constructed an elevated tank, well and pump in August 2015. During the public consultation the school principal advised that the water is not used as it is too salty. This was subsequently sampled and analysed and was found to be four times higher than the Tonga Water Board standard for salinity. (6,000ppm versus 1,500ppm).

Figure III-XII Elevated Tank, Well and Pump

### 4. Power

69. During Cyclone Ian the overhead electricity distribution network suffered outages. In order to avoid this happening again an underground coaxial cable connection rated at 250KV will be provided to the hospital. This will enter the site from the existing road to the south of the site.

70. The hospital may have a standby generator provided although as the power supply line is underground there should not be any interruptions due to high winds causing power transmission lines to fall.

As the existing hospital will no longer be operational and the new hospital is a replacement, there will not be significant additional demand on the current electricity distribution network.

### 5. Solid Wastes

71. Low level medical waste such as cardboard, paper wrapping and rubber inspection gloves will be disposed of to the municipal landfill in open skips. Sharps such as scalpel blades and hypodermic syringes are disposed of in the hospital in non-openable plastic containers and then will be transported to the sanitary landfill.

Figure III-XIII Sharps Disposal

### 6. Medical Wastes

72. Pathological wastes such as bandages contaminated with blood or surgical matter will be disposed of in the on-site incinerator. Ash from the incinerator will be sealed and transported to the sanitary landfill.

### 7. Incinerator

73. The existing hospital has a new small scale incinerator which has not been commissioned or installed yet. It can be moved to the new site. It is supplied by "*Inciner8 Ltd"* of UK and complies the E.U. standards. All incinerators are CE certified to

- BS E7N4 6-2:1997(industrial thermo processing equipment – part 2. Safety requirements for combustion and handling systems)
- Low Voltage Directive 73/23/EEC, EMC Compatibility Regulation 89/336/EEC and Machinery Directive 89/392/EEC

In addition, due to twin chamber designs and long retention time this type of incinerator complies with the highest standards of air quality emission as laid down by the E.U.

| Average emissions / EU standards on medical incinerators with secondary chamber | | |
|---|---|---|
| Parameter | Limits(1/2 hour average) | Measured |
| Total dust | 30 mg/m$^3$ | 12 mg/m$^3$ |
| Sulphur dioxide | 200 mg/m$^3$ | 2.4 mg/m$^3$ |
| Nitrogen dioxide* | 400 mg/m$^3$ | 60 mg/m$^3$ |
| Carbon monoxide | 100 mg/m$^3$ | 78.3 mg/m$^3$ |

Figure III-XIV Ha'apai Hospital Incinerator and Performance Standards

Consideration has been given to its location with respect to the Ha'apai High School and it is to be located at the most distant point on the site.


Figure III-XV Location of Incinerator

74. Most dwellings are to the south and west of the site. As the prevailing winds are south easterly this should blow any fumes in a northerly direction away from the school and inhabited areas.

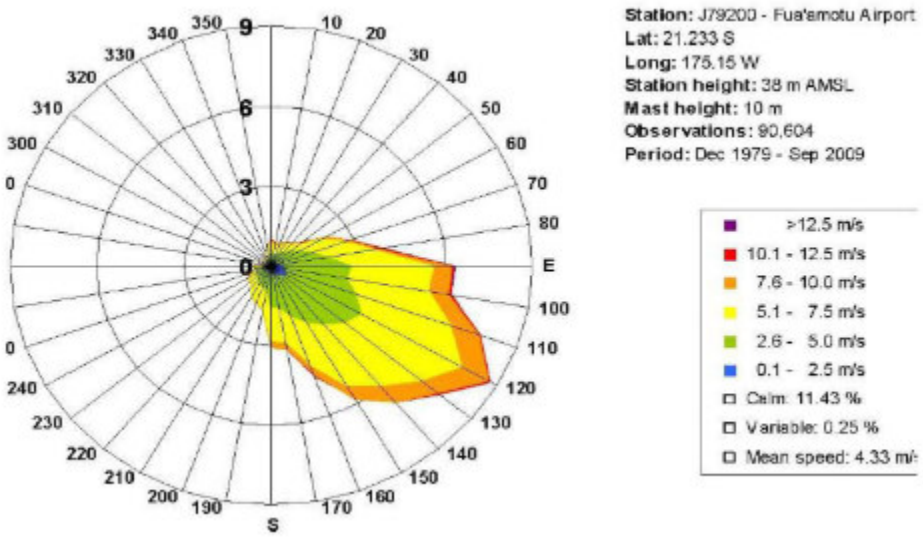



Figure III-XVI Windrose Tonga

### 8. Liquid Wastes

75. The water supply to the hospital is rated at 4,000 litres / day. It is conventional to assume that 80% of this will become waste water. There are two anticipated liquid effluent waste streams:

- grey water (sullage) - kitchen, laundry etc
- black water (septage) - septic waste from toilet, laboratory waste, post operative liquid waste (blood)

Blood is well known for having extremely high BOD value and so it recommended that two waste streams be implemented, one for grey water and one for black water. [1] Each will lead through an underground piped system to separate septic tanks. Each tank will be designed to have a 5 days retention time. As an additional precaution the black water septic tank will have sand filters in accordance with WHO Standards for Medical Waste treatment. [2]

76. The tanks will discharge to an underground drain field. Percolation tests will be carried out to determine the carrying capacity of the underlying soils and from that the application rate and consequent size of the drain field.

[1] Mara D (1996). Low-cost urban sanitation. Chichester, England, Wiley.

[2] World Health Organization(1992) A guide to the development of on-site sanitation

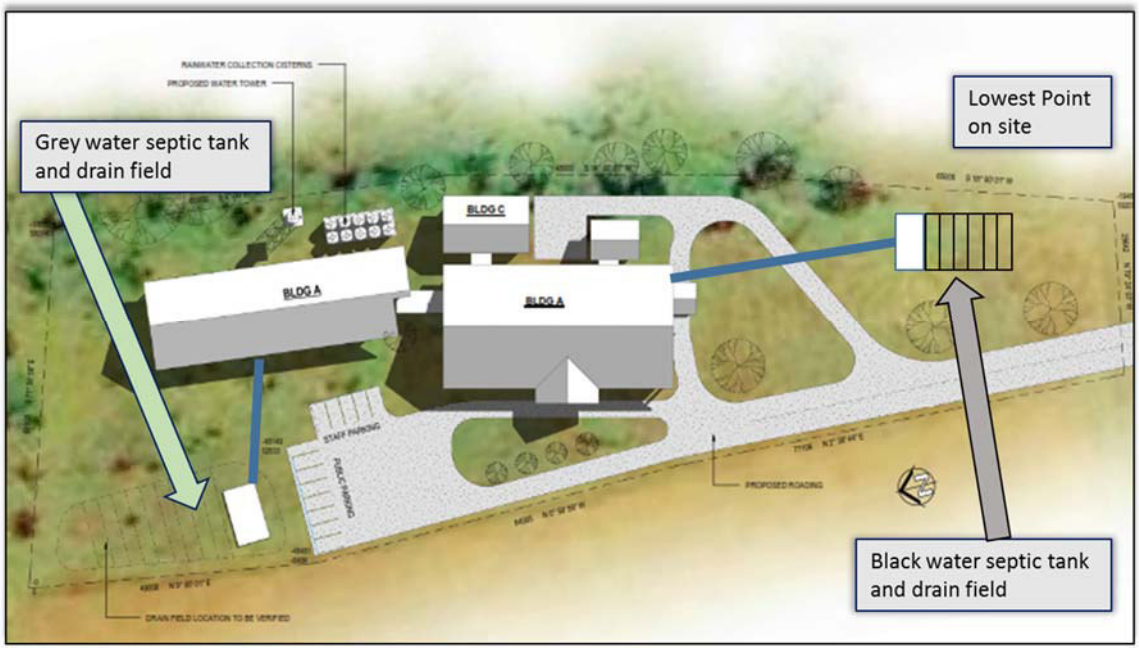



Figure III-XVII Gradient

77. The grey water septic tank and drain field will be located in the northwest corner of the site. The black water septic tank and drain field will be located in the south east corner of the site. At this location the natural gradient from the black water septic tank to drain field away from town water supply. This has been implemented as an extra precaution to prevent contamination of the underlying aquifer.

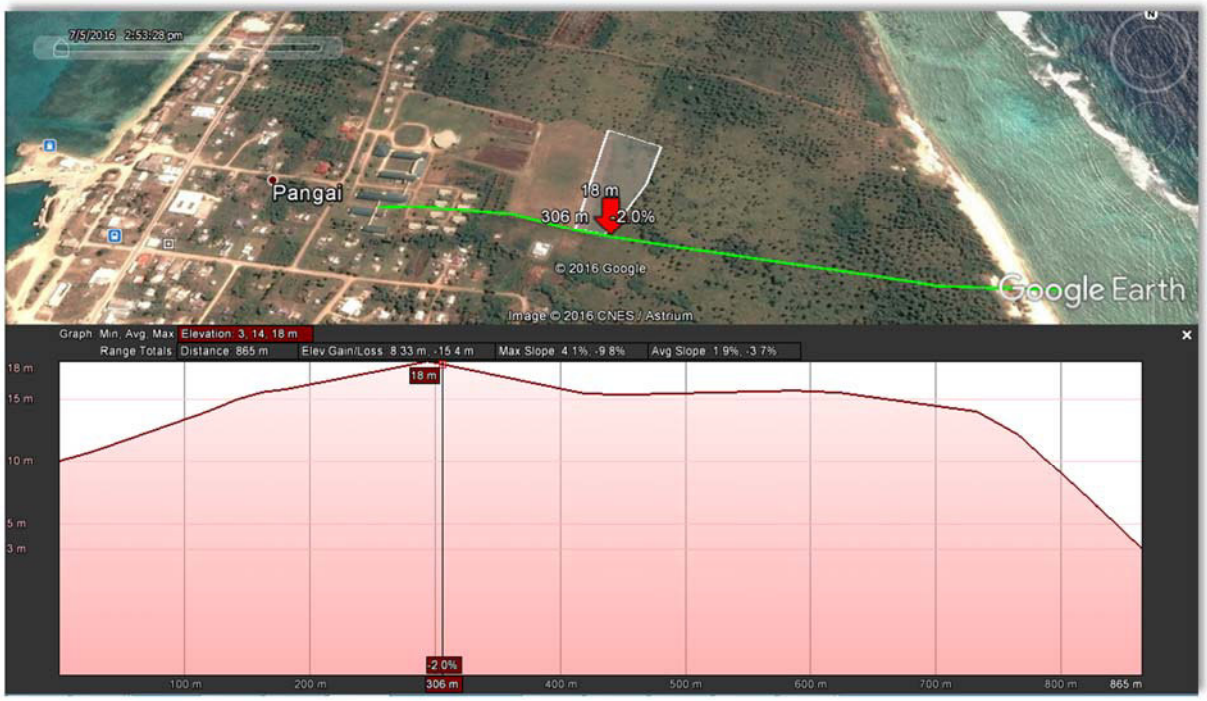



Figure III-XVIII Gradient from Black Water Septic Tank away from Town Water Supply

# IV. Description of the Environment (Baseline Data)

## A. Physical Environment

### 1. Topography

78. The Ha'apai Island Group is a chain of 62 volcanic islands. The islands include barrier reefs, shallow marine lagoons, coral shoals and active volcanoes including Kao, the highest point in Tonga standing at 1,046 meters. All the larger islands are in the eastern Lifuka group, including the most densely populated islands of Lifuka and Foa. The majority of the islands are small low-lying coral atolls with the smallest island being less than 1 hectare. Tofua is the largest island in the Ha'apai Group at approximately 46.6km2. The total land mass of the Ha'apai Islands group is 109.3km$^2$.

