

Environmental Assessment Report

Summary Initial Environmental Examination
Project Number: 38160
August 2007

Kingdom of Tonga: Integrated Urban Development Sector Project

Prepared by Global Works for the Asian Development Bank (ADB).

The summary initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

A. Introduction

1. The Project has been categorized as category B, requiring the preparation of an initial environmental examination (IEE). The IEE was prepared in accordance with the *Environmental Assessment Guidelines* (2003) of the Asian Development Bank (ADB) and complies with ADB's *Environment Policy* (2002). It takes into consideration the government environmental act (2003).¹ This summary IEE outlines the findings and recommendations of the IEE concerning improvement and reconstruction of drainage systems, road rehabilitation, and installation of water quality monitoring wells.

B. Description of the Project

2. The overall objective of the Integrated Urban Development Sector Project (IUDSP) is to improve rundown urban infrastructure assets identified during the IUDSP consultation process. Seven core subprojects have been selected. All of the subprojects involve minor civil works and are located in urban areas surrounding Nuku'alofa.

3. The core subprojects have been selected from a long list prepared during project preparation and confirmed by the Government. The seven subprojects are briefly described below:

Table A11.1: Integrated Urban Development Sector Project Core Subprojects

Drainage Work	Description
Central District Drainage System Cleaning and Repair	Improvement and rehabilitation of the existing drainage system in the central commercial area of Nuku'alofa and along the main sea frontage of Vuna Road. Maintenance of the structures will be facilitated by the purchase of street sweeping equipment and a jet-and-vacuum truck to clean stormwater drains.
Sopu Drainage Channel	Excavation and construction of a gabion-lined drainage channel through the low-lying area of Sopu, which will drain currently impounded water within residential areas to a nearby coastal swamp area. The channel will reduce flooding and health hazards.
Road Rehabilitation Work	
Taufa'ahau Road Upgrade	Taufa'ahau Road is the town's main arterial route. The road will be widened, resurfaced, provided with a turning lane, and sidewalks will be constructed on both sides of the road. Existing stormwater collection systems will be rehabilitated.
Alaivahamama'o Road Upgrade	Alaivahamama'o Road is one of Nuku'alofa's busiest. Rehabilitation work includes widening, resurfacing, and providing sidewalks. Existing stormwater collection systems will be rehabilitated.
Vaha'akolo Road Upgrade	Resurfacing, provision of sidewalks, and drainage improvements so as to provide an alternative route into the center of town.
Popua and Sopu Roads	Surfacing, repair, and extension of minor roads in low-lying areas of Popua and Sopu.
Ground Water Monitoring	
Installation of monitoring wells	Installation of eight water quality monitoring wells in strategic locations within the urban area to facilitate collecting data on groundwater quality, particularly in relation to the impact of septic systems on the well field and the lagoon.

Source: Asian Development Bank.

¹ While Tonga enacted the Environmental Impact Assessment Act in 2003, supporting regulations to enable the Act are still being considered by the Crown Law Office.

4. The Project has been costed at \$14.68 million, of which ADB will finance \$11.32 million. The works will be undertaken by a project management, design and supervision consultant through a project management unit (PMU) located within the Ministry of Works (MOW), which is the Executing Agency. Construction will be undertaken by contractors. Work is planned for a 3-year period commencing in December 2007.

C. Description of the Environment

1. Physical Resources

5. The Project is located in the capital Nuku'alofa (population 34,000) on the island of Tongatapu, which at 260 km² is Tonga's largest island. Most of the island is less than 17 meters above sea level. The land is lowest in the northwest and rises very gradually towards the south and east. Nuku'alofa is situated at the low northern shore of Tongatapu, and most of the town is 1–2 meters above sea level. Large areas such as Sopa, Popua, Ngele'ia, and Kolofo'ou are less than 1 meter above sea level.

