Pacific Aviation Investment Program (PAIP)

Environmental & Social Management Plan - Fua’amotu International Airport (TBU)
Quality Information

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# Glossary and Abbreviations

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<th>Description</th>
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<tbody>
<tr>
<td>°C</td>
<td>Degrees Celsius</td>
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<tr>
<td>ACM</td>
<td>Asbestos Containing Material</td>
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<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>ADS-B</td>
<td>Auto Dependent Surveillance – Broadcast</td>
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<tr>
<td>AGL</td>
<td>Aeronautical Ground Lighting System</td>
</tr>
<tr>
<td>ARFF</td>
<td>Airport Rescue and Fire Fighting</td>
</tr>
<tr>
<td>ATC (ATCT)</td>
<td>Air Traffic Control (Air Traffic Control Tower)</td>
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<tr>
<td>ATR</td>
<td>Twin-engine turboprop short-haul regional aircraft built by the French-Italian aircraft manufacturer ATR</td>
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<td>AWS</td>
<td>Automatic Weather Station</td>
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<tr>
<td>CAD</td>
<td>Civil Aviation Directorate</td>
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<tr>
<td>Category B</td>
<td>World Bank categorised projects with potential limited adverse social or environmental impacts that are few in number, site-specific, largely reversible, and readily addressed through mitigation measures.</td>
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<tr>
<td>CLSM</td>
<td>Controlled Low Strength Material</td>
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<tr>
<td>DME</td>
<td>Distance Measuring Equipment</td>
</tr>
<tr>
<td>DVOR</td>
<td>Doppler VHF Omnidirectional Radar</td>
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<tr>
<td>EHS</td>
<td>Environmental, Health and Safety</td>
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<tr>
<td>ESMP</td>
<td>Environmental and Social Management Plan</td>
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<tr>
<td>FOD</td>
<td>Foreign Object Debris</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GOT</td>
<td>Government of Tonga</td>
</tr>
<tr>
<td>HAT</td>
<td>Highest Astronomical Tide</td>
</tr>
<tr>
<td>HIV/ AIDS</td>
<td>Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>IATA</td>
<td>International Air Transportation Association</td>
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<tr>
<td>ICAO</td>
<td>International Civil Aviation Organisation</td>
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<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>km</td>
<td>kilometre</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>m/ m²/ m³</td>
<td>Metre/ square metres (area)/ cubic metres (volume)</td>
</tr>
<tr>
<td>MECC</td>
<td>Ministry of Environment and Climate Change</td>
</tr>
<tr>
<td>MEIDECC</td>
<td>Ministry of Meteorology, Energy, Information, Disaster Management, Climate Change and Communications</td>
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<tr>
<td>MEWAC</td>
<td>Ministry of Education, Women’s Affairs and Culture</td>
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<td>MFNP</td>
<td>Ministry of Finance and National Planning</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
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</tr>
<tr>
<td>MIA</td>
<td>Ministry of Internal Affairs</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>MOI</td>
<td>Ministry of Infrastructure, an amalgamation of the Ministry of Transport (which in turn is the merger of the Ministry of Marine &amp; Ports and Ministry of Civil Aviation), and Ministry of Works.</td>
</tr>
<tr>
<td>MOWWP</td>
<td>Method of Works Plan</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organisation</td>
</tr>
<tr>
<td>NZAid</td>
<td>New Zealand Government’s Aid Programme</td>
</tr>
<tr>
<td>NZBC</td>
<td>New Zealand Building Code</td>
</tr>
<tr>
<td>NZCAA</td>
<td>New Zealand Civil Aviation Authority</td>
</tr>
<tr>
<td>OLS</td>
<td>Obstacle Limitation Surface</td>
</tr>
<tr>
<td>PAPI</td>
<td>Precision Approach Path Indicator</td>
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<tr>
<td>PAIP</td>
<td>Pacific Aviation Investment Program</td>
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<tr>
<td>PCN</td>
<td>Pavement Classification Number</td>
</tr>
<tr>
<td>PIB</td>
<td>Project Information Bulletin</td>
</tr>
<tr>
<td>PMU</td>
<td>Project Management Unit</td>
</tr>
<tr>
<td>PV</td>
<td>Photovoltaic</td>
</tr>
<tr>
<td>PVC</td>
<td>Polyvinyl Chloride (type of plastic)</td>
</tr>
<tr>
<td>SIT</td>
<td>Series Isolation Transformer</td>
</tr>
<tr>
<td>SPREP</td>
<td>South Pacific Regional Environmental Program</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project stakeholders are all people directly or indirectly, negatively or positively impacted by the project; that are important to make the project successful, or that may oppose the project or that have a vested interest.</td>
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<tr>
<td>TAIP</td>
<td>Tonga Aviation Investment Project</td>
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<tr>
<td>TAL</td>
<td>Tonga Airports Limited</td>
</tr>
<tr>
<td>TANGO</td>
<td>Tonga Association of Non-Governmental Organisations</td>
</tr>
<tr>
<td>TBU</td>
<td>Fua’amotu International Airport</td>
</tr>
<tr>
<td>TFSU</td>
<td>Technical and Fiduciary Services Unit responsible for coordinating implementation across all activities for the PAIP. The TFSU is based at Tonga Airports Ltd and is comprised of fiduciary, procurement and technical staff. The TFSU leads the procurement activities on the PAIP, with inputs from the countries (Kiribati, Tonga and Tuvalu).</td>
</tr>
<tr>
<td>TMP</td>
<td>Traffic Management Plan</td>
</tr>
<tr>
<td>TOP</td>
<td>Tongan Pa’Anga (currency)</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>UHF/ VHF</td>
<td>Ultra-High Frequency/ Very High Frequency</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>WAL</td>
<td>Waste Authority Limited</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WDI</td>
<td>Wind Direction Indicator</td>
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<tr>
<td>WISE</td>
<td>Women In Sustainable Enterprises (NGO)</td>
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Executive Summary

The Tonga Aviation Investment Project (TAIP) was established to carry out the upgrade activities as identified in the Pacific Aviation Investment Program (PAIP) funding loan from the World Bank (WB). The TAIP aims to provide safe and secure air transport operations and environmentally sustainable and efficient airports in Tonga. All components of the TAIP are required to meet ICAO standards and recommended practices, as well as airline safety standards. This Environmental and Social Management Plan (ESMP) has been prepared for the Fua’amotu International Airport (TBU) TAIP project components which are listed below and to meet with funding and Tongan legislative requirements.

- Runway pavement rehabilitation
- Upgraded terminal
- Upgraded runway lighting and navigational aids
- New Air Traffic Control Tower

Tonga Airports Limited (TAL) manage airport operations and are responsible for compliance with national and international civil aviation requirements.

This ESMP looks to outline the potential environmental and social impacts and the measures needed to prevent, minimise, or mitigate adverse impacts and improve environmental performance for the TAIP project components.

Overall the TAIP is a Category B project under WB environmental and social screening guidelines and requires development of a project ESMP. Category B projects have potentially limited adverse social or environmental impacts that are few in number, site specific, largely reversible, and readily addressed through mitigation measures. This ESMP is a dynamic document to be updated if there are changes to the project scope, detailed designs, or if further information becomes available as a result of consultation with stakeholders and the community. The objective of the ESMP is to provide a framework for managing the airport upgrade works in a manner that incorporates the principles of environment sustainability while minimising potential adverse effects on the local community and the environment.

This ESMP includes information on mitigation, monitoring, capacity development and training, and implementation costs (in accordance with WB Operational Policy 4.01 Environmental Assessment). The majority of potential adverse impacts will occur during the construction phase of the TAIP. However given that this primarily involves the rehabilitation of existing infrastructure, mitigation measures should be able to alleviate or lessen any potential negative impacts. The key potential impacts that are being mitigated are:

- Solid waste generation
- Soil erosion through vegetation clearing and excavation
- Hazardous materials handling and storage (potentially including asbestos and hydrocarbon contaminated soils)
- Noise and vibration disturbances from machinery and construction activities
- Air pollution from dust and equipment
- Traffic disruption during construction activities
- Transport of equipment and materials from the port and around Tongatapu
- Disposal of waste materials
- Safety hazards for workers and users of the facilities where upgrades are occurring
- Water demand management for freshwater resources
- Wastewater discharges
- Construction camp establishment and dis-establishment

This ESMP is designed to address these issues through:

- Implementation of this ESMP through the Contractor’s ESMP.
- Regular supervision and monitoring of the implementation of the ESMP (refer ESMP monitoring plan).
1.0 Introduction

1.1 Background
The Pacific Aviation Investment Program (PAIP) is funded by the World Bank (WB) and has the development objective to (i) improve the safety, security, efficiency, management and environmental sustainability of airports, and (ii) improve regional harmonization of aviation safety standards. Phase I of the Program, for which this Environmental and Social Management Plan (ESMP) is prepared, includes Kiribati, Tonga and Tuvalu. This site specific ESMP has been developed for project work at Fua'amotu International Airport (TBU) on Tongatapu.

Tonga has a large expatriate community and the aviation sector provides the link between friends and relatives at home in Tonga and those living elsewhere. Some 40% of passengers are visiting friends and relatives. Tonga also plays a key role in search and rescue (SAR) covering the Cook Islands, Fiji, and Samoa. Tonga’s geographical location within the region includes agreements with regional neighbours (e.g. Fiji, Niue, and New Zealand) for aviation and control tower services.

Under the Government of Tonga’s Transport Sector Consolidation Project (TSCP), aviation investments and high priority safety and security requirements for selected airports were identified. Funding was requested from the WB under the PAIP. The aviation components are implemented under the Tonga Aviation Investment Project (TAIP). In February 2011 an overarching EMP (Tonga Airports Limited and Ministry of Public Enterprises, February 22, 2011. Environmental Management Plan for Tonga Aviation Infrastructure Investment Project) was published for all components of the TAIP. This overarching EMP is in compliance with WB Policy OP/BP 4.01 Environmental Assessment and Tongan national legislation. The overarching EMP provides a framework for mitigation of the projects impacts and development of specific ESMPs for the detailed design and construction stages. Consultation and public disclosure was undertaken during the project preparation phase with details of stakeholders and outcomes included in the overarching EMP. This ESMP builds on the overarching EMP, details environmental impacts and mitigation measures specifically for TBU and incorporates details of the final detailed designs.

Tonga Airports Limited (TAL) is responsible for all airport operations, compliance and infrastructure at TBU.

1.2 TAIP Objective
The TAIP project objective is to provide safe and secure air transport operations and environmentally sustainable and efficient airports. This objective is aligned to the PAIP development objectives.

1.3 Environmental and Social Management Plan Objectives and Scope
The TAIP is a Category B project requiring development of a site specific ESMP. The WB involuntary resettlement policy OP/BP4.12 is not triggered by the components of the TAIP.

This ESMP is a dynamic document to be updated if there are changes to the project scope, detailed designs, or if further information becomes available as a result of consultation with stakeholders and the general public. The objective of the ESMP is to provide a framework for managing the airport upgrade works in a manner that incorporates the principles of environment sustainability while minimising adverse effects on the local community and environment.

To achieve this objective the ESMP outlines the mitigation measures required for avoiding or minimising the potential impacts of the works and provides a monitoring program to confirm effectiveness of the required mitigation measures. Roles and responsibilities are clearly defined for all stages of the project works and their execution. The ESMP also provides the details of how the community and stakeholders are to be engaged and the mechanisms for ongoing consultation and communication.

This ESMP is limited to the scope of works as described in Section 2 of this document and addresses impacts and mitigation measures identified at each stage of the project’s execution, namely detailed design, construction and operation. This ESMP builds on the impacts and mitigation measures as identified in the overarching EMP which included outcomes of the consultation undertaken at the time. This ESMP will be included in the bidding documents for construction contractors and form the basis of the Contractor’s ESMP. The mitigation measures identified in this ESMP form the minimum requirement for reducing impacts on the environment as a result of works associated with the project.
1.3.1 Environmental Safeguards Document Hierarchy and Development

The PAIP has an Environmental and Social Management Framework (ESMF) which outlines the key steps and procedures in screening and assessment of environmental and social issues related to the PAIP (generally). The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social impacts. It contains measures and plans to reduce, mitigate and/or offset adverse impacts and enhance positive impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project impacts. It defines roles and responsibilities, and provides guidance for the Implementing Agency (IA), Executing Agencies (EA) (respective country’s ministries) and the respective countries Civil Aviation Authorities for developing the environmental and social safeguards documents in compliance with respective WB operational policies (namely OP/BP4.01) and respective country environmental requirements.

The ESMP is a dynamic document which is updated as and when project scope, detailed designs or further information becomes available, thus creating a hierarchy of documents as the project progresses. The diagram below shows the hierarchy and development of these documents culminating in the development of the contractor’s ESMP which specifically details how the contractor will implement requirements of the ESMP. Issues, impacts and mitigation measures identified in superseded ESMPs are incorporated into subsequent versions unless they have been addressed through design or other means, in which case this is identified in the ESMP.

Only those documents in the diagram below showing a date have been drafted, all others are either in progress or are yet to start. This ESMP supersedes the overarching EMP and identifies the impacts and mitigation measures that must be implemented in order to manage the identified impacts. The contractors are required to comply with this ESMP and use it to identify what mitigation measures need to be implemented. The contractors ESMPs will document implementation and specific measures that will be used based on their construction methodology (if different from that identified in Section 2.0).

Figure 1 Environmental safeguard document hierarchy

In order to finalise this ESMP for inclusion with the pavement (runway), navigational aids and lighting contractor procurement bid documents for the TAIP, the information pertaining to the terminal has been left at the draft detailed design stage. An addendum to this ESMP specifically addressing the final detailed design of the terminal will follow when the detailed design phase is finalised and confirmed by TAL.
1.4 ESMP Methodology

The methodology used to develop this ESMP is as follows:

- Review the ESMF and overarching EMP including consultation outcomes to inform the Design and Supervision team of specific issues or items for detailed design.
- Prepare for field survey and organise site visits, inclusive of specific requirements as identified in the overarching EMP and ESMF.
- Conduct field survey using the overarching EMP, ESMF and an environmental screening checklist as a basis for assessment.
- Liaise with the Design and Supervision teams regarding any findings which may influence detailed design.
- Draft the TBU ESMP based on overarching EMP framework and consultation outcomes and update with information obtained from the field survey and detailed designs.
- Submit to Technical and Fiduciary Services Unit (TFSU) and TAL/Ministry of Environment and Climate Change (MECC) for review prior to consultation. Update according to comments and feedback from TFSU and TAL/MECC.
- TAL to undertake consultation to be conducted at TBU, with this site specific ESMP available in hard copy and posted online. Incorporate outcomes as required from consultation into final TBU ESMP to be included in bidding documents.
- Submit to TFSU and TAL/MECC for final review.

A number of PAIP concept design, detailed design and supporting assessment reports have also been reviewed in compiling information regarding the scope of the project and identifying potential effects and mitigation measures. Some of these reports are still in draft form and changes may impact on the type and scale of potential effects and opportunities to avoid these impacts or potential mitigation measures that may need to be implemented. Any changes in these documents should prompt a review of this ESMP and updates made accordingly. The documents, including the version date at the time of review and preparation of this ESMP, are as follows:

- Pacific Aviation Investment Program Airport PCN Study Report – Fua’amotu, 20 March 2013
- Coral Aggregate Testing Program, PAIP Tonga and Vava’u, 26 July 2013
- Pacific Aviation Investment Program (PAIP) Final Pavement Detailed Design Report – Fua’amotu (D-10) (Version B – with final amendments), 1 August 2013
- Pacific Aviation Investment Program (PAIP – Tonga, Draft Final Design Report – Airport Terminals & Security (D-5), 7 August 2013
2.0 TBU Upgrade Description of Works

2.1 Overview of Works

The TAIP TBU consists of four primary tasks:
- Airport pavements
- Airport terminal and security
- Airport lighting and navigational aids
- Air Traffic Control Tower (ATCT)

2.1.1 Runway Pavement Upgrade

The runway pavement works at TBU will entail structural overlay on Runway 11-29 and international taxiway, surface enrichment spray treatment to selected areas of Runway 11-29, international and domestic apron and domestic taxiway, and installation of runway end turning bays. The runway 11 turn pad (northern end) will measure 6,400 m$^2$ and the 29 turn pad (southern end) will measure 4,800 m$^2$. The runway end turning bays have been sized to accommodate future Code E operations. Initial check at the concept design stage confirmed, whilst very tight, it is possible to turn around a B777 (Code E aircraft most likely to operate into TBU) on the apron noting that it will take out two of the current three parking gates to achieve this.

Fua'amotu airfield was originally built in 1942 by a civilian contractor for the US Army. The facility was intended as a WWII heavy bomber field, and had three coral-surfaced runways. Post WWII the facility was largely abandoned, with the main 11/29 runway subsequently developed for civilian operations in the 1960’s.

In the late 1970s the runway was extended to permit jet aircraft operations and was last resurfaced in 1990. The runway surfacing is aged and requires a resurfacing overlay.

Fua'amotu is currently rated for Code 4D operations (B767), though operations are limited by the current runway reliable strength rating or PCN index of 42. The 11/29 Runway surfacing is aged, now 23 years old with clear signs of extensive oxidation of the asphaltic bitumen.

The main 11/29 runway and international apron structural overlay will be dense mix asphaltic concrete. AECOM have evaluated a strengthening strategy; and have assessed that a 65 mm structural overlay to the original section of the runway (600 m – 2,700 m) and international taxiway will provide sufficient structural strength to cater for low volume B777 use in line with master planning assessments of passenger volumes for the airport. The revised PCN index post overlay will be PCN 70. All airside surfaces, namely the international apron and extended main runway formation, not receiving an asphaltic overlay are to receive a bituminous surface treatment.

The runway pavement works as described above have been progressed to the final detailed designs. A selection of design plans which best demonstrate the work described are included in Appendix A.

The following volumes of materials have been estimated (subject to change based on any design changes and outcomes of procurement process).
Table 1 Estimated quantities of material required for the runway pavement component of the TAIP TBU (this list is not exhaustive and subject to change)

<table>
<thead>
<tr>
<th>Material</th>
<th>Unit</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Aggregates</td>
<td>m³</td>
<td>100,000</td>
</tr>
<tr>
<td>Bitumen</td>
<td>m³</td>
<td>3,000</td>
</tr>
<tr>
<td>Prime Coat</td>
<td>Litres</td>
<td>17,000</td>
</tr>
<tr>
<td>Fog Coat</td>
<td>Litres</td>
<td>6,000</td>
</tr>
<tr>
<td>Tack Coat</td>
<td>Litres</td>
<td>120,000</td>
</tr>
<tr>
<td>RBB Banding</td>
<td>Litres</td>
<td>5,000</td>
</tr>
<tr>
<td>White (Paint)</td>
<td>Litres</td>
<td>5,500</td>
</tr>
<tr>
<td>Yellow (Paint)</td>
<td>Litres</td>
<td>400</td>
</tr>
<tr>
<td>Glass Beads</td>
<td>Tonnes</td>
<td>5.1</td>
</tr>
<tr>
<td>In-situ Waste</td>
<td>m³</td>
<td>8,000</td>
</tr>
</tbody>
</table>

1 In-situ waste refers to material (topsoil and vegetation) from excavations and clearance work

2.1.2 Terminal

THE TERMINAL UPGRADES ARE SPECIFICALLY ADDRESSED IN THE EMP-TERMINAL ADDENDUM, DATED 13 JANUARY 2015

2.1.3 Runway Lighting and Air Navigation Aids

The Aeronautical Ground Lighting (AGL) System upgrade will replace existing AGL lighting units to include power efficient LED type fittings with significant power savings (70% to 80%).