### 2. Geology

79. The Ha'apai Group lies along the crest of the mostly submerged Tonga ridge and includes the Tofua Volcanic Arc. The Tofua Arc separates the shallow Tonga Ridge from the deep Lau Basin formed during the Cenozoic Period. The majority of the islands are flat although due to plate movement, they have locally tilted slopes. The windward islands, especially Lifuka and Foa have marked sea cliffs of limestone that have retreated following coastal erosion from wave action. Along these coastlines, inshore fringing reefs cover erosional impacted ancient coral reefs. The uplifted reef flats that form the uplands of Lifuka are tilted downwards to the west to northwest and this result in elevations of slightly in excess of 15m.

The soils are made up of a relatively young to moderately weathered reddish brown soil of about 1.5m thick. The underlying older tephra layer is more strongly weathered with yellowish brown tints.

### 3. Seismic Activity

80. Tonga is located near the world's longest deep oceanic trench, the Tonga Trench. The area is an extremely active seismic zone having around 150 earthquakes per year due to subduction of the Pacific Plateunder the Australian plate along the Tonga Trench.

A tremor of magnitude 7.9 occurred on 20 March 2009, 200km north east of Nukualofa. An accompanying tsunami with a height of 0.8 meter resulted from this earthquake. No damage was recorded.

### 4. Climate

81. The climate of Tonga is tropical, with warmer summers and temperate winters.

Figure IV-I provides a graphical representation of monthly mean minimum, mean and mean maximum temperatures from Ha'apai from 2000-2012.

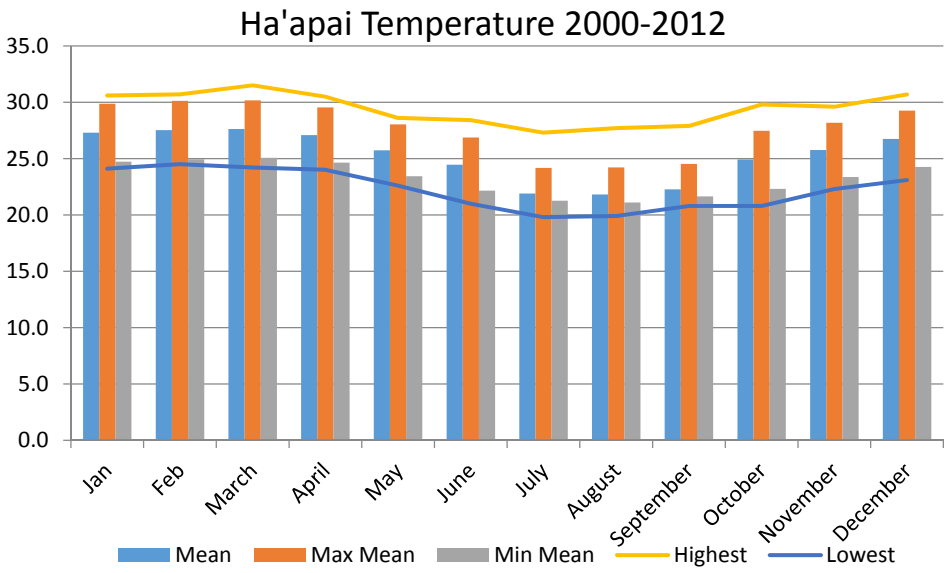



Figure IV-I: Air Temperature recorded at Ha'apai - 2000 to 2012

### 5. Rainfall

82. Fua'amotu Airport has comprehensive atmospheric data but rainfall data is collected in Ha'apai. Figure IV-II provides a graphical representation of monthly mean minimum, mean and mean maximum temperatures from Ha'apai from 2000-2012.

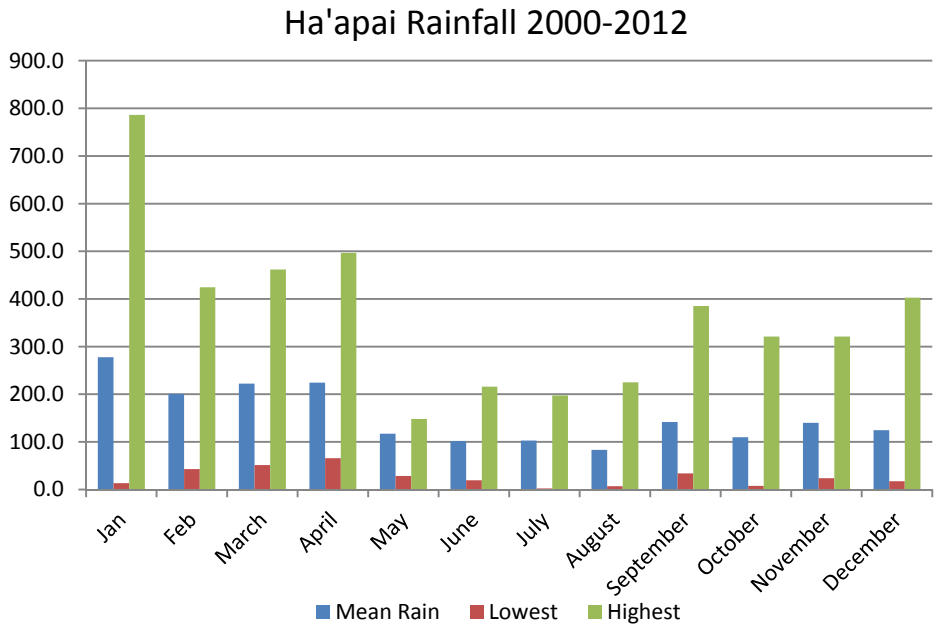



Figure IV-II: Rainfall recorded at Ha'apai - 2000 to 2012

## 6. Winds

83. Wind data is recorded at both Ha'apai and Fua'amotu Airport. Tonga is not impacted by significant ocean breezes. Stronger winds are predominantly recorded between November and April and come from the east and south east directions. Figure IV-1 gives the wind rose for Tongatapu airport.

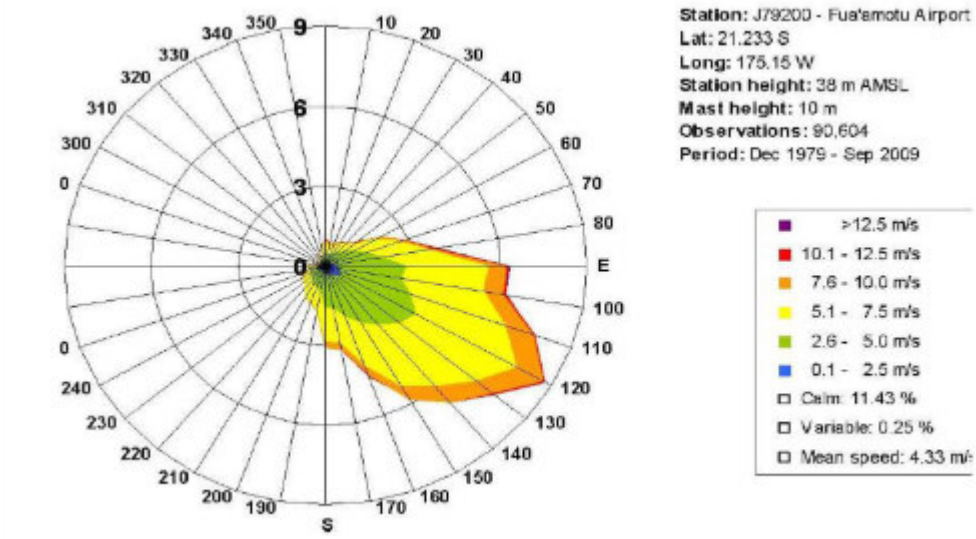



Table IV-1 provides wind speed and direction at Haapai. .

Table IV-1: Wind Direction and Maximum Speed at Ha'apai - 2000 to 2012

| Wind Direction | Percentage of Time | Max Wind Speed (m/s) | Max Wind Speed (km/h) |
|---|---|---|---|
| North | 7.2% | 24.7 | 89 |
| North East | 6.4% | 12.9 | 46.5 |
| East | 56.8% | 72 | 259 |
| South East | 18.4% | 56.6 | 204 |
| South | 2.4% | 41.2 | 148 |
| South West | 2.3% | 11.8 | 42.5 |
| West | 3.5% | 12.9 | 46.5 |
| North West | 3% | 15.4 | 55.5 |

## 7. Severe Tropical Storms

84. The cyclone season in Tonga occurs during the months of January to April. Damaging cyclones normally have an eight to ten year cycle. From 1960 to 2006, there were 58 severe weather events within Tonga. Of the 58 cyclones 28 have impacted the central region of Tonga which includes Ha'apai. In December 2012, Tropical Cyclone Evan missed the northern region of Tonga as a Category 3 cyclone and killed two people in Samoa. In January

2012, Cyclone Jasmine caused damage to Tonga which resulted in minor damages such as fallen trees and power lines, uprooted root crops and vegetables.

On 11 January 2014, Tropical Cyclone Ian, a Category 5 cyclone directly impacted the Ha'apai Islands. This was the first Category 5 system to directly affect Tonga. Cyclone Ian claimed one life and left significant destruction to buildings in the Ha'apai Island group including removing roofing from the existing hospital.