6. The Tongan Archipelago is a seismically active region. Tremors with magnitudes of 3 to 4 on the Richter scale are frequent. Major earthquakes (>7 on the Richter scale) occurred in Tonga in 1853, 1865, 1881, 1908, 1977 and 2006.

7. Cyclones commonly occur between November and April, on average 1.3 times per year. Cyclones causing serious damage occur approximately once every 10 years.

8. Groundwater is plentiful throughout the islands and occurs as a thick lens of freshwater situated on a highly porous limestone substrate. Drinking water is either pumped from groundwater or caught and stored in tanks as rainwater. Nuku'alofa's municipal water supply comes from the Mataki'eua well field, the extraction from which is well within a sustainable level.

2. Ecological Resources

9. The Project is situated in a low-lying area of Nuku'alofa that is bounded by sensitive coastal areas comprising the foreshore on the north and the Fanga'uta Lagoon located immediately to the south. The coastal resources provide an important source of livelihood for a large number of people, primarily for subsistence, but also as a limited source of cash income.

10. The 27 square kilometer (km²) Fanga'uta Lagoon is a major feature and an important fisheries habitat yielding a wide range of marine products. The lagoon is increasingly threatened by numerous problems arising from poorly planned urban development. These include pollution, habitat destruction, and overfishing. While Fanga'uta Lagoon has been declared a National Marine Reserve under the Parks and Reserves Act of 1976, protection measures do not appear to be effective.

3. Human and Economic Development

11. The seven core subprojects will serve Nuku'alofa and its immediate environs. The subprojects will rehabilitate roads and improve drainage systems. Requiring rehabilitation are primary and secondary roads that are now unable to cope with increased traffic volumes and

are often badly broken and potholed. As no sidewalks are provided, pedestrians are required to walk on the roads. The town has no organized drainage system. After heavy rain, stormwater collects in low points and thereafter may take 2–3 days to drain into the ground.

12. There is no sewerage system in Nuku'alofa. Septic tanks of varying quality are used and these drain to the groundwater. Groundwater quality is considered to be deteriorating from septic tank effluent and as the tanks are located close to the municipal town water supply, Fanga'uta Lagoon, and the foreshores, there are concerns whether the area can maintain acceptable groundwater quality.

13. While Tonga's economy can be said to be based in agriculture, also important are remittances from abroad. In 2003–2004, these compromised 48.5% of GDP.

4. Quality of Life Values and the Sociocultural Environment

14. The project area has a well-developed infrastructure of health and educational facilities. The national hospital is located in Nuku'alofa, as are private health and educational facilities. Nuku'alofa is supplied with electricity and reticulated water. Its road system is well developed.

D. Screening of Potential Environmental Impacts and Mitigation Measures

1. Design and Preconstruction Phase Considerations

15. During the design and preconstruction phase, attention has been given to mitigating concerns through environmentally sound subproject designs, elements of which include (i) ensuring subproject activities do not intrude into environmentally sensitive areas of the lagoon and foreshore, (ii) ensuring surface runoff does not discharge directly to these areas by ensuring that roads have adequate cross drainage leading to groundwater infiltration areas rather than using conventional piped drainage systems, (iii) including pedestrian pavements and turning lanes in road design to improve road safety, (iv) preparing maintenance procedures to ensure drainage systems continue to function as planned, and (v) paying compensation for any loss of private property. These conditions are included in the attached environmental management and monitoring plan and will be addressed by MOW during design and contract preparation.

2. Environmental Impacts and Mitigation Measures during Construction

16. Mitigation measures associated with construction include (i) planning to avoid construction impacts in the environmentally sensitive lagoon and foreshore areas; (ii) excavating and removing road sub-base and incompetent channel material to approved waste material dump sites or, if the material is to be reused, stockpiling it securely; (iii) controlling sediment from excavated areas so sediment does not enter environmentally sensitive areas, including priority installation of sediment and infiltration systems to trap sediments on road construction sites; (iv) supervising haulage of construction materials so dust and community road safety risk are minimized; (v) using best industry practices in storing and handling fuel and lubricants (including to have a mandatory contingency plan to deal with any fuel spills); (vi) mitigating noise and construction activities posing a risk to workers and local communities by timing the work and providing protective safety equipment; (vii) developing a quarry management plan so that quarry material is removed in an approved manner and the areas are rehabilitated, (viii) the contractor's developing a community and worker safety and health plan to minimize construction hazards. These conditions are included in the EMMP and will be addressed by the contractor.