In addition to the runway, taxiway and apron edge lighting systems, the following items have been incorporated into the detailed design scope:

1) Illuminated Wind Direction Indicators – existing units have extensive structural corrosion damage.
2) Illuminated signs for international night operations.
3) Obstruction lights.
4) Runway threshold identification lights at the 11 threshold – these will replace the non-compliant wing bar installations.
5) Alterations to runway lighting to include extended runway end turning bays.
6) Replacement of aerodrome beacon on top of the Air Traffic Control (ATC) tower.

Replacement of the Air Navigation Aids listed below with new equipment:

1) Automatic Weather Station (AWS).
2) Automatic Dependent Surveillance-Broadcast (ADS-B) – currently on hold pending further independent review by the funding agency.

The physical works associated with the AGL and navigation aids will include trenching, pit excavations (for SITs and class D and Class G heavy duty pits), and excavations for foundations of lighting and towers (e.g. AWS). Details of these excavations are provided in Appendix A.

The ducts (trenches) will require a minimum 500 mm cover of compacted controlled low strength material (CLSM) fill. The sand and hardfill required for the backfill of trenches will make use of material from the excavations associated with the trenches, pits and foundations for the AWS pads. Material from other sources (e.g. the beach) will not be used. Concrete mixing will be subject to the requirements of this ESMP.

Old equipment and material associated with the airport navigation equipment which are obsolete and cannot be reused or recycled on the island must be removed from the island at completion of project works. Some transformers are very old and there is potential for these to contain polychlorinated biphenyls (PCBs). If these
transformers are being replaced, handling and disposal should be in accordance with requirements of the Stockholm Convention and validated by a suitably qualified scientist or engineer.

2.1.4 New Air Traffic Control Tower

A new ATCT is proposed in a new location to improve sight lines and compliance under ICAO guidelines. The existing ATCT will remain for training and emergency use. The new ATCT is to be located near the DVOR (Doppler VHF Omnidirectional Range) equipment, approximately 720 m northwest of the existing tower and past the newly constructed Airport Rescue and Fire Fighting Station. Preliminary conceptual plans for the site layout and tower design are included in Appendix A with a layout diagram shown in Figure 2 below.

The ATCT footprint will measure 6.9 m by 12.5 m (86.25 m²) and include five levels with a height of approximately 19 m. Facilities will include toilet and shower amenities, storage areas, offices, training room, sleeping quarters, equipment room, evacuation preparation room and the controller cab operations area (level 5a). The ATCT will include two rain water harvest storage tanks and two Ministry of Infrastructure (MOI) septic tanks. The MOI septic tanks are constructed under the regulations of the Building Code of Kingdom of Tonga. Exact location of these tanks are to be determined on site. The rain water storage tanks will likely be rotomould or similar with a capacity of 20,000 L – 30,000 L capacity. They will be above ground and located at least 5 m away from the septic tanks. The drainage field of the septic tanks will not be located near the rain water supply tanks. The ATCT will be serviced by 594 m² of chip seal car parking and 495 m² of access road (72 m long) connecting to the internal perimeter road from the DVOR and fire rescue station.

The ATCT construction will consist of precast concrete walls, stormshield windows on levels 1 to 4 with grey lined laminated hush glass in the controller cab. Aluminium window frames to be commercial heavy duty with very high wind speed resistance grade.

2.2 Alternatives

The airport is existing infrastructure which requires improvements to ensure continued operation. Alternatives regarding design approach and methodology were explored however budgets and constraints around land and natural resource availability limited the selection of design and construction methodology. The designs and proposed construction methodology have been selected based on the most effective use of natural resources, labour, ease of ongoing maintenance, effects on the local environment and community and in the case of the Terminal ability to build onto the design at a later date as and when funds are available.
2.3 Construction Methodology

The runway pavement will most likely be the first component of the TAIP TBU to be started followed by the navigational aids and the construction of the ATCT and terminal. The contracts for the physical works for each component have yet to be awarded so the precise construction methodology is unknown. However the conceptual and detailed designs provide an indication of the nature of the work. The Contractor’s implementation ESMP will address specific methodological measures or impacts.

2.3.1 MOWP

The Method of Works Plan (MOWP) is a required document for any major construction works within the boundaries of an airport. The MOWP sets out the operational requirements for maintaining a functioning airport throughout the construction process. It includes the concessions and alternative arrangements that may need to be made (e.g. alternative aircraft parking apron) and staging of the construction process while ensuring the safety and security of all personnel, the community and aircraft and continued operation of the airport throughout construction works. The existing ATCT will remain operational until the new ATCT is fully commissioned and put into operational service.

2.3.2 Materials and Equipment

The majority of materials and equipment for each component of the TAIP TBU will need to be imported. All cargo whether air or ship will need to be processed in accordance with Tongan quarantine and customs laws which require fumigation (proof of) of materials and equipment and declarations by personnel (specifically regarding communicable diseases).

2.3.3 Aggregate Supply

The coral based asphalt on the existing TBU runway has performed well to date as have other coral asphalt runways in the Pacific region. Therefore provided quality coral aggregate can be sourced, there are no technical impediments to being able to resurface and strengthen the runway using a coral asphaltic mix. Tongatapu island has several quarries near the airport (refer to Figure 3) which are either currently active or have previously been used to source aggregate for airport runway upgrades. The Contractor is required to use existing quarries and material supply companies with valid operating licenses.
All quarry sites identified have been visually inspected and samples collected for testing to determine suitability. Further to this, past quarry inspection and testing information for Tongatapu has been retrieved from published sources dating from 2011 and 1993, and comparisons with that historic testing information have been undertaken. The now abandoned Quarry site Q1 (Ahononou Quarry) was the original supply site for the last runway overlay. Quarry Site Q2 is currently active, while site Q3 is not active. Samples from Q2 and Q3 were compared to samples from Q1 to gauge suitability of coral aggregate. Quarry Sites near Malapo village (Q2 and Q3) are privately owned. Ownership of the Quarry Site Q1 is thought to be owned by Prince Tungi (Pacific Region Infrastructure Facility, 2011. *Institutional Assessment of Road Construction and Maintenance Services in the Royal Kingdom of Tonga, Final Report*), however this requires further verification.

Quarry Site Q1 (Ahononou Quarry) was the main material source for the original runway construction and the later runway extension and resurfacing. The quarry walls are up to approximately 20 m high (refer to Figure 4 photos) and it is likely that blasting will be required to achieve acceptable extraction rates. There is freshwater ponding at some areas across the quarry floor. The degree of weathering varies in the limestone. Upon visual inspection it is estimated that materials for basecourse and asphalt aggregates can be produced from this location with crushing and screening as processing requirement. Ahononou Quarry is located approximately 6 km south west of the airport. The delivery route for material would pass through Fua’amotu village, however it may be possible to use
alternative roads on the outskirts of Fua’amotu to reduce impact on road surface and residents within the village during transport. It is understood that the quarry has been inactive for approximately seven years and while bare road is still visible vegetation has started to recolonize areas of the quarry site where loose soil is available. There are no settlements near the Ahononou Quarry site – the nearest settlement is Fua’amotu over 3.5 km east of the site. Ahononou Quarry is located approximately 30m inland from the coast, the photo on the left (below) shows the quarry face, the ocean is located approximately 30m behind this.

Figure 4 Quarry Site Q1

It was stated by locals that the disused quarries (Quarry Site Q3) were also used as material sources for the later works on the runway. There is material of different degrees of weathering. It appears that overall Quarry Sites Q2 and Q3 have a slightly higher content of weathered limestone in comparison with quarry site Q1. However, it is estimated that the rock is suitable for production of asphalt aggregates and basecourse material with crushing and screening as processing requirement. A privately owned processing yard is set up and in operation near these quarries and produces different sizes of materials. Raw material samples were taken from the quarries and processed material samples were taken from the processed materials for suitability testing. Q2 is located approximately 1 km south of Malapo village, approximately 1.4 km east of Pelehake and approximately 1.4 km north of Tupou College. Q3 is located approximately 0.5 km south east of the site Q2. The main road route from Q2 and Q3 is approximately 6 km along Tuku’Aho Road through Pelehake village then onto Airport Road to reach the airport. Alternative less trafficked roads are available however these would likely double the delivery route length and the quality of roads would need to be assessed. As can be seen in Figure 6 below grasses are starting to recolonize quarry site Q3.

Figure 5 Typical source rock

Figure 6 Quarry Site Q3 (abandoned)
Bulk samples for testing were obtained from:

a) Ahononou Quarry (Q1) – Reported as being the primary quarry used for the construction of the airport extension.

b) Existing Commercial Quarry (Q2).

c) Abandoned Commercial Quarry (Q3) – Reportedly used for later works at the airport.

Laboratory testing data indicates that the quality of the aggregates in the wider area surrounding the airport are extremely variable and supports the general conclusions presented in earlier reference reports that the highest quality (the densest, least porous, strongest and most durable) aggregates have been those extracted from the Ahononou quarry site (Quarry Site Q1).

Other quarries founded at higher elevations typically have lower densities, higher absorption percentages and display somewhat lower crushing strength values and are generally more variable with regards to material characteristics. A lot of by product is generated at these locations during the crushing phase.

The Ahononou Quarry (Site Q1 refer Figure 3) is the preferred material source for the TBU runway works for asphaltic and basecourse aggregates. This site has also been identified as the preferred quarry source for road upgrades in the Kingdom of Tonga. The 2011 Pacific Region Infrastructure Facility study (Institutional Assessment of Road Construction and Maintenance Services in the Royal Kingdom of Tonga, Final Report) recommended that the Tonga Government secure leases for the land identified at Ahononou Quarry with a view to sub-leasing to a quarry operator and seek advice regarding operating permits and or the need for an EIA given the quarry has been used in the past (existing activity) but is not currently active. The Ministry of Infrastructure has since sought bid submissions for the operation of Ahononou Quarry and have identified a preferred operator based on their submission assessment. It is understood the operator will be responsible for managing the quarry operation and providing reasonable and quality aggregate fit for purpose. Details regarding the operation of the site and whether the TAIP pavement contractor will purchase material from the operator or extract and process the material themselves is unclear.

2.3.4 Construction Lay Down Areas

The proposed construction lay down area to be utilised by all project Contractors (pavement works, building (terminal and ATCT) and navigational aids) at differing times is located adjacent (north western side) to the Airport Rescue and Fire Fighting (ARFF) building situated on the south eastern side of the runway. Drawing 60277004-AV-3104 Rev3 in Appendix A shows the proposed location of the lay down area and highlights the route to the quarries (through Fua'amotu village) and the route to the terminal. The scale of the lay down area may vary with each stage of works but is expected to be at its greatest during the runway pavement works. It is estimated that 1 hectare (ha) of land will be required for the duration of the TAIP TBU construction works. The proposed location is within the airport security perimeter fence and so will be a secure site with restricted access to non-authorised personnel.
The exact details of the location, size and site management (health and safety, solid waste management, water management and wastewater management) will need to be decided by the Contractors in consultation with TAL. Final approval of these details will be required by TAL before the construction lay down area can be set up and documented in the contractors’ ESMP.

Construction lay down area size should be kept to a minimum, be fenced and materials and equipment kept secure to prevent access and use by non-authorised personnel. There are no existing hard stand areas available for stock piling or bunted areas (secondary containment) for hazardous substance storage. Vegetation clearance along with temporary hard stand and bunted areas will need to be constructed. The area identified as a potential construction lay down is overgrown with grasses and scrub (mainly wattle (Acacia spp.) trees). The wattles and scrub in this area of the airport are regularly cleared to maintain visuals of the airport. Noise, dust, vibration and increased traffic are impacts that can negatively affect communities and sensitive receptors. The closest residential properties are located approximately 850 m east on Airport Road. The outskirts of Fua’amotu village is approximately 1.1 km south east of the proposed construction lay down area. The construction lay down area is not a residential camp. Foreign contractors will use local existing accommodation facilities.

Transport to and from the construction lay down area, particularly of materials and equipment, must occur on the existing road network and measures undertaken to prevent dust, noise and vibration nuisance (e.g. wheel wash, covering of loads, servicing of vehicles). If the transport of material or equipment is likely to impact on normal pedestrian and vehicle traffic or pose an increased safety hazard, consideration should be given to moving these items during off peak times. Alternative less trafficked routes should also be investigated provided damage will not occur to existing road surfaces and dust and noise nuisances will not adversely affect residents.

Hard stand areas must be available for storage of hazardous substances and other equipment that poses a potential risk to the environment (e.g. leaking lubricant from machinery). Runoff from hard stand areas used to store machinery will need to be collected and treated (e.g. oil water separator) to prevent contamination of soil or water bodies. Hazardous substances (e.g. fuel, lubricants or oil) must be stored in a bunded area which is constructed with an impermeable base and water tight walls to contain the larger of 110% of the largest tank/container or 25%of the combined tank volumes in areas with a total storage volume equal or greater than 1,000 L\(^1\). Solid waste and wastewater must be managed in such a way to prevent the spread of vector-borne diseases and contamination of soil and water bodies. The Tapuhia Landfill is located on the outskirts of Vaini village (approximately 10 km from the airport) and is the only approved operating landfill on Tongatapu. The Waste Authority Ltd (WAL) is a public enterprise that has been established to manage domestic solid waste and the Tapuhia landfill facility. It is likely that temporary toilets will be required for workers resulting in the need for disposal or treatment of wastewater. Construction of any temporary facilities and disposal procedures will need to be approved by TAL, Ministry of Health (MOH) and MECC as required. The location of temporary sanitary facilities will also need to consider potential groundwater contamination and current boreholes for water supply.

All occupational health and safety requirements must be in place and workers trained in necessary procedures (e.g. spill response plan). Personal protection equipment (PPE) needs to be available to workers as required (e.g. high visibility vest, safety boots) and processes in place for obtaining relevant PPE.

### 2.3.5 Asphalt/ Bitumen Plant

The asphalt/ bitumen processing plant will be located either within the construction lay down area or at the quarry. The exact location is to be decided by the contractor and any site specific requirements for managing environmental, social and health and safety will need to be included in the Contractor’s ESMP. High temperatures are used in preparing the bitumen and coating the aggregate therefore only authorised personnel should be able to access the plant area (whether at the lay down area or quarry). The proposed construction lay down area is located within the fenced airport compound so the general public will not be able to access the area. However due to the high temperatures involved and type of machinery the plant area itself should also be fenced. The plant will also need to be fitted with a dust scrubber regardless of whether it is located at the airport or quarry.

### 2.3.6 Duration and Timing of Construction Activities

Three separate contracts will probably be awarded for the three types of work, namely pavement rehabilitation (runway), terminal construction, and installation of navigational aids. As the contractors have yet to be appointed the exact duration of each component is not yet known, however indicative time scales for the physical portion of the works are as follows in probable order of commencement.

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\(^1\) International Finance Corporation and World Bank Environmental, Health and Safety (EHS) Guidelines, Section 1.5 Hazardous Materials Management, Control Measures
- Runway pavement – 24 weeks (to be confirmed)
- Lighting and navigational aids – 16 weeks (to be confirmed)
- ATCT construction – 18 months (to be confirmed)
- Terminal construction – To be confirmed

Normal working hours are Monday to Friday, 7am to 6pm. Works outside of these hours will require permission from TAL and notice to affected parties and the public at least one week prior to work commencing. It is likely the runway pavement works will need to work after hours in addition to the normal working hours in order to work around flight schedules to ensure safe operations of the airstrip for incoming and outgoing aircraft. Work on a Sunday (Sabbath Day) is not permitted (as protected in the Constitution of Tonga) and any requirements to work on a Sunday (e.g. emergency works) will require special approvals.
3.0 Policy, Legal and Administration Framework

3.1 National Requirements

Tonga has a well-established regulatory framework that provides measures to protect and preserve the environment from abuse, pollution and degradation, to manage the environment for sustainable development and to promote environmental awareness.

Legislation concerning the protection and preservation of the environment is found in a number of Acts and is the responsibility of a number of different Ministries according to their focus. Amongst these, the following are the key legislative acts:

- Environmental Impact Assessment Act 2003
- Environmental Impact Assessment Regulations 2010
- Environmental Management Act 2010
- Marine Pollution Prevention Act 2002
- Parks and Reserves Act 1988
- Fisheries Management Act 2002
- Aquaculture Management Act 2003
- Birds and Fish Preservation Act 1988
- Public Health Act 1992

The Ministry of Environment and Climate Change (MECC) is the principal agency responsible for the management of the environment, and in administering the environmentally related legislation in Tonga. It provides environmental assessments, reports and recommendations to the responsible Ministry, as well as being mandated under the Environmental Impact Assessment Act 2003 to require environmental impact assessments and impose conditions for development projects within Tonga.

Accordingly, activities funded under the TAIP will follow the Government of Tonga’s established procedures and associated guidelines established under the Environmental Assessment Act 2003, and environmental legislation of the relevant ministry.

The Environmental Impact Assessment Act 2003 is specifically concerned with ensuring development projects are managed, conducted and carried out sustainably and appropriately. It requires that all major development projects submit an appropriate environmental impact assessment (EIA) report that will include a review of all relevant impacts as determined by the MECC from time to time. The definition of major development projects is provided in Schedule 1 of this Act, and covers a broad range of major development activities such as tourism facilities, abattoirs, marinas, or mining activity.

The MECC is also empowered with imposing appropriate mitigation measures on proposed development projects, in accordance with the outcomes of the environmental impact assessment reports.

The Regulations under this Act (Environmental Impact Assessment Regulations 2010) providing fuller procedural, compliance and penalty requirements were approved in 2010. The EIA Regulations identify information requirements for assessment of minor and major projects.

The MECC currently works closely with GOT ministries in assessing development projects and has a process in place for categorising development projects as minor or major according to the likely impact. It also requires the implementing agency to identify any potential environmental risks or impacts, and to propose appropriate mitigation measures. Approval from the MECC is required under these regulations in order that projects may proceed.

The MECC makes its recommendation for approval, deferral, mitigation, or cancellation of projects in relation to the powers of the Environmental Management Act 2010.

In regards to quarry operations, extractive industries are not separately defined, but would be covered by Item (k) – Mining where they disturb more than one hectare of land of Schedule 1.
As reported in a recent report on an institutional assessment of road construction and maintenance services, no quarries have applied for assessment since the Act was proclaimed in 2003. No case law has therefore been developed testing whether re-opening a quarry or expanding an existing quarry would require assessment under the legislation (McCotter, 2011).

3.2 World Bank Policy

The TAIP TBU is a category B project under WB environmental and social screening guidelines and requires development of the project specific ESMP. Due to the nature of the project it is expected that environmental impacts will be site specific, few if any are irreversible, and mitigation measures can be readily designed and implemented. In accordance with the WB Operational Policy 4.01 Environmental Assessment this ESMP includes information on mitigation, monitoring, capacity development and training, and implementation costs. The ESMP outlines the potential environmental impacts and the measures needed to prevent, minimise, mitigate or compensate for adverse impacts and improve environmental performance of the project.