#### 8. Water Resources

85. Ha'apai obtains its water supply from groundwater. The water is pumped from abstraction galleries into reservoirs for treatment with calcium hypochlorite before it is delivered through pipes to domestic premises. Another form of water supply is rainwater obtained from roof top harvesting that is stored in rainwater tanks. There is no surface water storage on the island and no streams or rivers. Wells are used by residents with elevated communal tanks.

#### 9. Air Quality

86. There is no known air quality data available for Ha'apai. The known impacts to air quality are from the generation of dust from the unpaved or unmaintained roads and fugitive emissions of vehicle traffic and generators.

### B. Ecological Resources

#### 1. Biodiversity

87. The natural vegetation pattern on Ha'apai includes secondary fallow vegetation. All islands have a cover of coconuts, but few other trees. Erosion and slash and burn agriculture have caused a decline in vegetation. The majority of natural woodland is located on Tofua and Koa Islands. The hospital site has been fully cleared except for some overgrown grasses and a small number of shrubs.

#### 2. Birds

88. Of the 15 resident species of terrestrial birds that inhabit Ha'apai Island Group, 9 are widespread and locally common within Ha'apai, although only 4 (*Gallirallus philippensis, Ptilinopus porphyraceus, Halcyon chloris, Aplonis tabuensis*) occur on all 13 islands. Overall species richness and abundance of terrestrial birds is greater on Tofua than on the other islands as a result of the primary forest on Tofua.

#### 3. Marine Areas

89. The marine environment plays an important role in Ha'apai. From a tourism perspective, the use of the waters by migrating whales provides valuable income to the local people, although tourism numbers are higher in Vava'u than Ha'apai.

90. There are no significant mangrove communities located within the Ha'apai Island Group. The coastal marine ecosystems includes rocks and terraces (1,581 ha) sandy beaches (185ha) and reef flats (4,719ha). There are three special management areas including 'O'ua, Ha'afeva and Felemea. An area of 10,000ha has been set aside as the Ha'apai Conservation Area.

## C. Socio-Economic Development

### 1. Tongan Economy

91. The Tongan economy had a Gross Domestic Product (GDP) in Tongan Pa'anga (TOP) of about $800 million per year. The Tongan GDP is made up of $133.8 million TOP from the agricultural sector ($109.1 mill TOP from agriculture, $4 million TOP from forestry and $20.8 million TOP from fisheries); $150.1 million TOP from industry ($8.4 million TOP from mining and quarrying; $44.9 million TOP from manufacturing; $22.4 million TOP from electricity and water supply and $74.4 million TOP from construction). The vast majority of GDP come from the service sector ($427 million TOP) which includes among others, $80.4 million TOP from wholesale and retail trade; $93.9 million TOP from public administration and $72.4 million TOP from the ownership of dwellings.

### 2. Population

92. Tonga underwent a census in 2011. The total population was 103,036 (52,001 males, 51,035 females). The majority of the population is located on Tongatapu (75,158).

With respect to the Ha'apai Island Group which the new hospital will serve, the 2011 Census data indicates that a total of 6,616 individuals are living in the Ha'apai Group. The populations is split fairly equally between females (3,210) and males (3,406). The population density across the island group was 61 individuals/km$^2$.

### 3. Socio-economic Conditions

#### *a) Buildings*

93. Materials for house construction vary across Ha'apai. Within the Island Group (1,258 houses), the vast majority of houses were built from wood with concrete block and metal being the next most favored although substantially less Similar results were observed in Pangai (463 houses). Table IV-2 provides information on the various house construction materials used across the four project areas.

Table IV-2 2011 Census Data – House Construction Material

| Location | Poured Concrete | Concrete Blocks | Metal | Wood |
|---|---|---|---|---|
| Ha'apai | 18 | 146 | 68 | 1,017 |
| Pangai | 9 | 68 | 25 | 361 |

#### *b) Power*

94. The majority of houses across Ha'apai and Pangai are connected to mains electricity for their lighting. Some homes across Ha'apai have their own electricity generator or use kerosene for lighting. The majority of households use wood for cooking.

### 4. Employment

95. In the Ha'apai Island Group, 2,656 persons are within the labor market. Of those, 1,435 males were employed while 1,221 females were employed. Of the 2,656, 238 were employed by Government, 68 were Quasi Government, 951 were private employees, 20 were employers, 924 are self-employed and 1,069 are unpaid family workers.

### 5. Health

96. In relation to the development of a new hospital, statistics with respect to health are important. From the 2011 Census, of the 6,607 residents in Ha'apai, 237 (106 males and 131 females) indicated that they had a health complaint. Of the 237 individuals, 7 did not seek care (5 males and 2 females) – all 7 indicated that the reason they did not seek care was for an "other" reason rather than being not ill enough. "Other" includes that the individuals could not afford treatment, too far to travel, service at provider is poor, too busy and other unspecified reasons.

### 6. Cultural Heritage

97. There are no known cultural heritage sites in the immediate proximity of the project. The Cemetery is located about 440m from the eastern site of the Hospital where the late Prime Minister, Shirley Baker is at rest. Ha'apai High School is located 250m west where culture and traditional values of Tongan heritage and language are learned at school. Free Wesleyan Church (FWC) is located to the southwest which became a historical site since the early 1970's where Christians believe and witnessed the Cross of Jesus was discovered at Ha'apai. The King's Palace is located 1,100m west, where Tongan people shows their respect with traditional dresses and languages.

### 7. Indigenous People

98. There are no indigenous peoples in Ha'apai or in the Kingdom of Tonga.

## D. Climate Change Projections

### 1. IPCC

99. The Intergovernmental Panel on Climate Change (IPCC) is a U.N. scientific body who produce a series of international assessment reports on the current state of climate change knowledge. (AR5 is the current edition) The release of $CO_2$ and other greenhouse gasses (GHGs) into the atmosphere will lead to an increase in the average temperature in the future. It is likely that these higher temperatures across the globe will change rainfall patterns. The IPCC compares GCM (Global Climate Models) by suggesting standard future $CO_2$ scenarios and standard input data such as temperature, rainfall, wind speed etc. GCMs are constantly being updated and results from each new model are compared to the outputs from all of the others.

### 2. Future Scenarios

100. Accurately forecasting the future climate is not possible because of uncertainties in the interactions between the oceans, atmosphere and biosphere. As a result GCMs produce a range of modeled future climate situations. These are not attempts to predict the likelihood of what may happen but the consequences of certain concentrations of GHGs. These are called climate scenarios.

101. The latest IPCC report (Number 5) uses "Representative Concentrations Pathway (RCP)". These RCP scenarios are projections of the change in the balance between incoming and outgoing radiation to the atmosphere. The numbers refer to global energy imbalances, measured in watts per square meter, by the year 2100.

102. RCP 3 (PD) refers to a scenario where $CO_2$ emissions peak in the near future and then decline. This is optimistic. RCP 8.5 refers to the worst case scenario where emissions

continue to rise until 2100 leading to global temperature increases. This is pessimistic. RCP 4.5 and 6.0 are intermediate scenarios.

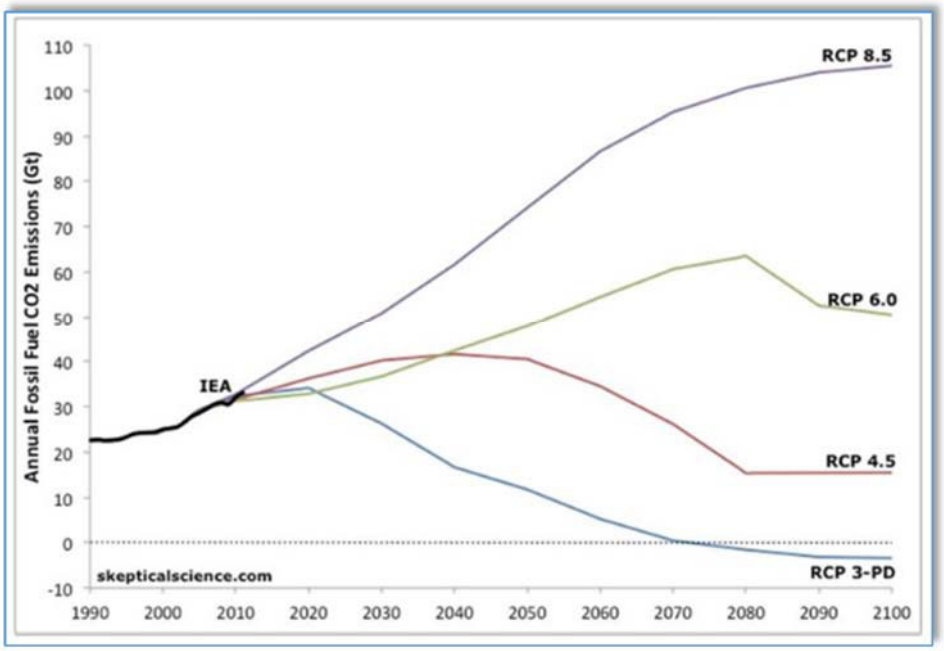



Figure IV-III RPCs from IPCC AR5 (2011)

103. Recent climate change studies use RCPs of 8.5 for extreme $CO_2$ future concentrations and values of 3.5 or 4.5 to represent low $CO_2$ future concentrations. RCP 8.5 is a pessimistic scenario and will give worst case conditions. It is designated the “extreme scenario”.

### 3. Rainfall Intensity

104. Climate change studies have projected an increase in **rainfall intensity** during rainy days by 2055. A decrease in the total yearly rainfall that is projected for some locations is a result of a decrease in the number of rainy days not a reduction in intensity.

105. While climate models are run at intervals of 1 hour or less the outputs that are generated are at the scale of 1 day. Predictions of rainfall intensity in terms of mm per hour may under estimate maximum rainfall intensity. As a guide, in tropical conditions, hourly rain fall can be assumed to be 20-40% of daily rainfall.

### 4. Storm Projections

106. A paper by O’Gorman in Nature Geoscience Letters[3] related increases in precipitation to increases in temperature and shows that for extreme storm events (0.01% probability of occurrence or less) precipitation increases by 10% for each degree of increase in temperature. As temperature increases are hoped not to exceed 2$^{o}$C by the end of this century then an addition of 20% on intensity of short duration extreme storms would account for climate change.

107. The main conclusions from the above as they relate to precipitation are:

[3] ‘Sensitivity of tropical precipitation extremes to climate change’ in Nature Geoscience Letters, September 2012.