3. Environmental Impacts and Mitigation Measures during Operation

17. Road users' safety will be enhanced by the provision of sidewalks while improved road drainage will reduce stormwater ponding on the roads.

18. To achieve the Project's environmental benefits will require following a regular maintenance schedule for cleaning the road drainage systems where sediment and debris will be removed from within the stormwater retention chambers. Regular maintenance must also include grass cutting, pothole patching, and shoulder repairs. Grit and sediments from drain clearing activities will be disposed of at the approved Tapuhia Landfill, where it will be used as landfill cover. These conditions are in the EMMP, and MOW will address them during operation.

19. Predicted environmental impacts, mitigating measures, monitoring programs, and institutional responsibilities are detailed in the attached environmental management and monitoring plan (Table A11.2).

E. Institutional Requirements and Environmental Monitoring Plan

20. There is no environmental management unit or environment officer within the MOW. Therefore, institutional strengthening of MOW will be necessary and has been included in the Project by establishing an environment and social unit (ESU). The unit will consist of two persons who will be responsible for environmental management, land acquisition and resettlement, as well as public relations and consultation. The ESU will be responsible to prepare IEEs for the subprojects, as well as to supervise the contractor's site environmental management plan (SEMP) implementation through regular observation and spot-checking construction-related activities. In short, the ESU will be responsible for environmental compliance requirements.

21. MOW will incorporate the environmental design requirements into the project design specifications. It will arrange for the EMMP's construction requirements to be included into the contract documents so that contractors can address these in their bids. During construction, the PMU site engineer will ensure that conditions contained in the EMP are observed. This engineer will be assisted by ESU staff in supervising and approving the completion of EMMP requirements.

22. The Land Management Division of the Ministry of Lands, Survey and Natural Resources (MLSNR) will help coordinate compensation for loss of private property and implement the requirements of the Short Resettlement Plan. The MLSNR will ensure that all compensation is completed before construction commences.

23. The following reports will be prepared. The contractor will prepare a monthly EMMP compliance report that will be submitted to the PMU. The PMU will evaluate the contractor's EMMP report. A section concerning compliance with the EMMP will be prepared and included as a part of the quarterly project report to ADB. A copy of this report will also be sent to Department of Environment.

F. Public Consultation and Disclosure

24. Extensive public consultation has been undertaken by the IUDSP, which has established a highly participatory approach of working with local counterparts within the Government, private sector, nongovernment organizations, the church, women's and youth groups, and the broader community. As a result, there is overall strong public support for and agreement about the Project. The IEE report will be made available at the Department of Environment and IUDSP offices in Nuku'alofa and uploaded onto ADB's website.

G. Environmental Assessment Review Procedure

1. Selection Criteria of Subprojects

25. All of the subprojects will be subject to a first level of screening in accordance with the Kingdom of Tonga's environmental laws and regulations and ADB's environmental assessment guidelines. Accordingly, subprojects will not be selected if the following are found:

- (i) significant impact on ecologically sensitive areas of the Fanga'uta Lagoon National Marine Reserve arising from their design, location, construction, or operation;
- (ii) significant impacts on coral reefs and natural vegetation as specified in the Schedule of Environmental Impact Assessment Act, 2003;
- (iii) a permanent negative effect on a known rare or endangered species; and
- (iv) permanent damage to irreplaceable cultural relics and archaeological sites.