The ESMP is a dynamic document which must be updated as consultation and detailed designs of the project components are finalised to ensure currently unanticipated impacts and revised mitigation measures are addressed. Effective implementation of the ESMP is a requirement of the funding agencies and local legislation so monitoring is an integral component of implementation. A Monitoring Plan is included in Section 9 (and Appendix D) of this ESMP. This ESMP is to form part of the bidding documents for contract(s) awarded under the TAIP and will form the basis of the contractor’s environmental management implementation plan.

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4.0 Environmental and Social Environment

4.1 Physical Environment

4.1.1 Location and Geography

The Kingdom of Tonga is a small island developing country located in the Central South Pacific between 15° and 23° 30' South and 173° and 177° West. It is an archipelago of 172 named islands (total land area of 747 km²), 36 of which are inhabited (land area of 670 km²).

Tonga consists of four main island groups extended over a north south axis: Tongatapu and 'Eua southernmost, Ha'apai, Vava'u and the Niuaus (Niuao'ou and Niuaotuputapu). Nuku'alofa, the capital, is situated in Tongatapu, the largest island. The Kingdom's islands are comprised of both volcanic and uplifted coral islands and reefs. Tongatapu is a limestone capped islands with volcanic ash rich soils.

Figure 9 Location map, Kingdom of Tonga
Tongatapu is also the centre of economic development and the seat of the monarch. At the steep coast of the south, heights reach an average of 35 m gradually decreasing towards the north. Tongatapu is highest in elevation around the villages of Fua'amotu and Nakolo with a height of 65 m. The airport is located in this higher region of the island (refer to Figure 10).

**Figure 10 Tongatapu Island map**

### 4.1.2 Land Use Around TBU

The Taliai Military Camp is adjacent (north) to the domestic terminal with residential houses located on the eastern side of Airport Road. It is understood many airport employees live in these residential properties. Surrounding land use is predominantly agriculture with crops of potato, maize, corn and squash to the north; coconut plantation to the south; and dairy farming to the west of the airport. The land within the boundary fence is mostly grassed and mown regularly with pockets of scrub (long grass and wattle trees) along the south eastern perimeter fence. In areas where the perimeter fence is not mounted on concrete edge beams the grass beneath is controlled using Gramoxone (active ingredient Paraquat dichloride), refer to Figure 11. There is evidence of channels and scouring of soil along the south western boundary where there is no vegetation cover beneath the fence and no concrete edge beams.
4.1.3 Climate

Tongatapu has a milder climate due to its southern latitude with a distinct warm wet season from November to April (also the cyclone season) and a cooler dry season from May to October. Temperature ranges from 22 to 29 °C during the wet season and 18 to 25 °C during the dry season. The average annual rainfall on Tongatapu is 1,753 mm with an average monthly rainfall during the dry season of 111 mm and 176 mm during the wet season.

4.1.4 Soils and Geology

Tongatapu is a low coral limestone island with rich volcanic soils (volcanic ash) able to support agricultural development of the land. The soils are generally free draining. The northern end of the island is low lying increasing to 65 m above sea level at Nakolo on the southern end of the island. The airport is located within an area that is sparsely populated but with a variety of agricultural activities surrounding it.

4.1.5 Water Resources

Tongatapu has a fresh water lens with a water table less than one metre above mean sea level. The lens reaches a maximum thickness of about 12 m at the three widest parts of the island. There is a reticulated water supply system which circulates groundwater. Most households will use this water for toilets, washing, cooking, bathing, watering plants and animals. Rainwater tanks at household and community level supplement the water supply. The airport site has a number of bores for extracting freshwater for use in the terminal and for firefighting, along with rain tanks and a reservoir at the northern end of the runway. Over extraction, pollution from septic tanks and industrial activity all pose a threat to groundwater quality as does rising sea level as a result of climate change.

4.2 Biological Environment

4.2.1 Marine Biodiversity

The marine and coastal environment around Tongatapu is experiencing increasing pressure from encroachment into low lying marginal land, particularly around Fanga’uta and Fangakakau Lagoon (northern side of the island, refer Figure 10); effects of pollution; overfishing; and climate change. Ecosystems include the coral reef, seagrass beds, and mangrove forests. Two endemic marine species have been identified, one inshore fish known as 'Pokumei' (*Siganus niger*) and a giant clam (*Tridacna tevoro*), however there is not a lot of data available on these species.

The airport site is inland from the coast (approximately 2.5 km at the nearest point) so it is not expected that TAIP activities will have any effect on the marine or coastal environments.

4.2.2 Terrestrial Biodiversity

The greatest threat on Tongatapu to its terrestrial biodiversity (flora and fauna) is the expansion of agricultural activities and the conversion of land for houses and development. Tongatapu has only isolated remnants of woodland or forest, approximately 618.7 ha (MECC). Low lying areas on the northern side of Tongatapu (particularly around Kolova) are showing the effects of saltwater intrusion, with plants dying off or in poor condition due to the effects of saltwater.

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Important crop species include root crops (e.g. yams, taro, sweet potato, and cassava), peanuts, mangoes, coconuts, breadfruit, pawpaw, pandanus, squash and watermelon. Some species are exported e.g. squash or are grown for the local market.

Terrestrial biodiversity, particularly on Tongatapu is limited. The area in which the airport is located is an agricultural area with differing types of agricultural activities along each boundary. There are no conservation or reserve areas near the airport. The land within the airport boundary fence is periodically cleared to maintain airport operation (security, safety and reduction of bird habitat to prevent air strike) and consists of open grass land and small shrubs (wattle and other opportunistic species).

4.2.3 Rare or Endangered Species

The 2008 International Union for Conservation of Nature (IUCN) Red List identified a total of 56 species in Tonga which are threatened. Six of Tonga’s 357 assessed species are endemic to Tonga. Tonga has one reptile that has been assessed as extinct on the 2008 Red List: the Tonga Ground Skink, *Tachygia microlepis*. A total of 357 species were assessed and 4 birds, 2 mammals, 9 fish, 35 invertebrates, 4 plants and 2 reptile species were identified as being threatened. The IUCN regard the threatened status of animals and plants as one of the most useful signs for assessing the condition of an ecosystem and its biodiversity. The IUCN Red List of Threatened Species™ (IUCN Red List) is widely recognized as the most comprehensive, apolitical approach for assessing and monitoring the status of biodiversity.

4.3 Socio-economic Conditions

4.3.1 Population and Demographics

According to the preliminary 2011 census results the population of Tonga is 103,036, with 73% of the population residing in Tongatapu (75,158). The annual rate of growth between the 1996 and 2011 census is calculated at 0.2% per annum, a population increase of 1% in 15 years. The population of each of Tongatapu’s 7 districts are as follows:

- Kolofo’ou 18,832
- Kolomotu’a 16,946
- Vaini 12,951
- Tatakamotonga 7,252
- Lapaha 7,382
- Nukunuku 7,724
- Kolovai 4,071

The airport is located within district of Tatakamotonga.

4.3.2 Education and Health

Education is important for Tongan people with compulsory education from age 6 to 14 years. The government provides free primary education however high school and senior school education is highly sought after and tends to be dominated by church or missionary schools with tough entrance exams. The literacy rate in Tonga of both Tongan and English is high, estimated at 99%.

The life expectancy at birth is 75 years.

4.3.3 Livelihoods and Economic Activities

Tonga has a small, open, South Pacific island economy. It has a narrow export base in agricultural goods which includes fisheries. Marine Aquarium Fisheries has become the second highest export revenue earner for the Kingdom. Squash, vanilla beans, and yams are the main agricultural exports.

The 2011 GDP was estimated at Tongan Pa'Anga (TOP) $799.3 million, made up of 19% for the agricultural sector 20% for the industrial sector and 61% in the services sector. The household expenditure survey (2009) reported the total household income for urban Tongatapu residents was TOP $3,169 which includes income from wages, property and remittances. The total reported household expenditure (2009) was TOP $2,852, with 51% of expenditure going on food, 11% on transportation and 10% on housing and utilities.
As reported by the Tonga Department of Statistics the 2003 unemployment rate was 5.2%. The service sector had the highest proportion of employment, 37.6% followed by the agricultural sector (31.8%) and industry (30.6%).

4.3.4 Land Tenure and Rights

Tonga has a complex land system, which is administered through the Land Act 1988 and its subsidiary legislation. It is a comprehensive Act and provides for, amongst other things, the provision of land to estate holders (nobles), rights of Tongans to be allotted land, ownership, inheritance, lease and resumption of land to the Crown.

Land issues are sensitive and are governed by comprehensive legislative processes. Land in Tonga may not be sold, but may be leased or sub-leased. All leases up to 99 years require the consent of Cabinet; longer leases require Privy Council approval. Leases are common in Tonga and may be made between the landholder and individuals, organisations or companies.

Where land is required for public purposes, the Minister of Lands, Survey, Natural Resources and Environment may reserve Crown Land for this purpose. In cases where the required land is not Crown Land, and a lease or other agreement cannot be arranged, the King, with the consent of Privy Council may resume land compulsorily.

Resumption of land, as detailed in the legislation, requires appropriate compensation to the landholder. Whilst it is not often used in Tonga, it is an important clause that provides an avenue for the Crown to reoccupy land when and where it may be needed. There has been some precedent for this in the resumption of land in the Vaini district from the Noble for the construction of Hu’atolitoli Prison.

It is understood TBU land is leased from private landowners and leases were recently renewed. However there may be some outstanding issues around some subleases.

4.4 Projected Climate Changes and Impacts

The Pacific Climate Change Science Program (PCCSP) (part of the International Climate Change Adaptation Initiative) conducts critical climate research and capacity building in Pacific Island countries. Information regarding climate change projections was obtained from the BoM and CSIRO (2011) Climate Change in the Pacific: Scientific Assessment and New Research (Vol. 2: Country Reports) produced by the Pacific Climate Change Science Program.

Tonga, like many other pacific nations are already experiencing the effects of increased temperatures and rising sea level. Sea level (measured by satellite altimeters and tide gauges) has risen by 6 mm per year since 1993. Sea level does fluctuate year to year and decade to decade due to El Nino-Southern Oscillation. The annual mean air temperature in Nuku’alofa (since 1950) has increased by approximately 0.1 °C per decade. Annual and wet season rainfall trends have shown a clear decreasing trend but no clear trends in dry season rainfall. Generally there has been substantial variation in rainfall from year to year.

The projected design life is 20 years for the runway, and 50 years for the new terminal structure (or less for specific components such as cladding). Climate change projections for 2030, 2055 and 2090 (relative to 1990) were reviewed. The PCCSP report (as identified above) reviewed a number of climate projection models to determine the most plausible representations of future climate in the pacific under the three emission scenarios developed by the Intergovernmental Panel on Climate Change (IPCC). The three emission scenarios are: low (B1), medium (A1B) and high (A2), for time periods around 2030, 2055 and 2090 (refer to Figure 12 for details of emission scenarios).
Current and future climate of Tonga Brochure. Tonga Meteorological Service, Australian Bureau of Meteorology and CSIRO.

Figure 12  Carbon dioxide (CO\textsubscript{2}) concentrations (parts per million, ppm) associated with three IPCC emissions scenarios: low emissions (B1 – blue), medium emissions (A1B – green) and high emissions (A2 – purple). The PCCSP has analysed climate model results for periods centred on 1990, 2030, 2055 and 2090 (shaded).

Table 2 below shows the projected changes in annual average air temperature and sea level for Tonga for the three emission scenarios and the three time horizons.

<table>
<thead>
<tr>
<th>Annual Average Air Temperature Projection</th>
<th>Sea Level Rise Projection</th>
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<tr>
<td>Values represent 90% of the range of the models and changes are relative to the average of the period 1980-1999.</td>
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<td>2030 (°C)</td>
<td>2055 (°C)</td>
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<td>Low emissions scenario</td>
<td>0.2–1.0</td>
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<tr>
<td>Medium emissions scenario</td>
<td>0.2–1.2</td>
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<tr>
<td>High emissions scenario</td>
<td>0.3–1.1</td>
</tr>
</tbody>
</table>


In the short term (2030) the climate models prediction for rainfall do not increase (or decrease) significantly, in either wet or dry seasons, however by 2090 it is expected that rainfall will increase during the wet season and stay the same or decrease during the dry season. There is only moderate confidence in the models prediction of rainfall in the wet season and low confidence for the dry season. There is high confidence that the intensity and frequency of extreme rainfall days are projected to increase. As most runoff from rain events goes to natural soakage this does have implications for localised flooding depending on impermeable surfaces and the ability of the rainfall to percolate into the ground. Due to the elevation of TBU sea level rise is unlikely to have any effect on the airport operations or design parameters.
5.0 Consultation and Stakeholder Engagement

5.1 Background and Approach

As required by WB Safeguard Policies consultation and disclosure of Category B projects must be undertaken with project affected groups (stakeholders) and non-government organisations (NGO). The potential environmental and social impacts of the project require the opportunity for discussion and review during the environmental assessment/ ESMP process to inform detailed design and mitigation measures. This ESMP will remain a draft until public disclosure and consultation has been completed. This will allow for the ESMP to be updated with details of consultation and disclosure as and when this is completed. Disclosure and consultation will be the responsibility of TAL either directly or through their nominated Consultant.

5.2 Outcomes of Consultation to Date

The following sections summarise the outcomes of the initial public consultation completed in 2011 and also a second round completed in 2015 which was undertaken to update stakeholders of the progress of the TAIP project and also to provide details on the development of the ATCT phase of the project.

5.2.1 2011 – Initial Public Consultation

In 2011, the overarching EMP (dated 22 February 2011) was publicised and initial public consultation for the project was undertaken at the Fua’amotu Domestic Airport on Friday 4 February 2011. During that initial round of public consultation an announcement was placed in the following newspapers in both Tongan and English on 31 January 2011.

- Tonga Chronicle
- Taimi ‘o Tonga
- Kele’a
- Talaki

The primary issues of concern raised by attendees during this phase of TBU public consultation were noise, solid waste management, construction traffic, and the grievance mechanisms. All issues were addressed in the overarching EMP and have been incorporated into this updated TBU specific ESMP. A total of 18 people attended this initial public consultation meeting and participants consisted of a roughly even mix of government employees (from a number of different departments) and non-government community representatives. Minutes from the public meetings and signed attendance record are included in the overarching EMP (dated 22 February 2011).

5.2.2 2015 – Public Consultation

A local safeguards specialist consultant, Mr. Malakai Kaufusi on behalf of TFSU and TAL ran the 2015 public consultation. Mr. Kaufusi and representatives from TAL, AECOM and the GoT Department of Environment conducted a public consultation workshop on 26 November 2015. A summary of the 2015 public consultation is provided in a report titled “Tonga Aviation and Investment Project (TAIP) – Community Engagement and Consultation Program” (dated 26 November 2015) by Mr. Kaufusi; which is provided in Appendix F.

Prior to the workshop, a Project Information Bulletin (PIB) (dated 18 November 2015) was prepared by AECOM and published online and in local newspapers on 19 November 2015. The PIB, which was provided in Tongan and English, was published via the following newspapers and websites:

- Matangi Tonga online
- Kele’a
- Talaki
- Tonga Chronicle

To ensure district officers and church leaders were aware of the information and had time to share it with their communities, hard copies of the Tongan version of the PIB were given directly to district officers and church leaders prior to local meetings with their communities.
The consultation workshop was held at TBU and a total of 37 stakeholders and affected parties were invited to attend; invitees included:

- Representatives from local villages (Fua’amotu town and district officers).
- Representatives from the GoT (MFNP, MOI, MEIDECC (Department of Environment), Ministry of Education, MOH, MIA, Crown Law, MEWAC, Parliament Office).
- Representatives from NGOs (Civil Society Forum of Tonga, Tonga Community Development Trust, Women In Sustainable Enterprises (WISE), NATA (Disability Persons Organisations), Tonga Red Cross Society).
- Representatives from churches (Westlyan Church, Catholic, LDS).
- Donors (New Zealand Aid Programme, UNDP, WB/ADB, AusAID, JICA).
- TAIP and TAL employees.

A total of 12 participants attended the public consultation workshop; participants included the following:

- GoT (representatives from MFNP, MEIDECC, MIA).
- Donors (representatives from WB/ADB).
- NGOs (representatives from Tonga Red Cross Society, NATA).
- TAIP (representatives from TFSU).
- Representative from TAL.
- A town officer.
- A church leader.
- Representative from the Civil Society Forum of Tonga.
- Representative from AECOM.

The consultation report (November 2015) summarised the following key messages and questions from participants during the workshop:

- Participants encouraged that TAIP Contractors provide employment opportunities for local skilled tradesmen and unskilled labour from Fua’amotu and other bordering villages during the project.
- Representatives from disabled person’s organisation requested that accessibility be provided for people with disabilities at the airport (including the ATCT). It was noted that new buildings in the general Fua’amotu area have not provided accessibility for people with disabilities and the elderly; it was suggested that development partners mandate ‘Universal Design’ in providing accessibility in all new structures.
- There were cultural concerns regarding the provision of unisex bathrooms and sleeping areas in the ATCT designs. Mitigation options may require that bathrooms and sleeping areas are segregated for men and women in the new ATCT detailed designs.
- Participants wished for ongoing consultation during the project and for locals to have an opportunity to be involved with the project decisions.
- Participants wished to know what resources will be utilised for the project works and how will GoT keep up with the supply and demand of future development at the airports in Fua’amotu and in Vava’u (no answer was provided in the report).
- Participants wished to know what the broader benefits of the project will be for the community (e.g. tourism, retail, local products and crafts)?
- It was noted that the impacts will be minimal, however participants stated that the project impact may be improved by encouraging TAIP Contractors and airport employees to patronise local village shops and BBQ stands.
- Participants requested that security be maintained at the airport and in the new construction areas.
- In light of the recent international concerns of terrorism, how can TAL/TAIP maintain high standards of airport security?
- Representatives from Fua’amotu village reported no major issues regarding current construction activities.

A number of the concerns raised through consultation are yet to be addressed and will likely require coordination with other government ministries.

Following the public consultation workshop, the following recommendations have been made:

1) Deliver translated copies of the PIB to the district officer and Fua’amotu town officer for local village meetings.

2) Complete a feasibility study for the introduction of ‘Universal Designs’ for the provision of accessibility in all new TAIP structures for people with disabilities.

3) Encourage TAIP Contractors to continue to employ local skilled and unskilled labour from villages in the vicinity of TBU.

4) Review the environmental status of Ahononou Quarry and the feasibility of it to sustainably provide aggregate resources for future TAIP upgrades and the general requirements of TBU and Lupepau’u airports.

The overarching EMP was reviewed by the Ministry of Environment and Climate Change (MECC) and accepted on 17 September 2010 (see Appendix B). The draft version of this updated TBU specific ESMP should also be provided to the MECC for review and feedback.