- Annual rainfall may remain unchanged but rainfall will increase more in the wettest months by being of stronger duration. This will lead to longer dry periods. There may be “mini-droughts” during the wet season.
- The relative increase in rainfall is heavier for short durations.
- An increase of 20% on existing IDF curves will allow for a global temperature increase of 2$^{o}$C. This factor is conservative and is recommended as a design factor.
- The occurrence of cyclones may remain the same or may increase from 3 to 4 times per year but the intensity of cyclones in terms of rainfall and wind speed may increase by 15-20%.

## V. Environmental Baseline

### A. Site Visits

108. In order to stablish the existing environmental conditions on Ha'apai an environmental baseline survey was carried out between 7th and 10th October 2016. This section describes the findings.

### B. Geography

109. Ha'apai is a group of islands with an area of 109km2 in the central part of the Kingdom of Tonga, north of Tongatapu Island and south of the Vava'u group. There are 17 islands and are populated with a total population of 6,616 people (census 2011). Pangai is the administrative capital village of the Ha'apai Group and is located on Lifuka Island. Pangai consists of 2,410 people and 239 households as of 2011. It has one hospital and six high schools.

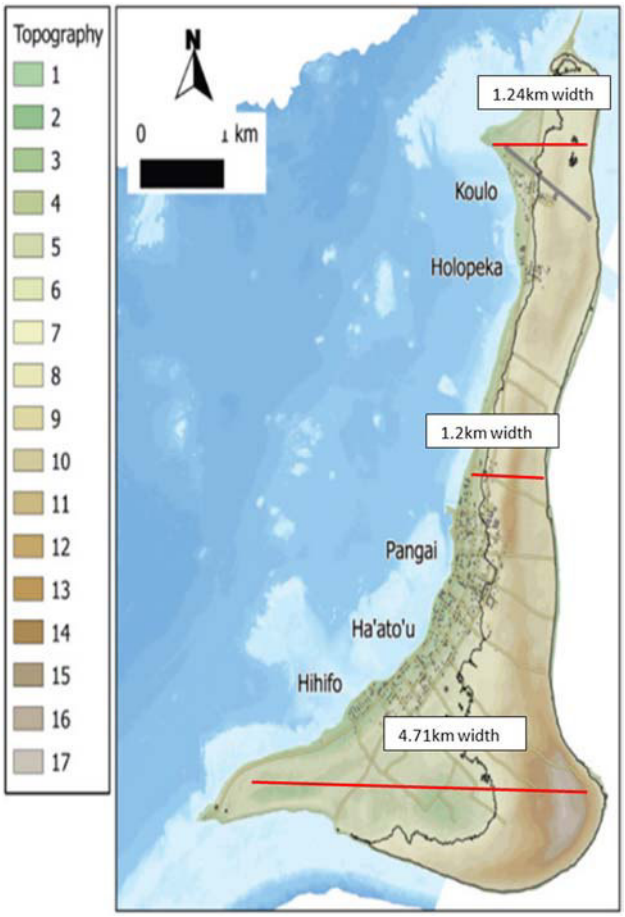



Figure V-I Lifuka Island, Ha'apai

110. The land area of Lifuka is 7.31km long, 4.71km wide to the south, 1.2km in the centre, and 1.24km at the north. Pangai capital village itself is 2.81 long. The highest elevation above sea level is roughly 17 meters.

### C. Hydrological setting

111. There is no surface water catchment in Ha'apai. The freshwater resources consist mainly of groundwater in the form of freshwater lenses. Freshwater lenses form on top of seawater due to the difference in density of the two fluids. The interface, or boundary, between the two fluids is not sharp but rather is in the form of a transition zone. Within the transition zone the water salinity increases from fresh to seawater over a meter. The upper surface of a freshwater lens is the water table.


Figure V-II Freshwater Lense on Lifuka

112. The thickness of freshwater and transition zones are dependent on many factors but the most important are:

- Rainfall amount and distribution
- Amount and nature of surface vegetation and the nature and distribution of soils (influencing evapotranspiration)
- Size of the island, particularly the width
- Permeability and porosity of the geological formation, and the presence of cave systems and solution cavities
- Tidal range
- Methods of extraction and quantity of water extracted by pumping

In the strata underlying the proposed hospital site the lens is at its thinnest being less than 3m.

Most of the houses on each island have individual household rainwater tanks. Groundwater can be used for domestic purposes although some islands are fully reliant on rain for their fresh water.

The majority of households have toilets (flush, composting and pit) and most have access to electricity either through diesel-generated power or solar power although the cost of diesel energy can limit people's usage.

### D. Relocation Site Assessments

113. The relocation site for Ha'apai Hospital is situated in the Pangai High School adjacent to the existing rugby field.

114. There are two ground water wells near to the site. The nearest is the new well at Ha'apai High School which is about 140m from the site. The well was drilled recently under the MORDI project in August 2016. The second nearest well is a private well, located at the Taufa'ahau College compound which is about 574m from the site.

The agricultural activities observed in the surrounding areas of the site are mainly subsistence farming. There are no vegetable or any crops that use fertilizers and pesticides.

The majority of the 239 households in Pangai have flushing toilets with septic tanks.

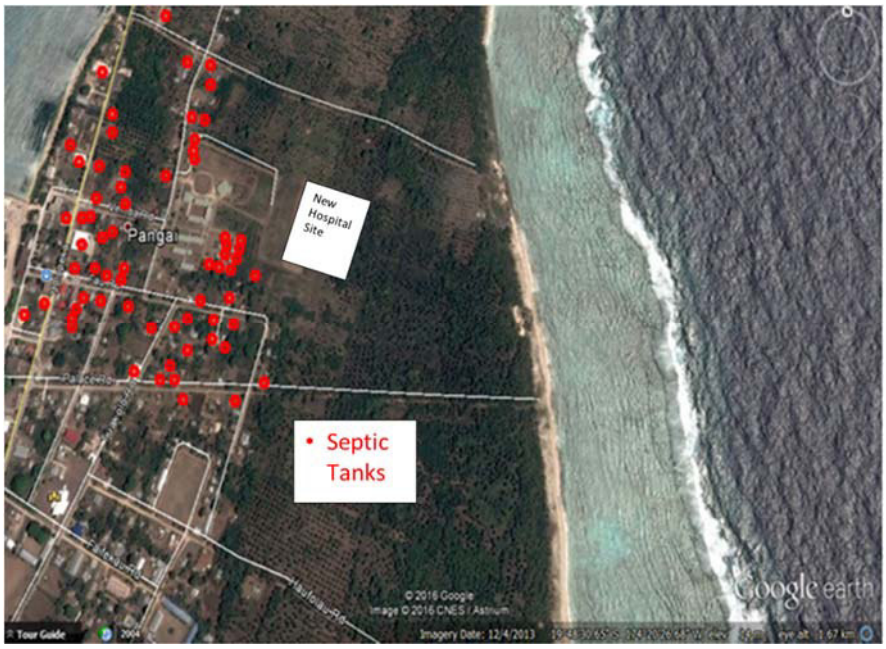



Figure V-III Households with Septic tanks around the relocation site

### E. Water Analysis

115. Water samples were taken from five selected areas across the residential area of Pangai on the 7th of October 2016. There were hand carried from Pangai to Nuku'alofa on the same day, refrigerated and tested at Tonga Water Board National Water Testing Laboratory on the 10th of October 2016.

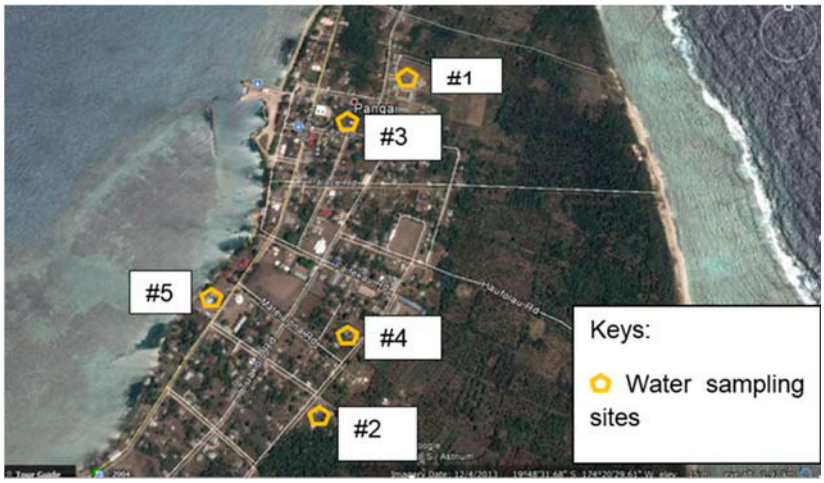



Figure V-IV Water sampling sites

The testing methodologies and Thresholds of Detection are given below.

Table V-1 Test Methodologies

| Test | Methodology | Detection Limit |
|---|---|---|
| $NH_4$ | Palintest Ammonia indophenol method - Palintest Photometer | 0-1.0 mg/l |
| $PO_4$ | Palintest Phosphate LR method - Palintest Photometer | 0-4.0 mg/l |
| $NO_3$ | Palintest Nitratest method - Palintest Photometer | 0-1 mg/l |

## F. Water Testing Results

### 1. Electronic Conductivity and Total Dissolved Solids

116. The analysis of water samples (Table V-2) indicates high electronic conductivity (EC) in site #1 (Ha'apai High School) with a reading of 10,600µS/cm while the rest of the testing samples (sites #2 - #5) are around 5,800-5,915µS/cm. For the purpose of this report and according to WHO standard for drinking water (Table V-3), the following EC limits are suggested as water quality objectives in terms of salinity:

- Potable water: 1,500 µS/cm
- Non-potable fresh groundwater (desirable): 1,500 µS/cm
- Non-potable fresh groundwater (maximum): 2,500 µS/cm.

Above 2,500 µS/cm, the groundwater can be described as brackish. Therefore, groundwater at site #1 is described as very brackish, not potable and no person or animal can drink from it. It is recognised that groundwater with salinity above the suggested maximum limit for freshwater (2,500 µS/cm) can be used for a number of purposes e.g. bathing, washing and

toilet flushing without significant impacts, provided that the salinity is not much greater as in the case of sites #2 - #5.

117. However, the limit standard for Total Dissolved Solids (TDS), mainly mineral salts in drinking water is 1000ppm. The testing analysis shows high amount of dissolved mineral salts in Pangai's groundwater (Table V-2). Therefore, the high levels of TDS and EC should be considered as it is potentially harmful to community human health.