2. Review Procedure for Environmental Assessment of Subprojects and Responsibilities of the Ministry of Works and ADB

26. To ensure that the remaining subprojects will be prepared in accordance with ADB's environmental assessment procedures² and the Government's Environmental Impact Assessment Act, 2003, responsibilities of the concerned authorities will be as follow:

a. Ministry of Works Responsibilities

27. Ministry of Works (through the ESU) will be responsible for

- (i) preparing IEEs, including the requirement to undertake public consultations and public disclosure of the IEE;
- (ii) obtaining IEE clearance from the MLSNR;
- (iii) submitting to ADB the IEEs for subprojects, as well as the IEEs' clearance for ADB's consideration in approving the subprojects;
- (iv) incorporating mitigation measures during preconstruction and construction phases (which will be done by the design engineer within the PMU);
- (v) ensuring that the EMMP's construction stage mitigation measures are included in the bidding document for costing by the contractor and that IEE clearances will be obtained before commencing any civil works for a subproject;
- (vi) ensuring that contractors have completed the detailed EMMP for approval;
- (vii) monitoring EMMP implementation; and
- (viii) submitting quarterly reports on implementing EMPs to MLSNR and ADB.

² ADB. 2003. *Environmental Assessment Guidelines*. Manila.

b. ADB Responsibilities

28. ADB is responsible for:

- (i) reviewing IEE and summary IEE reports and disclosing these on ADB's website,
- (ii) reviewing all statutory environmental clearance granted by the Government's environmental authority and noting all conditions in approving the subprojects,
- (iii) reviewing the quarterly report on implementing the EMMP and taking actions (as necessary) in close coordination with the Ministry of Works, and
- (iv) monitoring implementation of the EMMP and due diligence as part of overall project review missions.

3. Environmental Due Diligence to Ensure Compliance with ADB's Environment Policy

29. MOW will ensure that ADB will be given access to undertake environmental due diligence for all subprojects, if necessary. MOW has primary responsibility, however, for environmental due diligence and for monitoring implementation of subprojects' environmental mitigation measures. The due diligence report and monitoring report for the EMMP implementation need to be systematically documented.

4. Public Disclosure

30. In the context of disclosing environmental documentation to the public, MOW will undertake the following:

- (i) public consultations, and particularly with affected people, during preparation of IEEs for the remaining subprojects;
- (ii) public disclosure of all environmental documents, whereby IEE reports will be made available at the Department of Environment and IUDSP offices in Nuku'alofa; and
- (iii) properly keeping all environmental documents, including the environmental due diligence and monitoring reports for each subproject, as part of the Ministry of Works records.

H. Findings and Recommendations

31. Based on discussions, review of documents, and field assessment of the Project, it is concluded that by rehabilitating and improving the surrounding urban infrastructure the Project will assist in maintaining the environmental quality of the Nuku'alofa foreshore areas and the Fanga'uta Lagoon, and it will maintain the water quality of the groundwater resources of the area. The Project has strong community support in Nuku'alofa. The Project complies with ADB's environmental safeguard policies and no irreversible or significant cumulative impacts have been identified. Thus, a more detailed environmental impact assessment is not warranted and the summary IEE will be the final environmental assessment for the Project. By adopting the environmental mitigation and monitoring measures outlined in the environmental management and monitoring plan, the Project will not cause environmental concerns.

I. Conclusions

32. The Project is classified as Category B. The initial environmental screening process and analysis of potential environmental impacts concluded that the Project will not result in any direct or indirect significant adverse environmental impacts and will not require further study. All impacts can be satisfactorily mitigated and an EMMP has been prepared that contains practical mitigation measures. A full environmental impact assessment is not warranted.

33. An environmental assessment review framework has been prepared that will guide implementation of the subsequent subprojects under the sector project.