5.3 Disclosure

Disclosure does not equate to consultation (and vice versa) as disclosure is about transparency and accountability through release of information about the project. The draft overarching TAIP EMP has been made available on the WB Infoshop website and in hard copy at government offices (most applicable and accessible). A draft of this updated TAIP TBU ESMP should also be made available online (WB and government websites) and hard copies available at government offices and community centres on Tongatapu.
6.0 Environmental and Social Impacts

6.1 Overview of Impacts
The TAIP TBU scope is to rehabilitate the existing runway, upgrade the existing terminal and navigation aids, and construct a new ATCT. New land acquisition is not required and the project is unlikely to cause any major negative environmental or social impacts as the work is providing maintenance to and improving existing infrastructure. The social outcomes of the TAIP TBU are expected to be positive by improving safety, accessibility and mobility of island communities. No land acquisition is required thus no physical resettlement will be necessary.

Possible negative impacts related to the airport upgrade are expected to be confined to the construction phase. Public notices and consultation with affected people will continue throughout the project. Where appropriate warning notices and project bulletins will be posted informing the community when particular stages are to be completed and opportunities for involvement, whether through employment, collection and reuse of demolition materials or if there are complaints. With timely and proper implementation of this ESMP and application of appropriate mitigation measures, most if not all the potential negative impacts can be prevented or minimized. These impacts are expected to be limited to the following impacts, however this ESMP is a dynamic document and any changes in design or construction methodology may result in a reduction of impacts or additional impacts that will require mitigation.

6.2 Environmental Impacts

6.2.1 Solid Waste
Scarification, replacement of unsuitable pavement material, demolition within the terminal, replacement of lighting and navigation aids, site clearance for the new ATCT and facilities, and decommissioning and removal of specialist equipment of the old ATCT will lead to the generation of excess soil and demolition waste. Waste management on Tongatapu has been poor but more recent efforts have resulted in the establishment of an approved, licensed landfill located on the outskirts of Vaini village. The WAL manages the landfill which is licensed to receive demolition waste including limited hazardous substance disposal (arrangements to be confirmed with WAL).

Material will also be generated from the excavations associated with the runway turning bays, concrete pads for navigational aids, cable trenches, ATCT foundations and car parking/access road, and the removal of the old concrete surrounds of the fuel hydrant system. Most of the raw material can either be used to backfill areas where old equipment or infrastructure has been removed or as a resource (e.g. crushed concrete) for general use by TAL/WAL and the community.

6.2.2 Water Resources
Freshwater will be required for workers and some construction activities (e.g. dust suppression and concrete and bitumen production). The impact on current water supply could be significant if not properly mitigated through good resource planning. Water efficiency, conservation and reclamation practices will be adopted, for example use of non-potable water where suitable, use of an osmosis plant for non-potable water purification or a mobile desalination plant.

6.2.3 Biological Resources
For the most part the TAIP TBU will rehabilitate and upgrade the existing infrastructure. The airport land is defined by a secure perimeter fence designed to exclude animals and prevent access by people. Most of the airport land is mown grass however on the southern side of the runway there are some areas of scrub particularly around the ARFF building where the proposed construction lay down area is located. The location of the new ATCT, car park and access road is predominantly grass (refer to Figure 13). The vegetation within the airport perimeter fence is periodically cleared to maintain airport operations which include security and safety (particularly as it relates to reduction of bird habitat and potential for bird strike). This regular maintenance means that the species that do grow are pioneering, fast growing species such as wattles and grasses. Mitigation measures will include liaison with the MECC should any fauna (reptile, avian, or mammal) be encountered that affect construction activities (e.g. nesting birds).
6.2.4 Hazardous Materials

Potential soil and water pollution from construction run-off containing fuel and lubricants are expected to be temporary and minor. Work practices and mitigation measures for spills will be implemented, including spill response plan and bunded areas for storage (during construction and operation phase).

There is also potential for hazardous materials to be in the building materials used in existing structures that are to be demolished (e.g. asbestos containing material in the terminal).

6.2.5 Noise and Vibration

Noise and vibration disturbances are particularly likely during construction as a result of the transportation of construction materials from the quarry and operation of equipment (e.g. milling of pavement surface). These impacts will be short-term and affect different people at different times. Impacts include noise during pavement resurfacing and possible effects of vibration caused by operation of heavy machinery, increased traffic in some sections of roads, etc. Noise and vibration is likely to be an ongoing issue throughout the construction stage and to a lesser degree the operational phase (e.g. aircraft landing and take-off). As the airport is existing infrastructure operational noise or vibration impacts are probably already being experienced by the local community.

6.2.6 Erosion and Sediment Control

Some soil erosion may occur as a result of activities such as the removal of shrubs and earth cover during resurfacing, and the restoration of pavement areas; also site clearance for the ATCT foundations, access road, and car parking. The impacts on vegetative cover will be short-term and reversible through natural regeneration. There is only a thin topsoil layer in most parts and runoff is easily filtered into the underlying groundwater table. Where topsoil is required to be cleared this will be set aside for use in restoring disturbed areas.

Sediment has the potential to be generated during any excavations, for the turning bays at either end of the runway (6,400 m² and 4,800 m²) and the ATCT works. The excavation of the turning bays will be to a depth of approximately 0.3 m. Excavation will also be required for the lighting and navigational aids (concrete pads and cable trenches). The ATCT foundations will be dug to an estimated depth between 2 m to 2.5m; it is possible that excavations will be advanced below the groundwater table. The area of the new ATCT is flat and so runoff from excavations will go to ground.

6.2.7 Air Emissions

Air pollution can arise due to improper maintenance of equipment, dust generation and the bitumen smoke / fumes arising from application of new pavement seal and maintenance work. Impacts are expected to be localised and short term with only minor negative impact on the ambient air quality in the vicinity of the construction areas. No ongoing impact to air quality is expected as this is rehabilitation of existing infrastructure.

6.2.8 Traffic and Airport Operations

Traffic impacts will occur in transporting equipment and materials from the port and quarry. These impacts will mostly be short-term and through good mitigation and traffic management the impacts should be low. The
Contractor(s) is responsible for developing and implementing a Traffic Management Plan (TMP). The TMP will need to consider pedestrian traffic as well as vehicle traffic management. Particular attention will need to be given in the TMP to traffic management near sensitive receptors (residential dwellings, markets, churches etc.). Upon completion of the construction phase of works traffic and road safety impacts caused by the TAIP TBU should cease.

The MOWP will specify safety measures required for the operation of the airport during the construction phase. The MOWP includes instruction on airfield operational distances, FOD protection, airfield security, and responsibility hierarchy and communication methods.

6.2.9 Wastewater Discharges
Sanitary facilities for workers will be provided to prevent water bodies or other areas being used. The terminal will re-use the existing septic system (a new septic system may be installed at a later date) which will require the sludge to be cleaned out periodically (dependent on level of use). The new ATCT will have two septic tanks installed and sized to accommodate the facilities and level of use within the ATCT. Drainage fields from the septic tanks will be directed away from the rain water harvesting storage tanks and groundwater abstraction bores which may be nearby (the nearest bore is understood to be at the ARFF).

Uncontrolled wastewater (e.g. sewage, grey water, wash water) discharges have the potential to contaminate soil, ground and surface water, and spread disease. Wash water from equipment can be contaminated with hydrocarbons (e.g. oil and fuel) which have a detrimental effect on aquatic life, water quality and soil quality. There are also human health impacts regarding hydrocarbon exposure which vary in severity depending on type and length of exposure. Wash water from concrete processing and cutting is highly alkaline and can burn vegetation, result in fish kills and also cause burns to the skin. Sediment loads in wash water if allowed to discharge to either marine or freshwater systems can also adversely impact aquatic life and water quality. While the potential impacts of uncontrolled discharges of wastewater can adversely affect the receiving environment, they can be easily mitigated through planning and implementation of mitigation measures (as outlined in Section 7.8). While the airport and proposed construction camp location is not near any surface freshwater or marine environments there is groundwater which will need to be protected from uncontrolled wastewater discharges.

6.2.10 Quarry and Aggregate Supply
Potential adverse impacts from uncontrolled quarrying or mining are high and include all of the above listed impacts, namely:
- Air emissions – machinery and dust.
- Noise and vibration – machinery and blasting (if used).
- Water – consumption, hydrology (changes to site drainage patterns and groundwater), wastewater, and contamination.
- Waste – overburden, by-products and contaminated waste material.
- Land conversion – loss of habitat, agricultural land.

Only licensed quarry operations, whether private or government owned, will be used to source suitable aggregate (Ahononou Quarry is the recommended source to be confirmed by the contractor). The potential quarry sources identified in section 2.3.3 are either currently operating as a quarry or have been used as a quarry in the recent past so land conversion has already taken place. Impacts of quarrying are not limited to the location of the quarry but can extend along the delivery route. Noise, dust, and traffic (vehicle and pedestrian) safety are primary concerns for the transport of materials from the quarry site.

Depending on the quarry site selected to supply the required aggregate a more detailed assessment of impacts will be completed by the contractor in their ESMP along with mitigation measure suitable for the location and activities within the quarry. The Ahononou Quarry is located near the coast therefore there is potential for effects to reach the coastal and marine environment if not managed in accordance with international standard practice (see Section 8.10 for specific mitigation measures that will be applicable to Ahononou Quarry only).

6.2.11 Biosecurity
Some equipment will most likely need to be imported which can harbour plant and animal species which may pose a threat to Tonga’s biodiversity and ecosystems.
6.2.12 Secondary and Cumulative Impacts

Secondary and cumulative impacts tend to be triggered by impacts to environmental resources that function as integral parts of a larger system over time and space, and can initially be ‘invisible’ to the normal present time impact assessment. Secondary impacts can include land use changes due to improved accessibility which in turn can impact habitats and pressure on existing resources and utilities (e.g. water supply). Secondary and cumulative impacts also often cannot be managed solely by the project executors (TAL). Town planning (e.g. restricting development and clearing of land) and conservation are two examples of external influences which can assist in reducing secondary and cumulative impacts.

Secondary and cumulative impacts are not always negative, positive impacts include increased business and supply chain opportunities due to improved infrastructure and accessibility, improved access to health and education facilities and employment (beyond the scope of the project).

The airport is existing infrastructure which has existing impacts (e.g. noise and dust generation). In most cases the TAIP will not be able to remedy these impacts however the designs can lessen and in some cases mitigate some of the impacts.

6.3 Social Impacts

6.3.1 Health and Safety

During construction and operation health and safety is to be managed through a Site Specific Safety Management Plan (to be developed by the contractors for their respective works) and application of international environmental and health and safety (EHS) standards (WB/IFC EHS Guidelines). The primary hazards identified are construction works involving hot bituminous products (up to 165°C), and working in extreme ambient temperatures.

Trenches for the navigational aids are not expected to exceed 1.2 m however batter slopes or shoring may be required to stabilise the sides of the trenches. Exposed trenches pose a risk to the community and airport operations therefore trenches will be progressively filled as the cable ducts are laid. At any one time the maximum length of exposed trench shall be 30 m. Exposed trenches shall be secured at night to prevent access by non-authorised personnel.

In construction of the new ATCT there will be hazards associated with working at heights.
7.0 Mitigation Measures

Due to the nature of the rehabilitation activities proposed there are some mitigation measures which are applicable to all aspects of the project, while others are specific to particular components. Sensitive receptors and environmental values have been identified around the airport site which will require specific mitigation measures for safety and environmental protection. The mitigation measures are outlined in Appendix C. The mitigation tables contained in Appendix C detail the impact or issue, the mitigation required, where this is to occur, when this mitigation is to be applied, estimated costs, implementation responsibility and supervision responsibility.

This ESMP should be included in all bidding documents and form the basis of the Contractors ESMP which will detail implementation of the mitigation measures identified in this ESMP. The ESMPs are dynamic documents which should be updated to include any variation from the current scope or addition of newly identified impacts and mitigation measures that may arise through the bidding and contracting process (if not addressed in the Contractor’s ESMP) or consultation. The mitigation measures associated with the impacts identified above are detailed below.

7.1 Aggregate and Quarrying

Aggregate will ideally be sourced from existing quarry sites on Tongatapu (Ahononou Quarry has been recommended as the most suitable). Once the suitable quarry is confirmed the contractor is responsible for reviewing site operations to ensure that the operation is legal and approved for supply of aggregate (under Tongan law). The contractor and TAL will have a choice as to which quarry source to use and how the quarry operation is to be set up (e.g. operated by the TAIP contractor or a local quarry operator). If the contractor uses a local operator they are responsible for reviewing operating license/permits and any conditions of operation which may have been imposed to ensure the operation is legal and that the contractor’s work complies with any transport or purchase requirements. If the TAIP contractor is to operate the quarry (or part of) themselves they are responsible for securing the necessary operating permits and completing environmental assessments. An EIA and quarry management plan may be required to support any permit application. As a minimum the contractor should adopt the IFC Environmental, Health and Safety Guidelines for Construction Materials Extraction. Key mitigation measures from this document are outlined below.

Dust is a major issue at quarry sites and dust can travel some distance affecting a large number of people if not properly managed. As stated in Section 2.3.3 the nearest settlement is Fua‘amotu village located approximately 3.5 km east of Ahononou Quarry. Dust should be managed using the same measures as identified in Appendix C (under Generation of Dust and Dust/ Air Emissions) along with use of linear layout for materials handling to reduce the need for loading and unloading and vehicle movements around the site. When locating operations consideration should be given to prevailing wind conditions.

Water is significant resource in quarry activities and where possible closed circuit systems should be implemented for treatment and re-use in site activities and processes (e.g. washing plants). There is no surface water near the site, although freshwater was observed ponding at the base of the old pit (at Ahononou Quarry). It is not clear whether this is localised ponding due to rainfall or groundwater. Implementing a closed circuit water management cycle would allow for treatment of wastewater contaminated with sediment (through settlement ponds) and collection of wastewater contaminated with hydrocarbons for treatment through an oil water separator.

In order to minimise site waste careful planning and understanding of product quality is required. Overburden and by-product should be stockpiled for use in rehabilitation of the quarry site at a later date.

Other mitigation measures that have been identified for the project as a whole (refer to Appendix C) are also applicable to the quarry site if managed by the TAIP pavement contractor. For example chance find of archaeological artefacts or loss of biodiversity, erosion and sediment control measures (e.g. clean water diversion), wastewater treatment, noise and vibration mitigation etc.

The transport of material from the quarry will need to be managed through a Traffic Management Plan which will identify the route, maximum load limits, required transport permits and required measures to reduce dust. Mitigation measures provided in Appendix C include covering of loads, refused delivery of overloaded trucks, transport during off peak times and route identification which uses existing less trafficked roads.
7.2 Hazardous Substance Use, Storage and Disposal

Hazardous liquids (e.g. fuel and lubricants) must be managed within hardstand and bunded areas to prevent runoff to surrounding permeable ground. Bunded areas (secondary containment) must contain the larger of 110% of the largest tank or 25% of the combined volumes in areas with a total storage volume equal or greater than 1,000 L. Bunded areas are to be impervious (water tight), constructed from chemically resistant material, and be sheltered from the rain as rain water allowed to collect within the bund could be contaminated if there is any hazardous substance residue on storage containers or spilt product within the bund. A spill response plan must be in place and all workers trained in correct implementation of the spill response plan. Spill kits should be available in close proximity to where hazardous substances are used and stored e.g. on the work truck or beside the fuel store.

The bitumen and asphalt plant should be located at the construction lay down area or quarry to contain potential environmental impacts. The location of the construction lay down area should be such that residential settlements are not impacted by dust, noise or runoff.

Asbestos (hazardous substance) is suspected in some building materials used in the terminal and potentially the old ATCT. Other areas, such as wrapped pipes and floor surfaces, may also have asbestos containing material (ACM). The International Finance Corporation (IFC) Environmental, Health and Safety (EHS) Guidelines for Occupational Health and Safety (section 2.4 Chemical Hazards) should be followed for demolition, handling and transport of any ACM. An asbestos management plan which clearly identifies the locations where the ACM is present, its condition (e.g. whether it is in friable form with the potential to release fibres), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities, including the MECC and MOH. The plan should describe the work in detail and may include but not be limited to the following:

- Containment of interior areas where removal will occur in a negative pressure enclosure;
- Protection of walls, floors, and other surfaces with plastic sheeting;
- Construction of decontamination facilities for workers and equipment;
- Removing the ACM using wet methods, and promptly placing the material in impermeable containers;
- Final clean-up with special vacuums and dismantling of the enclosure and decontamination facilities;
- Inspection and air monitoring as the work progresses, as well as final air sampling for clearance, by an entity independent of the contractor removing the ACM.

Repair or removal and disposal of existing ACM in buildings should only be performed by specially trained personnel (equivalent to training standards required under applicable regulations in the United States and Europe) following Tongan national requirements, or in their absence, internationally recognised procedures.

Tapuhia Landfill is authorised to accept selected hazardous substances however arrangement must be made with the operator prior to transport (refer to http://www.wasteauthority.to/ for further information). Any personnel in contact with the ACM must be wearing suitable PPE, including respiratory protection, suitable for the removal of asbestos to be worn while handling and transporting the material. All workers should be provided with onsite washing facilities, and should wash hands, face, and boots/shoes before eating, drinking or smoking, and before returning home. Work clothing should be removed as soon as possible after arriving home and should be washed separately from other family laundry. It is advisable to have an officer from MECC and or MOH onsite during asbestos removal and packing to assist in monitoring and ensuring compliance with environmental, and health and safety requirements.

Work on the apron is restricted to an application of bituminous surface treatment and no excavation into the sub base is required which is where hydrocarbon contamination (related to the fuel hydrant system) is most likely to occur. If staining or odour is encountered during the works a photoionization detector (PID) should be used to quantify the potential risk to workers. The worker breathing zone concentration of volatile organic compounds (VOCs) should not exceed 5 part per million. If the concentration of VOCs does exceed this limit workers must immediately move to an upwind location until the vapours clear.
7.3 Safety and Traffic Management

The airport is protected by a patrolled perimeter security fence. All works, including the construction lay down area will occur within this fence. Security clearance will be required for all airside construction workers. Airside construction works will be managed through the MOWP and TAL will be responsible for ensuring the safe operation of the airport at all times. The MOWP will detail the specific safety and security requirements for the airport operations, including safe operating distances and responsibility of key project roles.

The transport of materials has the potential to impact the community through noise, dust and road safety. The Contractors are responsible for developing a TMP which will specify how traffic (vehicle and pedestrian) will be managed, including transport times (outside peak hours), maximum speed and loads of trucks, use of flag controls at site entrances (construction lay down area) and around specific work areas.

7.4 Stormwater and Water Management

Localised flooding on the shoulders of the runway, taxiway and apron were observed and occurs where compaction has occurred and drains have blocked.

During construction clean water diversion bunds will be used to direct any runoff from undisturbed areas away from work areas, stockpiles and storage areas. The diversion bunds will direct this clean water to land for soakage. There are no surface water bodies adjacent to the airport.

Water required for construction activities such as dust suppression and concrete production will need to be managed carefully so as not to impact on the island’s freshwater supply or the airport’s needs for ARFF. Where possible rain water should be collected or non-potable water should be used, provided there will be no risk of contamination of groundwater.