### 2. Ammonia

118. The analysis of water samples shows the presence of Ammonia only at the water sample taken from the existing hospital of Ha'apai (site #5) which reads 0.36mg/L of ammonia litre (Table V-2). Natural levels of ammonia in groundwater are usually below 0.2mg/l (Table V-4). The presence of ammonia higher than 0.2mg/L is an important indicator of faecal pollution. Ha'apai Hospital is surrounded by households septic tanks.

### 3. Nitrate

119. Nitrate is evidence of sewage pollution and from agricultural practices. It is found in all sample sites (#1 - #5) and they do not exceed the drinking standard recommended by WHO (Table V-2 and V-4). Therefore, the presence of Nitrate is not a concern.

### 4. Faecal Coliform

120. Faecal Coliform indicates bacterial, sewage and agricultural pollution. It is only present at the Ha'apai High School well (site #1).

Table V-2 Water Testing Results of Pangai, Ha'apai

| Sample Sites | Ammonia (mg/l) | Phosphate (mg/l) | Nitrate (mg/l) | Conductivity (µS/cm) | TDS (ppm) | Faecal Coliform (count/100ml) |
|---|---|---|---|---|---|---|
| **#1** (Ha'apai High School, HHS) | 0 | 0.33 | 4.47 | 10,600 | 7420 | 1 |
| **#2** (TWB Well) | 0.05 | 0.5 | 3.54 | 5,915 | 4141 | 0 |
| **#3** (Household near HHS) | 0.01 | 0.45 | 3.3 | 5,870 | 4109 | 0 |
| **#4** (Household before HHS) | <0.0 | 0.76 | 4.47 | 5,875 | 4113 | 0 |
| **#5** (Ha'apai Existing Hospital) | 0.36 | 0.81 | 4.21 | 5,873 | 4111 | 0 |

### 5. Standards

121. The WHO standards for drinking water are given below. All wells showed evidence of contamination beyond WHO acceptable limits.

Table V-3 Typical salinity (EC) values for water

| • Type of Water | • Typical EC range (μS/cm) |
|---|---|
| • Rainwater | • 50 – 100 |
| • Very fresh groundwater | • 250 – 500 |
| • Fresh groundwater | • 500 – 1,500 |
| • Maximum limit for potable water<br>• Suggested desirable limit of 'freshwater' for non-potable purposes, | • 1,500<br>• (based on WHO guideline for chloride of 250 mg/L) |
| • Suggested maximum limit of freshwater for non-potable purposes | • 2,500 |
| • Mildly brackish water | • 2,500 – 5,000 |
| • Very brackish water | • 10,000 – 50,000 |
| • Seawater | • 50,000 – 55,000 |

Note: WHO = World Health Organisation drinking water quality guidelines (2004)

Table V-4 WHO standard for drinking water (2004)

| • Type of Test | • Limit Standard on groundwater (mg/l) |
|---|---|
| • Ammonia | • <0.2 |
| • Nitrate | • 4-9 |
| • TDS (ppm) | • 1000 |

### G. Community Survey

122. A brief social survey was conducted to take note on the perspectives of people on the relocation site of the Ha'apai Hospital and their reliance on groundwater resources.

123. Twenty people were interviewed within the 20 – 65 age groups. The survey indicates that about 95% of the population of Pangai rely on harvested rainwater as the primary source of water. People described groundwater as their secondary source of water during long dry seasons to save rainwater. Some 5% of the population used groundwater for drinking which they boil prior to drinking.

124. The Chief Doctor (Dr. Vakasiuola) reported that neither infection diseases nor contagious diseases have been admitted in the last 5 years.

125. People fully support the Ha'apai Hospital relocation program of the CRSP as they have been waiting for the relocation to take place. People mentioned the risks of the existing hospital's location to the patients during cyclone seasons as they usually evacuate to their own houses.

### H. Results

126. Rainwater is the primary source of water for its people and has greater reliance on groundwater during long dry periods and wet seasons. The freshwater lens on Pangai is naturally dynamic, fragile and contaminated from human activity.

127. Groundwater test analysis indicates the presence of faecal coliform, nutrients, ammonia, nitrate and phosphate. These are important indications of contamination from human and animal activities. Water analysis shows the groundwater resources are very high in salinity.

128. The groundwater resource of Pangai were found to be contaminated as supported by previous reports on groundwater pollution in Ha'apai in 1998 to 2013. There is indication of ammonia, nitrate and phosphate contamination from septic tanks in groundwater. The limiting factor on the usefulness of water usage from the aquifer is the salinity which is too high, making it not potable, and hardly anyone is drinking from it.

129. The social survey showed that people are concerned over the vulnerability of the existing hospital to natural disasters due to its proximity to the coastline and fully support the hospital relocation program of the Climate Resilience Sector Project (CRSP).

## VI. Anticipated Environmental Impacts and Mitigation Measures

### A. Impacts and Mitigation due to Location

#### 1. Water Quality

##### *a) Impact*

130. A major concern is potential contamination of the aquifer underlying the hospital site. The freshwater lens is the major source of water for Pangai and is abstracted by Tonga Water Board for reticulation to commercial and domestic properties. In the south of Pangai the lens is 9metres thick but in the vicinity of the hospital is thin, being 3 metres deep. The hospital site overlies the extremity of the freshwater lens.

131. The high school recently (August 2016) sank a well, installed a pump and constructed an elevated tank next to the rugby pitch adjacent to the hospital site. This was intended to provide drinking water to the school. After initial trials the use of this well and tank has been discontinued as the water is too saline.

132. An environmental baseline study was carried out. Water samples were taken from five locations including the new school well and tank. Analysis of the school well water was found to be 4 times higher than the maximum allowable salinity stipulated as acceptable by Tonga Water Board and 10 times higher than WHO standards for potable water.

133. All dwellings in populated areas have septic tanks or pit latrines. Four wells in densely populated areas were sampled and analysed for bacterial contamination, nutrients and salinity. All were saline; some showed evidence of faecal contamination but it was not severe apart from near the existing hospital which was heavily contaminated.

134. Residents reported that the main source of drinking water is rain water collected from roofs. If ground water is needed for drinking it is boiled first.

135. Based on the evidence collected, the suggestion that the aquifer underlying the proposed hospital site is critical to the freshwater supply of Pangai is rejected. The underlying aquifer is too saline to be an acceptable potable water source.

##### *b) Mitigation*

136. Notwithstanding the dubious use of the aquifer for water supply the hospital will not discharge any liquid effluents exceeding public health standards for avoidance of contamination of water courses.

137. The water supply to the hospital is rated at 4,000 litres / day. It is conventional to assume that 80% of this will become waste water. A 5 day retention time will be used so the septic tank system will be capable of storing 16$m^3$ in total volume. Two waste streams be implemented, one for grey water and one for black water. An additional precaution the black water septic tank will have sand filters in accordance with WHO Standards for Medical Waste Treatment.

138. The tanks will discharge to an underground drain field. Percolation tests will be carried out to determine the carrying capacity of the underlying soils and from that the application rate and consequent size of the drain field.

139. There are no standards for Liquid Effluent Discharge in Tonga so it recommended that figures of $BOD_{5-20}$ = 30mg/L and Suspended Solids (SS) = 50mg/L be adopted. This is a "good" standard for discharge to an underground drain field.

140. In addition the black water drain field will be located in the south east corner of the proposed site furthest from the school. At this point the natural gradient does not flow towards the aquifer but flows in the opposite direction to the sea. Any discharges will flow away from the aquifer but the intervening soils will ensure full biodegradation of any organic materials and destruction of any pathogens. No effluents will enter the sea.

### 2. Air Quality

#### *a) Impact*

141. Pathological wastes such as bandages contaminated with blood or surgical matter will be disposed of in the on-site incinerator.

142. A new small scale incinerator will be installed. All incinerators are E.U. certified to the highest standards of air quality emission as laid down by the E.U. and in fact surpasses them.

#### *b) Mitigation*

143. Consideration has been given to the location of the incinerator with respect to the Ha'apai High School and it is to be located at the most distant point on the site. As the prevailing winds blow from the south east this will blow any residual fumes away from the school.

### 3. Noise

#### *a) Impact*

144. The hospital may have a standby generator provided although as the power supply line is underground there should not be any interruptions due to high winds causing power transmission lines to fall.

#### *b) Mitigation*

145. The standby generator will be silenced to E.U. and I.E.C standards of 75dB(A) Leq at 7 metres. Given the distance of the hospital from the school and the further distance to residential property the operation of the standby generator will not cause noise intrusion.

### 4. Solid Waste

#### *a) Impact*

146. There will be low level medical waste generated such as cardboard, paper wrapping and rubber inspection gloves. There will also be scalpel blades and hypodermic syringes.

#### *b) Mitigation*

147. Ash from the incinerator will be sealed and transported to the sanitary landfill. Low level medical waste will be disposed of to the municipal landfill in open skips. Sharps such as scalpel blades and hypodermic syringes are disposed of in the hospital in non-openable plastic containers and then will be transported to the sanitary landfill.

### 5. Socio - Economic

#### *a) Impact*

148. The operation of the hospital will create job opportunities dueing construction and overall will bring benefits to the community.

#### *b) Mitigation*

149. None required.

## B. Impacts and Mitigation during Pre-construction Phase

### 1. Lands

#### *a) Impact*

150. The land for the site has been transferred from the MRT to MOH and this has been confirmed by the GoT Cabinet. The cadastral survey has been completed and occupancy of the land can be obtained whenever needed.

#### *b) Mitigation*

151. None required

### 2. Access

#### *a) Impact*

152. The current access to the site is through the school entrance. This will cause disturbance to the school children and pose a traffic hazard during construction and operation.

#### *b) Mitigation*

153. A new access road to the south of the site completely avoiding the school will be opened up and constructed.

### 3. Environmental Management Plan (EMP)

#### *a) Impact*

154. An EMP is included in the tender documents. This is general in nature and must be converted into a CEMP (Contractors Environmental Management Plan) before commencement of building works. This must be done within 30 days of contract signing.

#### *b) Mitigation*

155. The CEMP will give specific details on pollution control measures to be undertaken by the selected contractor. This must be approved by MoI before building works start.

## C. Impacts and Mitigation during Construction Stage

### 1. Construction Camp

#### *a) Impact*

156. It may be necessary to set up a construction camp on the site. It is preferable that workers do not live on the site due to the close proximity of the school. Residential quarters should be provided for them in the town. If workers must occupy the site then living and sleeping quarters must be provided in a sanitary manner.