Table A11.2: Environmental Management and Monitoring Plan

Project Activity	Impact Mitigation				Impact Monitoring			
	Potential Environmental Impact	Proposed Mitigation Measure	Implementing Responsibility	Mitigation Cost	Parameter to be Monitored	Frequency and Means of Verification	Monitoring Responsibility	Monitoring Cost
A. Preconstruction								
Project location	Intrusion into environmentally sensitive areas	a. Careful location of projects so that projects do not intrude into environmentally sensitive areas, including the foreshore or Fanga'uta Lagoon	Design Engineer, MOW project management unit (PMU)	Cost is already included in overall project.	Locations comply with (a) government requirements and (b) user communities	a. Once, verify design location. b. Comments received from public consultation	PMU project engineer and DOE	Cost included in overall project.
Environmentally sound design	Declining water quality from discharge of sediment and stormwater to the Fanga'uta Lagoon and foreshore	a. No new drains allowed to directly discharge to the lagoon or foreshore b. Include groundwater infiltration chambers in design for stormwater disposal c. Roads should have sufficient camber so that runoff is not allowed to pond and is directed to the infiltration chambers.	a. Design Engineer, MOW PMU	Cost is already included in overall project.	Design complies with a.-c.	Once, verify structural and location design	PMU project engineer and DOE	Cost included in overall project.
Road safety	Increasing road accidents	Design to include a. roads having pedestrian sidewalks on both sides, b. separate turning lanes at busy intersections	a. PMU project engineer	Cost is already included in overall project budget.	a. OH&S requirements complied with b. Plan available	Verify initially, thereafter regular field monitoring	PMU project engineer and DOE	Cost included in overall project.
Drain and road maintenance	Loss of environmental values in environmentally sensitive areas	a. Develop maintenance procedures b. Ensure equipment maintenance and replacement costs are included in project operation's budget	PMU project engineer	Cost is already included in overall project budget.	a. Maintenance procedures developed b. maintenance costs included in project budget	Verify	PMU project engineer and DOE	Cost included in overall project.
Land acquisition	Loss of private property	a. Road works will be restricted to the rights-of-way. b. Design to minimize acquisition required for drainage c. Consultation with affected	PMU project engineer and Ministry of Land	Cost already included in LARP and carried into project cost.	a.-b. Design c. Meetings d. Land acquisition compensation	a.-b. Once c: Minutes d. Compensation paid prior to	PMU project engineer and DOE	Cost included in overall project.

Project Activity	Impact Mitigation				Impact Monitoring			
	Potential Environmental Impact	Proposed Mitigation Measure	Implementing Responsibility	Mitigation Cost	Parameter to be Monitored	Frequency and Means of Verification	Monitoring Responsibility	Monitoring Cost
		persons d. Compensate in accordance with established Government procedures and the law			payments made	construction commencing		
B. Construction								
Planning work so that construction avoids environmentally sensitive areas	Loss of environmental values	Contractor limits work area to not interfere with environmentally sensitive areas	Contractor. Addressed in EMMP.	Costed by contractor and cost carried into contract.	Limits to established environmentally sensitive areas. Contractor does not enter these areas.	a. Spot-checks b. Best practices used	PMU site engineer and DOE	Cost included in overall project.
Excavation and removal of road sub-base or other materials	Improper disposal causing (a) loss of environmental values (dumping in environmentally sensitive areas), b. sediment entering waterways	All sub-base and material that is removed either from roads or the Sopus channel excavation are to be disposed of in a. approved waste material dump areas or b. temporary stock piles if to be re-used. c. Sediment fences erected near waterways	Contractor. Addressed in EMMP.	Costed by contractor and cost carried into contract.	Only Department of the Environment (DOE) approved dump areas are used.	a. Spot-checks b. Best practices used	PMU site engineer and DOE	Cost included in overall project.
General site excavation and land preparation for road and drainage works	Sediment arising from construction sites entering water courses and carried to environmentally sensitive areas	a. Arrange for groundwater infiltration systems to be installed as priority b. Limit disturbed areas and plan work c. Erect sediment fences near waterways d. Use best construction practices	Contractor. Addressed in SEMP.	Costed by contractor and cost carried into contract.	Occurrences of sediment escape: best construction practices adopted.	a. Spot-checks b. Best practices used	PMU site engineer and DOE	Cost included in overall project.
Material haulage and operation of machinery	a. Dust b. Community road safety issues	a. Use tarpaulins to cover loads, as necessary b. Spray water on roads within urban areas, as necessary	Contractor and PMU site engineer. Addressed in	Contractor's cost.	Dust and load handling procedures. Driver and	Contractor's water spraying record. Traffic accident	PMU site engineer and DOE	Cost included in overall project.