The airport has a number of bores used to extract water for the terminal and ARFF operations. Due to the proximity of these bores, monitoring should be completed prior to construction works commence, during construction works and at completion of all construction works to confirm no contamination of groundwater as a result of the works. Depending on what works are being undertaken (e.g. terminal versus runway pavement) different bores may be selected to provide information on groundwater quality at any given time in that area. As a minimum the bores that should be included in the monitoring programme are the terminal bore, to capture activities related to the terminal upgrade and apron pavement works, and the bore nearest to the construction laydown area (near the ARFF building), to capture any potential effects as a result of a spill or general site activities. Other bores may also be identified by the MECC as requiring monitoring to determine effects from construction and or operational activities.

Parameters that should be monitored include pH, electrical conductivity, total nitrogen and total petroleum hydrocarbons (TPH).

The new ATCT will be fitted with two rain water collection tanks (2 x 20,000 L – 30,000 L) to service the kitchen and bathroom facilities within the tower. These will be above ground tanks to allow for maintenance and cleaning and prevent cross contamination with groundwater contamination (if present).

7.5 Bitumen, Asphalt and Concrete Plant

Bitumen and asphalt production requires very high temperatures which pose a significant risk to workers and the general public. Therefore the bitumen and asphalt plant should be located within a secure compound (the construction lay down area or quarry) to ensure security and reduce risk of unauthorised access. The plant also requires use of hazardous materials which must be stored on hard stand areas within bunded areas (both should be available at the construction lay down area or quarry). The equipment must be fitted with a dust scrubber to prevent the dispersal of fine coral particulates.

The project requires concrete production for the terminal, new ATCT, navigational aids and runway. It is likely that the bulk of concrete will be supplied to site by local ready mix concrete suppliers or alternatively, prefabricated at a local concrete plant on the island and transported to site. If concrete is to be constructed in-situ care needs to be taken with slurry and runoff from the concrete. Concrete production should only take place when there is no rain forecast. Concrete slurry is highly alkaline and cannot be diluted. Sand bags or diversion drains must be used to divert runoff from concrete cutting or setting areas. Any concrete debris must be collected and disposed of as a hazardous substance and removed to an authorised landfill (Tapuhia Landfill). Wastewater from concrete cutting or production must be collected and treated (settling and neutralisation through pH adjustment). All equipment
used in concrete production must be cleaned in designated wash down areas away from surface water and not be allowed to permeate to ground.

7.6 Construction Lay Down Area

The construction lay down area will be used to store equipment and materials for all components of the project, and so there are a number of potential hazards associated with the equipment and materials. The construction lay down area is within the airport perimeter fence however additional fencing may be required around specific stores (e.g. hazardous substances) to prevent access by unauthorised personal. Areas within the compound must be clearly marked for solid waste collection, machinery maintenance, hazardous substance storage, plant operations (concrete, bitumen, asphalt) and toilet facilities for workers. Each of these areas must be constructed in such a way to prevent any potential adverse impacts on the surrounding environment. This includes providing hard stand areas, protection from wind and rain, bunding (hazardous substances), clean water diversion drains, and collection and treatment of waste water from site operations (e.g. concrete production, machinery maintenance). The construction lay down area is not a residential camp. Foreign contract and project staff will utilise existing local accommodation. The ground of the construction lay down area will likely be compacted by the end of its use and so restoration will require scarification of the soil, application of topsoil and revegetation.

7.7 Erosion and Sediment Control

The land around TBU is relatively flat, with porous soils. While construction activities should be limited to the dry season there is still potential for rainfall events. Clean water diversion bunds should be constructed around any excavation to prevent ingress of runoff from surrounding areas. Any ponding which may occur within an excavated area shall either be allowed to percolate into the subsoil or pumped out to a settling area or used for dust suppression at a later date. Excavations should be kept to a manageable size to reduce the time of exposure. The largest stockpiles will be within the construction lay down area for the quarried aggregate. These stockpiles will need to be on an impermeable geotextile or hardstand and runoff directed to permeable land. The aggregate material will be inert larger size pieces. Stockpiles of any fine grain materials (e.g. sand and topsoil) must be covered to prevent dust and sediment laden runoff during rain events.

7.8 Wastewater Management

There are a number of activities during construction and operation phases of the project which will generate wastewater. During construction wastewater will be generated by the sanitation facilities provided for workers and as there is no reticulated wastewater treatment system on the island, the contractor is responsible for the collection and treatment of the generated wastewater from sanitation facilities. There are a number of options regarding sewage treatment that the contractor can implement to mitigate the potential impacts on the land and or water (groundwater). These include mobile proprietary treatment systems (to be imported for the project) and composting systems. The contractor is responsible for ensuring the treatment and disposal of wastewater is in accordance with TAL advice and approved by MOI and MOH as required.

Wastewater from wash down areas is to be collected either in a settlement pond or tank to allow sediment and particulate matter to drop out before the water can be reused as wash water, dust suppression or in other processes. A separate wash down area is required for machinery or material with oil or fuel residue as this wash water is required to be treated through a mobile oil water separator. Wash water from concrete production, cutting, washing of equipment used and areas where concrete is produced must be collected and treated to lower the pH (closer to neutral) and to allow settlement of suspended solids (see Section 7.5). All wash down areas and wastewater treatment areas, should be located within the construction camp.

Treated wash water where possible should be reused for dust suppression or within other processes. Direct discharge to the marine or coastal environment is prohibited. Discharges of treated wash water (as described above) are to occur only to land with vegetation cover and in areas where groundwater quality is not going to be affected (e.g. not adjacent to an extraction bore). Sufficient measures to avoid direct discharges are required, which may include bunding (e.g. sand bags), demarcation of exclusion zones, and limited use of large machinery.

7.9 Solid Waste Management

The Tapuhia Landfill is the only authorised landfill on Tongatapu operated by WAL. The contractor is responsible for coordinating with WAL, TAL and the Ministry of Infrastructure regarding what waste can be accepted by Tapuhia Landfill (e.g. hazardous substances, wastewater). Waste streams able to be re-used or recycled are to
be done by licensed operators able to provide this service. Some waste can be re-used within the project however excess re-usable or recyclable waste will be provided to TAL (or nominated receiver). The type of waste expected to be generated are:

- Building materials from demolition
- Decommissioned electrical equipment (transformers and generators) as required in the old ATCT
- Excess rubble generated from milling of the runway surface and excavations
- Green waste from clearing the area for the construction camp and new ATCT, car park and access road
- Packaging materials from imported supplies
- Waste oil, lubricants etc.
- Wastewater from sanitary facilities (dependent on system used).

Any waste that cannot be disposed of at the Tapuhia Landfill, reused or recycled must be removed from the island at the completion of the project. International waste conventions (e.g. Waigani, Basel and Stockholm conventions) may apply depending on the type of waste that is to be transported across country boundaries.

7.10 Marine and Coastal Specific Mitigation Measures

The airport is not located near the coast however Ahononou Quarry (the preferred quarry source) is located approximately 30 m inland from the coast. Quarry activities generally can have a negative impact on the environment in which they operate. However many of these impacts can be managed effectively through good site planning and implementation of mitigation measures. The Ahononou Quarry should clearly mark the boundary of the site with fencing to prevent creep into the coastal environment. Currently the old quarry face separates the main quarry area and the coast. Extraction and process activities must not extend beyond this toward the water (see Figure 14) and should be located as far inland as property boundaries allow.

![Ahononou Quarry showing quarry face and ocean in the background (looking west up the coast)](image)

When planning the site layout, process activities, settlement ponds, and stockpile areas should be located outside the coastal margin. Site runoff should be intercepted and not permitted to discharge directly to the coast. Machinery and vehicles must not use the beach.
8.0 Roles and Responsibilities

The TAL is responsible for delivery of the TAIP TBU project (including all components), funding received and contracts awarded under the TAIP. TAL is the Implementing Agency in regards to funding received from donors including the WB. A Project Management Unit (PMU) within TAL has been established to undertake the day to day management of the project. Aspects of the monitoring required by the ESMP will be undertaken by TAL. The implementation of this ESMP is the responsibility of the contractors awarded contracts under the TAIP. The diagram below shows the reporting and responsibilities for this ESMP. The MECC has a statutory responsibility to respond to pollution complaints, and ensuring impacts are managed as per the ESMP. There will also be ongoing airport operational monitoring requirements of the MECC.

8.1 Institutional Capacity

TAL will require environmental awareness training for monitoring the Contractors’ implementation of the ESMP. Personnel from the MOI will work alongside the Contractor and Resident Engineer to capacity build and gain a better understanding of the type of runway surface seal being used and ongoing maintenance requirements. A training budget must be put aside to enable this capacity building with the Government departments. There may also be an opportunity for an Officer from the MECC to work with the Contractor’s environmental officer. TBU has x-ray equipment for security screening however equipment for monitoring of the x-ray machines is not available. Costs for ongoing monitoring of x-ray equipment have been included below but are provisional based on whether x-ray equipment is actually installed. It is understood that noise meters will not be required as these have already been allowed for in the TSCP.

An indicative training budget is as follows:

- Training for Contractors and TAL/ MECC personnel (onsite training in Tonga) US$ 15,000
- Operational monitoring of x-ray equipment (annual cost) US$ 1,000
- Miscellaneous (e.g. MECC participation) US$ 2,000

TOTAL Budget US$ 18,000

8.2 Complaints and Incident Reporting

All complaints and incidents should be referred to the TAL’s Project Officer (or designated staff) for undertaking complaint/incident investigation procedures. All complaints must be acknowledged with the complainant within 24 hours. In general the following procedure should be followed:

- Log complaint/incident, date of receipt and acknowledge complaint receipt
- Investigate the complaint/incident to determine its validity and to assess the source of the problem
- Identify and undertake any action required, communicate response action to complainant (if requested by complainant)
- Log the date of resolution
- Report the complaint in monthly monitoring report including actions, resolution status and any outstanding actions required.

Signage at site and public advertisements (print media and online) will be displayed by the contractor outlining the complaints procedure and contact details for making complaints.
9.0 Compliance and Monitoring Plan

9.1 Monitoring Plan

The Environmental Monitoring Plan identifies the environmental monitoring requirements to ensure that all the mitigation measures identified in this ESMP are implemented effectively. The environmental monitoring methodology (refer Appendix D for details) for this project includes:

- Audit of detailed designs.
- Audit and approval of site environmental planning documents.
- Consultations with communities and other stakeholders as required.
- Routine site inspection of construction works to confirm or otherwise the implementation and effectiveness of required environmental mitigation measures.

Non-compliance to environmental mitigation measures identified in the ESMP will be advised to the Contractor(s) in writing by TAL’s nominated Environmental Officer as required. The non-compliance notification will identify the problem, including the actions the Contractor needs to take, a time frame for implementing the corrective action and any further preventative actions.

9.2 Monitoring Plan Reporting

Throughout the construction period, the Contractor(s) will include results of the ESMP monitoring in a monthly report for submission to the TAL who is responsible for submitting these monthly progress reports to the PAIP TFSU. The format of the monthly report shall be agreed with all agencies but is recommended to include the following aspects:

- Description and results of environmental monitoring activities undertaken during the month, including record of all consultation (formal and informal).
- Status of implementation of relevant environmental mitigation measures pertaining to the works.
- Key environmental problems encountered and actions taken to rectify problems.
- Summary of non-compliance notifications issued to the Contractor during the month.
- Summary of environmental complaints received and actions taken.
- Key environmental issues to be addressed in the coming month.

A day to day contract diary is to be maintained pertaining to administration of the contract, request forms and orders given to the Contractors, and any other information which may at a later date be of assistance in resolving queries which may arise concerning execution of works. This day to day contract diary is to include any environmental events that may arise in the course of the day, including incidents and response, complaints and inspections completed. Discussions with the local community both informal and formal should be noted in the day to day contract diary and include names and contact details of individuals and the outcome of any agreements or resolutions. If agreements regarding use of land and or removal of vegetation are made the owner must sign the meeting minutes to document agreement.

During airport operations the TBU Managers will include an environmental management section as part of their normal reporting to TAL. The environmental management section shall include an analysis of the operation monitoring programme, any environmental issues arising and recommendations (including cost estimates as required) for further action.

TAL is also responsible for quarterly progress reports to the WB. This quarterly progress report will include a section on environmental and social compliance and issues. This section will cover (as a minimum) the overall compliance with implementation of the ESMP, any environmental or social issues arising as a result of project works and how these issues will be remedied or mitigated, and the schedule for completion of project works.
10.0 Contingency Plan

It is recommended that the Contractors prepare a Contingency Plan encompassing cyclone and storm events. The purpose of the Plan is to ensure all staff are fully aware of their responsibilities in respect to human safety and environmental risk reduction. Procedures should clearly delineate the roles and responsibilities of staff, define the functions to be performed by them, the process to be followed in the performance of these functions including tools and equipment to be kept in readiness, and an emergency medical plan. All of the Contractor’s staff should undergo training/induction to the Plan.

The wet season on Tongatapu is November to April which coincides with the cyclone season. Construction activities should be limited to the dry season (May to October) however storm and rain events can still occur during this period causing flooding and bringing high winds.

The Contractors are responsible for monitoring weather forecasts, inspecting all erosion and sediment control measures and undertaking any remedial works required prior to the forecast rain or storm event.

In general the Contractors will:

- Inspect daily weather patterns to anticipate periods of risk and be prepared to undertake remedial works on erosion and sediment control measures to suit the climatic conditions;
- Monitor the effectiveness of such measures after storms and incorporate improvements where possible in accordance with best management practice;
- Ensure appropriate resources are available to deal with the installation of additional controls as and when needed; and
- Inform TAL if there are any concerns associated with the measures in place.
Appendix A

Plans and Detailed Designs
TYPICAL RUNWAY TURNING BAY CONSTRUCTION

Pavement construction to be stepped in to existing runway pavement

100mm New structural AC layer to be placed over primed basecourse surface

300mm New Course Basecourse constructed in two 150mm deep layers

50-100mm Structural AC overlay (depths vary). Minimum overlay depth 75mm in the center varying to 50mm on the outer edges

Runway edges to have rolled profile as per FAA specification requirements

Topsoil and grass seed to be planted in to pavement edges

Transition from 65mm depth existing pavement to 100mm suracing of new pavement

1.5-1.5S Variants

Task cost quotation between 0.15-0.3 $/sqm between AC layers

Finished Surface Level

Compaction Surface Level

Runway G/C

100mm New structural AC layer to be placed over primed basecourse surface

300mm New Course Basecourse constructed in two 150mm deep layers

NOT FOR CONSTRUCTION
NOT FOR CONSTRUCTION

1. Transition Length. Temporary during construction
   - Overcut Thickness 50 mm = 5000 mm long
   - Overcut Thickness 35 mm = 7500 mm long

2. All seawalls need to be minimum 150 mm from rolled edges or transitions.

3. All seawalls inclined 1:4 to full depth of AC layer.

4. No vertical seawalls - No exceptions.

TYPICAL TEMPORARY TRANSITION RAMP

1:10 @ A1

INDICATED SAWCUT DETAIL

1:10

Note:
All Sawcarts - longitudinal and transverse to have 1:4 inclined face
1. **UNLESS OTHERWISE SPECIFIED, ALL NON-SYMBOLIC ALPHABETIC TEXT WILL BE IN BLACK, BOLD, UPPER CASE.**

2. **SYMBOLS FOR RUNWAY LIGHTING:**
   - **RUNWAY EDGE LIGHT:** ELEVATED OR INTEGRATED.
   - **RUNWAY THRESHOLD LIGHT:** ELEVATED OR INTEGRATED.
   - **RUNWAY LINEAR LIGHT:** ELEVATED OR INTEGRATED.

3. **SYMBOLS FOR Runway Lighting Configuration:**
   - **MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT:** ELEVATED INTEGRATED, WHITE.
   - **MEDIUM INTENSITY UPLIGHT:** ELEVATED INTEGRATED, WHITE.
   - **MEDIUM INTENSITY DOWNLIGHT:** ELEVATED INTEGRATED, WHITE.

4. **SYMBOLS FOR Runway Lighting Fixtures:**
   - **MEP-7:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
   - **MEP-8:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
   - **MEP-9:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.

5. **SYMBOLS FOR Runway Lighting Designation:**
   - **MEP-10:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
   - **MEP-11:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.

6. **SYMBOLS FOR Runway Lighting Orientation:**
   - **MEP-12:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
   - **MEP-13:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.

7. **SYMBOLS FOR Runway Lighting Installation:**
   - **MEP-14:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
   - **MEP-15:** MEDIUM INTENSITY ELEVATED TURNING NOSE AND TAILWAY SIDE LIGHT, INTEGRATED, WHITE.
#50 DRAIN STUB

SET MOUNTING TRAY 150mm WIDE GALVANISED CABLE TRAY SUPPORTED BY GALVANISED UNISTRUT BRACKETS FIXED TO PIT WALL USING STAINLESS STEEL FASTENERS (BOTH SIDES TYPICAL)

CONDUITS (TYPICAL)

110+75mm RECESS IN CONCRETE PIT FOR 100mm IDENTIFICATION PLATE

ENGRAVED 3mm THICK BRASS PLATE IDENTIFYING PRIMARY CIRCUITS WITHIN PIT, RECESS PLATE IN CONCRETE COLLAR, FIX PLATE WITH 24MM COUNTERSUNK 5/8 THREADED FASTENERS

CLASS D ELECTRICAL PIT

GENERAL ARRANGEMENT

SCALE 1:10

SETOUT POINT

STEEL FRAME (TO MANUFACTURER'S DETAILS)

HEAVY DUTY COVER CLASS G

ADDITIONAL NSW TRIMMERS ABOVE AND BELOW DUCT PENETRATIONS

ALL CONDUITS MUST BE INSTALLED WITH METAL MOUNTS (TYPICAL)

400 + 500 LONG SLEEVE DRAINAGE STUB SURROUNDED WITH 500mm OF NOW 20mm COARSE FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC (SBC NRM 840.100)

W15-200 C/W (TBU)

W15-200 C/W (TBU)

500 + 500 LONG SLEEVE DRAINAGE STUB SURROUNDED WITH 500mm OF NOW 20mm COARSE FILTER MATERIAL WRAPPED IN GEOTEXTILE FILTER FABRIC (SBC NRM 840.100)

TYPICAL SECTION OF CLASS D PIT

REINFORCEMENT

W15-200 C/W, LF UNM,F TUBING, DISPLAY REINFORCEMENT AT DUCTS WHERE REQUIRED DO NOT CUT

1 NSW TRIMMER E.F. ABOVE, BELOW & EACH SIDE OF ALL DUCT PENETRATIONS WHERE APPLICABLE REFER NTS 1

#100 BELLMOUTH CONDUIT STUB CAST INTO PIT WALL (AUSTRALIAN PLASTICS PRODUCTS PTY LTD WINDSOR OR SIMILAR)

NOMINAL #100 PLUS ALLOWED W14 BELLMOUTH CONDUIT STUB TO FACILITATE INSTALLATION OF A FUTURE CONDUIT REMOVE PLUS AFTER CURING OF CONCRETE

EXTERNAL PIT WALL

NOT FOR CONSTRUCTION

PACIFIC AVIATION INVESTMENT PROGRAM (PAIP)

FUA'AMOTU INTERNATIONAL AIRPORT (TBU)