157. Impacts are from toilets, bathrooms and solid waste from kitchens.

158. Threats to health and safety of workers may include malaria and dengue, unsanitary camp conditions, lack of clean water and sanitary facilities.

#### *b) Mitigation*

159. Health and safety of workers in the camp is part of the Contractors obligation. For health and safety of workers, the contractor should provide: safe, suitable and comfortable accommodations, kitchen, dining and sanitary facilities (toilet and bath); ample supply of clean water; and first aid supplies and equipment. Camp surroundings should be kept clean to prevent breeding of insect vectors.

160. Solid waste management should be implemented. Waste bins for segregating waste should be provided within the camp with a regular collection schedule. Waste should be segregated with recyclables recovered and non-recyclable wastes disposed at the landfill.

161. Contractor should conduct a training and orientation on environmental protection, hygiene, health, safety and security. The training program should be presented in the CEMP.

162. The CEMP to be prepared by the Contractor should present a detailed plan of the construction camp showing the layout, the sanitary facilities, septic tank, drainage, access road, fuel storage, equipment yard, among others.

### 2. Water Quality

#### *c) Impact*

163. Heavy rain may cause run off of silt from the site. Rainwater contaminated by waste oil or fuel spillages may contaminate adjacent fields.

#### *d) Mitigation*

164. Silt traps should be installed at perimeter drains which lead run off water away from the site. Drains should lead to the south east corner of the site to prevent the rugby pitch being covered with muddy water.

165. Any fuel stores should be located on a hard base with weather shielding to prevent rain water contamination.

### 3. Air Quality

#### *a) Impact*

166. Stock piling of materials on site may lead to dust blowing towards the nearby school.

### *b) Mitigation*

167. Any materials stockpiled on site should be covered with tarpaulins. In dry weather if dust is entrained by site vehicles water sprays should be used. Any vehicles carrying materials onto the roads should have their loads covered to prevent spillage on the road.

168. No open burning of any waste materials is allowed on site.

## 4. Noise

### *a) Impact*

169. Noise levels may be generated by site vehicles and construction equipment.

### *b) Mitigation*

170. All site vehicles and construction equipment should be maintained in good condition with silencers. Work is only allowed between 0700 to 1900 and no work on Sundays or public holidays unless with prior permission.

## 5. Solid Waste

### *a) Impact*

171. Some site clearance of vegetation may be necessary. This will need removal to the landfill.

172. Site vehicles or equipment may need oil filters changing. Wooden formwork may be needed for construction.

### *b) Mitigation*

173. Any vehicles carrying materials onto the roads should have their loads covered to prevent spillage on the road. All maintenance of vehicles and equipment should be done off site. All waste wooden formwork must be removed to the landfill. No burning of waste wood is allowed on site.

174. No solid wastes or litter should be dumped in the fields adjoining the site.

## 6. Socio - Economic

### *a) Impact*

175. Security should be maintained in the camp to avoid social problems with the community. Camp rules have to be established to address health, safety and security of workers and compliance with environmental management plan.

### *b) Mitigation*

176. Among the house rules and prohibition are:

- Entry to camp is limited only to workers residing in the camp
- Curfew time should be imposed
- No consumption of alcoholic drinks and illegal drugs in camp and worksite
- No gambling in the camp and work site
- Workers are prohibited from collecting firewood and / or wildlife, i.e. no hunting
- Weapons, guns and bladed weapons are not allowed in camp and worksite

- Speed limits to be imposed for construction vehicles travelling in populated areas.
- Local workers to be hired when possible
- Security guards to be posted to keep children off the site
- Under NO circumstances should children be allowed to play on the site
- Traffic management should be implemented during construction work. If necessary signal men should be assigned at entrance to site from main road to avoid traffic accidents. Workers should wear high visibility vests.

## D. Impacts and Mitigation during Operation

### 1. Water Quality

#### *a) Impact*

177. Although the discharge from the waste water treatment system will be treated to a high standard it is recommended to install a monitoring well near to the discharge fields.

#### *b) Mitigation*

178. A monitoring well will be drilled and installed on the perimeter of the site. Samples will be taken and analysed at regular intervals for potential contamination. The location and sampling regime will be agreed with MLNR.

### 2. Air Quality

#### *a) Impact*

179. The incinerator will be used intermittently for destruction of medical waste. The standby generator will be used intermittently as needed and occasionally started to testing and maintenance.

#### *b) Mitigation*

180. Visual observations will be made of the exhaust of the incinerator and the standby generator. Both machines run on diesel oil. The absence of black or dark smoke is a good indication of complete combustion and efficient operation of the machines.

### 3. Noise

#### *a) Impact*

181. No noise impacts are anticipated from operation of the hospital.

#### *b) Mitigation*

182. None needed.

### 4. Solid Waste

#### *a) Impact*

183. As indicated all low level solid waste will be sent to landfill. All medical waste will be incinerated.

### *b) Mitigation*

184. None needed.

## 5. Socio - Economic

### *a) Impact*

185. All impacts will be beneficial.

### *b) Mitigation*

186. None needed.

## VII. Environmental Management Plan

### A. The Environmental Management Plan (EMP)

187. The Environmental Management Plan (EMP) gives guidance on how to mitigate the environmental concerns identified in connection with this project. The EMP deals with mitigation and management measures to be taken during implementation to avoid, reduce, and mitigate adverse environmental impacts.

188. MoI will ensure that the EMP is included in the tender documents for civil works. It will form part of the contract between MoI and the selected contractor and the requirements of the EMP will be contractually binding on the contractor. The conformity of contractors with environmental contract procedures and specifications shall be regularly monitored by the project management unit (PMU) through the Social and Environmental Office (SEO) during implementation. PMU/SEO will be assisted by the detailed design and implementation supervision consultant (DDIS) to undertake EMP monitoring and to prepare corresponding semi-annual reports for submission to ADB.

### B. Contractors Environmental Management Plan (CEMP)

189. After appointment and mobilization the contractor must prepare his own version of the EMP known as the Contractors EMP (CEMP). This must give specific details of locations of borrow areas, borrow roads, workers camps and other facilities. This must be submitted to the DDIS Consultant for their approval before works commence.

### C. Environmental Management and Monitoring Plan (EMMP)

190. The Environmental Monitoring Program is included in the Environmental Management Plan and so the EMP can be considered as an EMMP - Environmental Management and Monitoring Plan.

#### 1. Environmental Monitoring

191. The essence of monitoring is to ensure Compliance with the EMP. The contractors have a duty to comply with this and the relevant legislation. The supervising consultant must check their activities and report to MoI. In the event of noncompliance MoI can exert pressure on the contractor to comply.

#### 2. Inspections

192. It will be necessary to carry out regular inspections to ensure the CEMP is being followed. In fact, simple compliance with the CEMP is not necessarily the final objective. There is no harm in the contractor “going beyond compliance” and running an operation better than that required by the contract.

193. Initially, contractors should check daily that all operations are being conducted correctly. In general “good housekeeping” must be employed and checked by visual inspection. Dust must be controlled by covering of stockpiles and water sprays. Solid waste, engine oil and grease, must be taken away by waste removal contractors and records kept.

194. Construction supervision inspectors must make regular checks and formal reports on site operations. They must also investigate any pollution incidents or complaints. They must use checklists for record purposes and make sure that the complaint or incident is brought to the notice of the contractor immediately, verbally and with a follow up written notice.

195. In addition SEU staff should make monthly visits to site to check the veracity of reporting. They should also review the reports submitted by the consultants to the MoI and report to the PMU project manager.

196. The site inspectors should make regular reports which are compiled into a monthly report. This should be submitted to the Supervising Engineer and discussed with the contractors as necessary but at a minimum on a monthly basis. Monthly reports should be compiled into quarterly and annual reports to be submitted to ADB.

### 3. CEMP Review

197. Successful implementation of the CEMP will require combined efforts from contractors, consultants, and MoI. The CEMP is a dynamic document and may be subject to change by the contractor as the work progresses. Periodic reviews of the CEMP may be necessary and these should in fact be encouraged.

### 4. Response to Complaints

198. The construction phase is expected to last 8 months. Residents and any Affected Persons (Aps) are encouraged to voice complaints and these are to be duly investigated and reported through the contractor to SEO and so to MoI.

199. The contractor will be required to display on a notice board a 24 hour phone number to which any complaints can be made. All complaints must be responded to in an efficient and polite manner.

200. Response to complaints must be checked by the inspectors. Any urgent issues must be drawn to the contractors' attention immediately. Failure by the contractor to respond in a timely or adequate manner must be raised with them at the monthly progress meetings.

201. The EMP is given below.

Table VII-1 Environmental Management and Monitoring Plan

EMP GIVING POTENTIAL NEGATIVE IMPACTS, MITIGATION MEASURES AND RESPONSIBILITIES

| **Activities** | **Potential Negative Impacts** | **Mitigation Measures** | **Implementing Organisation** | **Supervising Organisation** |
|---|---|---|---|---|
| **Impacts and Mitigation – Location** | | | | |
| (a) Liquid effluent discharges | Water quality of aquifer affected by septic tanks. | ▪ Two septic tank system with sand filters.<br>▪ Drain field located on gradient away from aquifer direction<br>▪ Monitoring well | Consultant | MOI |
| (b) Incineration of medical waste | Air pollution | ▪ Medical waste incinerator to be installed and maintained<br>▪ Incinerator located at furthest point from school | Consultant | MOI |
| (c) Standby generator | Air pollution and noise | ▪ Keep standby generator well maintained | Consultant | MOI |
| (d) Medical waste disposal | Littering and encouragement of vectors | ▪ Low level waste (cardboard etc) to landfill<br>▪ High level waste (bandages etc) to incinerator<br>▪ Incinerator ash to landfill<br>▪ Sharps to landfill in sealed containers | Consultant | MOI |
| **Impacts and Mitigation – Pre-Construction** | | | | |
| (a) Land occupancy | Land transfer title required | ▪ Decision by Cabinet endorsing cadastral plan | MOI | Cabinet |
| (b) Road access | Traffic congestion | ▪ New road | Consultant | MOI |
| (c) Prepare CEMP | Cannot commence building unless CEMP approved | ▪ CEMP submitted by contractor within 30 days of contract signing | Contractor | MOI |
| **Impacts and Mitigation – Construction** | | | | |
| (a) Construction camp | Workers living in unsanitary conditions | ▪ If possible workers should live off site<br>▪ If on site provide adequate sleeping quarters | Contractor | MOI |