Project Activity	Impact Mitigation				Impact Monitoring			
	Potential Environmental Impact	Proposed Mitigation Measure	Implementing Responsibility	Mitigation Cost	Parameter to be Monitored	Frequency and Means of Verification	Monitoring Responsibility	Monitoring Cost
within community and workplace		c. Instruct drivers in road safety and to reduce speeds through urban areas	SEMP.		operator responsibilities.	reports, Spot-checks and weekly inspections		
Storage and handling of fuel and lubricants	Contamination of soil and water	Use best industry practices	Contractor and PMU site engineer. Addressed in SEMP.	Contractor's cost.	Fuel and lubricant handling procedures. Incident reports.	Spot-checks and weekly inspections	PMU-SE and DOE	Cost included in overall project.
Noise from construction equipment	a. Nuisance to surrounding communities b. Work place health hazard	a. Equipment maintained in good working order and fitted with manufacturer's approved noise suppression equipment b. Operators provided with ear protection	Contractor and PMU site engineer. Addressed in SEMP.	a. Contractor's cost	a. Noise levels in community areas b. Noise levels in workplace	Spot-checks a. for noise levels in residential and workplace areas b. that workers have ear protection	Contractor, PMU site engineer and DOE	Cost included in overall project.
Quarry management	a. Loss of land value b. Production of sediments c. Dust d. Community safety	Preparation of a quarry management plan	Addressed in SEMP.	Contractor's cost	Plan prepared and implemented	Once for plan preparation, then spot-checks for implementation	PMU site engineer and DOE	Cost included in overall project.
Construction activities posing risks to traffic and pedestrians	a. Hazards to traffic b. Hazards to pedestrians	a. Erect warning signs before work areas b. Stop-go person to control traffic	Contractor. Addressed in EMMP.	Contractor's cost	Pedestrian and traffic accident records	Spot-checks and weekly inspections	Contractor, PMU site engineer and DOE	Cost included in overall project.
C. Operation								
Routine	Declining water	a. Conduct routine	MOW	To be met by	a. Drains	a. Before the	a. b and c.:	To be met by

Project Activity	Impact Mitigation				Impact Monitoring			
	Potential Environmental Impact	Proposed Mitigation Measure	Implementing Responsibility	Mitigation Cost	Parameter to be Monitored	Frequency and Means of Verification	Monitoring Responsibility	Monitoring Cost
maintenance practices	quality in environmentally sensitive areas resulting from blocked road drains.	maintenance, including to clean sediment and debris from drains and infiltration chambers, grass cutting, pothole patching, and shoulder repairs b. Debris from drain cleaning to be taken to the Tapuhia landfill and used as cover c. Adequate budget to replace street sweeping and jet-and-vacuum trucks		MOW c. Capital replacement cost. Met from MOW budget.	cleaned and operating effectively. Roads and pedestrian areas being maintained. b. Tapuhia landfill records c. Cleaning machinery maintained and ready to work.	start of wet season b.-c. quarterly	MOW b. and c. DOE	MOW.

DOE = Department of the Environment, EMMP = environmental management and monitoring plan, LARP = land acquisition and resettlement plan, MOW = Ministry of Works, OH&S = occupational health and safety, PMU = project management unit, SEMP = site environmental management plan.

Source: Asian Development Bank.