CLASS 'D' AND 'G' HEAVY DUTY PIT DETAILS

AECOM New Zealand Limited

NOTES

A1

FOR TENDER 60277004-AV-34711 1
PRELIMINARY CONCEPTUAL DESIGN FOR THE NEW TONGA AIRPORT LIMITED CONTROL TOWER,
FUA’AMOTU INTERNATIONAL AIRPORT COMPOUND, TONGATAPU

DRAWING INDEX

DATED: OCTOBER, 2014
PRELIMINARY WORKS SERIES

PR.00  COVER SHEET
PR.01  PRELIMINARY MASTER SITE PLAN
PR.01a  PRELIMINARY ENLARGED SITE PLAN
PR.02  PRELIMINARY LEVEL 1 PLAN
PR.03  PRELIMINARY LEVEL 2 PLAN
PR.04  PRELIMINARY LEVEL 3 PLAN
PR.05  PRELIMINARY LEVEL 4 PLAN
PR.06  PRELIMINARY LEVEL 5 PLAN
PR.07  PRELIMINARY LEVEL 5a PLAN
PR.08  PRELIMINARY SECTION

ATTACHMENTS

PRELIMINARY COSTING REPORT
3D PERSPECTIVE VIEWS & ELEVATIONS

PRELIMINARY FOR APPROVAL ONLY
Descriptive Details:

- **200mm Pre-Cast concrete walls, render and paint finish**
- **150mm Pre-Cast concrete walls, render and paint finish**
- **Commercial grade Aluminium Proprietary partitions with glass panels**
- **RONDON GRID wall framings, lined with 6mm Villaboard internal linings, tape jointed and paint finish**
- **450 x 450mm selective Ceramic floor tiles**
- **R.C. Columns, to engineer design, columns are to render and paint finish**
- **Corner R.C. Columns to engineer design, however, columns are to render and paint finish**
- **Commercial grade aluminium frame ‘Awning’ type windows with ‘Stormshield’ specified glazing**
- **Corrugated Colorsteel Cladd Service Duct**
PRELIMINARY PLAN - LEVEL 2

Scale 1:100

Descriptions | Floor area (m²)
---|---
STAIR | 6.5
LIFT | 3.2
Access Way | 9.9
OFFICE 1 | 15.2
OFFICE 2 | 15.2
TEA | 3.9
SERVER/ARCHIVE | 2.9

LEGEND:

- 200mm Pre-Cast concrete walls, render and paint finish
- 150mm Pre-Cast concrete walls, render and paint finish
- Commercial grade Aluminium Proprietary partitions with glass panels
- RONDO GRIDs wall framings, lined with 6mm Villaboard internal linings, tape jointed and paint finish
- 450 x 450mm selective Ceramic floor tiles
- R.C. Columns, to engineer design, columns are to render and paint finish
- Corner R.C. Columns to engineer design, however, columns are to render and paint finish
- Commercial grade aluminium frame "Awning" type windows with "Stormshield" specified glazing
- Corrugated Colorsteel Cladding Service Duct

NOTE:

QUALITY DESIGN LTD
Architectural Services & Contract Supervision

Quality Design Ltd

NOTE:

LEVEL 2, Talofa
Ph: 21493 or 874-1011
Email: qualitydesign.tupou51@gmail.com

NEW TONGA AIRPORT LTD
CONTROL TOWER

PRELIMINARY LEVEL 2 PLAN

PR.03
PRELIMINARY PLAN - LEVEL 3

Scale 1:100

<table>
<thead>
<tr>
<th>Description</th>
<th>Floor area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stair</td>
<td>6.5</td>
</tr>
<tr>
<td>Lift</td>
<td>3.2</td>
</tr>
<tr>
<td>Access Way</td>
<td>9.4</td>
</tr>
<tr>
<td>Unisex</td>
<td>4.6</td>
</tr>
<tr>
<td>Bedroom</td>
<td>7.4</td>
</tr>
<tr>
<td>Training/Meeting</td>
<td>24.9</td>
</tr>
</tbody>
</table>

**Legend:**

- 200mm Pre-Cast concrete walls, render and paint finish
- 150mm Pre-Cast concrete walls, render and paint finish
- Commercial grade Aluminium Proprietary partitions with glass panels
- RONDÒ GRID wall framings, lined with 6mm Villaboard internal linings, tape jointed and paint finish
- 450 x 450mm selective Ceramic floor tiles
- R.C. Columns, to engineer design, columns are to render and paint finish
- Corner R.C. Columns to engineer design, however, columns are to render and paint finish
- Commercial grade aluminium frame 'Awning' type windows with 'Stormshield' specified glazing
- Corrugated Colorsteel Cladding Service Duct
PRELIMINARY PLAN - LEVEL 4

Scale 1:100

Descriptions | Floor area (m²)
---|---
STAIR | 5.5
LIFT | 3.2
ACCESS WAY | 10.9
SERVICES AREA | 2.9
EQUIPMENT ROOM | 33.8

LEGEND: DESCRIPTIONS

- 200mm Pre-Cast concrete walls, render and paint finish
- 150mm Pre-Cast concrete walls, render and paint finish
- Commercial grade Aluminium Proprietary partitions with glass panels
- RONDO GRIDs wall framings, lined with 6mm Villaboard internal linings, tape jointed and paint finish
- 450 x 450mm selective Ceramic floor tiles
- R.C. Columns, to engineer design, columns are to render and paint finish
- Corner R.C. Columns to engineer design, however, columns are to render and paint finish
- Commercial grade aluminium frame 'Awning' type windows with 'Stormshield' specified glazing
- Corrugated Colorsteel Cladd Service Duct
PRELIMINARY PLAN - LEVEL 5a

Scale 1:100

Descriptions | Floor area (m²)
--- | ---
VOID | 16.8
CONTROLLER LEVEL | 35.0
STAIR | 1.3

LEGEND:

- **VOID** from controller floor level to Floor Level 5a (Lift & Stair access level)
- Commercial Carpet floor finish, fixed ontop of structural steel framed controller floor
- RONDO grid wall system, with 6mm Villaboard linings
- Corrugated Colorsteel Cladding Service Duct

**Descriptions**

- Commercial Carpet floor finish, fixed ontop of structural steel framed controller floor
- RONDO grid wall system, with 6mm Villaboard linings
- Void from controller floor level to Floor Level 5a (Lift & Stair access level)
- 17.5mm Grey Lined Laminated Hush Glass, 25° Inclined. Mullions of specialized commercial heavy duty aluminium frames, to very high wind speed resistance grade. Window are to set upon 200mm Precast concrete walls to engineer design
- Corrugated Colorsteel Cladding Service Duct
Appendix B

MECC Draft EMP Approval Letter
FROM: Director for Environment & Climate Change

TO: Secretary for Transport

CC: Lasale Cocker

DATE: 17 September 2010

SUBJECT: Submission of Draft Final Environmental Management Plan as part of the Transport Sector consolidation project

With reference to the Draft Final Environment Management Plan (EMP), we would like to inform you that after reviewing the plan, together with the ongoing consultations with our Ministry, we would like to inform you that approval for the EMP is granted.

We sincerely apologise for the delay with the approval process and hope that we will continue working collaboratively with your organisation.

For your further action.

Yours sincerely

[Signature]

'Asipeli Palaki
Appendix C

Mitigation Measures
Appendix C  Mitigation Measures

<table>
<thead>
<tr>
<th>POTENTIAL NEGATIVE IMPACT</th>
<th>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</th>
<th>IMPLEMENTING LOCATION</th>
<th>ESTIMATED MITIGATION COSTS¹</th>
<th>EXECUTING AGENCY</th>
<th>SUPERVISING AGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road traffic safety</td>
<td>Provide for Traffic Management Plan (TMP) to be developed by Contractor, to include signage, flag operators, personnel protective equipment (e.g. high visibility vest), and specific actions to be implemented around sensitive receptors (e.g. residential dwellings, schools, hospital). TMP to include vehicle and pedestrian traffic. Include transport of materials and equipment from the Port and quarry to construction lay down area (located at the airport) in the TMP e.g. covering of loads, maximum speed, designated travel times and notification of police and other required departments (e.g. hospital and schools). Any road upgrades required to enable safe transport of materials and equipment must be assessed for environmental and social impacts and mitigation measures devised to reduce the impacts. This ESMP and the PAIP ESMF should be used to guide the assessment. Details are to be included in the Contractor’s ESMP. Additional approval by MECC may be required.</td>
<td>From port to airport (delivery of equipment) To and from the construction lay down area and the quarry</td>
<td>Minimal (requirement of bidding documents)</td>
<td>Contractors</td>
<td>TAL</td>
</tr>
</tbody>
</table>

¹ Costs are estimates only and will be calculated during the detailed engineering design.
<table>
<thead>
<tr>
<th>POTENTIAL NEGATIVE IMPACT</th>
<th>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</th>
<th>IMPLEMENTING LOCATION</th>
<th>ESTIMATED MITIGATION COSTS</th>
<th>EXECUTING AGENCY</th>
<th>SUPERVISING AGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation traffic safety</td>
<td>Each investment within an operational airport is to have a Methods of Works Plan (MOWP) which is to be included in all bid and contract documents. The Contractor is to develop a Safety Management Plan as an addendum to the MOWP. The MOWP will include details of site works scheduling around known flight timetables and procedures for emergency response for all workers. Restricted areas are to be clearly defined which include a clearance area around the DVOR where access is limited.</td>
<td>Operational airports</td>
<td>Minimal (requirement of bidding documents and standard construction practices)</td>
<td>Design Consultant and Contractors</td>
<td>TAL</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Minimize erosion and design erosion protection measures according to international good practice standards, including incorporation of effective drainage systems (soakage pits) and consideration of surface flow paths. Schedule earthworks and construction activities during dry season (May to October).</td>
<td>All locations</td>
<td>Minimal (part of standard design practices)</td>
<td>Contractors</td>
<td>TAL</td>
</tr>
<tr>
<td>Dust/Air Pollution</td>
<td>Identify and locate waste disposal sites, stockpile sites and equipment (e.g. bitumen plant) to minimize impacts on the environment and nearby population. Ensure all equipment is serviced and issued with warrant of fitness (as required). Any machinery deemed to be polluting the air must be replaced (or fixed) on instruction by the TAL.</td>
<td>Construction camp</td>
<td>Minimal (part of standard design practices)</td>
<td>Contractors</td>
<td>TAL</td>
</tr>
<tr>
<td>POTENTIAL NEGATIVE IMPACT</td>
<td>ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES</td>
<td>IMPLEMENTING LOCATION</td>
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<tr>
<td>Water and soil pollution</td>
<td>Minimise risk to groundwater and surrounding soil by developing a spill response plan and provide training to all contract workers on how to implement the spill response plan.</td>
<td>All components</td>
<td>Minimal (part of standard design and construction practices).</td>
<td>Contractors</td>
<td>TAL</td>
</tr>
<tr>
<td></td>
<td>Ensure bunded areas and hard stands are allocated at construction lay down area for the storage of fuel, lubricants and other potential substances required for the project. Water tight bunds to be able to contain 110% of volumes being stored or 25% if total volume greater than 1,000 L.</td>
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<td></td>
<td>Ensure wash down areas with respective collection and treatment systems are designated within the construction camp (e.g. settling pond or tank and concrete slurry treatment) prior to works commencing.</td>
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<td></td>
<td>Sanitation treatment system (e.g. compost or proprietary treatment system) is to be approved by the TAL, MOI and MOH prior to implementation.</td>
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<td></td>
<td>Septic tanks for the new ATCT are to be located more than 5m from the rain water harvesting tanks.</td>
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<tr>
<td>Water supply</td>
<td>Include maximum rainwater reclamation and water conservation/efficiency in design of terminal and new ATCT. The Contractors will also need to ensure adequate supply of water for construction and personnel which does not adversely affect the community’s water supply (e.g. mobile desalination plant or organise a reservoir supply specifically for construction). Prior to any site establishment or construction activities the Contractor shall sample groundwater at specified bores (e.g. Terminal, ARFF) adjacent to work areas (to be coordinated with TAL and MECC) to determine base line conditions. Measure depth to groundwater and analyse samples for concentrations of pH, electrical conductivity, total petroleum hydrocarbons (for potential petroleum contamination), and total nitrogen (for potential sewage contamination), or as agreed with TAL and MECC.</td>
<td>Airport terminals</td>
<td>Minimal (part of standard design practices)</td>
<td>Design Consultant and Contractors</td>
<td>TAL</td>
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<tr>
<td>Sourcing aggregate material</td>
<td>Ensure aggregate is sourced from an approved/ permitted quarry and are operating in accordance with the Tongan law. If the quarry is to be operated by the TAIP contractor they are responsible for seeking operating and environmental permits as required. As a minimum the IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction should be adopted. Materials extraction is likely to begin prior to construction on site to ensure enough material is available for the works. If Ahononou Quarry is to be mined, ensure fencing is installed to define the boundary, protect the coastal margin and prevent creep toward the ocean by quarry activities. Site runoff and wastewater is prohibited from being discharged directly to the coast. Site processing and stockpiles should be located inland.</td>
<td>All components</td>
<td>Minimal (part of standard design and construction practices)</td>
<td>Contractor</td>
<td>TAL</td>
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<tr>
<td>Solid waste generation</td>
<td>Allow for re-use of as much material as possible either within the TAIP, other projects, or for community use. The Waste Authority Limited should be consulted for approval to receive material that cannot be recycled or reused at the Tapuhia Landfill. When planning the construction lay down area ensure temporary waste dump areas are allowed for and approved waste disposal sites / methodologies identified for removal of all solid waste.</td>
<td>All locations</td>
<td>Minimal (part of standard design and construction practices).</td>
<td>Design Consultant and Contractors</td>
<td>TAL</td>
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<tr>
<td>Hazardous substances</td>
<td>Where possible fuel shall be obtained from local commercially available sources. Prior arrangement regarding quantity and type will need to be organised (TAL to provide details of providers). Confirm the presence of asbestos containing material on any buildings to be demolished and develop an asbestos management plan addressing the necessary EHS and disposal arrangements (Tapuhia Landfill) to deal with demolition and transport.</td>
<td>All locations</td>
<td>Minimal (part of mobilisation and construction planning).</td>
<td>Contractors</td>
<td>TAL</td>
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<tr>
<td>Importation of equipment and materials</td>
<td>Obtain import permits and quarantine certification prior to export from country of origin. Certificate of fumigation required.</td>
<td>All components</td>
<td>Minimal (part of mobilisation and construction planning)</td>
<td>Contractors</td>
<td>TAL</td>
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</table>