| | | | | |
|---|---|---|---|---|
| | | ▪ Provide sanitary arrangements for toilets, showers, laundry.<br>▪ Provide clean cooking facilities<br>▪ Provide sufficient drinking water<br>▪ Provide garbage bins for workers. Waste in the bins should be cleared periodically.<br>▪ Special attention should be paid to the sanitary condition of camps to avoid disease. | | |
| (b) Protecting workers safety | Accident risk from equipment | The following safety precautions should be provided to workers:<br>▪ Introductory briefing on health and safety.<br>▪ Warning and/or Precaution Signs on safety.<br>▪ Provide full PPE; Helmets, boots, high vis jackets etc | Contractor | MOI |
| (c) Drainage | Water pollution | ▪ Install temporary perimeter drains to carry away rain<br>▪ Install silt traps in drains<br>▪ All stored fuel, oils and paints to be undercover on hard bases with kerbs to stop spills being washed away in heavy rain. | Contractor | MOI |
| (d) Stockpile materials | Dust and poor air quality | ▪ All stockpiled materials to be covered<br>▪ Water sprays to be used for dust suppression in dry weather<br>▪ All vehicle movement of materials to have the loads covered | Contractor | MOI |
| (e) Solid wastes | Littering and garbage | ▪ All construction waste to be removed from site and sent to landfill<br>▪ No dumping of waste in neighboring fields | Contractor | MOI |
| (f) Stagnant water areas | Breeding habitats for mosquito vector | ▪ Removal and draining of stagnant water areas. | Contractor | MOI |
| (g) Security of site | Trespassing | ▪ Given proximity of school no children to be allowed on site | Contractor | MOI |

| | | | | |
|---|---|---|---|---|
| | | ▪ Erect security fence around boundary with school | | |
| (h) Traffic | Traffic congestion | ▪ Enforce traffic management scheme. No access to be allowed through school | Contractor | MOI |
| (i) Noise | Disturbance with sleep or school activities | ▪ Vehicle noise control<br>▪ Timing of work 0700-1900 and no Sunday working | Contractor | MOI |
| (j) Discovery of artifacts and relics | Permanent loss of cultural items | ▪ Contractor awareness<br>▪ Must report “Chance Finds” | Contractor | MOI |
| (k) Being ready for accidents and injuries | Slow response to injury, no treatment for illness | ▪ Worker Health and Safety Plan, First Aid officer on site identifying nearest medical facilities. | Contractor | MOI |
| (l) Construction Camps Operation | Health and safety | ▪ Practice “Good Housekeeping” at all times | Contractor | MOI |
| **Impacts and Mitigation – Hospital Operation** | | | | |
| (a) Water quality | Non- performance of septic tanks | ▪ Install monitoring well<br>▪ Sample and analyse groundwater samples | MOH | MLNR |
| (b) Air quality | Increased air pollutionon | ▪ Check performance of incinerator<br>▪ Check performance of standby generator | MOH | MEIDECC |
| (c) Waste management | Waste dumping and littering | ▪ Send wastes to landfill | MOH | MEIDECC |

## VIII. Public Consultation

### A. Background

202. The ADB's Environment Policy mandates the procedural requirements for effective public consultation and information disclosure in the EA process. The degree of consultation depends on the project and local situation.

### B. Community Survey

203. A social survey was conducted to take note on the perspectives of people on the relocation site of the Ha'apai Hospital and their reliance on groundwater resources.

204. Twenty people were interviewed within the 20 – 65 age groups. The survey indicates that about 95% of the population of Pangai rely on harvested rainwater as the primary source of water. People described groundwater as their secondary source of water during long dry seasons to save rainwater; 5% of the population used groundwater for drinking which they boil prior drinking.

205. The Chief Doctor (Dr. Vakasiuola) reported that neither infection diseases nor contagious diseases have been admitted in the last 5 years.

206. People fully support the Ha'apai Hospital relocation program of the CRSP as they have been waiting for the relocation to take place. People mentioned the risks of the existing hospital's location to the patients during cyclone seasons as they usually evacuate to their own houses.

207. People dispute the objection raised on the relocation site. People classify the objection as "political trash" and/or "social safety/development obstacle". The classification was based on comparison of impacts of the relocation site of Ha'apai Hospital to Vaiola Hospital in Tongatapu and Prince Ngu Hospital of Vava'u.

208. Vaiola and Ngu Hospital are located within residential areas and there have been no infectious or contagious diseases occurring in the past 5 years from the surrounding households. The interviewees stated that the relocation site for Ha'apai Hospital is situated away from the residential area and it will not harm groundwater resource. The community also suggested that the design for the new hospital should be safeguarded from any leakages that could contaminate potential groundwater resource.

Table VIII-1 Interview Questions

| Household #: | |
|---|---|
| Name: | Age: |
| 1. What is the source of water you are utilizing? | a. Groundwater b. Rainwater c. Both |
| 2. How are you utilizing Groundwater? | |
| 3. How are you utilizing Rainwater? | |
| 4. How do you treat the rainwater before drinking? | a. Boil b. Filter c. No treatment |
| 5. How often do you utilize both water sources? | |
| 6. When did you last use the pump-out truck? | |

| | |
|---|---|
| 7. Do you have any comment on the relocation of the Niu'ui Hospital? | |

### C. Photos of Consultation Activities


Figure VIII-I Public Consultation were conducted around the Ha'apai High School

## IX. Grievance Redress Mechanism

### A. General Principles

209. ADB requires that a grievance redress mechanism (GRM) be established and maintained. It should be designed to efficiently receive and facilitate the resolution of affected peoples' concerns and grievances about project-level social and environmental issues within a reasonable timeframe. The GRM should be scaled to the risks and impacts of the project. It will address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the community. The GRM may be revised once the project commences to ensure that its provisions are relevant and practical. It should also be updated as required during the construction process, to optimize the redress process.

210. During project implementation, it is possible that people may have concerns about the project's environmental performance. People may perceive negative impacts during the construction or operational phase, and they have the right to have their complaint fairly heard and acted on. Many issues can be resolved effectively through timely communication, inquiry, and mitigation measures.

211. The grievance redress process will be widely disseminated to all affected people during project consultations. The GRM is in place for all safeguard issues, providing a streamlined process for any concerns or issues in relation to resettlement, social safeguards, and environmental impacts.

212. Consideration of the grievance process should be given to both the construction and operational phases. Environmental impacts from operations are considered within an IEE and EMP, and as such breaches to the EMP in operations need to also provide a GRM.

### B. Grievance Coordination

213. A grievance focal point (GFP) will be established by the district/town Officer to coordinate and address all complaints and concerns arising from the project. The contact details will be provided to all affected persons.

214. The GFP will be assisted and supported by the PMU ESU who will maintain a register of complaints, keep track of their status, and report to the PSC. They will regularly track complaints received, actions taken and the status of resolution. All communications with the affected person(s) will be documented, and whether management action has been taken to avoid community concerns in the future. Complaint forms will be distributed to the GFP to facilitate recording of complaints.

### C. Grievance Redress Procedures

215. Affected persons will be informed that they should ask any questions or discuss grievances with their community leader or the district/town GFP by phone or in person; or to project staff visiting the area. The GFP is encouraged to discuss the issue with the contractor or ESU, as often minor environmental impacts can be remedied with immediate action.

216. If these questions/grievances are not answered within 1 week, they should be prepared in writing (using the assistance of the local community leader, church, or school if necessary). The complainant will also be informed that national and international project staff could assist them with writing a grievance if necessary. Written complaints can be sent or delivered to the

MEIDECC PMU/ESU, where they will be registered as being received, and will be treated confidentially. The PMU/ESU will have 1 week to deliver a resolution to the affected person.

217. In the event that a satisfactory answer cannot be provided, the affected person may lodge the complaint with the Minister of MEIDECC and receive a reply within 7 days.

218. In the event that the situation is not resolvable, or the complainant does not accept the decision, the affected person(s) may have recourse to the land court (or other relevant court). All court costs (preparation and representation) will be paid for by the project, regardless of the outcome.

219. Project Management Unit (PMU) of MEIDECC shall undertake the following prior to start of site works:

- Establish a grievance redress mechanism (GRM) prior to site works
- Make public the existence of the GRM through public awareness campaigns
- Ensure that names and contact numbers of representatives of the PMU as well as SEO and contractors are placed on the notice boards outside the construction site and at subnational level of local government offices.

220. The GRC shall be established before commencement of site works and shall be chaired by Project Management Unit (PMU) to be assisted by the Social and Environmental Office (SEO). The GRC shall have members from the PMU/ MEIDECC, local NGO and women's organization. Grievances can be filed in writing or verbally with any member of the GRC. The committee will have 15 days to respond with a resolution. If unsatisfied with the decision, the existence of the GRC shall not impede the complainant's access to the Government's judicial or administrative remedies.

## X. Conclusion

221. The current hospital on the coast at Niu'ui on the island of Lifuka in the Ha'apai Island Group is deemed unsuitable as it will be impacted by climate change in the form of Sea Level Rise and more extreme weather events such as storm surges and tsunamis in the future

222. The Government of Tonga has received assistance from the Asian Development Bank through the Pilot Program for Climate Resilience to construct a hospital at a new site on land currently within the boundaries of the Ha'apai High School at Pangai.

223. The new hospital will link with the climate proofing upgrades carried out at the Ha'apai High School which is immediately adjacent to the new hospital site.

224. The Cabinet of the GoT has agreed to the transfer of 1.4 hectares from Ministry of Education and Training to the Ministry of Health for the construction of the new hospital.

225. The school hall at Ha'apai High School is currently used as one of Lifuka's designated disaster evacuation shelter during storm events so the location of the new hospital adjacent to the shelter complements this natural disaster response.

226. The new hospital will have a beneficial impact on approximately 6,600 residents in the Ha'apai Island Group.

227. An environmental baseline study has been carried out. The underlying aquifer has been found to be highly saline and unsuitable as a source of potable water. Most sources of drinking water on the island are obtained by rainwater capture.

228. The hospital design will incorporate waste water treatment measures than are more than sufficient to preclude contamination of the underlying aquifer.

229. There are no important habitats in close proximity to the new hospital site.

230. There are no historical or culturally significant sites nearby. The nearest sensitive location is the cemetery which is over 500metres away downhill by the coastline.

231. All medical waste will be treated on site in a new high temperature double chamber long residence time incinerator. Residual ash will be taken to the landfill.

232. The hospital will be separated from the school with a boundary fence. A new access road will be constructed so that there is no interference with traffic visiting the school or children being collected or dropped off.