**CONSTRUCTION STAGE**

<p>| Traffic (vehicle and pedestrian) and construction safety | Implement the TMP to ensure smooth traffic flow and safety for workers, passing vehicles and pedestrian traffic. Where appropriate, employ flag operators on the road to prevent traffic accidents. The workers shall have relevant safety equipment. | Route from quarry and port to airport | Safety equipment included in construction cost. | Construction Contractors | TAL                |</p>
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<tr>
<td>Soil erosion</td>
<td>Minimise time and size of ground disturbing activities to workable size at any one time. Vegetation to be removed manually, strictly no use of herbicides/pesticides. Stockpiles are to be positioned on impermeable surfaces (e.g. geotextile or concrete hard stand). Keep construction vehicles on defined tracks. Revegetate disturbed areas that are not being paved as soon as practicable (loosen ground; apply topsoil; seed or plant as necessary).</td>
<td>All locations</td>
<td>Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
<td>TAL</td>
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<tr>
<td>Waste disposal</td>
<td>Ensure all construction waste material is reused, recycled or packed up for transport to Tapuhia Landfill. Ensure areas for waste collection, recycling and off-site disposal are clearly marked/sign posted. Segregate waste to avoid cross contamination, such as with contaminated material (hazardous substance). Install waste collection facilities at construction lay down area to allow for collection and packing of waste. Strictly no dumping of rubbish. Include awareness training in general environmental training. Workers must be provided with a sanitary system to prevent fouling of surrounding soils.</td>
<td>All locations</td>
<td>Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
<td>TAL</td>
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<tr>
<td>Water and soil pollution</td>
<td>Lubricants shall be collected and recycled, or disposed of according to Tongan regulations. Spill response plan training completed for all construction workers. Zones for preliminary accumulation of wastes are designated in areas that will cause no damage to the vegetation cover or leach into groundwater (e.g. within construction lay down area on hard surface).</td>
<td>All locations</td>
<td>Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
<td>TAL and MECC</td>
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<td>Excavations are bunded to prevent ingress of water runoff and clean water diversion (e.g. sand bags, clay bund, or shallow trenches) are used to direct overland flow away from active work and storage areas.</td>
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<td>Sediment laden runoff from excavations or stockpiles must be directed to a settling area (e.g. pond or decant pond to be sized for area covered) or collected for dust suppression provided the runoff is not contaminated with any chemicals (e.g. fuel).</td>
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<td>The area around the fuel hydrant pipes on the apron has potential to be contaminated with hydrocarbons. While excavation of the apron in the vicinity of the fuel hydrant system is not required any material encountered which has a PID reading of 10 ppm shall be treated as contaminated fill and must be disposed of at an approved facility able to deal with contaminated fill (e.g. Tapuhia Landfill with approval from WAL).</td>
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<td>During construction activities, including establishing the construction laydown area and at completion of all physical works, sample groundwater at specified bores (e.g. Terminal, ARFF) adjacent to work areas (to be coordinated with TAL and MECC) to indicate whether construction activities have adversely affected groundwater quality. Measure depth to groundwater and analyse samples for concentrations of pH, electrical conductivity, total petroleum hydrocarbons (for potential petroleum contamination), and total nitrogen (for potential sewage contamination), or as agreed with TAL and MECC.</td>
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<td>Generation of dust</td>
<td>Use closed/covered trucks for transportation of construction materials. Any vehicle which is overloaded (exceed designed load limit) or is not covered properly shall be refused entry to the construction lay down area or material shall be refused delivery (if not to the construction lay down area). Cover stockpiles containing fine material (e.g. sand and topsoil) when not actively being used. Keep work areas clean with regular sweeping. Due to freshwater supply constraints large scale water sprinkling should be kept to a minimum and only as required. Only small areas should be cleared of vegetation at any one time and revegetation should occur as soon as practicable. Dust masks and personnel protective equipment must be available for workers during dust generating activities (e.g. pavement milling). Asphalt mix plant to be fitted with a dust scrubber.</td>
<td>All locations</td>
<td>Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
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<td>Noise and vibration disturbances</td>
<td>Minimise nuisance from noise, especially closer to residential areas, through establishment and communication to affected parties of standard working hours (07:00 to 18:00, Monday to Friday) and avoid increase of noise and number of work equipment at peak hours.</td>
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<td>Any work outside prescribed hours of operation requires approval by the TAL and notice to affected peoples provided at least one week prior to out of schedule works starting. Work on Sunday is restricted and is likely to only be approved in emergency situations.</td>
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<td>Regularly check and maintain machinery, equipment and vehicle conditions to ensure appropriate use of mufflers, etc.</td>
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<td>Workers in the vicinity of sources of high noise shall wear necessary protection gear rated for the situation they are being used.</td>
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<td>Signage to outline complaints procedure and contact details of recipient of complaints (e.g. phone number, physical address and email).</td>
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<td>The WB/IFC EHS Guidelines(^5) section 1.7 Noise Management shall be applied (if no local limits are prescribed). Noise impacts should not exceed the levels for industrial commercial activities for one hour L(A_{eq}) of 70 dB at any point of the day or night within the airport boundaries. At residential or school receptors the limit shall not exceed 55 dB during daytime hours (07:00 – 22:00) and 45 dB during night time hours (22:00 – 07:00). Alternatively noise impacts should not result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site (e.g. residential house).</td>
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<tr>
<td>Accident risks/Impacts on traffic safety</td>
<td>Arrange necessary measures for pedestrian and passer-by safety and all means of transportation safety (e.g. establish protection zones, bypass these areas during transportation of materials, etc.) Relevant safety elements such as guardrails, road signs and delineators, pavement markings, barricades and beams, warning lights shall be installed. In some cases a flag operator or traffic control supervisor could be engaged around the specific work site.</td>
<td>All locations</td>
<td>Safety equipment included in construction cost. Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
<td>TAL</td>
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<tr>
<td>Loss of archaeological artefacts or sites</td>
<td>Work to stop in specific location of unearthed artefacts or site. Fence the area to limit access and notify TAL and Ministry of Education, Women’s Affairs and Culture (MEWAC) immediately for instruction to proceed.</td>
<td>All locations</td>
<td>No marginal cost</td>
<td>Construction Contractors</td>
<td>TAL and MEWAC</td>
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<tr>
<td>Landscape degradation</td>
<td>Restoration of landscape after completion of rehabilitation works; restore the vegetation cover in accordance with the surrounding landscape and any required design (e.g. grass land or shrubs). Use plant species characteristic for the landscape in the course of restoration of the vegetation cover.</td>
<td>All locations</td>
<td>Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
<td>TAL</td>
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<tr>
<td>Hazardous substances and safety and pollution</td>
<td>Store and handle hazardous substances in bunded, hard stand or designated areas only. Bunded areas to drain to an oil water separator which will need to be constructed or a mobile proprietary unit imported specifically for use on the TAIP. Bunds to contain 110% of total volume required to be stored or, 25% of total volume if total volume is over 1,000 L. Provide hazard specific personnel protective equipment to workers directly involved in handling hazardous substances (e.g. chemical or heat resistant clothing, gloves). Complete list, including MSDS for each chemical stored or used shall be accessible at all times. Signage to be posted in storage areas identifying all chemicals present. Spill kits and training of use to be provided to all workers during toolbox meetings. Spill kits to contain PPE gear for the spill clean-up (e.g. gloves and overalls), material to contain the spill and absorbent pads, and a heavy duty rubbish bag to collect absorbent pads or material. Used oil to be collected and taken to an approved facility (for disposal or cleaning) at completion of works if no on island disposal or recycling facility available material is to be taken off island and disposed of at an approved facility. Asbestos containing material (ACM) to be removed from buildings by trained workers wearing full asbestos suitable PPE gear (overalls, respirators, booties, etc.) in accordance with the Contractor’s approved asbestos management plan (refer IFC EHS Guidelines). Asbestos to be disposed of at the Tapuhia Landfill (minimum 24 hours notice required to be given to Waste Authority Limited (landfill operators)).</td>
<td>All locations</td>
<td>Safety equipment included in construction cost. Minimal (part of standard construction practice).</td>
<td>Construction Contractors</td>
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<td>Loss of biodiversity</td>
<td>If during course of construction work, particularly vegetation clearance and excavations any bird, reptile or mammal species is identified as being potentially impacted (e.g. nesting bird in area of proposed vegetation clearance) work is to stop in the specific location of the find and the MECC and TAL notified immediately for instruction to proceed.</td>
<td>All locations</td>
<td>No marginal cost</td>
<td>Contractors</td>
<td>TAL and MECC</td>
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<tr>
<td>Health and safety</td>
<td>Construction lay down area to be fenced to prevent access by unauthorised personnel. First aid training to be provided as required to site workers with basic first aid services to be provided by Contractor e.g. stretcher, vehicle transport to hospital. Only personnel trained in asbestos handling may be involved in any demolition works involving ACM. Full PPE to be used when handling the material ready for transport. While constructing the new ATCT worker safety is essential as the tower height increases. Training and use of temporary fall prevention and arrest devices (e.g. rails, full body harness) to be used when working at heights greater than 2 m (reference WB/IFC EHS Guidelines section 4.2 Occupational Health and Safety). Falling objects and debris can pose a significant hazard and mitigation measures such as exclusion zones should be implemented.</td>
<td>All locations</td>
<td>Security included in construction cost. Included in construction costs</td>
<td>Contractor</td>
<td>TAL</td>
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<tr>
<td>Damage to assets and infrastructure</td>
<td>As a result of TAIP construction activities any damage to assets or infrastructure must be reported to the TAL and rectified at the expense of the Contractors.</td>
<td>All locations</td>
<td>Dependent on asset/ infrastructure and level of damage</td>
<td>Contractors</td>
<td>TAL</td>
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<td>Operation Stage</td>
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<td>Hazardous substance</td>
<td>Strictly apply and enforce manufacturer’s</td>
<td>All airport compounds</td>
<td>No marginal cost</td>
<td>TBU Management</td>
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<td>management</td>
<td>recommendations for handling and storage.</td>
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<td>These measures include sealing of drums,</td>
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<td>and avoiding extreme heat.</td>
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<td>Compliance with international good practice.</td>
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<td>Security of storage areas to facilitate</td>
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<td>transport, handling and placement to be</td>
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<td>maintained (e.g. fences and locks fixed</td>
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<td>immediately if broken or vandalised).</td>
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<td>Complete list, including MSDS for each</td>
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<td>chemical stored or used shall be accessible</td>
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<td>at all times. Signage to be posted in</td>
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<td>storage areas identifying all chemicals</td>
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<td>Staff to wear manufacturers recommended</td>
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<td>personnel protective equipment (e.g. gloves</td>
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<td>and overalls) when handling or mixing</td>
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<td>hazardous substances.</td>
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<td>Emergency vehicles are to be serviced and</td>
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<td>maintained at existing workshop areas.</td>
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<td>Water or soil pollution</td>
<td>Workshops or maintenance areas to be fitted</td>
<td>All locations</td>
<td>No marginal cost</td>
<td>TBU Management</td>
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<td>with bunded areas for storage of oil and</td>
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<td>fuel drums (and any other hazardous</td>
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<td>substances).</td>
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<td>Used oil drums should be returned to the</td>
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<td>suppliers or, after being cleaned, sold</td>
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<td>in secondary local market if there is</td>
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<td>demand for this.</td>
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<td>Used oils may be used for emergency drills/</td>
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<td>preparedness exercises as appropriate by</td>
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<td>Maintenance of drainage and soakage systems</td>
<td>Drainage systems shall be periodically cleared of sediment and organic matter build up to ensure appropriate flows and soakage. Material to be disposed at approved site (e.g. landfill or used as cleanfill) or composted if organic. Vegetation to be cleared from drainage channels and soakage pits and composted through the Tapuhia Landfill.</td>
<td>All locations</td>
<td>No marginal cost (standard operating procedure).</td>
<td>TBU Management</td>
<td>TAL</td>
</tr>
<tr>
<td>Wastewater management</td>
<td>Septic systems of the terminal to be cleaned regularly and sludge disposed or treated in accordance with requirements of WAL. Sludge can be disposed of at Tapuhia Landfill</td>
<td>Terminal</td>
<td>No marginal cost for current practice of disposal.</td>
<td>TBU Management</td>
<td>TAL</td>
</tr>
</tbody>
</table>

Note: “All locations” refers to all areas in Tongatapu which will be impacted by TAIP activities, namely the airport (runway, terminal, control tower), the road corridor (transport of materials), the port (for delivery of equipment and material), and the construction lay down area.
Appendix D

Monitoring Plan
## Appendix D  Monitoring Plan

<table>
<thead>
<tr>
<th>PARAMETER TO MONITOR</th>
<th>LOCATION</th>
<th>MONITORING</th>
<th>FREQUENCY</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DETAILED DESIGN/ PRE-CONSTRUCTION PHASE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic safety</td>
<td>Design documents</td>
<td>Ensure TMP drafted and approved.</td>
<td>Prior to sign off of final designs</td>
<td>Design Consultant</td>
</tr>
<tr>
<td>Aviation safety</td>
<td>Design documents</td>
<td>MOWP complete with details of flight schedules and emergency procedures.</td>
<td>Prior to sign off of final designs</td>
<td>Design Consultant</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Design documents</td>
<td>Construction scheduled for between May and December. Designs include erosion protection measures.</td>
<td>Prior to sign off of final designs</td>
<td>Design Consultant</td>
</tr>
<tr>
<td>Water supply</td>
<td>Design documents</td>
<td>Water reclamation systems included in designs (particularly terminal and new ATCT design).</td>
<td>Prior to sign off of final designs</td>
<td>Design Consultant</td>
</tr>
<tr>
<td>Quarry operations</td>
<td>Quarry</td>
<td>Upon confirmation of which quarry is to supply aggregate verify quarry operations to ensure any required permits or approvals are in place. Ensure TMP is included in procurement documentation for transport of materials from the quarry to the airport.</td>
<td>Prior to contract award</td>
<td>TAL</td>
</tr>
<tr>
<td>Importation of equipment and materials</td>
<td>Importation permits</td>
<td>Ensure inclusion in design and material specifications that material and equipment to be fumigated and free of contamination. Approval to import material and equipment is given prior to material and equipment leaving country of origin.</td>
<td>Contractor to organize prior to export from country of origin.</td>
<td>Contractors</td>
</tr>
<tr>
<td><strong>CONSTRUCTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreement for waste disposal</td>
<td>Construction Contractor’s records</td>
<td>Permits and/or agreements with local waste disposal providers (e.g. Tapuhia Landfill) and licensed recycling operators. Inspection of disposal sites.</td>
<td>Documentation viewed prior to construction works starting. Weekly as applicable to schedule of works.</td>
<td>TAL</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Areas of exposed soil and earth moving</td>
<td>Inspections at sites to ensure silt fences, diversion drains etc. are constructed as needed. Inspection to ensure replanting and restoration work completed.</td>
<td>Weekly inspection as applicable to schedule of works and after site restoration.</td>
<td>TAL</td>
</tr>
<tr>
<td>PARAMETER TO MONITOR</td>
<td>LOCATION</td>
<td>MONITORING</td>
<td>FREQUENCY</td>
<td>RESPONSIBILITY</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>Waste disposal</td>
<td>At construction sites</td>
<td>Inspection to ensure waste is not accumulating and evidence waste has been stockpiled for removal to licensed landfill. Inspection to ensure waste streams are sorted for re-use, recycling or waste to landfill.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Water and soil pollution</td>
<td>At construction sites including quarry</td>
<td>Inspection of sites to ensure waste collection in defined area; spill response plan in place and workers trained. Complete spill kits available where hazardous substances sorted and handled. Results from groundwater sampling are submitted to TAL and MECC with remedial action points if background/baseline conditions are exceeded. Inspection of Ahononou Quarry (if operational) to ensure site runoff and wastewater is not discharging to the beach.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints</td>
<td>TAL</td>
</tr>
<tr>
<td>Dust</td>
<td>At construction sites, quarry and adjacent sensitive areas.</td>
<td>Site inspections. Regular visual inspections to ensure stockpiles are covered when not in use and trucks transporting material are covered and not overloaded.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Noise</td>
<td>At work sites and sensitive locations</td>
<td>Site inspections to ensure workers wearing protective equipment when required. Measurement of noise level with hand-held noise meter not to exceed 70 dB within airport property. Public signage detailing complaints procedure and contact person/person on display. Noisy machinery is replaced or fixed as soon as problem arises or on instruction by TAL.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Air pollution</td>
<td>At work sites (including quarry)</td>
<td>Site inspections to ensure equipment and machinery operating without excessive emissions. If an issue is reported the contractor is responsible for replacing or fixing the equipment to the satisfaction of TAL.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>PARAMETER TO MONITOR</td>
<td>LOCATION</td>
<td>MONITORING</td>
<td>FREQUENCY</td>
<td>RESPONSIBILITY</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Storage of fuel, oil, bitumen, etc.</td>
<td>At work sites and construction camp. Contractors training log.</td>
<td>Regular site inspections to ensure material is stored within bunded area and spill response training for workers completed. Visual inspection of spill kit for completeness and accessibility.</td>
<td>Weekly as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Vehicle and pedestrian safety</td>
<td>At and near work sites</td>
<td>Regular inspections to check that TMP is implemented correctly (e.g. flags and diversions in place) and workers wearing appropriate personnel protective gear.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Construction workers and staff safety (personal protective equipment)</td>
<td>At work sites</td>
<td>Inspections to ensure workers have access to and are wearing (when required) appropriate personnel protective equipment (e.g. for handling hazardous materials and working at height). WB/IFC Guidelines have been implemented.</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Community safety</td>
<td>At work sites</td>
<td>Inspections to ensure signs and fences restricting access are in place and pedestrian diversion routes clearly marked (whether for access to a building or home or particular route).</td>
<td>Weekly inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
<tr>
<td>Materials supply</td>
<td>Quarry and work sites</td>
<td>Inspections to ensure permits in place for transporting loads over 3 tonnes (if applicable). Evidence that trucks are not overloaded and loads are covered e.g. complaints register, evidence of debris on the road. For Ahononou Quarry boundary fences are in place preventing creep into coastal environment.</td>
<td>Weekly visual inspection as applicable to schedule of works and on receipt of any complaints.</td>
<td>TAL</td>
</tr>
</tbody>
</table>

**OPERATION**

<table>
<thead>
<tr>
<th>Accident with hazardous materials or wastes</th>
<th>Airport sites</th>
<th>Accident report</th>
<th>Immediately after accident</th>
<th>TAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wastewater management</td>
<td>Terminal, control tower and ARFF</td>
<td>Proper maintenance of septic system, no reports of odour or seepage</td>
<td>Quarterly inspection (observation) at connection to septic system.</td>
<td>TAL</td>
</tr>
<tr>
<td>Solid waste collection and disposal (non-hazardous)</td>
<td>Terminal and control tower</td>
<td>Solid waste being collected and taken to approved disposal site (e.g. landfill)</td>
<td>To be arranged with Waste Authority Limited as required</td>
<td>TAL</td>
</tr>
</tbody>
</table>
Appendix E

Inspection Checklist
# Appendix E  Inspection Checklist

## ESMP Monitoring Plan Checklist

<table>
<thead>
<tr>
<th>Location:</th>
<th>Auditor:</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

<table>
<thead>
<tr>
<th>Audit Date/Time (Start):</th>
<th>Audit Date/Time (Finish):</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Issue:</th>
<th>Inspection areas:</th>
<th>Requirements met?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.0 Construction Phase</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1.1 Soil Erosion | - Silt fences and diversion drains in place  
- Replanting and restoration work completed | Yes ☐  No ☐  
If No, details: |
| 1.2 Waste accumulation and Disposal Agreements | - Good housekeeping around the work sites  
- Waste stockpiled in defined areas with signage ready for removal  
- Waste/recycling permits/agreements in place | Yes ☐  No ☐  
If No, details: |
| 1.3 Soil and Water Pollution | - Waste collected in defined area on impermeable ground  
- Appropriate spill response plan/kit in place for waste area  
- Groundwater quality results sighted, and any remedial actions implemented. | Yes ☐  No ☐  
If No, details: |
| 1.4 Dust | - Stockpiles covered or kept wet when not in use  
- Visual inspection of ambient dust conditions  
- Truck transports are covered | Yes ☐  No ☐  
If No, details: |
| 1.5 Noise | - Workers wearing ear protection as required  
- Noise level maximum of 70 dB within airport boundaries | Yes ☐  No ☐  
If No, details: |
<table>
<thead>
<tr>
<th>Environmental Issue:</th>
<th>Inspection areas:</th>
<th>Requirements met?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.0 Construction Phase</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1.6 Hazardous Substance Storage (fuel/oil/bitumen) | - Hazardous substances within bund on impermeable surface  
- Spill kit complete and accessible  
- Spill training completed | Yes ☐ No ☐  
If No, details: |
| 1.7 Traffic Management Plan Implementation | - Traffic Management Plan (TMP) implemented  
- PPE is being worn by workers | Yes ☐ No ☐  
If No, details: |
| 1.8 Personal Protective Equipment Use | - Workers have access to, and using appropriate, PPE for the task. | Yes ☐ No ☐  
If No, details: |
| 1.9 Community Safety | - Public signage of complaints procedure  
- Signs and fences restrict or direct pedestrians and public where appropriate | Yes ☐ No ☐  
If No, details: |
| **2.0 Operational Phase** | | |
| 2.1 Drainage Maintenance | - Inspect to check for blockages and debris, particularly after storm events | Yes ☐ No ☐  
If No, details: |
| 2.2 Septic System Maintenance and Upkeep at Terminal/Control tower | - Quarterly inspection of connections to system, for leaks | Yes ☐ No ☐  
If No, details: |
| 2.3 Solid Waste Collection/Disposal from Terminal/Control Tower | - Solid non-hazardous waste being removed to council approved disposal site (Tapuhia Landfill) | Yes ☐ No ☐  
If No, details: |
## Actions Required:

<table>
<thead>
<tr>
<th>Issue No.</th>
<th>Action Required? By Whom?</th>
<th>Date Action Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

## Signoff

Signature: ___________________________ Date: ___________________________
Appendix F

2015 Public Consultation Report
Tonga Aviation and Investment Project (TAIP)

Community Engagement and Consultation Program

26 November 2015
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Map of Tonga
Executive Summary

1. The WB Safeguards Policies requires consultation and disclosure of Category B projects must be undertaken with project effected groups (stakeholders) and non-government organisations (NGOs). The potential environmental and social impacts of the project require the opportunity for discussion and review during the environmental assessment/ environmental and social management plan process to inform the new Air Traffic Control Tower (ATCT) design and to suggest potential mitigation measures.

2. TAL/TAIP conducted consultations on 26 November 2015 on the updated ESMP submitted on the 18 November 2015 and published publicly for all stakeholders and project effected groups to be informed of new construction of an Air Traffic Control Tower at Fua’amotu International Airport.

3. Presentations were conducted by TAIP, AECOM, and Government to give stakeholders updated information on the TAL/TAIP upgrading activities and construction of the new ATCT. Participants were also informed of the potential environmental and social impacts and how the project would mitigate potential impacts to their communities.

Background

4. The Pacific Aviation Investment Program (PAIP) is funded by the World Bank (WB) and has the development objective to (i) improve the safety, security, efficiency, management and environmental sustainability of airports, and (ii) improve regional harmonization of aviation safety standards. Phase I of the Program, for which this Environmental and Social Management Plan (ESMP) is prepared, includes Kiribati, Tonga and Tuvalu.

5. Tonga has a large expatriate community and the aviation sector provides the link between friends and relatives at home in Tonga and those living elsewhere. Some 40% of passengers are visiting friends and relatives. Tonga also plays a key role in search and rescue (SAR) covering the Cook Islands, Fiji, and Samoa. Tonga’s geographical location within the region includes agreements with regional neighbours (e.g. Fiji, Niue, and New Zealand).

6. Under the Government of Tonga’s Transport Sector Consolidation Project (TSCP), aviation investments and high priority safety and security requirements for selected airports were identified. Funding was requested from the WB under the PAIP. The aviation components are implemented under the Tonga Aviation Investment Project (TAIP).

8. The planned investments include the construction of a new Air Traffic Control Tower for Fua’amotu International Airport (TBU). The works will be supplemented by engineering design and supervision consultancies, along with project implementation support activities. The construction of the new ATCT building will be positioned in a new location to provide improved sight and compliance under ICAO guidelines, which is the primary consideration for the new facility. The existing tower will remain for use by TAL as a standby and training facility.

9. Primary beneficiaries are air travellers throughout the Pacific Islands, as well as the national and regional administrative bodies and personnel involved in air transport management, freight and passenger air service providers. Other indirect beneficiaries are tourism-related services and seasonal labour markets. The project development objective is to improve operational safety and oversight of international air transport infrastructure.

10. Tonga Airports Limited (TAL) is responsible for all airport operations, compliance and infrastructure at TBU.

TAIP Objective

11. The TAIP project objective is to provide safe and secure air transport operations and environmentally sustainable and efficient airports which is aligned to the PAIP development objectives

Safeguards Context

12. An update to the existing Tonga Environmental and Social Management Plan (ESMP) is required to identify and assess environmental and social issues associated with the proposed activities, and develop mitigation and management measures consistent with World Bank requirements. The update to the ESMP is being undertaken by AECOM, the design and supervision consultant for TALs infrastructure investments.

13. The PAIP is also governed by an Environmental and Social Management Framework (ESMF) which provides the strategic direction for this ESMP.

Foreseen Environmental and Social Impacts

14. The current scope of the project is limited to the existing physical footprint of Fua’amotu International Airport, Tongatapu, together with the adjacent social and physical environments that could be potentially impacted by the activities. No new land or asset acquisition is envisaged.

15. Physical works will be undertaken on (i) new Air Traffic Control Tower Building; and, (ii) access roads and car parking areas.
16. Except for transport of materials and equipment, all impacts will occur within the airport precincts.

17. Excavated and spoil materials will need to be recycled or disposed of in an appropriate manner.

18. No land acquisition is required for the project as all activities are on the existing Fua’amotu precinct.

Community Engagement Program

19. The Project Information Bulletin (PIB) was updated by AECOM on the 18 November 2015 and published publicly on online and local newspapers on 19 November 2015. The public news entities included:

- Matangi Tonga Online
- Kele’a
- Talaki
- Tonga Chronicle

20. Due to the brief timeline of the consultations, hard copies of the Tongan version of the PIB were given to district officers and church leaders for their local meetings with their communities.

21. The consultation workshop was conducted on the 26 November 2015 at the Domestic Terminal Conference Room. A total of 37 participants were invited (Annex 1) to attend the consultations from the local villages, relevant Government Ministries and Departments, Non-Government Organisations, and Churches. A total of 12 participants attended the public consultation which included members of Government, town officer, church leaders, civil society, disabled persons organisations, and environment committee representative from parliament. There were no major issues reported regarding current construction activities by representatives from the local village of Fua’amotu.

22. Viliami Ma’ake, CEO of TAL, provided an overview of project activities and historical background on TAL/PAIP. Janek Czastka, AECOM Engineer, presented updates of the current construction activities. Sione Tukia, Department of Environment presented on Environmental Impact Assessments and its benefits and challenges. Malakai Kaufusi, Safeguards Specialist, presented the updated ESMP, general info on the ATCT, and environmental and social impacts, mitigation factors, and M&E (Annex 2).
23. Key messages from participants during the consultations included (Annex 3):

- Current resources utilized for the project and how will government keep up with the supply and demand of future developments at the airport in Fua’amotu and in Vava’u
- Ongoing consultations with locals and have them participate in the improved economics of the construction area and in new infrastructure projects such as the ATCT
- Broader benefits for the public, how can we help the broader community benefit (i.e. tourism, retail, local products and crafts)
- Request that security be maintained at the airport and in the new construction
- In light of the recent international concerns of terrorism, how can TAL/TAIP maintain the high standards of airport security?
- Impacts are minimal but can improve by encouraging with contractors and employees to patronise the local village shops and BBQ stands
- Encourage local tradesmen from Fua’amotu and other bordering villages to apply for work
- Encourage contractors to employ local skilled and unskilled labour from nearby villages
- Accessibility for Persons with Disabilities in new construction of ATCT and airport upgrades
- Local new buildings are built without accessibility for persons with disabilities and the elderly and suggest that development partners mandate universal design.
- Cultural concerns (ATCT) on the use of bathrooms and sleeping rooms are Unisex (Utilised by both male and female). Mitigation may require that bathrooms and sleeping rooms are gender specific and identified specifically for women or men at the new ATCT.

Recommendations

1. Deliver translated copies of PIB to the district officer (30) and town officer (20) of Fua’amotu for village meetings
2. Feasibility review for the introduction of Universal Design for persons with disabilities in new construction and upgrades
3. Incentives/encourage contractors to employ skilled and unskilled labour from bordering villages to Fua’amotu International Airport
4. Review Ahononou Quarry and its ability to provide aggregate resources for the future upgrades and needs of Fua’amotu and Lupepau’u Airport
Annexes

1. Invite List
2. Slides from Presentations
3. Minutes from Consultation
4. List of Persons Met By Consultation Program
5. Sign-in List for Consultation Program
Annex 1: Invite List

**Government**
- Ministry of Finance: Sione Faleafa, Ma'u Leha
- Ministry of Infrastructure: Fotu Veikune, Pesa Tuiano
- MEIDECC: Sione Tukia
- Ministry of Education: Claude Tupou
- Ministry of Health: Siale Akauola
- MIA: Inoke Kupu
- Crown Law: James Lutui
- Women Affairs: Tupou Fakakovi
- Parliament Office: Sulia Makasini, Social Committee

**PAIP and TAL Staff**
- PAIP
- TAL

**NGO's**
- Civil Society Forum of Tonga: Siale Ilolahia and Drew Havea
- Tonga Community Development Trust: Sione Fakaosi
- Women In Sustainable Enterprises (WISE): Robina Nakau
- NATA (DPO): Rhema Misa
- Tonga Red Cross Society: Sione Taumoefolau

**Town and District Officers**
- Fua'amotu

**Churches (Fua'amotu)**
- Westlyan Church
- Catholic
- LDS

**Donors**
- New Zealand Aid Programme: Aid Manager
- UNDP Rep: Milika Tuita
- WB/ADB Rep: Saia Faletau
- AusAID: Aid Manager, Telusa Fotu-Prog Manager
- JICA: Director
ENVIRONMENT IMPACT ASSESSMENT (EIA)
TONGA PERSPECTIVES

PREPARED BY
ENVIRONMENT IMPACT ASSESSMENT - UNIT

DEPARTMENT OF ENVIRONMENT
MEIDECC – 2015

OUTLINE
1. Background
2. Define EIA
3. EIA Act
   03/Regulation 2010
4. EIA Assessment
   Procedure
BACKGROUND

- 1992 UNCED – Adoption RIO declaration on Environment and Development (EARTH SUMMIT)
- Rio Declaration – right and obligation of Tonga in relation to SUSTAINABLE DEVELOPMENT

Principle 17

- Environmental Impact Assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

DEFINITION

“Environmental Impact Assessment” (EIA Act 2003)

... the study and evaluation of the potential effects that a development project may have on the environment.

“Fakafofoa Uesia ‘o e ‘Atakai”

‘oku ‘uhinga ki hano vakai i pe fakamahu inga’i ‘o e ngaahi uesia ‘e ala fakchoko ‘e ha ngaue fakalakalaka ki he ‘atakai,
Pacific Aviation Investment Program (PAIP)  
Technical and Fiduciary Services Unit (TFSU)
ENVIRONMENT ASSESSMENT COMMITTEE - EAC

Which shall consist of:

(a) CEO MEIDECC, (Chairman)
(b) Solicitor General
(c) Director of Health
(d) Director of National Planning
(e) Coop member as it deem necessary

- The Secretariat shall be provided by the Department of Environment.
  - A quorum shall be the Chairman and any 3 members.

PREScribed FORM – REGULATION 2010

- FORM 1 – NOTIFICATION FORM SCREENING
- FORM 2 – MINOR DEVELOPMENT
- FORM 3 – MAJOR DEVELOPMENT
- FORM 4 – ENDORSEMENT BY MINISTER
Construction Progress at Fua'amotu International Airport

Runway Resurfacing and Markings, TONGA - TAL/A6CC/A06/A16.1
Jarek Czestka
TAIP Resident Engineer

November 26, 2015

Scope of Works
- Runway End Turn bay widening x 2
  - Pavement Construction
  - Asphalt Surfacing
- Surface Enrichment Spray Treatment (SEST)
  - 500 metres on Runway
  - International Apron
  - Domestic Taxiway and Apron
- Asphalt Overlay
  - Runway - total length 2,190 metres
  - International Taxiway
- Paint Markings

Runway End Turn Bay Widening
RE08 – complete
RE26 – complete
(both pavement construction and Asphalt surfacing)
Pacific Aviation Investment Program (PAIP)
Technical and Fiduciary Services Unit (TFSU)

SEST
Runway – complete
International Apron – complete
Domestic Taxiway and Apron - complete
Asphalt Overlay

Runway – 59% complete
900 metres to go

International Taxiway – 81% complete
45 metres to go
Pacific Aviation Investment Program (PAIP)
Technical and Fiduciary Services Unit (TFSU)

Thank You

Janek.Czartka@azcom.com
Contact telephone number: 770 3001
What is an EMP?

- An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation. A site-specific EMP must be prepared for all WB projects.
- Category B expects it to “have only small, temporary, and localized adverse impacts on the environment, which can be readily managed by proposed mitigation measures”.
- The EMP is a dynamic document to be updated when changes occur.
Environmental Management Plan

Key points
Primary Works Covered by the EMP

- Airport pavements
- Airport terminal and security
- Airport lighting and navigational aids
- Air Traffic Control Tower (ATCT)
Air Traffic Control Tower (ATCT)

- The ATCT footprint will measure 6.9m by 12.5m (86.25m²) and include five levels with a height of approximately 19m.
- Facilities will include toilet and shower amenities, storage areas, offices, training room, sleeping quarters, equipment room, evacuation preparation room, and the controller cab operations area (level 5a).
- The ATCT construction will consist of precast concrete walls, stormshield windows on levels 1 to 4 with grey tinted laminated hush glass in the controller cab.
Air Traffic Control Tower (ATCT)

- Aluminium window frames to be commercial heavy duty with very high wind speed resistance grade.
- The existing ATCT will remain operational until the new ATCT is fully commissioned and put into operational service.
- Once the New ATCT is operational, the Old Existing ATCT will be used for training purposes.
- Timeline for completion of the New ATCT is sometime in 2016, not yet confirmed.
Environmental and Social Impacts

The New Air Traffic Control Tower (ATCT)
Environmental Impacts

- Solid Waste
  - Excess soil and CDW
- Water Resources
  - Workers and some construction activities such as dust suppression
  - Impacts could be significant if not mitigated properly through conservation, resource planning, and reclamation
Environmental Impacts

- Ecological Resources
  - Airport land is defined by a secure perimeter fence designed to exclude animals and prevent access by people.
  - Mitigation measures will include liaison with the MECC should any fauna (reptile, avian, or mammal) be encountered that affect construction activities (e.g., nesting bird).

- Hazard Materials
  - Potential soil and water pollution from construction run-off with fuel and lubricants are expected to be temporary and minimal.
  - Mitigation measures for spills will be implemented, including spill response plan and bailed areas for storage (during construction and operation phase).

Environmental Impacts

- Noise and Vibration
  - Noise and vibration disturbances are particularly likely during construction related to the transportation of construction materials from the quarry and operation of equipment.
  - Impacts include noise during pavement resurfacing and possible effect of vibration caused by operation of heavy machinery, increased traffic in some sections of roads, etc.
  - As the airport is existing infrastructure any noise or vibration impacts are probably already being experienced by the local community.
Environmental Impacts

- **Air Emissions**
  - Impacts are expected to be localized and short term with only minor negative impact on the ambient air quality in the vicinity of the construction areas.
  - No ongoing impact to air quality is expected as this is rehabilitation of existing infrastructure.

- **Traffic and Airport Operations**
  - The Contractor(s) is responsible for developing and implementing a Traffic Management Plan (TMP).
  - The TMP will need to consider pedestrian traffic as well as vehicle traffic management, and particular attention will need to be given to management near sensitive receptors (residential dwellings, markets, churches, etc.).
  - Upon completion of the construction phase of works traffic and road safety impacts caused by the TALF TBU should cease.

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Environmental Impacts

- **Wastewater Discharges**
  - The new ATCT will have two septic tanks installed sized to accommodate the facilities and level of use within the ATCT.
  - Uncontrolled wastewater (e.g. sewage, grey water, wash water) discharges have the potential to contaminate soil, ground and surface water, and spread disease.
  - While the potential impacts of uncontrolled discharges of wastewater can adversely affect the receiving environment, they can be easily mitigated through planning and implementation of mitigation measures.
Environmental Impacts

- **Quarry and Aggregate Supply**
  - Only licensed quarry operations, whether private or government owned, will be used to source suitable aggregate.
  - Ahonomou Quarry is located near the coast therefore there is potential for effects to reach the coastal and marine environment if not managed in accordance with international standard practice.

- **Biosecurity**
  - Some equipment will most likely need to be imported which can harbour plant and animal species which may pose a threat to Tonga's biodiversity and ecosystem.
Social Impacts

- Health and Safety
  - Construction and operation health and safety is to be managed through a Site Specific Safety Management Plan
  - Application of international environmental and health and safety (EHS) standards (WBD/IFC EHS Guidelines)
  - Construction of the new ATCT there will be hazards associated with working at heights
Social Impacts

- Socioeconomics
  - Impacts are minimal but can improve by encouraging contractors and employees to patronise the local village shops and BBQ stands.
  - Encourage local tradesmen from Putu’amo and other bordering villages to apply for work.
  - Encourage contractors to employ local skilled and unskilled labour.

Social Impacts

- Accessibility for Persons with Disabilities:
  - Local new buildings are built without accessibility.
  - The new ATCT is accessible with a lift and accessible bathrooms.

- Cultural
  - Bathrooms and sleeping rooms are Unisex (Utilised by both male and female).
  - Mitigation may require that bathrooms and sleeping rooms are gender-specific and identified specifically for women or men.

- Resettlement and Land Acquisitions:
  - The current ATCT site is currently existing and will not require new land acquisitions.
Compliance and Monitoring

- Environmental Monitoring Plan identifies the environmental monitoring requirements to ensure that all the mitigation measures identified in this EMP are implemented effectively.
- Throughout the construction period, the Contractor(s) will include results of the ESMP monitoring in a monthly report for submission to the TAL who is responsible for submitting these monthly progress reports to the PAIP TFSU.
- During airport operations the TBU Managers will include an environmental management section as part of their normal reporting to TAL.

Compliance and Monitoring

- Quarterly progress report to the World Bank will include a section on environmental and social compliance and issues.
- A section of the report will cover (as a minimum) the overall compliance with implementation of the EMP, any environmental or social issues arising as a result of project works and how these issues will be remedied or mitigated, and the schedule for completion of project works.
Malo

For More Information
Fua'amotu International Airport
Mr Kintoni Mafi
Airport Superintendent
Tel: 21888
kmafi@tongaairports.com
Community Engagement and Consultation Program
Domestic Terminal Conference Room

Thursday, 26 November 2015

Consultation Minutes and Key Messages

Opening Remarks and Welcome:
The CEO of TAL, Viliami Ma’ake opened the consultations with a welcome speech and general info on the project which included:

- TAL History
- Benefits and challenges of upgrading the runway
- International practices on airport security
- Past challenges regarding environmental and social impacts
- Project updates
- Group Discussion

Presentation by Janek Czastka, AECOM Engineer
Janek gave updates on the current situation with the runway and answered specific questions on:

- The life of a runway and how often a runway needs to be refurbished and renewed
- Chemical used on the SEST application
- Environmental and safety monitoring of the current contractor
- Resources utilized by the current project including local quarry resources
- Group Discussion

Presentation given by Sione Tukia, Deputy CEO, Department of Environment
Sione’s presentation focused on the Environmental Impact Assessments (EIA) in Tonga and discussed:

- The EIA process for minor and major construction activities
- Lack of coordination with Government and Development Partners in regards to EIA
- Government challenges with EIA
- The need for better coordination and communication with government, aid division, and development partners
- Group Discussion

Presentation given by Malakai Kaufusi, Safeguards Specialist
Malakai’s presentation focused on the updated Environmental and Social Management Plan (ESMP) and discussed key areas such as:

- Historical background of the ESMP
- Background info of the ESMP
- General ESMP Info
- General info on the new Air Traffic Control Tower (ATCT)
- Key Environmental Impacts and mitigating factors in regards to the new ATCT
- Key Social Impacts and mitigating factors in regards to the new ATCT
- Key Cultural Impacts and mitigating factors in regards to the new ATCT
- Key Compliance and Monitoring activities in regards to the new ATCT
- Group Discussion

**Key Messages from participants:**

- Current resources utilized for the project and how will government keep up with the supply and demand of future developments at the airport in Fua’amo’otu and in Vava’u
- Ongoing consultations with locals and have them participate in the improved economics of the construction area and in new infrastructure projects such as the ATCT
- Broader benefits for the public, how can we help the broader community benefit (i.e. tourism, retail, local products and crafts)
- Will security be maintained at the airport and in the new construction
- In light of the recent international concerns of terrorism, how can TAL/TAIP maintain the high standards of airport security
- Impacts are minimal but can improve by encouraging with contractors and employees to patronise the local village shops and BBQ stands
- Encourage local tradesmen from Fua’amo’otu and other bordering villages to apply for work
- Encourage contractors to employ local skilled and unskilled labour
- Accessibility for Persons with Disabilities in new construction of ATCT and airport upgrades
- Local new buildings are built without accessibility for persons with disabilities and the elderly
- Cultural concerns (ATCT) on the use of bathrooms and sleeping rooms are Unisex (Utilised by both male and female). Mitigation may require that bathrooms and sleeping rooms are gender specific and identified specifically for women or men at the new ATCT.
Annex 4: List of Persons Met By Consultation Program

**Ministry of Finance and National Planning**

Mr. Sione Faleafa
Acting Deputy Secretary, Ministry of Finance, Policy and Planning Division

**Department of Environment**

Mr. Sione Tukia
Deputy CEO, Department of Environment, Environmental Impact Assessments

**ADB/ World Bank Office**

Mr. Saia Faletau
ADB/WB Liaison Officer

**Tonga Red Cross Society**

Mr. Sione Taumoefolau
Secretary General

**NATA (Disability Persons Organisations)**

Mr. Rhema Misa
President, NATA

**Pacific Aviation Investment Program**

Mrs. Lasale Cocker
Program Manager

**Tonga Airports Limited**

Mr. Viliami Ma’ake
Chief Executive Officer

**AECOM**

Janek Czastka
Resident Engineer
## Annex 5: Sign-in List for Consultation Program

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
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<th>Email/Contact</th>
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<td>Civil Society</td>
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<td>Fa'asini Tino</td>
<td>Tolu Officer</td>
<td></td>
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<tr>
<td>Te'ah Tavale</td>
<td>Tasi Lota</td>
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