233. The construction program will last 8 months. During this time there may be some temporary disturbances. The contractors will be required to follow the CEMP to minimise adverse environmental impacts. Construction activities and adherence to the CEMP will be monitored and supervised.

234. This IEE concludes that there are no outstanding environmental issues remaining and there is no environmental reason for this project not to proceed.

## XI. Annex 1 International Conventions

| STOCKTAKE OF MULTILATERAL ENVIRONMENTAL AGREEMENT AS OF AUGUST 2016 | | | | | | |
|---|---|---|---|---|---|---|
| **NAME OF AGREEMENT** | **DATE,PLACE of SIGNATURE** | **ENTRY INTO FORCE** | **TONGA'S STATUS** | **NUMBER OF PARTIES** | **PURPOSE** | **Focus Area** |
| United Nations Framework Convention on Climate Change | 9 May 1992, New York, USA | 21 March 1994 | Accession<br>(20 July 1998) | 197 | Stabilize and mitigate atmospheric pollution, the effect of greenhouse gas concentrations in the atmosphere. | Climate Change<br>Environment<br>Biodiversity |
| Kyoto Protocol to the UNFCCC | 11 December 1997, Kyoto, Japan | 16 February 2005 | Accession<br>(January 2008) | 192<br>(191 states & 1 organization) | To ensure that aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex I to the Protocol do not exceed the assigned amounts, with a view to reducing overall emissions of such gases by at least 5% below 1990 levels the commitment period 2008-2012. | Atmospheric Pollution<br>Ozone Layer Protection<br>Environment<br>Biodiversity |
| Convention on Protection of Biological Diversity | 5 June 1992, Rio de Janeiro, Brazil | 29 December 1993 | Accession<br>(19 May 1998) | 196 | Conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. | Environment<br>Biodiversity |
| Cartagena Protocol on Biosafety | 15 May 2000<br>(Montreal, Canada) | 11 September 2003 | Accession | 170 | Regulate the trans boundary movement, transit, handling and use of Living Modified | Generic Resources |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | (18 September 2003) | | Organisms [LMOs] which may have adverse impacts on the conservation of biodiversity from one country to another. | (Living Modified Organism) |
| Paris Agreement | April 2016<br>(New York, USA) | - | Signed<br>(April 2016) | 21 | Combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future. | Atmospheric Pollution<br>Environment<br>Biodiversity<br>Climate Change Resilience |
| Vienna Convention for the Protection of the Ozone Layer | 22 March 1985<br>(Vienna, Austria) | 22 September 1988 | Accession<br>(29 July 1998) | 197 | Framework Convention to promote research, legislate and international cooperation in the protection of the ozone layer. | Atmospheric Pollution<br>Ozone Layer Protection |
| Montreal Protocol on Substance that deplete Ozone Layer | 16 Sept 1987<br>(Montreal, Canada) | 1 January 1989 | Accession<br>(29 July 1998) | 197 | Regulate the issue of production and consumption of ozone depleting substances in abundance | Atmospheric Pollution<br>Ozone Layer Protection |
| Nagoya Protocol on Access and Benefit sharing of Genetic Resources | 29 October 2010<br>Nagoya, Japan) | 12 October 2014 | - | 170<br>(92 signatories)<br>(78 ratification) | Access and Benefit Sharing of Genetic Resources. | Generic Resources<br>Biotechnology |
| United Nations Convention to Combat Desertification | 17 June 1994 | | Accession | | Addressing the Adverse impacts of Desertification and Droughts | Forest |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (Paris, France) | | (25 September 1998) | | | Deserts<br>Environment |
| Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Waste and to Control the Tran boundary Movement and Management of Hazardous Waste within the South Pacific Region | 29 January 2000<br>(Waigani, PNG) | 21 October 2001 | Ratification<br>(22 May 2002) | 13<br>(Palau signed yet to ratify) | Regulate banning and managing of importation into Forum Island Countries of Hazardous and Radioactive Waste | Hazardous Wastes<br>Chemical Wastes<br>Biodiversity<br>Environment |
| Convention for the Protection of the World Cultural and Natural Heritage | 23 November 1972)<br>(Paris, France) | 17 December 1975 | Accession<br>(30 April 2004) | 192 | Promote cooperation at all level in identifying, protection, conservation and presentation and transmission to future generations of cultural and natural heritage. | Natural Heritage<br>Environment<br>Cultural Heritage |
| Stockholm Convention on Persistent Organic Pollutants | 23 May 2001<br>(Stockholm, | 17 May 2004 | Ratification<br>(23 October 2009) | 180 | Protect human health and the environment form persistent pollutants | Pollution<br>Chemical Wastes |
| Basel Convention on the Control of Tran boundary Movements of Hazardous Wastes and their Disposal | March 1989<br>(Basel, | 5 May 1992 | Accession<br>(26 March 2010) | 184 | Regulate the trans boundary movement of Hazardous Waste and their disposal | Hazardous Wastes |
| Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade | September 1998<br>(Rotterdam, | 24 February 2004 | Accession<br>(31 March 2010) | 155 | Promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their | Prior Informed Consent Process<br>Hazardous & Chemical Waste |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties. | Biodiversity<br><br>Environment |
| United Nations Convention on the Law of the Sea | 10 December 1982 | 16 November 1994 | Accession<br><br>(2 August 1995) | 168 | Regulate the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. | Maritime Boundaries |

## XII. Annex 2 Approval of Project under Tongan EIA Regulations 2010

Tel: (676) 28-170
Fax: (676) 24-861
Email: siaosi.sovaleni@gmail.com

Deputy Prime Minister
KINGDOM OF TONGA

**OFFICE OF THE DEPUTY PRIME MINISTER**

Ref No.: DPM 2016/MEC

Date: 29th November 2016

Our reference: EIA No. 133/2016-17

Malakai Vakasiuola,
Director
ITS Pacific Limited
Nuku'alofa

Dear Mr. Vakasiuola,

**RE: Approval of the Relocation of the Ha'apai Hospital Project**

On the 16th of November 2016, the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) received an application from the Climate Resilience Sector Project to relocate the Ha'apai hospital at Niu'ui on high ground in a relatively safe location.

In accordance with the *Environmental Impact Assessment Act 2003* (the EIA Act) and the *Environmental Impact Assessment Regulations 2010* (the EIA Regulations) the EIA Report was reviewed by the EAC Secretariat and the Environmental Assessment Committee (EAC) on 29th November 2016. Please find attached a copy of the EAC's Assessment Review Report and the EAC's recommendation (Form 4) for your records.

Based on the advice received from the EAC, I have made the decision to **approve the project subject to the following conditions:**

1. The Environmental Management and Monitoring Plan (EMMP) be adhered to and the Contractor Environment Management Plan be complied with by the contractor.
2. The proponent attain all determining authority approvals from Ministry of Infrastructure prior to construction.
3. The one percent fees ($TOP400, 000) will be Government's in-kind contribution

4. MOI will arrange for a cross-government monitoring team (MOH, MOI, MEIDECC) to visit the site during construction phase.

Please note that failing to comply with the approval conditions is an offence under the EIA Act. Part IV - Section 17 stating that;

*'any person who fails to comply with environmental conditions required under this Act commits an offence and shall be liable upon conviction to a fine not exceeding $5,000 or imprisonment for a term of 1 year or both, and in the case of a corporation to a fine not exceeding $10,000.'*

Furthermore, it is also an offence to supply false information and to carry out an activity or project without an approval required under the EIA Act. Therefore, I urge you to keep in mind that this approval is based on the information provided in the EIA Report. Any changes to the project must be notified to MEIDECC who can advise on whether any additional approvals are required.

If you have any queries or would like to discuss this matter further, please do not hesitate to contact 26 555, or see me at your earliest convenience.

*Yours Sincerely,*

DEPUTY PRIME MINISTER * KINGDOM OF TONGA *

.....

**Hon. Siaosi Sovaleni**
**Minister for Meteorology, Energy, Information, Disaster-Management, Environment, Climate Change and Communications (MEIDECC)**

## FORM 4: COMMITTEE RECOMMENDATIONS

Project ID No.: 133/2016-17
Name of Project: Relocation of Ha'apai Hospital
Contact Person: Sione Tukia Lepa
Contact Number: 7776768

Final Environmental Study

Not Satisfactory

Satisfactory

Conditions/Recommendations

1. The Environmental Management and Monitoring Plan (EMMP) be adhered to and the Contractor Environment Management Plan be complied with by the contractor.
2. The proponent attains all determining authority approvals from Ministry of Infrastructure prior to construction.
3. The one percent fees ($TOP400, 000) will be Government's in-kind contribution
4. MOI will arrange for a cross-government monitoring team (MOH, MOI, Environment, NGO) to visit the site during construction phase.

This is to confirm that all requirements have been met in accordance with the Act.

Signature:

DEPUTY PRIME MINISTER
KINGDOM OF TONGA

Print Name: Hon. Siaosi Sovaleni

Determining Authority: Minister for Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC)

## XIII. Annex 3 Approval of Land Transfer for Project by Tongan Cabinet Decision

**CONFIDENTIAL**

**No.**1268

**P.-11a**

**MEMORANDUM**

**23rd November 2016**

**To:** *Hon. Cabinet Ministers*
*Secretary for Foreign Affairs*
*CEO for MEIDECC*
*CEO for Finance and National Planning*
*CEO for Lands and Natural Resources*
*CEO for Education and Training*
*CEO for Health*
*Auditor General*
*Lord Chamberlain*

**With reference to** *Re: Allocation of Crown Land to Ministry of Health (new Ha'apai Hospital.*

**(MPH 3/2)**

**I have the honour to inform you that His Majesty's Cabinet Decision on 23rd November 2016 was as follows:-**

*Recommendations are approved, i.e.:*

1. *The rescission of Cabinet Decision No.639 of 19th July 2013 on the basis that agreement had been subsequently reached between the Ministry of Health and the Ministry of Education and Training for the relocation of the Ha'apai Hospital to within the Ha'apai High School area.*

2. *The allocation of land at Lifuka, Ha'apai by the Ministry of Lands to the Ministry of Health for the purpose of the construction of the new hospital.*

3. *The allocation of approximately 3A 2R 00P within the boundaries of Ha'apai High School.*

4. *The Hon. Minister for Lands shall provide the necessary documentation required by the Climate Resilience Sector Project to enable the construction of the new hospital.*

CHIEF SECRETARY & SECRETARY CABINET

'Olita Ha'ina Mo'uta Tupou
**Acting Chief Secretary & Acting Secretary to Cabinet**